

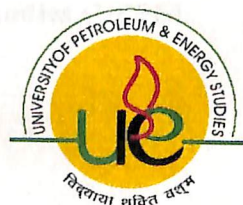
A
Project Report on

**“Exponential Decline Curve analysis and
its financial Implications”**

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A project report submitted in partial fulfillment of the requirements
for **MASTER OF TECHNOLOGY IN GAS ENGINEERING** of
University of Petroleum & Energy Studies



Harnessing Energy through Knowledge

University of Petroleum & Energy Studies

College of Engineering

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Certificate

This is to certify that the project report on “**Exponential Decline Curve Analysis and its Financial Implications**” submitted to The University of Petroleum and Energy Studies, Dehradun, by **Mr. Sreekanth. S**, in partial fulfillment of the requirement for the “M.Tech in Gas Engineering”, is a bonafide work carried out by him under my supervision and guidance.



23.05.06

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UPES, Dehradun.

Certificate

This is to certify that the project report on “**Exponential Decline Curve Analysis and its Financial Implications** ” submitted to University of Petroleum & Energy Studies, Dehradun, by **Mr. Sreekanth. S**, in partial fulfillment of the requirement for the “M.Tech in Gas Engineering”, is a bonafied work carried out by him under my supervision and guidance. This work has not been submitted anywhere else for any other degree.

Lakshman Singh

Mr. Lakshman Singh.
ONGC (Retired)

8th May 2006

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A Project report on "Exponential Decline Curve Analysis and Its Financial Implications"

1. Introduction

Wells usually reach their maximum output shortly after they are completed. From that time they decline in production, and the rapidity of decline depends upon the output of the wells and on other factors governing their productivity. The production curve of a well shows the amount of production per unit of time for several consecutive periods; if the conditions affecting the rate of production are not changed by outside influences, the curve will be fairly regular, and, if projected, will give the future production of the well. By the aid of this knowledge the value of a property may be judged, and proper depletion and depreciation charges may be made on the books of the operating company.

Decline Curve Analysis is used for estimating ultimate gas recoveries and predicting the performance from the analysis of long term gas production data either from individual wells (or) from entire fields. The basis of decline curve analysis is to match past production performance histories or trends with a model. Assuming that the future production continues to follow the past trend, we can use these models to estimate original gas in place and to predict ultimate gas reserves at some future reservoir abandonment pressure (or) economic production rate. Or we can determine the remaining productive life of a well (or) the entire field. In addition, we can estimate the individual well flowing characteristics, such as formation permeability and skin factor, with decline curve analysis techniques.

Decline curves are the most common means of forecasting production. Decline curves are simply a plot of production rate versus time on semi log, log – log, or specially scaled paper. When the logarithm of producing rate is plotted versus linear time, if a straight line results, it is referred to as "Exponential decline" or "Constant Percentage Decline". , if curved up or be concave upwards where the decline rate continuously decrease with time, is known as "Hyperbolic decline". A special case of hyperbolic decline is known as "Harmonic Decline". The basic difference between all these three types of analysis is that Exponential Decline Curve Analysis will give us the *minimum reserves* where as the other two will give higher values.

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Exponential decline is characterized by a decrease in production rate per unit of time that is proportional to the production rate.

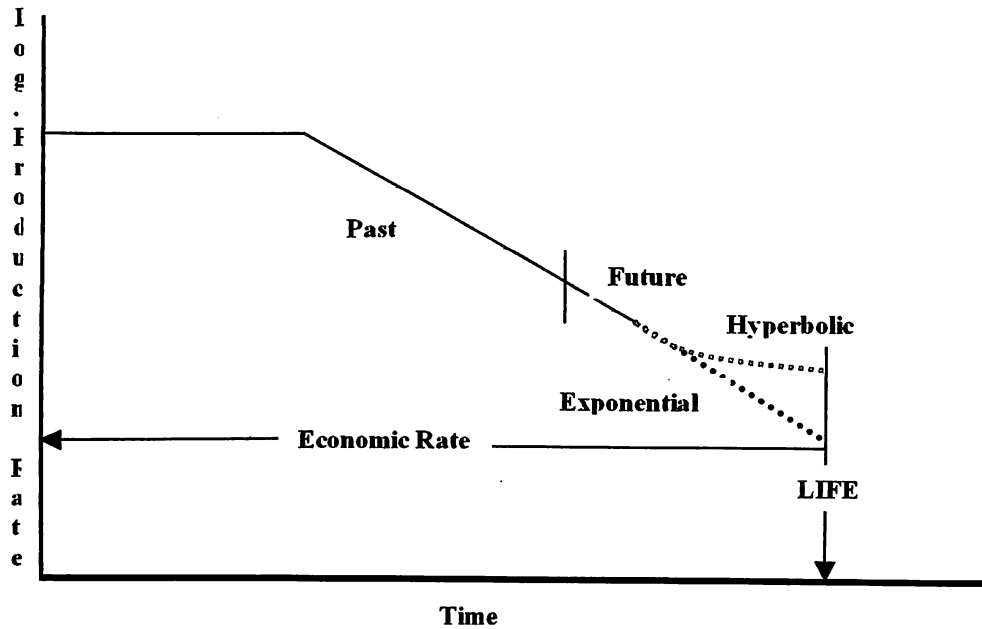


FIG 1: Types of Decline Curves

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2. Objective of the Project:

The primary objective of this project is to analyze the given 5 years production from a single well in a deep, Cotton Valley Lime reef in East Texas to establish if it follows the conventional decline modes such as exponential, harmonic and hyperbolic. If so, then the future performance of this well can be predicted using the appropriate decline mode assuming that the factors which affected the past production trend will continue into the future.

Assumption to be made is that whichever decline mode is prevailing in the past or the given 5 years will remain same and continue uniformly till abandonment.

Using the above equations, we can calculate the production rates at each month end which will be the begin rate for the next month also. By calculating the cumulative production, we can estimate the reserves. In this project the production forecasting will be done for 28 years and the reserves will be estimated.

In the financial analysis following factors are considered.

1. Drilling Schedule & Production:

- Net Volume of Gas produced
- Fuel Usage Shrinkage
- Net Sales Gas

2. Revenue & Taxes:

- Gas Price
- Gross Revenue
- Royalties
- Severance Tax
- Net Revenue

3. Operating Cost:

- Transportation & Procurements Cost
- Lease Operating Expenses (LOE)
- General & Administrative Expenses

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4 Operating Cash Flow:

Net Revenue - Operating cost

5 Capital Investments:

- Acquisition cost
- Drilling Cost

6. Undiscounted Cash Flow:

Operating Cash flow - Capital Investment

7. Project Returns

- Return on Investment (ROI)
- Net Present Value (NPV)

3. Decline Curve Equations:

General expression for the rate of decline D is

$$D = - (dq / dt) / q = K.q^n$$

For Exponential Decline:

$$q_t = q_i * e^{-Dt}$$

$$D = - (dq / dt) / q = K = - (\ln (q_i / q_t)) / t; \text{ when } n = 0$$

$$Q_t = (q_i - q_t) / D$$

For Hyperbolic Decline

$$q_t = q_i (1 + n D_i t)^{-1/n}$$

$$D = - (dq / dt) / q = K.q^n ; (0 < n < 1)$$

For initial condition, $K = D_i / q_i^n$

$$Q_t = q_i^n (q_i^{1-n} - q_t^{1-n}) / (1-n) D_i$$

For Harmonic Decline

$$D = - (dq / dt) / q = K.q; \text{ when } n = 1$$

For initial condition, $K = D_i / q_i$

$$q_t = q_i / (1 + D_i * t)$$

$$Q_t = (q_i / D_i) * \ln (q_i / q_t)$$

Where,

D is the decline rate.

q_i is the initial production rate

q_t is the production rate at time t

K is a constant.

n is the exponent

t is time in months.

Q_t is the cumulative production at time t

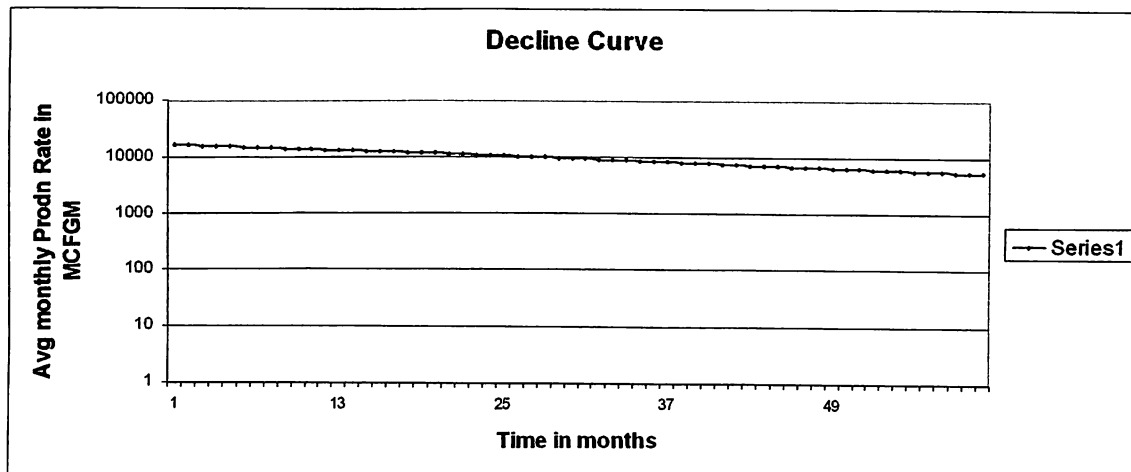
D_i is the initial decline rate

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4. Gallacher Model:

The given Gallacher model is of a single well in a deep, Cotton Valley Lime reef in East Texas. The given Gallacher model data contains the production rates for the first 5 years. If we plot these given average monthly production rates for the first 5 years in a semi log graph (FIG 2), we can observe that the production rates are declining *exponentially*.

FIG: 2



So, in this case, the appropriate decline mode is *Exponential Decline*. I.e., the primary objective of this decline curve analysis, to analyze the past data to establish if it follows the conventional decline modes such as exponential, harmonic (or) hyperbolic has been fulfilled. So, now the future performance of the well can be predicted using the appropriate decline mode (exponential decline mode), assuming that *the factors which affected the past production trend will continue into the future*.

Here in the Gallacher model, since the average production rates are showing an exponentially declining nature, *only* exponential decline curve analysis can be performed to the given data, as the decline curve analysis is data specific. Other methods like Harmonic decline & hyperbolic decline Curve analysis *cannot* be performed to this model. Next step in the process is to estimate the production rates for 28 years that are oriented for (or) showing *Exponential Decline*.

5. Exponential Decline Curve analysis of Gallacher Model

For exponential decline curve analysis, the equations used are

$$D = - (\ln (q_i / q_t)) / t; \text{ when } n = 0 \quad \text{-----} \quad (1)$$

$$q_t = q_i * e^{-Dt} \quad \text{-----} \quad (2)$$

Where,

D is the decline rate.

q_i is the initial production rate

q_t is the production rate at time t

n is the exponent

t is time in months.

Following are the assumptions made for the analysis:

- The entire analysis is done for the production rates of a single well.
- Exponential Decline continues uniformly till abandonment. i.e., the decline rate remains the same through out the life of the well.
- Well is produced according to stipulations for exponential decline analysis. This has been justified by FIG 2 & 3.

5.1 Procedure adopted & Model Calculation

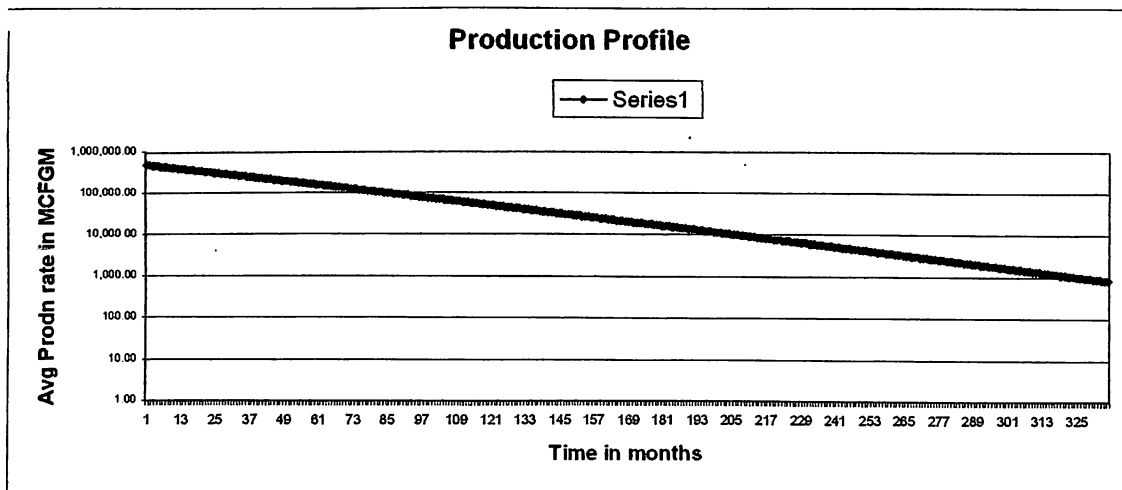
- Month begin rate for the first month = 16666 MCFD = q_i .
- Month begin rate for the second month = 16350 MCFD = q_t .
- So, $D = \ln (16666/16350) / 1 = 0.019142818 / \text{month}$ (Using eqn 1).
- Therefore, $q_t = 16666 * e^{- (0.019142818*t)}$: By substituting $t = 1, 2, 3 \dots$ find the Month end production rates in MCFD.
- i.e., if $t=1$, $q_1 = 16350$ MCFD which is the end production for the first month and will be equal to the begin rate for the second month.
- Similarly we can calculate the month end production rates for the required 336 months (28 years).
- Average production rate can be calculated by taking simple arithmetic average of two consecutive months production rates.
- i.e., for the 1st month the average production rate is $(16666+16350)/2 = 16508$ MCFD.

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- Convert the production rates from MCFD to MCFGM as $MCFGM = MCFD * (365/12)$.
- So, $16508 \text{ MCFD} = 16508 * (365/12) \text{ MCFGM} = 502,118.33 \text{ MCFGM}$.
- Calculate the cumulative production and the cumulative production at the end of the 28th year will indicate the total estimated reserves.

Figure 3 shows the Production decline profiles obtained for the calculated values.

FIG 3



6. Factors considered in Financial Analysis

Number of wells Drilled = 1

Monthly Gas production Rate

Fuel shrinkage of 1% is considered

Net Sales Volume of Gas = Monthly Production Rate – Fuel Shrinkage

Gas Price = \$7 / MCF

Gross Revenue = Net sales Volume * Gas Price

Royalty Charges = 25% of the Gross Revenue

Severance Tax = 6% of the Gross Revenue

Net Revenue = Gross Revenue - Royalty Charges - Severance Tax.

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Transportation & Procurement Cost = \$0.00

Lease Operating Expense (LOE) / well / month = \$2,900

General & Administrative Expenses (G&A) = \$0.00

Operating Cost = Transportation & Procurement Cost + Lease Operating Expense
(LOE) / well / month + General & Administrative Expenses (G&A).

Operating Cash Flow = Net Revenue – Operating Cost

Acquisition Cost = \$0.00

Well drilling Cost = \$24,00,000 / well

Capital Investment = Acquisition Cost + Well drilling Cost

Undiscounted Cash Flow = Operating Cash Flow - Capital Investment

Return on Investment (ROI) = Operating Cash Flow / Capital Investment

Net Present Value (NPV) = $\sum \frac{(\text{Undiscounted Cash Flow})_t}{(1 + \text{Discount Rate})^t}$

6.1 Procedure adopted & Model Calculation

Since Gallacher model involves only 1 well data,

The total capital investment = \$24,00,000 i.e., drilling cost for a single well.

Consider the 2nd month case:

Net Volume of Gas produced = 492.60 MMCF

Fuel Shrinkage (1% of Net volume of Gas produced) = 4.93 MMCF

∴ Net Volume of Sales Gas = 492.60 – 4.93 = 487.67 MMCF

= 487.67 / (365/12) = 16.03 MMCFD

Assumed Gas Price = \$7 / MCF

∴ Gross Revenue = 487.67 MMCF * \$7 / MCF = \$3413.70 x 10³

Royalties (25% of the Gross revenue) = \$853.43 x 10³

Severance Tax (6% of the Gross revenue) = \$204.82 x 10³

∴ Net Revenue = \$3413.70 x 10³ - \$853.43 x 10³ - \$204.82 x 10³ = \$2355.45 x 10³

Transportation & Procurement Cost = \$0.00

Lease Operating Expense (LOE) / well / month = \$2,900

General & Administrative Expenses (G&A) = \$0.00

Operating Cost = \$0.00 + \$2,900 + \$0.00 = \$2,900

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$$\text{Operating Cash Flow} = \$2355.45 \times 10^3 - \$2,900 = \$2352.55 \times 10^3$$

$$\begin{aligned} \text{Cumulative Operating Cash Flow} &= \$2398.08 \times 10^3 \text{ (1st month)} + \$2352.55 \times 10^3 \\ &= \$4750.63 \times 10^3 \end{aligned}$$

$$\text{Acquisition Cost} = \$0.00$$

$$\text{Well drilling Cost} = \$0.00$$

$$\text{Capital Investment} = \$0.00 + \$0.00 = \$0.00$$

$$\text{Cumulative Capital Investment} = \$24,00,000 \text{ (1st month)} + \$0.00 = \$24,00,000$$

$$\text{Undiscounted Cash Flow} = \$2352.55 \times 10^3 - \$0.00 = \$2352.55 \times 10^3$$

$$\begin{aligned} \text{Cumulative Undiscounted Cash Flow} &= - \$1.92 \times 10^3 \text{ (1st month)} + \$2352.55 \times 10^3 \\ &= \$2350.63 \times 10^3 \end{aligned}$$

$$\text{ROI} = \$4750.63 \times 10^3 / \$24,00,000 = 1.979$$

$$\begin{aligned} \text{NPV} &= \frac{- \$1.92 \times 10^3}{(1+0.1)^1} + \frac{\$2352.55 \times 10^3}{(1+0.1)^2} \\ &= \$1942.51 \times 10^3 \end{aligned}$$

6.2 Definitions of the different terms mentioned in the financial analysis:

Operating Costs:

The sum of lease operating costs, production taxes, G&A expenses, and oil and gas depreciation, depletion, and amortization

Net Present Value:

The present value of a security or an investment project, found by discounting all present and future receipts and outgoings at an appropriate rate of interest. If the net present value thus calculated is + ve, it is worthwhile investing in the project, provided it can be financed. If the receipts or outgoings are subject to uncertainty, picking the appropriate rate of interest is difficult.

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Lease Operating Expenses:

The costs of maintaining and operating property and equipment on a producing oil and gas lease.

Royalties:

Payments to the owners of the natural resources such as minerals or oil, made by mine operators. Royalties are so called because the owner is frequently a sovereign, or a state. Royalties are governed by agreements, which may specify them in amounts per unit extracted, or as a percentage of the revenue.

Severance Tax:

Severance tax is a tax imposed upon nonrenewable natural resources that are removed from the earth. It is applied to gross oil and gas income. Severance tax is different from income tax. It is a tax imposed by a state on the extraction of natural resources, such as oil, coal, or gas, that will be used in other states.

Return on Investment (ROI):

Return on Investment (ROI) is used by companies to understand the business value of investments and today it's one of the main drivers behind spending money on technology.

ROI is a family of financial measurements known as Net Present Value (NPV), Internal Rate of Return (IRR) and Payback. NPV, IRR and Payback are the primary measures that define the business value of any investment and therefore are key within the board decision-making process. The objective of ROI in the sales process is to quantify and value the benefits rather than minimize the cost.

The ROI family represents Value (NPV), Rate (IRR) and Time (Payback).

Value; how much money they will make on the investment.

Rate; the yearly percentage returned on the funds used on the investment.

Time; when they will get their initial investment back.

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Internal Rate of Return(IRR):

It is the return per year on the original investment when considering all costs and benefits over the given investment period.

Payback Period:

It is the time it taken for benefits generated to recover returns that equal the initial spend.

G&A Expenses: General and administrative expenses

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Conclusion:

Thus the given production profile of Gallagher model is found to be following an Exponentially declining nature. Using the exponential decline equations, the projected production rates for 28 years are estimated. The estimated production rates are verified for their exponentially declining nature.

From the analysis, the reserve is found to be **26,439,359.86 MCF**.

In the case of financial Analysis, parameters like Net Volume of Sales Gas, Gross Revenue, Net Revenue, Operating Cost, Operating Cash Flow, Capital Investment, Undiscounted Cash Flow, ROI and NPV are calculated for the entire life of the well.

APPENDIX .1

CALCULATIONS

GALLACHER MODEL : Given Data

Year	Month	Rate MCFD	Month Begin Rate MCFD	Avg. Monthly Rate MCFD
1	1	16666	16666	16508
	2		16350	16196
	3		16041	15889
	4		15737	15588
	5		15439	15293
	6		15147	15003
	7		14860	14719
	8		14578	14440
	9		14302	14167
	10		14032	13899
	11		13766	13636
	12		13505	13377
2	13		13249	13124
	14		12999	12876
	15		12752	12632
	16		12511	12392
	17		12274	12158
	18		12042	11928
	19		11814	11702
	20		11590	11480
	21		11370	11263
	22		11155	11049
	23		10944	10840
	24		10737	10635
3	25		10533	10434
	26		10334	10236
	27		10138	10042
	28		9946	9852
	29		9758	9665
	30		9573	9482
	31		9392	9303
	32		9214	9127
	33		9039	8954
	34		8868	8784
	35		8700	8618
	36		8536	8455
4	37		8374	8295
	38		8215	8138
	39		8060	7984
	40		7907	7832
	41		7758	7684
	42		7611	7539
	43		7466	7396
	44		7325	7256
	45		7186	7118
	46		7050	6984
	47		6917	6851
	48		6786	6722

Year	Month	Rate MCFD	Month Begin Rate MCFD	Avg. Monthly Rate MCFD
5	49		6657	6594
	50		6531	6469
	51		6408	6347
	52		6286	6227
	53		6167	6109
	54		6050	5993
	55		5936	5880
	56		5823	5768
	57		5713	5659
	58		5605	5552
	59		5499	5447
	60		5395	5343.7

GALLACHER MODEL

Assumptions:

1. Exponential Decline continues uniformly till abandonment.
2. Well is produced according to stipulations for exponential decline analysis.
3. Exponent $n = 0$ for exponential decline.

Equations Used

$$D = - (dq / dt) / q = K \cdot q^n = (\ln (q_i / q_t)) / t$$

$$q_t = q_i \cdot e^{-Dt}$$

Where,

D is the decline rate.

q_i is the initial production rate

q_t is the production rate at time t

K is a constant.

$n=0$ for exponential decline

t is time in months.

Calculation procedure

the first set of values are

Year	Month	Month Begin Rate	Avg. Monthly Rate		Cumulative Gas
		MCFD	MCFD	MCFGM	MCF
1	1	16,666.00	16,508.00	502,118.33	502,118.33
	2	16,350.00	16,195.00	492,597.76	994,716.09
		16039.99			

1st Month Begin rate is already given as 16666MCFD

2nd month begin rate is given as 16350 MCFD = 1st month end rate.

So, $D = \ln(16666/16350) / 1 = \mathbf{0.019142818}$

$q_t = 16666 \cdot e^{-(0.019142818 \cdot t)}$: By substituting $t = 1, 2, 3 \dots$ find the Month end production rates in MCFD

Take the average of two successive month begin rates to get the avg. monthly production in MCFD
ie, $(16666+16350)/2 = 16508$ MCFD

$MCFGM = MCFD \cdot (365/12)$

Also Calculate the cumulative production for each month in MCF

GALLACHER MODEL

Exponential Decline Equation - $qt = qi * e^{-Dt}$

where $D = (\ln (qi / qt)) / t$

qi	16,666.00	MCFD
t	1	month
D	0.019142818	<i>Calculated Value month</i>

DAILY PRODUCTION RATES

TOTAL PRODUCTION

Year	Month	Month End Rate	Avg. Monthly Rate	Monthly	Annual	Cumulative Gas
		MCFD	MCFD	MCFGM	MCF	MCF
1	1	16,350.00	16,508.00	502,118.33	5,435,133.80	502,118.33
	2	16,039.99	16,195.00	492,597.79		994,716.12
	3	15,735.86	15,887.93	483,257.76		1,477,973.88
	4	15,437.50	15,586.68	474,094.83		1,952,068.71
	5	15,144.79	15,291.14	465,105.63		2,417,174.34
	6	14,857.63	15,001.21	456,286.88		2,873,461.22
	7	14,575.92	14,716.78	447,635.33		3,321,096.55
	8	14,299.55	14,437.74	439,147.83		3,760,244.37
	9	14,028.42	14,163.99	430,821.25		4,191,065.63
	10	13,762.43	13,895.43	422,652.55		4,613,718.18
	11	13,501.49	13,631.96	414,638.74		5,028,356.92
	12	13,245.49	13,373.49	406,776.88		5,435,133.79
2	13	12,994.34	13,119.91	399,064.08	4,319,632.47	5,834,197.87
	14	12,747.96	12,871.15	391,497.52		6,225,695.39
	15	12,506.25	12,627.10	384,074.43		6,609,769.82
	16	12,269.12	12,387.69	376,792.09		6,986,561.91
	17	12,036.49	12,152.81	369,647.82		7,356,209.74
	18	11,808.27	11,922.38	362,639.02		7,718,848.76
	19	11,584.37	11,696.32	355,763.11		8,074,611.87
	20	11,364.73	11,474.55	349,017.57		8,423,629.44
	21	11,149.24	11,256.98	342,399.94		8,766,029.38
	22	10,937.84	11,043.54	335,907.77		9,101,937.15
	23	10,730.45	10,834.15	329,538.71		9,431,475.86
	24	10,527.00	10,628.73	323,290.40		9,754,766.26
3	25	10,327.40	10,427.20	317,160.57	3,433,075.50	10,071,926.84
	26	10,131.58	10,229.49	311,146.97		10,383,073.80
	27	9,939.48	10,035.53	305,247.39		10,688,321.19
	28	9,751.02	9,845.25	299,459.66		10,987,780.85
	29	9,566.13	9,658.58	293,781.68		11,281,562.53
	30	9,384.75	9,475.44	288,211.36		11,569,773.89
	31	9,206.81	9,295.78	282,746.65		11,852,520.55
	32	9,032.24	9,119.53	277,385.56		12,129,906.11
	33	8,860.98	8,946.61	272,126.12		12,402,032.23
	34	8,692.97	8,776.98	266,966.40		12,668,998.63
	35	8,528.15	8,610.56	261,904.52		12,930,903.15
	36	8,366.45	8,447.30	256,938.61		13,187,841.76
4	37	8,207.81	8,287.13	252,066.86	2,728,474.58	13,439,908.62
	38	8,052.19	8,130.00	247,287.48		13,687,196.10
	39	7,899.51	7,975.85	242,598.72		13,929,794.82
	40	7,749.73	7,824.62	237,998.87		14,167,793.69
	41	7,602.79	7,676.26	233,486.23		14,401,279.92
	42	7,458.63	7,530.71	229,059.15		14,630,339.07
	43	7,317.21	7,387.92	224,716.02		14,855,055.09
	44	7,178.47	7,247.84	220,455.23		15,075,510.32
	45	7,042.36	7,110.42	216,275.23		15,291,785.55
	46	6,908.84	6,975.60	212,174.49		15,503,960.05
	47	6,777.84	6,843.34	208,151.50		15,712,111.55
	48	6,649.33	6,713.58	204,204.79		15,916,316.34

Year	Month	DAILY PRODUCTION RATES		TOTAL PRODUCTION		
		Month End Rate	Avg. Monthly Rate	Monthly	Annual	Cumulative Gas
		MCFD	MCFD	MCFGM	MCF	MCF
5	49	6,523.25	6,586.29	200,332.91	2,168,485.23	16,116,649.25
	50	6,399.56	6,461.41	196,534.45		16,313,183.70
	51	6,278.22	6,338.89	192,808.01		16,505,991.71
	52	6,159.18	6,218.70	189,152.22		16,695,143.93
	53	6,042.40	6,100.79	185,565.75		16,880,709.68
	54	5,927.83	5,985.12	182,047.29		17,062,756.97
	55	5,815.44	5,871.63	178,595.53		17,241,352.50
	56	5,705.17	5,760.30	175,209.22		17,416,561.72
	57	5,597.00	5,651.08	171,887.12		17,588,448.85
	58	5,490.87	5,543.93	168,628.01		17,757,076.86
	59	5,386.76	5,438.82	165,430.70		17,922,507.56
	60	5,284.62	5,335.69	162,294.01		18,084,801.57
6	61	5,184.42	5,234.52	159,216.79	1,723,427.53	18,244,018.36
	62	5,086.12	5,135.27	156,197.92		18,400,216.28
	63	4,989.69	5,037.91	153,236.29		18,553,452.57
	64	4,895.08	4,942.38	150,330.81		18,703,783.38
	65	4,802.26	4,848.67	147,480.43		18,851,263.81
	66	4,711.21	4,756.74	144,684.09		18,995,947.89
	67	4,621.88	4,666.55	141,940.77		19,137,888.66
	68	4,534.25	4,578.06	139,249.46		19,277,138.12
	69	4,448.27	4,491.26	136,609.19		19,413,747.31
	70	4,363.93	4,406.10	134,018.97		19,547,766.28
	71	4,281.19	4,322.56	131,477.87		19,679,244.15
	72	4,200.01	4,240.60	128,984.95		19,808,229.10
7	73	4,120.38	4,160.20	126,539.30	1,369,713.02	19,934,768.40
	74	4,042.25	4,081.32	124,140.02		20,058,908.42
	75	3,965.61	4,003.93	121,786.23		20,180,694.65
	76	3,890.42	3,928.01	119,477.07		20,300,171.71
	77	3,816.65	3,853.54	117,211.69		20,417,383.41
	78	3,744.29	3,780.47	114,989.27		20,532,372.68
	79	3,673.29	3,708.79	112,808.99		20,645,181.67
	80	3,603.64	3,638.47	110,670.04		20,755,851.71
	81	3,535.32	3,569.48	108,571.66		20,864,423.37
	82	3,468.28	3,501.80	106,513.05		20,970,936.42
	83	3,402.52	3,435.40	104,493.49		21,075,429.91
	84	3,338.01	3,370.26	102,512.21		21,177,942.12
8	85	3,274.72	3,306.36	100,568.50	1,088,594.51	21,278,510.62
	86	3,212.63	3,243.67	98,661.65		21,377,172.27
	87	3,151.71	3,182.17	96,790.95		21,473,963.21
	88	3,091.95	3,121.83	94,955.72		21,568,918.93
	89	3,033.33	3,062.64	93,155.29		21,662,074.22
	90	2,975.81	3,004.57	91,388.99		21,753,463.21
	91	2,919.39	2,947.60	89,656.19		21,843,119.39
	92	2,864.03	2,891.71	87,956.24		21,931,075.63
	93	2,809.73	2,836.88	86,288.52		22,017,364.15
	94	2,756.46	2,783.09	84,652.42		22,102,016.57
	95	2,704.19	2,730.32	83,047.35		22,185,063.92
	96	2,652.92	2,678.55	81,472.71		22,266,536.63
9	97	2,602.62	2,627.77	79,927.92	865,172.48	22,346,464.56
	98	2,553.27	2,577.94	78,412.43		22,424,876.99
	99	2,504.86	2,529.06	76,925.67		22,501,802.66
	100	2,457.36	2,481.11	75,467.10		22,577,269.76
	101	2,410.77	2,434.07	74,036.19		22,651,305.95
	102	2,365.06	2,387.91	72,632.41		22,723,938.36
	103	2,320.22	2,342.64	71,255.24		22,795,193.60
	104	2,276.22	2,298.22	69,904.19		22,865,097.79
	105	2,233.06	2,254.64	68,578.75		22,933,676.54
	106	2,190.72	2,211.89	67,278.45		23,000,954.98
	107	2,149.19	2,169.95	66,002.80		23,066,957.78
	108	2,108.44	2,128.81	64,751.33		23,131,709.11

Year	Month	DAILY PRODUCTION RATES		TOTAL PRODUCTION		
		Month End Rate	Avg. Monthly Rate	Monthly	Annual	Cumulative Gas
		MCFD	MCFD	MCFGM	MCF	MCF
10	109	2,068.46	2,088.45	63,523.60	687,605.36	23,195,232.71
	110	2,029.24	2,048.85	62,319.14		23,257,551.86
	111	1,990.76	2,010.00	61,137.53		23,318,689.38
	112	1,953.02	1,971.89	59,978.31		23,378,667.69
	113	1,915.99	1,934.50	58,841.08		23,437,508.77
	114	1,879.66	1,897.82	57,725.41		23,495,234.17
	115	1,844.02	1,861.84	56,630.89		23,551,865.06
	116	1,809.05	1,826.54	55,557.12		23,607,422.19
	117	1,774.75	1,791.90	54,503.72		23,661,925.91
	118	1,741.10	1,757.93	53,470.29		23,715,396.19
	119	1,708.09	1,724.60	52,456.45		23,767,852.64
	120	1,675.70	1,691.90	51,461.84		23,819,314.48
11	121	1,643.93	1,659.82	50,486.08	546,481.94	23,869,800.56
	122	1,612.76	1,628.34	49,528.83		23,919,329.38
	123	1,582.18	1,597.47	48,589.72		23,967,919.10
	124	1,552.18	1,567.18	47,668.42		24,015,587.53
	125	1,522.75	1,537.47	46,764.59		24,062,352.12
	126	1,493.88	1,508.31	45,877.90		24,108,230.02
	127	1,465.55	1,479.72	45,008.02		24,153,238.05
	128	1,437.77	1,451.66	44,154.64		24,197,392.68
	129	1,410.50	1,424.13	43,317.43		24,240,710.11
	130	1,383.76	1,397.13	42,496.10		24,283,206.21
	131	1,357.52	1,370.64	41,690.34		24,324,896.55
	132	1,331.78	1,344.65	40,899.86		24,365,796.41
12	133	1,306.53	1,319.16	40,124.37	434,322.54	24,405,920.78
	134	1,281.76	1,294.15	39,363.58		24,445,284.36
	135	1,257.46	1,269.61	38,617.22		24,483,901.58
	136	1,233.61	1,245.53	37,885.00		24,521,786.58
	137	1,210.22	1,221.92	37,166.68		24,558,953.26
	138	1,187.28	1,198.75	36,461.97		24,595,415.23
	139	1,164.76	1,176.02	35,770.62		24,631,185.85
	140	1,142.68	1,153.72	35,092.38		24,666,278.23
	141	1,121.01	1,131.85	34,427.01		24,700,705.24
	142	1,099.76	1,110.39	33,774.24		24,734,479.48
	143	1,078.91	1,089.33	33,133.86		24,767,613.34
	144	1,058.45	1,068.68	32,505.61		24,800,118.96
13	145	1,038.38	1,048.41	31,889.28	345,182.63	24,832,008.24
	146	1,018.69	1,028.54	31,284.64		24,863,292.88
	147	999.38	1,009.03	30,691.46		24,893,984.34
	148	980.43	989.90	30,109.53		24,924,093.86
	149	961.84	971.13	29,538.63		24,953,632.49
	150	943.60	952.72	28,978.55		24,982,611.04
	151	925.71	934.66	28,429.10		25,011,040.13
	152	908.16	916.93	27,890.06		25,038,930.19
	153	890.94	899.55	27,361.24		25,066,291.44
	154	874.05	882.49	26,842.45		25,093,133.89
	155	857.47	865.76	26,333.50		25,119,467.39
	156	841.21	849.34	25,834.20		25,145,301.58
14	157	825.26	833.24	25,344.36	274,337.69	25,170,645.94
	158	809.62	817.44	24,863.81		25,195,509.75
	159	794.27	801.94	24,392.37		25,219,902.13
	160	779.21	786.74	23,929.88		25,243,832.00
	161	764.43	771.82	23,476.15		25,267,308.15
	162	749.94	757.18	23,031.02		25,290,339.17
	163	735.72	742.83	22,594.34		25,312,933.51
	164	721.77	728.74	22,165.93		25,335,099.44
	165	708.08	714.93	21,745.65		25,356,845.09
	166	694.66	701.37	21,333.33		25,378,178.43
	167	681.49	688.07	20,928.84		25,399,107.26
	168	668.56	675.03	20,532.01		25,419,639.28

Year	Month	DAILY PRODUCTION RATES		TOTAL PRODUCTION		
		Month End Rate	Avg. Monthly Rate	Monthly	Annual	Cumulative Gas
		MCFD	MCFD	MCFGM	MCF	MCF
15	169	655.89	662.23	20,142.71	218,032.91	25,439,781.98
	170	643.45	649.67	19,760.79		25,459,542.77
	171	631.25	637.35	19,386.11		25,478,928.88
	172	619.28	625.27	19,018.53		25,497,947.41
	173	607.54	613.41	18,657.93		25,516,605.34
	174	596.02	601.78	18,304.16		25,534,909.50
	175	584.72	590.37	17,957.10		25,552,866.60
	176	573.63	579.18	17,616.62		25,570,483.22
	177	562.76	568.19	17,282.59		25,587,765.81
	178	552.09	557.42	16,954.90		25,604,720.71
	179	541.62	546.85	16,633.42		25,621,354.14
	180	531.35	536.48	16,318.04		25,637,672.18
16	181	521.27	526.31	16,008.64	173,284.05	25,653,680.82
	182	511.39	516.33	15,705.10		25,669,385.93
	183	501.69	506.54	15,407.32		25,684,793.25
	184	492.18	496.94	15,115.19		25,699,908.44
	185	482.85	487.52	14,828.59		25,714,737.03
	186	473.69	478.27	14,547.43		25,729,284.46
	187	464.71	469.20	14,271.60		25,743,556.06
	188	455.90	460.31	14,001.00		25,757,557.07
	189	447.26	451.58	13,735.53		25,771,292.60
	190	438.78	443.02	13,475.10		25,784,767.69
	191	430.46	434.62	13,219.60		25,797,987.29
	192	422.30	426.38	12,968.94		25,810,956.23
17	193	414.29	418.29	12,723.04	137,719.41	25,823,679.28
	194	406.43	410.36	12,481.80		25,836,161.08
	195	398.73	402.58	12,245.14		25,848,406.22
	196	391.17	394.95	12,012.96		25,860,419.19
	197	383.75	387.46	11,785.19		25,872,204.37
	198	376.47	380.11	11,561.73		25,883,766.11
	199	369.34	372.90	11,342.51		25,895,108.62
	200	362.33	365.83	11,127.45		25,906,236.07
	201	355.46	358.90	10,916.47		25,917,152.53
	202	348.72	352.09	10,709.48		25,927,862.01
	203	342.11	345.42	10,506.42		25,938,368.43
	204	335.62	338.87	10,307.21		25,948,675.65
18	205	329.26	332.44	10,111.78	109,454.02	25,958,787.42
	206	323.02	326.14	9,920.05		25,968,707.48
	207	316.89	319.95	9,731.96		25,978,439.44
	208	310.88	313.89	9,547.43		25,987,986.87
	209	304.99	307.94	9,366.41		25,997,353.28
	210	299.21	302.10	9,188.81		26,006,542.09
	211	293.53	296.37	9,014.59		26,015,556.68
	212	287.97	290.75	8,843.66		26,024,400.34
	213	282.51	285.24	8,675.98		26,033,076.32
	214	277.15	279.83	8,511.48		26,041,587.80
	215	271.90	274.52	8,350.09		26,049,937.90
	216	266.74	269.32	8,191.77		26,058,129.66
19	217	261.68	264.21	8,036.45	86,989.79	26,066,166.11
	218	256.72	259.20	7,884.07		26,074,050.18
	219	251.85	254.29	7,734.58		26,081,784.77
	220	247.08	249.47	7,587.93		26,089,372.69
	221	242.39	244.74	7,444.06		26,096,816.75
	222	237.80	240.10	7,302.91		26,104,119.66
	223	233.29	235.54	7,164.44		26,111,284.10
	224	228.87	231.08	7,028.60		26,118,312.70
	225	224.53	226.70	6,895.33		26,125,208.03
	226	220.27	222.40	6,764.59		26,131,972.62
	227	216.09	218.18	6,636.33		26,138,608.95
	228	212.00	214.04	6,510.50		26,145,119.45

Year	Month	DAILY PRODUCTION RATES		TOTAL PRODUCTION		
		Month End Rate	Avg. Monthly Rate	Monthly	Annual	Cumulative Gas
		MCFD	MCFD	MCFGM	MCF	MCF
20	229	207.98	209.99	6,387.06	69,136.09	26,151,506.51
	230	204.03	206.00	6,265.95		26,157,772.46
	231	200.16	202.10	6,147.14		26,163,919.60
	232	196.37	198.27	6,030.59		26,169,950.19
	233	192.65	194.51	5,916.25		26,175,866.44
	234	188.99	190.82	5,804.07		26,181,670.51
	235	185.41	187.20	5,694.02		26,187,364.53
	236	181.89	183.65	5,586.06		26,192,950.58
	237	178.44	180.17	5,480.14		26,198,430.73
	238	175.06	176.75	5,376.23		26,203,806.96
	239	171.74	173.40	5,274.30		26,209,081.25
	240	168.49	170.11	5,174.29		26,214,255.54
21	241	165.29	166.89	5,076.18	54,946.67	26,219,331.73
	242	162.16	163.72	4,979.93		26,224,311.66
	243	159.08	160.62	4,885.51		26,229,197.17
	244	156.07	157.57	4,792.88		26,233,990.05
	245	153.11	154.59	4,702.00		26,238,692.05
	246	150.20	151.66	4,612.85		26,243,304.90
	247	147.36	148.78	4,525.38		26,247,830.28
	248	144.56	145.96	4,439.58		26,252,269.86
	249	141.82	143.19	4,355.40		26,256,625.27
	250	139.13	140.48	4,272.82		26,260,898.09
	251	136.49	137.81	4,191.80		26,265,089.89
	252	133.91	135.20	4,112.32		26,269,202.22
22	253	131.37	132.64	4,034.35	43,669.47	26,273,236.57
	254	128.88	130.12	3,957.86		26,277,194.43
	255	126.43	127.65	3,882.81		26,281,077.24
	256	124.04	125.23	3,809.19		26,284,886.43
	257	121.68	122.86	3,736.97		26,288,623.40
	258	119.38	120.53	3,666.11		26,292,289.51
	259	117.11	118.24	3,596.60		26,295,886.11
	260	114.89	116.00	3,528.41		26,299,414.51
	261	112.71	113.80	3,461.50		26,302,876.02
	262	110.58	111.65	3,395.87		26,306,271.89
	263	108.48	109.53	3,331.48		26,309,603.37
	264	106.42	107.45	3,268.32		26,312,871.69
23	265	104.41	105.41	3,206.35	34,706.79	26,316,078.03
	266	102.43	103.42	3,145.55		26,319,223.58
	267	100.48	101.45	3,085.91		26,322,309.49
	268	98.58	99.53	3,027.40		26,325,336.89
	269	96.71	97.64	2,970.00		26,328,306.89
	270	94.88	95.79	2,913.68		26,331,220.57
	271	93.08	93.98	2,858.44		26,334,079.01
	272	91.31	92.19	2,804.24		26,336,883.25
	273	89.58	90.45	2,751.07		26,339,634.31
	274	87.88	88.73	2,698.91		26,342,333.22
	275	86.22	87.05	2,647.73		26,344,980.95
	276	84.58	85.40	2,597.53		26,347,578.48
24	277	82.98	83.78	2,548.28	27,583.61	26,350,126.76
	278	81.40	82.19	2,499.96		26,352,626.72
	279	79.86	80.63	2,452.56		26,355,079.28
	280	78.35	79.10	2,406.06		26,357,485.34
	281	76.86	77.60	2,360.44		26,359,845.78
	282	75.40	76.13	2,315.68		26,362,161.46
	283	73.97	74.69	2,271.77		26,364,433.23
	284	72.57	73.27	2,228.70		26,366,661.93
	285	71.20	71.88	2,186.44		26,368,848.37
	286	69.85	70.52	2,144.99		26,370,993.36
	287	68.52	69.18	2,104.31		26,373,097.67
	288	67.22	67.87	2,064.42		26,375,162.09

Year	Month	DAILY PRODUCTION RATES		TOTAL PRODUCTION		
		Month End Rate	Avg. Monthly Rate	Monthly	Annual	Cumulative Gas
		MCFD	MCFD	MCFGM	MCF	MCF
25	289	65.95	66.58	2,025.27	21,922.38	26,377,187.36
	290	64.70	65.32	1,986.87		26,379,174.23
	291	63.47	64.08	1,949.20		26,381,123.43
	292	62.27	62.87	1,912.24		26,383,035.67
	293	61.09	61.68	1,875.98		26,384,911.66
	294	59.93	60.51	1,840.41		26,386,752.07
	295	58.79	59.36	1,805.52		26,388,557.59
	296	57.68	58.23	1,771.28		26,390,328.87
	297	56.58	57.13	1,737.70		26,392,066.57
	298	55.51	56.05	1,704.75		26,393,771.32
	299	54.46	54.98	1,672.43		26,395,443.75
	300	53.43	53.94	1,640.72		26,397,084.46
26	301	52.41	52.92	1,609.61	17,423.05	26,398,694.07
	302	51.42	51.92	1,579.09		26,400,273.16
	303	50.44	50.93	1,549.15		26,401,822.31
	304	49.49	49.97	1,519.77		26,403,342.08
	305	48.55	49.02	1,490.96		26,404,833.04
	306	47.63	48.09	1,462.69		26,406,295.73
	307	46.73	47.18	1,434.96		26,407,730.68
	308	45.84	46.28	1,407.75		26,409,138.43
	309	44.97	45.40	1,381.06		26,410,519.49
	310	44.12	44.54	1,354.87		26,411,874.36
	311	43.28	43.70	1,329.18		26,413,203.54
	312	42.46	42.87	1,303.98		26,414,507.51
27	313	41.66	42.06	1,279.25	13,847.16	26,415,786.77
	314	40.87	41.26	1,255.00		26,417,041.77
	315	40.09	40.48	1,231.20		26,418,272.97
	316	39.33	39.71	1,207.86		26,419,480.83
	317	38.58	38.96	1,184.96		26,420,665.78
	318	37.85	38.22	1,162.49		26,421,828.27
	319	37.14	37.49	1,140.45		26,422,968.71
	320	36.43	36.78	1,118.82		26,424,087.54
	321	35.74	36.09	1,097.61		26,425,185.15
	322	35.06	35.40	1,076.80		26,426,261.94
	323	34.40	34.73	1,056.38		26,427,318.32
	324	33.75	34.07	1,036.35		26,428,354.68
28	325	33.11	33.43	1,016.70	11,005.18	26,429,371.38
	326	32.48	32.79	997.42		26,430,368.80
	327	31.86	32.17	978.51		26,431,347.31
	328	31.26	31.56	959.96		26,432,307.27
	329	30.67	30.96	941.76		26,433,249.03
	330	30.08	30.37	923.90		26,434,172.93
	331	29.51	29.80	906.38		26,435,079.31
	332	28.95	29.23	889.20		26,435,968.50
	333	28.41	28.68	872.34		26,436,840.84
	334	27.87	28.14	855.80		26,437,696.64
	335	27.34	27.60	839.57		26,438,536.21
	336	26.82	27.08	823.65		26,439,359.86

Least Square Curve Fitting

(Ref: 1. Numerical Methods for Engineers By Santosh Gupta Page No: 130

2. Gas Reservoir Engineering By John Lee & Robert A. Wattenbarger Page No: 217)

The Exponential Decline Curve Equation is

$$q_t = q_i * e^{-Dt} \text{ ----- (1)}$$

Taking log (base10) on both sides, we get,

$$\log q_t = \log q_i - Dt \text{ which is of the form } y = a_0 + a_1x. \text{ ----- (2)}$$

Where, $y = \log q_t$

$$a_0 = \log q_i$$

$$a_1 = -D$$

$$x = t$$

For the eqn $y = a_0 + a_1x_i$, the residuals can be written as $y_i - (a_0 + a_1x_i)$; $i = 1, 2, 3, \dots, n$.

The sum of the squares of the residuals $E = \sum [y_i - (a_0 + a_1x_i)]^2$

The above equation gives E as a function of 2 variables a_0 and a_1 . To minimize E, we can calculate the values of a_0 and a_1 . This requires,

$$\partial E / \partial a_0 = -2 \sum [y_i - (a_0 + a_1x_i)] = 0 \text{ -----(3)}$$

$$\partial E / \partial a_1 = -2 \sum \{x_i [y_i - (a_0 + a_1x_i)]\} = 0 \text{ ----- (4)}$$

This can be written as,

$$a_0 n + a_1 (\sum x_i) = (\sum y_i)$$

$$a_0 (\sum x_i) + a_1 (\sum x_i^2) = \sum (x_i y_i)$$

The solution of these simultaneous equations in the two variables a_0 and a_1 is,

$$a_1 = \{n \sum (x_i y_i) - (\sum x_i)(\sum y_i)\} / \{n (\sum x_i^2) - (\sum x_i)^2\}$$

$$a_0 = - \{ a_1(\sum x_i) - (\sum y_i) \} / n$$

So, in the case of Exponential decline equation, these becomes

$$a_1 = \{n \sum (t_i * \log q_t) - (\sum t_i)(\sum \log q_t)\} / \{n (\sum t_i^2) - (\sum t_i)^2\}$$

$$a_0 = - \{ a_1(\sum t_i) - (\sum \log q_t) \} / n$$

From numerical Calculations, we have

$$\sum t_i = 1830$$

$$\sum \log q_t = 238.3662$$

$$\sum (t_i * \log q_t) = 7120.7635$$

$$(\sum t_i^2) = 73810$$

$$\therefore \text{Slope } a_1 = - 8.3026174 \times 10^{-3}$$

$$D = - a_1 * 2.303 = \underline{0.019120927}$$

$$\text{Intercept } a_0 = 4.226038 = \log q_i$$

$$\therefore q_i = \underline{16828.20 \text{ MCFD}}$$

t	q _t	log q _t	t* log q _t	t ²
1	16508	4.2177	4.2177	1
2	16196	4.2094	8.4188	4
3	15889	4.2011	12.6033	9
4	15588	4.1928	16.7712	16
5	15293	4.1845	20.9225	25
6	15003	4.1762	25.0571	36
7	14719	4.1679	29.1751	49
8	14440	4.1596	33.2765	64
9	14167	4.1513	37.3615	81
10	13899	4.1430	41.4298	100
11	13636	4.1347	45.4816	121
12	13377	4.1264	49.5163	144
13	13124	4.1181	53.5349	169
14	12876	4.1098	57.5369	196
15	12632	4.1015	61.5221	225
16	12392	4.0931	65.4903	256
17	12158	4.0849	69.4427	289
18	11928	4.0766	73.3782	324
19	11702	4.0683	77.2969	361
20	11480	4.0599	81.1988	400
21	11263	4.0517	85.0847	441
22	11049	4.0433	88.9531	484
23	10840	4.0350	92.8057	529
24	10635	4.0267	96.6417	576
25	10434	4.0185	100.4613	625
26	10236	4.0101	104.2634	676
27	10042	4.0018	108.0491	729
28	9852	3.9935	111.8187	784
29	9665	3.9852	115.5709	841
30	9482	3.9769	119.3070	900
31	9303	3.9686	123.0273	961
32	9127	3.9603	126.7305	1024
33	8954	3.9520	130.4166	1089
34	8784	3.9437	134.0855	1156
35	8618	3.9354	137.7392	1225
36	8455	3.9271	141.3761	1296
37	8295	3.9188	144.9962	1369
38	8138	3.9105	148.5997	1444
39	7984	3.9022	152.1866	1521
40	7832	3.8939	155.7549	1600
41	7684	3.8856	159.3091	1681
42	7539	3.8773	162.8472	1764
43	7396	3.8690	166.3669	1849
44	7256	3.8607	169.8707	1936
45	7118	3.8524	173.3561	2025
46	6984	3.8441	176.8288	2116
47	6851	3.8358	180.2804	2209
48	6722	3.8275	183.7199	2304
49	6594	3.8191	187.1383	2401
50	6469	3.8108	190.5419	2500
51	6347	3.8026	193.9310	2601
52	6227	3.7943	197.3025	2704
53	6109	3.7860	200.6564	2809
54	5993	3.7776	203.9928	2916
55	5880	3.7694	207.3158	3025
56	5768	3.7610	210.6174	3136
57	5659	3.7527	213.9062	3249
58	5552	3.7444	217.1781	3364
59	5447	3.7362	220.4333	3481
60	5343.7	3.7278	223.6705	3600
SUM	1830	594933.7	238.3662	7,120.7635
			7,120.7635	73810

t	q observed (O _i)	q calculated (E _i)	(O _i - E _i)	(O _i - E _i) ² / E _i
1	16508	16,509.49	-1.49	0.000134
2	16196	16,196.81	-0.81	0.000040
3	15889	15,890.05	-1.05	0.000070
4	15588	15,589.11	-1.11	0.000078
5	15293	15,293.86	-0.86	0.000048
6	15003	15,004.20	-1.20	0.000097
7	14719	14,720.04	-1.04	0.000073
8	14440	14,441.25	-1.25	0.000108
9	14167	14,167.74	-0.74	0.000039
10	13899	13,899.42	-0.42	0.000012
11	13636	13,636.17	-0.17	0.000002
12	13377	13,377.91	-0.91	0.000062
13	13124	13,124.54	-0.54	0.000022
14	12876	12,875.97	0.03	0.000000
15	12632	12,632.11	-0.11	0.000001
16	12392	12,392.87	-0.87	0.000061
17	12158	12,158.16	-0.16	0.000002
18	11928	11,927.89	0.11	0.000001
19	11702	11,701.98	0.02	0.000000
20	11480	11,480.36	-0.36	0.000011
21	11263	11,262.93	0.07	0.000000
22	11049	11,049.62	-0.62	0.000034
23	10840	10,840.34	-0.34	0.000011
24	10635	10,635.04	-0.04	0.000000
25	10434	10,433.62	0.38	0.000014
26	10236	10,236.01	-0.01	0.000000
27	10042	10,042.15	-0.15	0.000002
28	9852	9,851.96	0.04	0.000000
29	9665	9,665.37	-0.37	0.000014
30	9482	9,482.31	-0.31	0.000010
31	9303	9,302.72	0.28	0.000008
32	9127	9,126.54	0.46	0.000023
33	8954	8,953.69	0.31	0.000011
34	8784	8,784.11	-0.11	0.000001
35	8618	8,617.75	0.25	0.000007
36	8455	8,454.53	0.47	0.000026
37	8295	8,294.41	0.59	0.000042
38	8138	8,137.32	0.68	0.000057
39	7984	7,983.20	0.80	0.000079
40	7832	7,832.01	-0.01	0.000000

t	q observed (O _i)	q calculated (E _i)	(O _i - E _i)	(O _i - E _i) ² / E _i
41	7684	7,683.68	0.32	0.000014
42	7539	7,538.15	0.85	0.000095
43	7396	7,395.39	0.61	0.000051
44	7256	7,255.32	0.68	0.000063
45	7118	7,117.91	0.09	0.000001
46	6984	6,983.10	0.90	0.000115
47	6851	6,850.85	0.15	0.000003
48	6722	6,721.10	0.90	0.000121
49	6594	6,593.81	0.19	0.000006
50	6469	6,468.92	0.08	0.000001
51	6347	6,346.41	0.59	0.000055
52	6227	6,226.21	0.79	0.000100
53	6109	6,108.29	0.71	0.000082
54	5993	5,992.60	0.40	0.000026
55	5880	5,879.11	0.89	0.000135
56	5768	5,767.76	0.24	0.000010
57	5659	5,658.52	0.48	0.000040
58	5552	5,551.36	0.64	0.000075
59	5447	5,446.22	0.78	0.000112
60	5343.7	5,343.07	0.63	0.000074

$\chi^2 = \sum (O_i - E_i)^2 / E_i =$	0.002386
---------------------------------------	-----------------

(Ref: *Advanced Engineering Mathematics By H.K Das .*
S CHAND & COMPANY LTD
Page No: 768 (11.55 GOODNESS OF FIT)

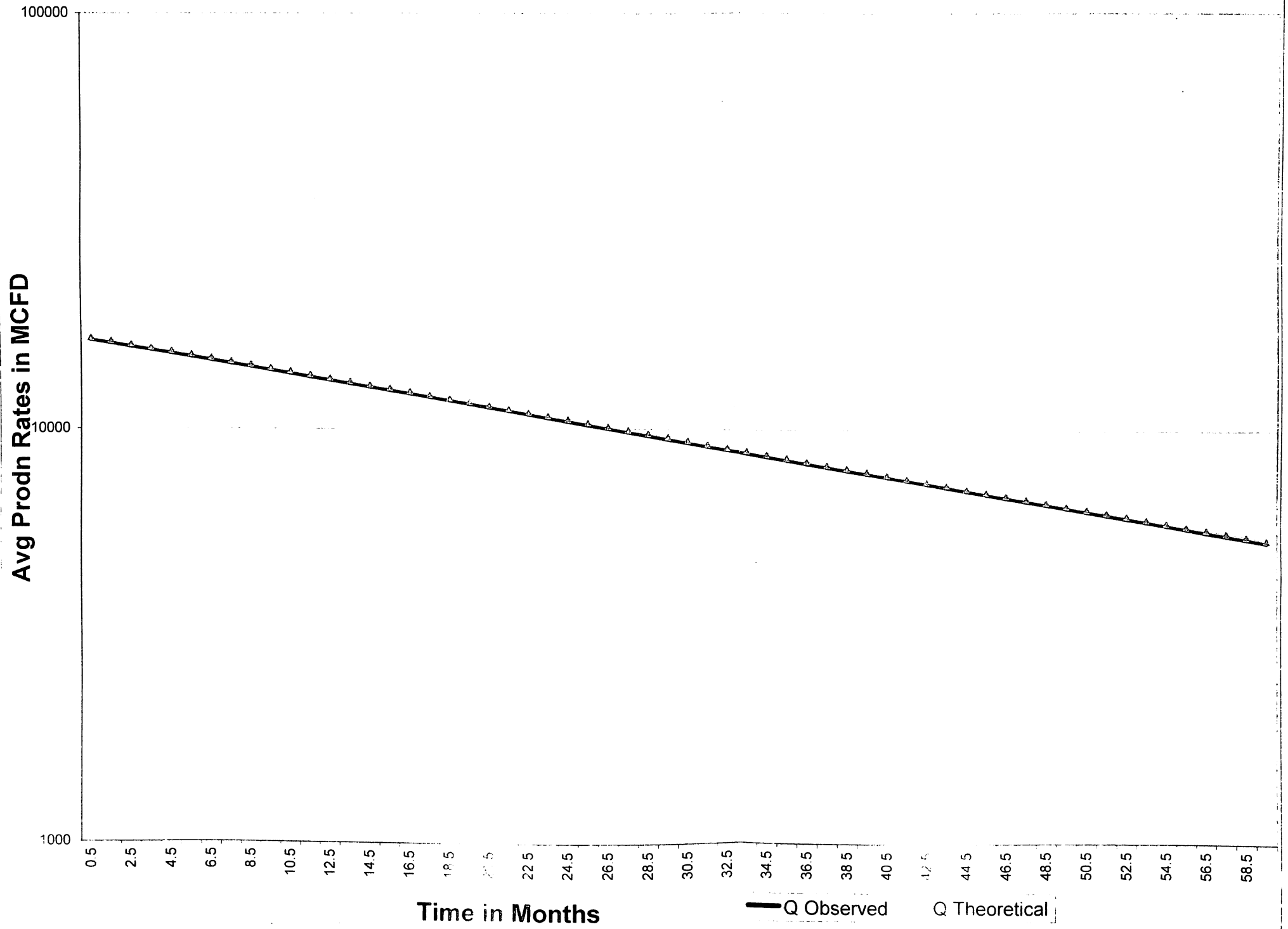
χ^2 is being used as a “test of goodness of fit”

Number of Degree of Freedom = 60 - 1 = **59**

From the tables of χ^2 (Ref : Table Attached), it is observed, the value of

χ^2 calculated above (**0.002386**) is far smaller than the value from the tables ie. $\chi^2_{0.95} = (42.339)$
for degree of freedom = 59 Indicative of a good fitness of the exponential Decline Curve

PRODUCTION PROFILES



Lower critical values of chi-square distribution with ν degrees of freedom

ν	Probability of exceeding the critical value				
	0.90	0.95	0.975	0.99	0.999
1.	.016	.004	.001	.000	.000
2.	.211	.103	.051	.020	.002
3.	.584	.352	.216	.115	.024
4.	1.064	.711	.484	.297	.091
5.	1.610	1.145	.831	.554	.210
6.	2.204	1.635	1.237	.872	.381
7.	2.833	2.167	1.690	1.239	.598
8.	3.490	2.733	2.180	1.646	.857
9.	4.168	3.325	2.700	2.088	1.152
10.	4.865	3.940	3.247	2.558	1.479
11.	5.578	4.575	3.816	3.053	1.834
12.	6.304	5.226	4.404	3.571	2.214
13.	7.042	5.892	5.009	4.107	2.617
14.	7.790	6.571	5.629	4.660	3.041
15.	8.547	7.261	6.262	5.229	3.483
16.	9.312	7.962	6.908	5.812	3.942
17.	10.085	8.672	7.564	6.408	4.416
18.	10.865	9.390	8.231	7.015	4.905
19.	11.651	10.117	8.907	7.633	5.407
20.	12.443	10.851	9.591	8.260	5.921
21.	13.240	11.591	10.283	8.897	6.447
22.	14.041	12.338	10.982	9.542	6.983
23.	14.848	13.091	11.689	10.196	7.529
24.	15.659	13.848	12.401	10.856	8.085
25.	16.473	14.611	13.120	11.524	8.649
26.	17.292	15.379	13.844	12.198	9.222
27.	18.114	16.151	14.573	12.879	9.803
28.	18.939	16.928	15.308	13.565	10.391
29.	19.768	17.708	16.047	14.256	10.986
30.	20.599	18.493	16.791	14.953	11.588
31.	21.434	19.281	17.539	15.655	12.196
32.	22.271	20.072	18.291	16.362	12.811
33.	23.110	20.867	19.047	17.074	13.431
34.	23.952	21.664	19.806	17.789	14.057
35.	24.797	22.465	20.569	18.509	14.688
36.	25.643	23.269	21.336	19.233	15.324
37.	26.492	24.075	22.106	19.960	15.965
38.	27.343	24.884	22.878	20.691	16.611
39.	28.196	25.695	23.654	21.426	17.262
40.	29.051	26.509	24.433	22.164	17.916
41.	29.907	27.326	25.215	22.906	18.575
42.	30.765	28.144	25.999	23.650	19.239
43.	31.625	28.965	26.785	24.398	19.906
44.	32.487	29.787	27.575	25.148	20.576
45.	33.350	30.612	28.366	25.901	21.251
46.	34.215	31.439	29.160	26.657	21.929
47.	35.081	32.268	29.956	27.416	22.610
48.	35.949	33.098	30.755	28.177	23.295
49.	36.818	33.930	31.555	28.941	23.983
50.	37.689	34.764	32.357	29.707	24.674

Probability of exceeding the critical value

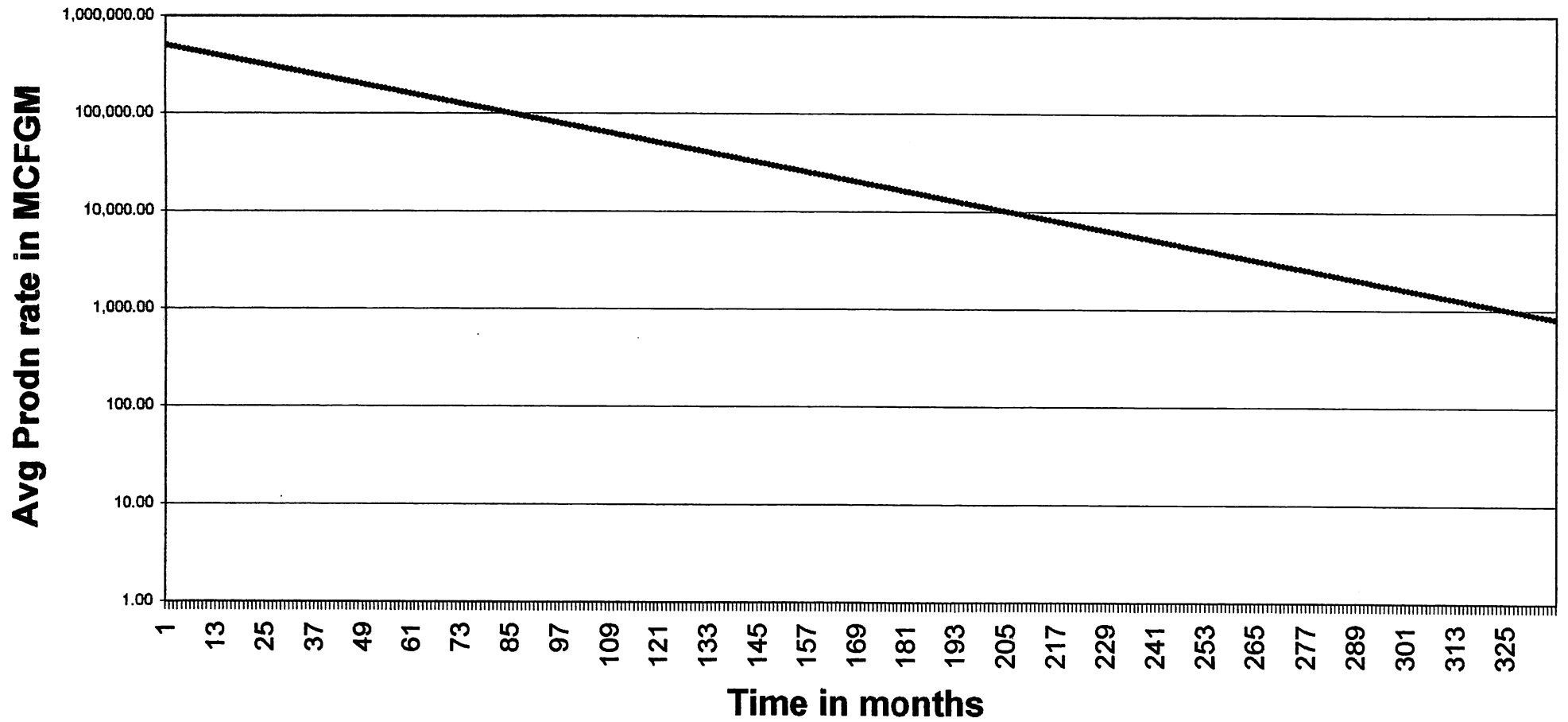
v	0.90	0.95	0.975	0.99	0.999
51.	38.560	35.600	33.162	30.475	25.368
52.	39.433	36.437	33.968	31.246	26.065
53.	40.308	37.276	34.776	32.018	26.765
54.	41.183	38.116	35.586	32.793	27.468
55.	42.060	38.958	36.398	33.570	28.173
56.	42.937	39.801	37.212	34.350	28.881
57.	43.816	40.646	38.027	35.131	29.592
58.	44.696	41.492	38.844	35.913	30.305
59.	45.577	42.339	39.662	36.698	31.020
60.	46.459	43.188	40.482	37.485	31.738
61.	47.342	44.038	41.303	38.273	32.459
62.	48.226	44.889	42.126	39.063	33.181
63.	49.111	45.741	42.950	39.855	33.906
64.	49.996	46.595	43.776	40.649	34.633
65.	50.883	47.450	44.603	41.444	35.362
66.	51.770	48.305	45.431	42.240	36.093
67.	52.659	49.162	46.261	43.038	36.826
68.	53.548	50.020	47.092	43.838	37.561
69.	54.438	50.879	47.924	44.639	38.298
70.	55.329	51.739	48.758	45.442	39.036
71.	56.221	52.600	49.592	46.246	39.777
72.	57.113	53.462	50.428	47.051	40.519
73.	58.006	54.325	51.265	47.858	41.264
74.	58.900	55.189	52.103	48.666	42.010
75.	59.795	56.054	52.942	49.475	42.757
76.	60.690	56.920	53.782	50.286	43.507
77.	61.586	57.786	54.623	51.097	44.258
78.	62.483	58.654	55.466	51.910	45.010
79.	63.380	59.522	56.309	52.725	45.764
80.	64.278	60.391	57.153	53.540	46.520
81.	65.176	61.261	57.998	54.357	47.277
82.	66.076	62.132	58.845	55.174	48.036
83.	66.976	63.004	59.692	55.993	48.796
84.	67.876	63.876	60.540	56.813	49.557
85.	68.777	64.749	61.389	57.634	50.320
86.	69.679	65.623	62.239	58.456	51.085
87.	70.581	66.498	63.089	59.279	51.850
88.	71.484	67.373	63.941	60.103	52.617
89.	72.387	68.249	64.793	60.928	53.386
90.	73.291	69.126	65.647	61.754	54.155
91.	74.196	70.003	66.501	62.581	54.926
92.	75.100	70.882	67.356	63.409	55.698
93.	76.006	71.760	68.211	64.238	56.472
94.	76.912	72.640	69.068	65.068	57.246
95.	77.818	73.520	69.925	65.898	58.022
96.	78.725	74.401	70.783	66.730	58.799
97.	79.633	75.282	71.642	67.562	59.577
98.	80.541	76.164	72.501	68.396	60.356
99.	81.449	77.046	73.361	69.230	61.137
100.	82.358	77.929	74.222	70.065	61.918

Year	Annual Prodn	Cum.% per year
	MCF	%
1	5,435,133.80	20.56
2	4,319,632.47	36.89
3	3,433,075.50	49.88
4	2,728,474.58	60.20
5	2,168,485.23	68.40
6	1,723,427.53	74.92
7	1,369,713.02	80.10
8	1,088,594.51	84.22
9	865,172.48	87.49
10	687,605.36	90.09
11	546,481.94	92.16
12	434,322.54	93.80
13	345,182.63	95.11
14	274,337.69	96.14
15	218,032.91	96.97
16	173,284.05	97.62
17	137,719.41	98.14
18	109,454.02	98.56
19	86,989.79	98.89
20	69,136.09	99.15
21	54,946.67	99.36
22	43,669.47	99.52
23	34,706.79	99.65
24	27,583.61	99.76
25	21,922.38	99.84
26	17,423.05	99.91
27	13,847.16	99.96
28	11,005.18	100.00

26,439,359.86

Prodn Profile

Series1



Exponential Decline Equation -		$qt = q_i * e^{-Dt}$		
		where $D = (\ln(q_i / qt)) / t$		
q_i	16,666.00	MCFD		
t	1	Year		
D	0.229713823	<i>Calculated Value/year</i>		

DAILY PRODUCTION RATES		
Year	Year End Rate	Avg. Yearly Rate
	MCFD	MCFD
1	13,245.49	14,955.74
2	10,527.00	11,886.24
3	8,366.45	9,446.72
4	6,649.33	7,507.89
5	5,284.62	5,966.98
6	4,200.01	4,742.32
7	3,338.01	3,769.01
8	2,652.92	2,995.46
9	2,108.44	2,380.68
10	1,675.70	1,892.07
11	1,331.78	1,503.74
12	1,058.45	1,195.12
13	841.21	949.83
14	668.56	754.89
15	531.35	599.96
16	422.30	476.82
17	335.62	378.96
18	266.74	301.18
19	212.00	239.37
20	168.49	190.24
21	133.91	151.20
22	106.42	120.16
23	84.58	95.50
24	67.22	75.90
25	53.43	60.32
26	42.46	47.94
27	33.75	38.10
28	26.82	30.28

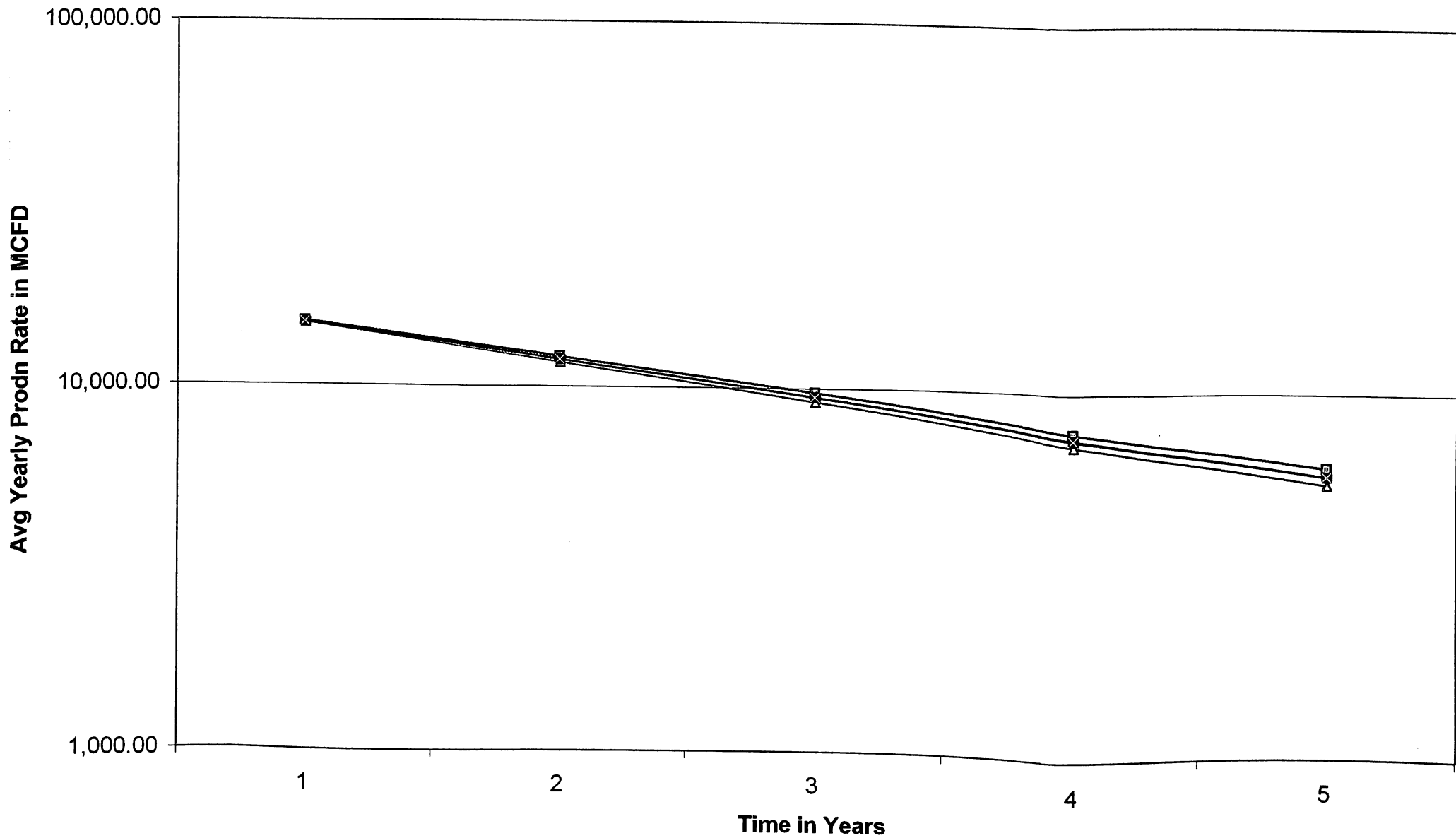
Exponential Decline Equation -	$qt = qi * e^{-Dt}$	
		where $D = (\ln (qi / qt)) / t$
qi	16,666.00	MCFD
t	1	Year
D	0.229713823	<i>Calculated Value/ year</i>
With an error of (-5%), D = 0.218228131		

DAILY PRODUCTION RATES		
Year	Year End Rate	Avg. Yearly Rate
	MCFD	MCFD
1	13,398.50	15,032.25
2	10,771.62	12,085.06
3	8,659.75	9,715.68
4	6,961.94	7,810.85
5	5,597.00	6,279.47
6	4,499.66	5,048.33
7	3,617.47	4,058.56
8	2,908.23	3,262.85
9	2,338.05	2,623.14
10	1,879.66	2,108.85
11	1,511.14	1,695.40
12	1,214.87	1,363.00
13	976.68	1,095.77
14	785.20	880.94
15	631.25	708.22
16	507.49	569.37
17	407.99	457.74
18	328.00	368.00
19	263.69	295.85
20	212.00	237.84
21	170.43	191.21
22	137.02	153.72
23	110.15	123.59
24	88.56	99.36
25	71.20	79.88
26	57.24	64.22
27	46.01	51.63
28	36.99	41.50

Exponential Decline Equation -	$qt = qi * e^{-Dt}$	
	where $D = (\ln (qi / qt)) / t$	
qi	16,666.00	MCFD
t	1	Year
D	0.229713823	<i>Calculated Value/year</i>
With an error of (+5%), D = 0.241199514		

DAILY PRODUCTION RATES		
Year	Year End Rate	Avg. Yearly Rate
1	13,094.22	14,880.11
2	10,287.93	11,691.08
3	8,083.07	9,185.50
4	6,350.75	7,216.91
5	4,989.69	5,670.22
6	3,920.32	4,455.00
7	3,080.14	3,500.23
8	2,420.02	2,750.08
9	1,901.37	2,160.69
10	1,493.88	1,697.62
11	1,173.72	1,333.80
12	922.17	1,047.94
13	724.54	823.35
14	569.26	646.90
15	447.26	508.26
16	351.40	399.33
17	276.09	313.75
18	216.92	246.51
19	170.43	193.68
20	133.91	152.17
21	105.21	119.56
22	82.66	93.93
23	64.94	73.80
24	51.03	57.99
25	40.09	45.56
26	31.50	35.79
27	24.75	28.12
28	19.44	22.10

PRODUCTION PROFILES



—●— Calculated value of D —■— -5% error in D —▲— +5% error in D —×— Given Data

Gallacher Financial Model Assumptions

(\$ in thousands except oil and gas prices)

Model Assumptions

Initial production (Mcf/day)	16508.00
Fuel usage shrinkage	1%
Realized gas price	\$7.00
Royalty	25%
Severance tax	6%
Fixed LOE / well / month	\$2.90
Well cost	\$2,400
Transportation & Proc Cost	\$0.00
Acquisition Cost	\$0.00
Number of wells drilled	1

GALLACHER MODEL

Year	Month	Active Wells	Wells Drilled	Capital	Monthly Prodn
				\$ 000's	MMCFGM
1	1	1	1	\$2,400	502.12
	2	1	0	\$0	492.60
	3	1	0	\$0	483.26
	4	1	0	\$0	474.09
	5	1	0	\$0	465.11
	6	1	0	\$0	456.29
	7	1	0	\$0	447.64
	8	1	0	\$0	439.15
	9	1	0	\$0	430.82
	10	1	0	\$0	422.65
	11	1	0	\$0	414.64
	12	1	0	\$0	406.78
2	13	1	0	\$0	399.06
	14	1	0	\$0	391.50
	15	1	0	\$0	384.07
	16	1	0	\$0	376.79
	17	1	0	\$0	369.65
	18	1	0	\$0	362.64
	19	1	0	\$0	355.76
	20	1	0	\$0	349.02
	21	1	0	\$0	342.40
	22	1	0	\$0	335.91
	23	1	0	\$0	329.54
	24	1	0	\$0	323.29
3	25	1	0	\$0	317.16
	26	1	0	\$0	311.15
	27	1	0	\$0	305.25
	28	1	0	\$0	299.46
	29	1	0	\$0	293.78
	30	1	0	\$0	288.21
	31	1	0	\$0	282.75
	32	1	0	\$0	277.39
	33	1	0	\$0	272.13
	34	1	0	\$0	266.97
	35	1	0	\$0	261.90
	36	1	0	\$0	256.94
4	37	1	0	\$0	252.07
	38	1	0	\$0	247.29
	39	1	0	\$0	242.60
	40	1	0	\$0	238.00
	41	1	0	\$0	233.49
	42	1	0	\$0	229.06
	43	1	0	\$0	224.72
	44	1	0	\$0	220.46
	45	1	0	\$0	216.28
	46	1	0	\$0	212.17
	47	1	0	\$0	208.15
	48	1	0	\$0	204.20

Year	Month	Active Wells	Wells Drilled	Capital	Monthly Prodn
				\$ 000's	MMCFGM
5	49	1	0	\$0	200.33
	50	1	0	\$0	196.53
	51	1	0	\$0	192.81
	52	1	0	\$0	189.15
	53	1	0	\$0	185.57
	54	1	0	\$0	182.05
	55	1	0	\$0	178.60
	56	1	0	\$0	175.21
	57	1	0	\$0	171.89
	58	1	0	\$0	168.63
	59	1	0	\$0	165.43
	60	1	0	\$0	162.29
6	61	1	0	\$0	159.22
	62	1	0	\$0	156.20
	63	1	0	\$0	153.24
	64	1	0	\$0	150.33
	65	1	0	\$0	147.48
	66	1	0	\$0	144.68
	67	1	0	\$0	141.94
	68	1	0	\$0	139.25
	69	1	0	\$0	136.61
	70	1	0	\$0	134.02
	71	1	0	\$0	131.48
	72	1	0	\$0	128.98
7	73	1	0	\$0	126.54
	74	1	0	\$0	124.14
	75	1	0	\$0	121.79
	76	1	0	\$0	119.48
	77	1	0	\$0	117.21
	78	1	0	\$0	114.99
	79	1	0	\$0	112.81
	80	1	0	\$0	110.67
	81	1	0	\$0	108.57
	82	1	0	\$0	106.51
	83	1	0	\$0	104.49
	84	1	0	\$0	102.51
8	85	1	0	\$0	100.57
	86	1	0	\$0	98.66
	87	1	0	\$0	96.79
	88	1	0	\$0	94.96
	89	1	0	\$0	93.16
	90	1	0	\$0	91.39
	91	1	0	\$0	89.66
	92	1	0	\$0	87.96
	93	1	0	\$0	86.29
	94	1	0	\$0	84.65
	95	1	0	\$0	83.05
	96	1	0	\$0	81.47
9	97	1	0	\$0	79.93
	98	1	0	\$0	78.41
	99	1	0	\$0	76.93
	100	1	0	\$0	75.47
	101	1	0	\$0	74.04
	102	1	0	\$0	72.63
	103	1	0	\$0	71.26
	104	1	0	\$0	69.90
	105	1	0	\$0	68.58
	106	1	0	\$0	67.28
	107	1	0	\$0	66.00
	108	1	0	\$0	64.75

Year	Month	Active Wells	Wells Drilled	Capital	Monthly Prodn
				\$ 000's	MMCFGM
10	109	1	0	\$0	63.52
	110	1	0	\$0	62.32
	111	1	0	\$0	61.14
	112	1	0	\$0	59.98
	113	1	0	\$0	58.84
	114	1	0	\$0	57.73
	115	1	0	\$0	56.63
	116	1	0	\$0	55.56
	117	1	0	\$0	54.50
	118	1	0	\$0	53.47
	119	1	0	\$0	52.46
	120	1	0	\$0	51.46
11	121	1	0	\$0	50.49
	122	1	0	\$0	49.53
	123	1	0	\$0	48.59
	124	1	0	\$0	47.67
	125	1	0	\$0	46.76
	126	1	0	\$0	45.88
	127	1	0	\$0	45.01
	128	1	0	\$0	44.15
	129	1	0	\$0	43.32
	130	1	0	\$0	42.50
	131	1	0	\$0	41.69
	132	1	0	\$0	40.90
12	133	1	0	\$0	40.12
	134	1	0	\$0	39.36
	135	1	0	\$0	38.62
	136	1	0	\$0	37.89
	137	1	0	\$0	37.17
	138	1	0	\$0	36.46
	139	1	0	\$0	35.77
	140	1	0	\$0	35.09
	141	1	0	\$0	34.43
	142	1	0	\$0	33.77
	143	1	0	\$0	33.13
	144	1	0	\$0	32.51
13	145	1	0	\$0	31.89
	146	1	0	\$0	31.28
	147	1	0	\$0	30.69
	148	1	0	\$0	30.11
	149	1	0	\$0	29.54
	150	1	0	\$0	28.98
	151	1	0	\$0	28.43
	152	1	0	\$0	27.89
	153	1	0	\$0	27.36
	154	1	0	\$0	26.84
	155	1	0	\$0	26.33
	156	1	0	\$0	25.83
14	157	1	0	\$0	25.34
	158	1	0	\$0	24.86
	159	1	0	\$0	24.39
	160	1	0	\$0	23.93
	161	1	0	\$0	23.48
	162	1	0	\$0	23.03
	163	1	0	\$0	22.59
	164	1	0	\$0	22.17
	165	1	0	\$0	21.75
	166	1	0	\$0	21.33
	167	1	0	\$0	20.93
	168	1	0	\$0	20.53

Year	Month	Active Wells	Wells Drilled	Capital	Monthly Prodn
				\$ 000's	MMCFGM
15	169	1	0	\$0	20.14
	170	1	0	\$0	19.76
	171	1	0	\$0	19.39
	172	1	0	\$0	19.02
	173	1	0	\$0	18.66
	174	1	0	\$0	18.30
	175	1	0	\$0	17.96
	176	1	0	\$0	17.62
	177	1	0	\$0	17.28
	178	1	0	\$0	16.95
	179	1	0	\$0	16.63
	180	1	0	\$0	16.32
16	181	1	0	\$0	16.01
	182	1	0	\$0	15.71
	183	1	0	\$0	15.41
	184	1	0	\$0	15.12
	185	1	0	\$0	14.83
	186	1	0	\$0	14.55
	187	1	0	\$0	14.27
	188	1	0	\$0	14.00
	189	1	0	\$0	13.74
	190	1	0	\$0	13.48
	191	1	0	\$0	13.22
	192	1	0	\$0	12.97
17	193	1	0	\$0	12.72
	194	1	0	\$0	12.48
	195	1	0	\$0	12.25
	196	1	0	\$0	12.01
	197	1	0	\$0	11.79
	198	1	0	\$0	11.56
	199	1	0	\$0	11.34
	200	1	0	\$0	11.13
	201	1	0	\$0	10.92
	202	1	0	\$0	10.71
	203	1	0	\$0	10.51
	204	1	0	\$0	10.31
18	205	1	0	\$0	10.11
	206	1	0	\$0	9.92
	207	1	0	\$0	9.73
	208	1	0	\$0	9.55
	209	1	0	\$0	9.37
	210	1	0	\$0	9.19
	211	1	0	\$0	9.01
	212	1	0	\$0	8.84
	213	1	0	\$0	8.68
	214	1	0	\$0	8.51
	215	1	0	\$0	8.35
	216	1	0	\$0	8.19
19	217	1	0	\$0	8.04
	218	1	0	\$0	7.88
	219	1	0	\$0	7.73
	220	1	0	\$0	7.59
	221	1	0	\$0	7.44
	222	1	0	\$0	7.30
	223	1	0	\$0	7.16
	224	1	0	\$0	7.03
	225	1	0	\$0	6.90
	226	1	0	\$0	6.76
	227	1	0	\$0	6.64
	228	1	0	\$0	6.51

Year	Month	Active Wells	Wells Drilled	Capital	Monthly Prodn
				\$ 000's	MMCFGM
20	229	1	0	\$0	6.39
	230	1	0	\$0	6.27
	231	1	0	\$0	6.15
	232	1	0	\$0	6.03
	233	1	0	\$0	5.92
	234	1	0	\$0	5.80
	235	1	0	\$0	5.69
	236	1	0	\$0	5.59
	237	1	0	\$0	5.48
	238	1	0	\$0	5.38
	239	1	0	\$0	5.27
	240	1	0	\$0	5.17
21	241	1	0	\$0	5.08
	242	1	0	\$0	4.98
	243	1	0	\$0	4.89
	244	1	0	\$0	4.79
	245	1	0	\$0	4.70
	246	1	0	\$0	4.61
	247	1	0	\$0	4.53
	248	1	0	\$0	4.44
	249	1	0	\$0	4.36
	250	1	0	\$0	4.27
	251	1	0	\$0	4.19
	252	1	0	\$0	4.11
22	253	1	0	\$0	4.03
	254	1	0	\$0	3.96
	255	1	0	\$0	3.88
	256	1	0	\$0	3.81
	257	1	0	\$0	3.74
	258	1	0	\$0	3.67
	259	1	0	\$0	3.60
	260	1	0	\$0	3.53
	261	1	0	\$0	3.46
	262	1	0	\$0	3.40
	263	1	0	\$0	3.33
	264	1	0	\$0	3.27
23	265	1	0	\$0	3.21
	266	1	0	\$0	3.15
	267	1	0	\$0	3.09
	268	1	0	\$0	3.03
	269	1	0	\$0	2.97
	270	1	0	\$0	2.91
	271	1	0	\$0	2.86
	272	1	0	\$0	2.80
	273	1	0	\$0	2.75
	274	1	0	\$0	2.70
	275	1	0	\$0	2.65
	276	1	0	\$0	2.60
24	277	1	0	\$0	2.55
	278	1	0	\$0	2.50
	279	1	0	\$0	2.45
	280	1	0	\$0	2.41
	281	1	0	\$0	2.36
	282	1	0	\$0	2.32
	283	1	0	\$0	2.27
	284	1	0	\$0	2.23
	285	1	0	\$0	2.19
	286	1	0	\$0	2.14
	287	1	0	\$0	2.10
	288	1	0	\$0	2.06

Year	Month	Active Wells	Wells Drilled	Capital	Monthly Prodn
				\$ 000's	MMCFGM
25	289	1	0	\$0	2.03
	290	1	0	\$0	1.99
	291	1	0	\$0	1.95
	292	1	0	\$0	1.91
	293	1	0	\$0	1.88
	294	1	0	\$0	1.84
	295	1	0	\$0	1.81
	296	1	0	\$0	1.77
	297	1	0	\$0	1.74
	298	1	0	\$0	1.70
	299	1	0	\$0	1.67
	300	1	0	\$0	1.64
26	301	1	0	\$0	1.61
	302	1	0	\$0	1.58
	303	1	0	\$0	1.55
	304	1	0	\$0	1.52
	305	1	0	\$0	1.49
	306	1	0	\$0	1.46
	307	1	0	\$0	1.43
	308	1	0	\$0	1.41
	309	1	0	\$0	1.38
	310	1	0	\$0	1.35
	311	1	0	\$0	1.33
	312	1	0	\$0	1.30
27	313	1	0	\$0	1.28
	314	1	0	\$0	1.25
	315	1	0	\$0	1.23
	316	1	0	\$0	1.21
	317	1	0	\$0	1.18
	318	1	0	\$0	1.16
	319	1	0	\$0	1.14
	320	1	0	\$0	1.12
	321	1	0	\$0	1.10
	322	1	0	\$0	1.08
	323	1	0	\$0	1.06
	324	1	0	\$0	1.04
28	325	1	0	\$0	1.02
	326	1	0	\$0	1.00
	327	1	0	\$0	0.98
	328	1	0	\$0	0.96
	329	1	0	\$0	0.94
	330	1	0	\$0	0.92
	331	1	0	\$0	0.91
	332	1	0	\$0	0.89
	333	1	0	\$0	0.87
	334	1	0	\$0	0.86
	335	1	0	\$0	0.84
	336	1	0	\$0	0.82

GALLACHER MODEL

Drilling Schedule & Production

Month	Well Count	Net Gas MMCF	Fuel Use Shrinkage 1%	Net Sales Gas MMCF	MMcfd
1	1	502.12	(5.02)	497.10	16.34
2	1	492.60	(4.93)	487.67	16.03
3	1	483.26	(4.83)	478.43	15.73
4	1	474.09	(4.74)	469.35	15.43
5	1	465.11	(4.65)	460.45	15.14
6	1	456.29	(4.56)	451.72	14.85
7	1	447.64	(4.48)	443.16	14.57
8	1	439.15	(4.39)	434.76	14.29
9	1	430.82	(4.31)	426.51	14.02
10	1	422.65	(4.23)	418.43	13.76
11	1	414.64	(4.15)	410.49	13.50
12	1	406.78	(4.07)	402.71	13.24
13	1	399.06	(3.99)	395.07	12.99
14	1	391.50	(3.91)	387.58	12.74
15	1	384.07	(3.84)	380.23	12.50
16	1	376.79	(3.77)	373.02	12.26
17	1	369.65	(3.70)	365.95	12.03
18	1	362.64	(3.63)	359.01	11.80
19	1	355.76	(3.56)	352.21	11.58
20	1	349.02	(3.49)	345.53	11.36
21	1	342.40	(3.42)	338.98	11.14
22	1	335.91	(3.36)	332.55	10.93
23	1	329.54	(3.30)	326.24	10.73
24	1	323.29	(3.23)	320.06	10.52
25	1	317.16	(3.17)	313.99	10.32
26	1	311.15	(3.11)	308.04	10.13
27	1	305.25	(3.05)	302.19	9.94
28	1	299.46	(2.99)	296.47	9.75
29	1	293.78	(2.94)	290.84	9.56
30	1	288.21	(2.88)	285.33	9.38
31	1	282.75	(2.83)	279.92	9.20
32	1	277.39	(2.77)	274.61	9.03
33	1	272.13	(2.72)	269.40	8.86
34	1	266.97	(2.67)	264.30	8.69
35	1	261.90	(2.62)	259.29	8.52
36	1	256.94	(2.57)	254.37	8.36
37	1	252.07	(2.52)	249.55	8.20
38	1	247.29	(2.47)	244.81	8.05
39	1	242.60	(2.43)	240.17	7.90
40	1	238.00	(2.38)	235.62	7.75
41	1	233.49	(2.33)	231.15	7.60
42	1	229.06	(2.29)	226.77	7.46
43	1	224.72	(2.25)	222.47	7.31
44	1	220.46	(2.20)	218.25	7.18
45	1	216.28	(2.16)	214.11	7.04
46	1	212.17	(2.12)	210.05	6.91
47	1	208.15	(2.08)	206.07	6.77
48	1	204.20	(2.04)	202.16	6.65
49	1	200.33	(2.00)	198.33	6.52
50	1	196.53	(1.97)	194.57	6.40

Revenue & Taxes

Gas Price / MCF	Gross Revenue \$ 000's	Royalties \$ 000's 25%	Severance Tax \$ 000's 6%	Net Revenue \$ 000's
\$7.00	\$3,479.68	(\$869.92)	(\$208.78)	\$2,400.98
\$7.00	\$3,413.70	(\$853.43)	(\$204.82)	\$2,355.45
\$7.00	\$3,348.98	(\$837.24)	(\$200.94)	\$2,310.79
\$7.00	\$3,285.48	(\$821.37)	(\$197.13)	\$2,266.98
\$7.00	\$3,223.18	(\$805.80)	(\$193.39)	\$2,224.00
\$7.00	\$3,162.07	(\$790.52)	(\$189.72)	\$2,181.83
\$7.00	\$3,102.11	(\$775.53)	(\$186.13)	\$2,140.46
\$7.00	\$3,043.29	(\$760.82)	(\$182.60)	\$2,099.87
\$7.00	\$2,985.59	(\$746.40)	(\$179.14)	\$2,060.06
\$7.00	\$2,928.98	(\$732.25)	(\$175.74)	\$2,021.00
\$7.00	\$2,873.45	(\$718.36)	(\$172.41)	\$1,982.68
\$7.00	\$2,818.96	(\$704.74)	(\$169.14)	\$1,945.08
\$7.00	\$2,765.51	(\$691.38)	(\$165.93)	\$1,908.20
\$7.00	\$2,713.08	(\$678.27)	(\$162.78)	\$1,872.02
\$7.00	\$2,661.64	(\$665.41)	(\$159.70)	\$1,836.53
\$7.00	\$2,611.17	(\$652.79)	(\$156.67)	\$1,801.71
\$7.00	\$2,561.66	(\$640.41)	(\$153.70)	\$1,767.55
\$7.00	\$2,513.09	(\$628.27)	(\$150.79)	\$1,734.03
\$7.00	\$2,465.44	(\$616.36)	(\$147.93)	\$1,701.15
\$7.00	\$2,418.69	(\$604.67)	(\$145.12)	\$1,668.90
\$7.00	\$2,372.83	(\$593.21)	(\$142.37)	\$1,637.25
\$7.00	\$2,327.84	(\$581.96)	(\$139.67)	\$1,606.21
\$7.00	\$2,283.70	(\$570.93)	(\$137.02)	\$1,575.76
\$7.00	\$2,240.40	(\$560.10)	(\$134.42)	\$1,545.88
\$7.00	\$2,197.92	(\$549.48)	(\$131.88)	\$1,516.57
\$7.00	\$2,156.25	(\$539.06)	(\$129.37)	\$1,487.81
\$7.00	\$2,115.36	(\$528.84)	(\$126.92)	\$1,459.60
\$7.00	\$2,075.26	(\$518.81)	(\$124.52)	\$1,431.93
\$7.00	\$2,035.91	(\$508.98)	(\$122.15)	\$1,404.78
\$7.00	\$1,997.30	(\$499.33)	(\$119.84)	\$1,378.14
\$7.00	\$1,959.43	(\$489.86)	(\$117.57)	\$1,352.01
\$7.00	\$1,922.28	(\$480.57)	(\$115.34)	\$1,326.37
\$7.00	\$1,885.83	(\$471.46)	(\$113.15)	\$1,301.23
\$7.00	\$1,850.08	(\$462.52)	(\$111.00)	\$1,276.55
\$7.00	\$1,815.00	(\$453.75)	(\$108.90)	\$1,252.35
\$7.00	\$1,780.58	(\$445.15)	(\$106.84)	\$1,228.60
\$7.00	\$1,746.82	(\$436.71)	(\$104.81)	\$1,205.31
\$7.00	\$1,713.70	(\$428.43)	(\$102.82)	\$1,182.45
\$7.00	\$1,681.21	(\$420.30)	(\$100.87)	\$1,160.03
\$7.00	\$1,649.33	(\$412.33)	(\$98.96)	\$1,138.04
\$7.00	\$1,618.06	(\$404.51)	(\$97.08)	\$1,116.46
\$7.00	\$1,587.38	(\$396.84)	(\$95.24)	\$1,095.29
\$7.00	\$1,557.28	(\$389.32)	(\$93.44)	\$1,074.52
\$7.00	\$1,527.75	(\$381.94)	(\$91.67)	\$1,054.15
\$7.00	\$1,498.79	(\$374.70)	(\$89.93)	\$1,034.16
\$7.00	\$1,470.37	(\$367.59)	(\$88.22)	\$1,014.55
\$7.00	\$1,442.49	(\$360.62)	(\$86.55)	\$995.32
\$7.00	\$1,415.14	(\$353.78)	(\$84.91)	\$976.45
\$7.00	\$1,388.31	(\$347.08)	(\$83.30)	\$957.93
\$7.00	\$1,361.98	(\$340.50)	(\$81.72)	\$939.77

Drilling Schedule & Production

Month	Well Count	Net Gas MCMCF	Fuel Use Shrinkage 1%	Net Sales Gas MCMCF	MMcfd
51	1	192.81	(1.93)	190.88	6.28
52	1	189.15	(1.89)	187.26	6.16
53	1	185.57	(1.86)	183.71	6.04
54	1	182.05	(1.82)	180.23	5.93
55	1	178.60	(1.79)	176.81	5.81
56	1	175.21	(1.75)	173.46	5.70
57	1	171.89	(1.72)	170.17	5.59
58	1	168.63	(1.69)	166.94	5.49
59	1	165.43	(1.65)	163.78	5.38
60	1	162.29	(1.62)	160.67	5.28
61	1	159.22	(1.59)	157.62	5.18
62	1	156.20	(1.56)	154.64	5.08
63	1	153.24	(1.53)	151.70	4.99
64	1	150.33	(1.50)	148.83	4.89
65	1	147.48	(1.47)	146.01	4.80
66	1	144.68	(1.45)	143.24	4.71
67	1	141.94	(1.42)	140.52	4.62
68	1	139.25	(1.39)	137.86	4.53
69	1	136.61	(1.37)	135.24	4.45
70	1	134.02	(1.34)	132.68	4.36
71	1	131.48	(1.31)	130.16	4.28
72	1	128.98	(1.29)	127.70	4.20
73	1	126.54	(1.27)	125.27	4.12
74	1	124.14	(1.24)	122.90	4.04
75	1	121.79	(1.22)	120.57	3.96
76	1	119.48	(1.19)	118.28	3.89
77	1	117.21	(1.17)	116.04	3.81
78	1	114.99	(1.15)	113.84	3.74
79	1	112.81	(1.13)	111.68	3.67
80	1	110.67	(1.11)	109.56	3.60
81	1	108.57	(1.09)	107.49	3.53
82	1	106.51	(1.07)	105.45	3.47
83	1	104.49	(1.04)	103.45	3.40
84	1	102.51	(1.03)	101.49	3.34
85	1	100.57	(1.01)	99.56	3.27
86	1	98.66	(0.99)	97.68	3.21
87	1	96.79	(0.97)	95.82	3.15
88	1	94.96	(0.95)	94.01	3.09
89	1	93.16	(0.93)	92.22	3.03
90	1	91.39	(0.91)	90.48	2.97
91	1	89.66	(0.90)	88.76	2.92
92	1	87.96	(0.88)	87.08	2.86
93	1	86.29	(0.86)	85.43	2.81
94	1	84.65	(0.85)	83.81	2.76
95	1	83.05	(0.83)	82.22	2.70
96	1	81.47	(0.81)	80.66	2.65
97	1	79.93	(0.80)	79.13	2.60
98	1	78.41	(0.78)	77.63	2.55
99	1	76.93	(0.77)	76.16	2.50
100	1	75.47	(0.75)	74.71	2.46
101	1	74.04	(0.74)	73.30	2.41
102	1	72.63	(0.73)	71.91	2.36
103	1	71.26	(0.71)	70.54	2.32
104	1	69.90	(0.70)	69.21	2.28
105	1	68.58	(0.69)	67.89	2.23
106	1	67.28	(0.67)	66.61	2.19
107	1	66.00	(0.66)	65.34	2.15
108	1	64.75	(0.65)	64.10	2.11

Revenue & Taxes

Gas Price / MCF	Gross Revenue \$ 000's	Royalties \$ 000's 25%	Severance Tax \$ 000's 6%	Net Revenue \$ 000's
\$7.00	\$1,336.16	(\$334.04)	(\$80.17)	\$921.95
\$7.00	\$1,310.82	(\$327.71)	(\$78.65)	\$904.47
\$7.00	\$1,285.97	(\$321.49)	(\$77.16)	\$887.32
\$7.00	\$1,261.59	(\$315.40)	(\$75.70)	\$870.50
\$7.00	\$1,237.67	(\$309.42)	(\$74.26)	\$853.99
\$7.00	\$1,214.20	(\$303.55)	(\$72.85)	\$837.80
\$7.00	\$1,191.18	(\$297.79)	(\$71.47)	\$821.91
\$7.00	\$1,168.59	(\$292.15)	(\$70.12)	\$806.33
\$7.00	\$1,146.43	(\$286.61)	(\$68.79)	\$791.04
\$7.00	\$1,124.70	(\$281.17)	(\$67.48)	\$776.04
\$7.00	\$1,103.37	(\$275.84)	(\$66.20)	\$761.33
\$7.00	\$1,082.45	(\$270.61)	(\$64.95)	\$746.89
\$7.00	\$1,061.93	(\$265.48)	(\$63.72)	\$732.73
\$7.00	\$1,041.79	(\$260.45)	(\$62.51)	\$718.84
\$7.00	\$1,022.66	(\$255.51)	(\$61.32)	\$705.21
\$7.00	\$1,002.64	(\$250.67)	(\$60.16)	\$691.84
\$7.00	\$983.65	(\$245.91)	(\$59.02)	\$678.72
\$7.00	\$965.00	(\$241.25)	(\$57.90)	\$665.85
\$7.00	\$946.70	(\$236.68)	(\$56.80)	\$653.22
\$7.00	\$928.75	(\$232.19)	(\$55.73)	\$640.84
\$7.00	\$911.14	(\$227.79)	(\$54.67)	\$628.69
\$7.00	\$893.87	(\$223.47)	(\$53.63)	\$616.77
\$7.00	\$876.92	(\$219.23)	(\$52.62)	\$605.07
\$7.00	\$860.29	(\$215.07)	(\$51.62)	\$593.60
\$7.00	\$843.98	(\$210.99)	(\$50.64)	\$582.35
\$7.00	\$827.98	(\$206.99)	(\$49.68)	\$571.30
\$7.00	\$812.28	(\$203.07)	(\$48.74)	\$560.47
\$7.00	\$796.88	(\$199.22)	(\$47.81)	\$549.84
\$7.00	\$781.77	(\$195.44)	(\$46.91)	\$539.42
\$7.00	\$766.94	(\$191.74)	(\$46.02)	\$529.19
\$7.00	\$752.40	(\$188.10)	(\$45.14)	\$519.16
\$7.00	\$738.14	(\$184.53)	(\$44.29)	\$509.31
\$7.00	\$724.14	(\$181.03)	(\$43.45)	\$499.66
\$7.00	\$710.41	(\$177.60)	(\$42.62)	\$490.18
\$7.00	\$696.94	(\$174.23)	(\$41.82)	\$480.89
\$7.00	\$683.73	(\$170.93)	(\$41.02)	\$471.77
\$7.00	\$670.76	(\$167.69)	(\$40.25)	\$462.83
\$7.00	\$658.04	(\$164.51)	(\$39.48)	\$454.05
\$7.00	\$645.57	(\$161.39)	(\$38.73)	\$445.44
\$7.00	\$633.33	(\$158.33)	(\$38.00)	\$436.99
\$7.00	\$621.32	(\$155.33)	(\$37.28)	\$428.71
\$7.00	\$609.54	(\$152.38)	(\$36.57)	\$420.58
\$7.00	\$597.98	(\$149.49)	(\$35.88)	\$412.61
\$7.00	\$586.64	(\$146.66)	(\$35.20)	\$404.78
\$7.00	\$575.52	(\$143.88)	(\$34.53)	\$397.11
\$7.00	\$564.61	(\$141.15)	(\$33.88)	\$389.58
\$7.00	\$553.90	(\$138.48)	(\$33.23)	\$382.19
\$7.00	\$543.40	(\$135.85)	(\$32.60)	\$374.94
\$7.00	\$533.09	(\$133.27)	(\$31.99)	\$367.84
\$7.00	\$522.99	(\$130.75)	(\$31.38)	\$360.86
\$7.00	\$513.07	(\$128.27)	(\$30.78)	\$354.02
\$7.00	\$503.34	(\$125.84)	(\$30.20)	\$347.31
\$7.00	\$493.80	(\$123.45)	(\$29.63)	\$340.72
\$7.00	\$484.44	(\$121.11)	(\$29.07)	\$334.26
\$7.00	\$475.25	(\$118.81)	(\$28.52)	\$327.92
\$7.00	\$466.24	(\$116.56)	(\$27.97)	\$321.71
\$7.00	\$457.40	(\$114.35)	(\$27.44)	\$315.61
\$7.00	\$448.73	(\$112.18)	(\$26.92)	\$309.62

Drilling Schedule & Production

Month	Well Count	Net Gas M MCF	Fuel Use Shrinkage %	Net Sales Gas M MCF	M MCFd
109	1	63.52	(0.64)	62.89	2.07
110	1	62.32	(0.62)	61.70	2.03
111	1	61.14	(0.61)	60.53	1.99
112	1	59.98	(0.60)	59.38	1.95
113	1	58.84	(0.59)	58.25	1.92
114	1	57.73	(0.58)	57.15	1.88
115	1	56.63	(0.57)	56.06	1.84
116	1	55.56	(0.56)	55.00	1.81
117	1	54.50	(0.55)	53.96	1.77
118	1	53.47	(0.53)	52.94	1.74
119	1	52.46	(0.52)	51.93	1.71
120	1	51.46	(0.51)	50.95	1.67
121	1	50.49	(0.50)	49.98	1.64
122	1	49.53	(0.50)	49.03	1.61
123	1	48.59	(0.49)	48.10	1.58
124	1	47.67	(0.48)	47.19	1.55
125	1	46.76	(0.47)	46.30	1.52
126	1	45.88	(0.46)	45.42	1.49
127	1	45.01	(0.45)	44.56	1.46
128	1	44.15	(0.44)	43.71	1.44
129	1	43.32	(0.43)	42.88	1.41
130	1	42.50	(0.42)	42.07	1.38
131	1	41.69	(0.42)	41.27	1.36
132	1	40.90	(0.41)	40.49	1.33
133	1	40.12	(0.40)	39.72	1.31
134	1	39.36	(0.39)	38.97	1.28
135	1	38.62	(0.39)	38.23	1.26
136	1	37.89	(0.38)	37.51	1.23
137	1	37.17	(0.37)	36.80	1.21
138	1	36.46	(0.36)	36.10	1.19
139	1	35.77	(0.36)	35.41	1.16
140	1	35.09	(0.35)	34.74	1.14
141	1	34.43	(0.34)	34.08	1.12
142	1	33.77	(0.34)	33.44	1.10
143	1	33.13	(0.33)	32.80	1.08
144	1	32.51	(0.33)	32.18	1.06
145	1	31.89	(0.32)	31.57	1.04
146	1	31.28	(0.31)	30.97	1.02
147	1	30.69	(0.31)	30.38	1.00
148	1	30.11	(0.30)	29.81	0.98
149	1	29.54	(0.30)	29.24	0.96
150	1	28.98	(0.29)	28.69	0.94
151	1	28.43	(0.28)	28.14	0.93
152	1	27.89	(0.28)	27.61	0.91
153	1	27.36	(0.27)	27.09	0.89
154	1	26.84	(0.27)	26.57	0.87
155	1	26.33	(0.26)	26.07	0.86
156	1	25.83	(0.26)	25.58	0.84
157	1	25.34	(0.25)	25.09	0.82
158	1	24.86	(0.25)	24.62	0.81
159	1	24.39	(0.24)	24.15	0.79
160	1	23.93	(0.24)	23.69	0.78
161	1	23.48	(0.23)	23.24	0.76
162	1	23.03	(0.23)	22.80	0.75
163	1	22.59	(0.23)	22.37	0.74
164	1	22.17	(0.22)	21.94	0.72
165	1	21.75	(0.22)	21.53	0.71
166	1	21.33	(0.21)	21.12	0.69

Revenue & Taxes

Gas Price / MCF	Gross Revenue \$ 000's	Royalties \$ 000's 25%	Severance Tax \$ 000's 6%	Net Revenue \$ 000's
\$7.00	\$440.22	(\$110.05)	(\$26.41)	\$303.75
\$7.00	\$431.87	(\$107.97)	(\$25.91)	\$297.99
\$7.00	\$423.68	(\$105.92)	(\$25.42)	\$292.34
\$7.00	\$415.65	(\$103.91)	(\$24.94)	\$286.80
\$7.00	\$407.77	(\$101.94)	(\$24.47)	\$281.36
\$7.00	\$400.04	(\$100.01)	(\$24.00)	\$276.03
\$7.00	\$392.45	(\$98.11)	(\$23.55)	\$270.79
\$7.00	\$385.01	(\$96.25)	(\$23.10)	\$265.66
\$7.00	\$377.71	(\$94.43)	(\$22.66)	\$260.62
\$7.00	\$370.55	(\$92.64)	(\$22.23)	\$255.68
\$7.00	\$363.52	(\$90.88)	(\$21.81)	\$250.83
\$7.00	\$356.63	(\$89.16)	(\$21.40)	\$246.08
\$7.00	\$349.87	(\$87.47)	(\$20.99)	\$241.41
\$7.00	\$343.23	(\$85.81)	(\$20.59)	\$236.83
\$7.00	\$336.73	(\$84.18)	(\$20.20)	\$232.34
\$7.00	\$330.34	(\$82.59)	(\$19.82)	\$227.94
\$7.00	\$324.08	(\$81.02)	(\$19.44)	\$223.61
\$7.00	\$317.93	(\$79.48)	(\$19.08)	\$219.37
\$7.00	\$311.91	(\$77.98)	(\$18.71)	\$215.21
\$7.00	\$305.99	(\$76.50)	(\$18.36)	\$211.13
\$7.00	\$300.19	(\$75.05)	(\$18.01)	\$207.13
\$7.00	\$294.50	(\$73.62)	(\$17.67)	\$203.20
\$7.00	\$288.91	(\$72.23)	(\$17.33)	\$199.35
\$7.00	\$283.44	(\$70.86)	(\$17.01)	\$195.57
\$7.00	\$278.06	(\$69.52)	(\$16.68)	\$191.86
\$7.00	\$272.79	(\$68.20)	(\$16.37)	\$188.22
\$7.00	\$267.62	(\$66.90)	(\$16.06)	\$184.66
\$7.00	\$262.54	(\$65.64)	(\$15.75)	\$181.15
\$7.00	\$257.57	(\$64.39)	(\$15.45)	\$177.72
\$7.00	\$252.68	(\$63.17)	(\$15.16)	\$174.35
\$7.00	\$247.89	(\$61.97)	(\$14.87)	\$171.04
\$7.00	\$243.19	(\$60.80)	(\$14.59)	\$167.80
\$7.00	\$238.58	(\$59.64)	(\$14.31)	\$164.62
\$7.00	\$234.06	(\$58.51)	(\$14.04)	\$161.50
\$7.00	\$229.62	(\$57.40)	(\$13.78)	\$158.44
\$7.00	\$225.26	(\$56.32)	(\$13.52)	\$155.43
\$7.00	\$220.99	(\$55.25)	(\$13.26)	\$152.48
\$7.00	\$216.80	(\$54.20)	(\$13.01)	\$149.59
\$7.00	\$212.69	(\$53.17)	(\$12.76)	\$146.76
\$7.00	\$208.66	(\$52.16)	(\$12.52)	\$143.97
\$7.00	\$204.70	(\$51.18)	(\$12.28)	\$141.24
\$7.00	\$200.82	(\$50.21)	(\$12.05)	\$138.57
\$7.00	\$197.01	(\$49.25)	(\$11.82)	\$135.94
\$7.00	\$193.28	(\$48.32)	(\$11.60)	\$133.36
\$7.00	\$189.61	(\$47.40)	(\$11.38)	\$130.83
\$7.00	\$186.02	(\$46.50)	(\$11.16)	\$128.35
\$7.00	\$182.49	(\$45.62)	(\$10.95)	\$125.92
\$7.00	\$179.03	(\$44.76)	(\$10.74)	\$123.53
\$7.00	\$175.64	(\$43.91)	(\$10.54)	\$121.19
\$7.00	\$172.31	(\$43.08)	(\$10.34)	\$118.89
\$7.00	\$169.04	(\$42.26)	(\$10.14)	\$116.64
\$7.00	\$165.83	(\$41.46)	(\$9.95)	\$114.43
\$7.00	\$162.69	(\$40.67)	(\$9.76)	\$112.26
\$7.00	\$159.60	(\$39.90)	(\$9.58)	\$110.13
\$7.00	\$156.58	(\$39.14)	(\$9.39)	\$108.04
\$7.00	\$153.61	(\$38.40)	(\$9.22)	\$105.99
\$7.00	\$150.70	(\$37.67)	(\$9.04)	\$103.98
\$7.00	\$147.84	(\$36.96)	(\$8.87)	\$102.01

Drilling Schedule & Production

Month	Well Count	Net Gas MCMCF	Fuel Use Shrinkage 1%	Net Sales Gas MCMCF	MMcfd
167	1	20.93	(0.21)	20.72	0.68
168	1	20.53	(0.21)	20.33	0.67
169	1	20.14	(0.20)	19.94	0.66
170	1	19.76	(0.20)	19.56	0.64
171	1	19.39	(0.19)	19.19	0.63
172	1	19.02	(0.19)	18.83	0.62
173	1	18.66	(0.19)	18.47	0.61
174	1	18.30	(0.18)	18.12	0.60
175	1	17.96	(0.18)	17.78	0.58
176	1	17.62	(0.18)	17.44	0.57
177	1	17.28	(0.17)	17.11	0.56
178	1	16.95	(0.17)	16.79	0.55
179	1	16.63	(0.17)	16.47	0.54
180	1	16.32	(0.16)	16.15	0.53
181	1	16.01	(0.16)	15.85	0.52
182	1	15.71	(0.16)	15.55	0.51
183	1	15.41	(0.15)	15.25	0.50
184	1	15.12	(0.15)	14.96	0.49
185	1	14.83	(0.15)	14.68	0.48
186	1	14.55	(0.15)	14.40	0.47
187	1	14.27	(0.14)	14.13	0.46
188	1	14.00	(0.14)	13.86	0.46
189	1	13.74	(0.14)	13.60	0.45
190	1	13.48	(0.13)	13.34	0.44
191	1	13.22	(0.13)	13.09	0.43
192	1	12.97	(0.13)	12.84	0.42
193	1	12.72	(0.13)	12.60	0.41
194	1	12.48	(0.12)	12.36	0.41
195	1	12.25	(0.12)	12.12	0.40
196	1	12.01	(0.12)	11.89	0.39
197	1	11.79	(0.12)	11.67	0.38
198	1	11.56	(0.12)	11.45	0.38
199	1	11.34	(0.11)	11.23	0.37
200	1	11.13	(0.11)	11.02	0.36
201	1	10.92	(0.11)	10.81	0.36
202	1	10.71	(0.11)	10.60	0.35
203	1	10.51	(0.11)	10.40	0.34
204	1	10.31	(0.10)	10.20	0.34
205	1	10.11	(0.10)	10.01	0.33
206	1	9.92	(0.10)	9.82	0.32
207	1	9.73	(0.10)	9.63	0.32
208	1	9.55	(0.10)	9.45	0.31
209	1	9.37	(0.09)	9.27	0.30
210	1	9.19	(0.09)	9.10	0.30
211	1	9.01	(0.09)	8.92	0.29
212	1	8.84	(0.09)	8.76	0.29
213	1	8.68	(0.09)	8.59	0.28
214	1	8.51	(0.09)	8.43	0.28
215	1	8.35	(0.08)	8.27	0.27
216	1	8.19	(0.08)	8.11	0.27
217	1	8.04	(0.08)	7.96	0.26
218	1	7.88	(0.08)	7.81	0.26
219	1	7.73	(0.08)	7.66	0.25
220	1	7.59	(0.08)	7.51	0.25
221	1	7.44	(0.07)	7.37	0.24
222	1	7.30	(0.07)	7.23	0.24
223	1	7.16	(0.07)	7.09	0.23
224	1	7.03	(0.07)	6.96	0.23

Revenue & Taxes

Gas Price / MCF	Gross Revenue \$ 000's	Royalties \$ 000's 25%	Severance Tax \$ 000's 6%	Net Revenue \$ 000's
\$7.00	\$145.04	(\$36.26)	(\$8.70)	\$100.08
\$7.00	\$142.29	(\$35.57)	(\$8.54)	\$98.18
\$7.00	\$139.59	(\$34.90)	(\$8.38)	\$96.32
\$7.00	\$136.94	(\$34.24)	(\$8.22)	\$94.49
\$7.00	\$134.35	(\$33.59)	(\$8.06)	\$92.70
\$7.00	\$131.80	(\$32.95)	(\$7.91)	\$90.94
\$7.00	\$129.30	(\$32.32)	(\$7.76)	\$89.22
\$7.00	\$126.85	(\$31.71)	(\$7.61)	\$87.52
\$7.00	\$124.44	(\$31.11)	(\$7.47)	\$85.87
\$7.00	\$122.08	(\$30.52)	(\$7.32)	\$84.24
\$7.00	\$119.77	(\$29.94)	(\$7.19)	\$82.64
\$7.00	\$117.50	(\$29.37)	(\$7.05)	\$81.07
\$7.00	\$115.27	(\$28.82)	(\$6.92)	\$79.54
\$7.00	\$113.08	(\$28.27)	(\$6.79)	\$78.03
\$7.00	\$110.94	(\$27.73)	(\$6.66)	\$76.55
\$7.00	\$108.84	(\$27.21)	(\$6.53)	\$75.10
\$7.00	\$106.77	(\$26.69)	(\$6.41)	\$73.67
\$7.00	\$104.75	(\$26.19)	(\$6.28)	\$72.28
\$7.00	\$102.76	(\$25.69)	(\$6.17)	\$70.91
\$7.00	\$100.81	(\$25.20)	(\$6.05)	\$69.56
\$7.00	\$98.90	(\$24.73)	(\$5.93)	\$68.24
\$7.00	\$97.03	(\$24.26)	(\$5.82)	\$66.95
\$7.00	\$95.19	(\$23.80)	(\$5.71)	\$65.68
\$7.00	\$93.38	(\$23.35)	(\$5.60)	\$64.43
\$7.00	\$91.61	(\$22.90)	(\$5.50)	\$63.21
\$7.00	\$89.87	(\$22.47)	(\$5.39)	\$62.01
\$7.00	\$88.17	(\$22.04)	(\$5.29)	\$60.84
\$7.00	\$86.50	(\$21.62)	(\$5.19)	\$59.68
\$7.00	\$84.86	(\$21.21)	(\$5.09)	\$58.55
\$7.00	\$83.25	(\$20.81)	(\$4.99)	\$57.44
\$7.00	\$81.67	(\$20.42)	(\$4.90)	\$56.35
\$7.00	\$80.12	(\$20.03)	(\$4.81)	\$55.28
\$7.00	\$78.60	(\$19.65)	(\$4.72)	\$54.24
\$7.00	\$77.11	(\$19.28)	(\$4.63)	\$53.21
\$7.00	\$75.65	(\$18.91)	(\$4.54)	\$52.20
\$7.00	\$74.22	(\$18.55)	(\$4.45)	\$51.21
\$7.00	\$72.81	(\$18.20)	(\$4.37)	\$50.24
\$7.00	\$71.43	(\$17.86)	(\$4.29)	\$49.29
\$7.00	\$70.07	(\$17.52)	(\$4.20)	\$48.35
\$7.00	\$68.75	(\$17.19)	(\$4.12)	\$47.43
\$7.00	\$67.44	(\$16.86)	(\$4.05)	\$46.54
\$7.00	\$66.16	(\$16.54)	(\$3.97)	\$45.65
\$7.00	\$64.91	(\$16.23)	(\$3.89)	\$44.79
\$7.00	\$63.68	(\$15.92)	(\$3.82)	\$43.94
\$7.00	\$62.47	(\$15.62)	(\$3.75)	\$43.11
\$7.00	\$61.29	(\$15.32)	(\$3.68)	\$42.29
\$7.00	\$60.12	(\$15.03)	(\$3.61)	\$41.49
\$7.00	\$58.98	(\$14.75)	(\$3.54)	\$40.70
\$7.00	\$57.87	(\$14.47)	(\$3.47)	\$39.93
\$7.00	\$56.77	(\$14.19)	(\$3.41)	\$39.17
\$7.00	\$55.69	(\$13.92)	(\$3.34)	\$38.43
\$7.00	\$54.64	(\$13.66)	(\$3.28)	\$37.70
\$7.00	\$53.60	(\$13.40)	(\$3.22)	\$36.98
\$7.00	\$52.58	(\$13.15)	(\$3.16)	\$36.28
\$7.00	\$51.59	(\$12.90)	(\$3.10)	\$35.60
\$7.00	\$50.61	(\$12.65)	(\$3.04)	\$34.92
\$7.00	\$49.65	(\$12.41)	(\$2.98)	\$34.26
\$7.00	\$48.71	(\$12.18)	(\$2.92)	\$33.61

Drilling Schedule & Production

Month	Well Count	Net Gas MCMCF	Fuel Use Shrinkage 1%	Net Sales Gas MCMCF	MMcfd
225	1	6.90	(0.07)	6.83	0.22
226	1	6.76	(0.07)	6.70	0.22
227	1	6.64	(0.07)	6.57	0.22
228	1	6.51	(0.07)	6.45	0.21
229	1	6.39	(0.06)	6.32	0.21
230	1	6.27	(0.06)	6.20	0.20
231	1	6.15	(0.06)	6.09	0.20
232	1	6.03	(0.06)	5.97	0.20
233	1	5.92	(0.06)	5.86	0.19
234	1	5.80	(0.06)	5.75	0.19
235	1	5.69	(0.06)	5.64	0.19
236	1	5.59	(0.06)	5.53	0.18
237	1	5.48	(0.05)	5.43	0.18
238	1	5.38	(0.05)	5.32	0.17
239	1	5.27	(0.05)	5.22	0.17
240	1	5.17	(0.05)	5.12	0.17
241	1	5.08	(0.05)	5.03	0.17
242	1	4.98	(0.05)	4.93	0.16
243	1	4.89	(0.05)	4.84	0.16
244	1	4.79	(0.05)	4.74	0.16
245	1	4.70	(0.05)	4.65	0.15
246	1	4.61	(0.05)	4.57	0.15
247	1	4.53	(0.05)	4.48	0.15
248	1	4.44	(0.04)	4.40	0.14
249	1	4.36	(0.04)	4.31	0.14
250	1	4.27	(0.04)	4.23	0.14
251	1	4.19	(0.04)	4.15	0.14
252	1	4.11	(0.04)	4.07	0.13
253	1	4.03	(0.04)	3.99	0.13
254	1	3.96	(0.04)	3.92	0.13
255	1	3.88	(0.04)	3.84	0.13
256	1	3.81	(0.04)	3.77	0.12
57	1	3.74	(0.04)	3.70	0.12
258	1	3.67	(0.04)	3.63	0.12
259	1	3.60	(0.04)	3.56	0.12
260	1	3.53	(0.04)	3.49	0.11
261	1	3.46	(0.03)	3.43	0.11
262	1	3.40	(0.03)	3.36	0.11
263	1	3.33	(0.03)	3.30	0.11
264	1	3.27	(0.03)	3.24	0.11
265	1	3.21	(0.03)	3.17	0.10
266	1	3.15	(0.03)	3.11	0.10
267	1	3.09	(0.03)	3.06	0.10
268	1	3.03	(0.03)	3.00	0.10
269	1	2.97	(0.03)	2.94	0.10
270	1	2.91	(0.03)	2.88	0.09
271	1	2.86	(0.03)	2.83	0.09
272	1	2.80	(0.03)	2.78	0.09
273	1	2.75	(0.03)	2.72	0.09
274	1	2.70	(0.03)	2.67	0.09
275	1	2.65	(0.03)	2.62	0.09
276	1	2.60	(0.03)	2.57	0.08
277	1	2.55	(0.03)	2.52	0.08
278	1	2.50	(0.02)	2.47	0.08
279	1	2.45	(0.02)	2.43	0.08
280	1	2.41	(0.02)	2.38	0.08
281	1	2.36	(0.02)	2.34	0.08
282	1	2.32	(0.02)	2.29	0.08

Revenue & Taxes

Gas Price / MCF	Gross Revenue \$ 000's	Royalties \$ 000's 25%	Severance Tax \$ 000's 6%	Net Revenue \$ 000's
\$7.00	\$47.78	(\$11.95)	(\$2.87)	\$32.97
\$7.00	\$46.88	(\$11.72)	(\$2.81)	\$32.35
\$7.00	\$45.99	(\$11.50)	(\$2.76)	\$31.73
\$7.00	\$45.12	(\$11.28)	(\$2.71)	\$31.13
\$7.00	\$44.26	(\$11.07)	(\$2.66)	\$30.54
\$7.00	\$43.42	(\$10.86)	(\$2.61)	\$29.96
\$7.00	\$42.60	(\$10.65)	(\$2.56)	\$29.39
\$7.00	\$41.79	(\$10.45)	(\$2.51)	\$28.84
\$7.00	\$41.00	(\$10.25)	(\$2.46)	\$28.29
\$7.00	\$40.22	(\$10.06)	(\$2.41)	\$27.75
\$7.00	\$39.46	(\$9.86)	(\$2.37)	\$27.23
\$7.00	\$38.71	(\$9.68)	(\$2.32)	\$26.71
\$7.00	\$37.98	(\$9.49)	(\$2.28)	\$26.20
\$7.00	\$37.26	(\$9.31)	(\$2.24)	\$25.71
\$7.00	\$36.55	(\$9.14)	(\$2.19)	\$25.22
\$7.00	\$35.86	(\$8.96)	(\$2.15)	\$24.74
\$7.00	\$35.18	(\$8.79)	(\$2.11)	\$24.27
\$7.00	\$34.51	(\$8.63)	(\$2.07)	\$23.81
\$7.00	\$33.86	(\$8.46)	(\$2.03)	\$23.36
\$7.00	\$33.21	(\$8.30)	(\$1.99)	\$22.92
\$7.00	\$32.58	(\$8.15)	(\$1.96)	\$22.48
\$7.00	\$31.97	(\$7.99)	(\$1.92)	\$22.06
\$7.00	\$31.36	(\$7.84)	(\$1.88)	\$21.64
\$7.00	\$30.77	(\$7.69)	(\$1.85)	\$21.23
\$7.00	\$30.18	(\$7.55)	(\$1.81)	\$20.83
\$7.00	\$29.61	(\$7.40)	(\$1.78)	\$20.43
\$7.00	\$29.05	(\$7.26)	(\$1.74)	\$20.04
\$7.00	\$28.50	(\$7.12)	(\$1.71)	\$19.66
\$7.00	\$27.96	(\$6.99)	(\$1.68)	\$19.29
\$7.00	\$27.43	(\$6.86)	(\$1.65)	\$18.93
\$7.00	\$26.91	(\$6.73)	(\$1.61)	\$18.57
\$7.00	\$26.40	(\$6.60)	(\$1.58)	\$18.21
\$7.00	\$25.90	(\$6.47)	(\$1.55)	\$17.87
\$7.00	\$25.41	(\$6.35)	(\$1.52)	\$17.53
\$7.00	\$24.92	(\$6.23)	(\$1.50)	\$17.20
\$7.00	\$24.45	(\$6.11)	(\$1.47)	\$16.87
\$7.00	\$23.99	(\$6.00)	(\$1.44)	\$16.55
\$7.00	\$23.53	(\$5.88)	(\$1.41)	\$16.24
\$7.00	\$23.09	(\$5.77)	(\$1.39)	\$15.93
\$7.00	\$22.65	(\$5.66)	(\$1.36)	\$15.63
\$7.00	\$22.22	(\$5.55)	(\$1.33)	\$15.33
\$7.00	\$21.80	(\$5.45)	(\$1.31)	\$15.04
\$7.00	\$21.39	(\$5.35)	(\$1.28)	\$14.76
\$7.00	\$20.98	(\$5.24)	(\$1.26)	\$14.48
\$7.00	\$20.58	(\$5.15)	(\$1.23)	\$14.20
\$7.00	\$20.19	(\$5.05)	(\$1.21)	\$13.93
\$7.00	\$19.81	(\$4.95)	(\$1.19)	\$13.67
\$7.00	\$19.43	(\$4.86)	(\$1.17)	\$13.41
\$7.00	\$19.06	(\$4.77)	(\$1.14)	\$13.15
\$7.00	\$18.70	(\$4.68)	(\$1.12)	\$12.91
\$7.00	\$18.35	(\$4.59)	(\$1.10)	\$12.66
\$7.00	\$18.00	(\$4.50)	(\$1.08)	\$12.42
\$7.00	\$17.66	(\$4.41)	(\$1.06)	\$12.19
\$7.00	\$17.32	(\$4.33)	(\$1.04)	\$11.95
\$7.00	\$17.00	(\$4.25)	(\$1.02)	\$11.73
\$7.00	\$16.67	(\$4.17)	(\$1.00)	\$11.51
\$7.00	\$16.36	(\$4.09)	(\$0.98)	\$11.29
\$7.00	\$16.05	(\$4.01)	(\$0.96)	\$11.07

Drilling Schedule & Production

Month	Well Count	Net Gas MCF	Fuel Use Shrinkage %	Net Sales Gas MCF	MMcfd
283	1	2.27	(0.02)	2.25	0.07
284	1	2.23	(0.02)	2.21	0.07
285	1	2.19	(0.02)	2.16	0.07
286	1	2.14	(0.02)	2.12	0.07
287	1	2.10	(0.02)	2.08	0.07
288	1	2.06	(0.02)	2.04	0.07
289	1	2.03	(0.02)	2.01	0.07
290	1	1.99	(0.02)	1.97	0.06
291	1	1.95	(0.02)	1.93	0.06
292	1	1.91	(0.02)	1.89	0.06
293	1	1.88	(0.02)	1.86	0.06
294	1	1.84	(0.02)	1.82	0.06
295	1	1.81	(0.02)	1.79	0.06
296	1	1.77	(0.02)	1.75	0.06
297	1	1.74	(0.02)	1.72	0.06
298	1	1.70	(0.02)	1.69	0.06
299	1	1.67	(0.02)	1.66	0.05
300	1	1.64	(0.02)	1.62	0.05
301	1	1.61	(0.02)	1.59	0.05
302	1	1.58	(0.02)	1.56	0.05
303	1	1.55	(0.02)	1.53	0.05
304	1	1.52	(0.02)	1.50	0.05
305	1	1.49	(0.01)	1.48	0.05
306	1	1.46	(0.01)	1.45	0.05
307	1	1.43	(0.01)	1.42	0.05
308	1	1.41	(0.01)	1.39	0.05
309	1	1.38	(0.01)	1.37	0.04
310	1	1.35	(0.01)	1.34	0.04
311	1	1.33	(0.01)	1.32	0.04
312	1	1.30	(0.01)	1.29	0.04
313	1	1.28	(0.01)	1.27	0.04
314	1	1.25	(0.01)	1.24	0.04
315	1	1.23	(0.01)	1.22	0.04
316	1	1.21	(0.01)	1.20	0.04
317	1	1.18	(0.01)	1.17	0.04
318	1	1.16	(0.01)	1.15	0.04
319	1	1.14	(0.01)	1.13	0.04
320	1	1.12	(0.01)	1.11	0.04
321	1	1.10	(0.01)	1.09	0.04
322	1	1.08	(0.01)	1.07	0.04
323	1	1.06	(0.01)	1.05	0.03
324	1	1.04	(0.01)	1.03	0.03
325	1	1.02	(0.01)	1.01	0.03
326	1	1.00	(0.01)	0.99	0.03
327	1	0.98	(0.01)	0.97	0.03
328	1	0.96	(0.01)	0.95	0.03
329	1	0.94	(0.01)	0.93	0.03
330	1	0.92	(0.01)	0.91	0.03
331	1	0.91	(0.01)	0.90	0.03
332	1	0.89	(0.01)	0.88	0.03
333	1	0.87	(0.01)	0.86	0.03
334	1	0.86	(0.01)	0.85	0.03
335	1	0.84	(0.01)	0.83	0.03
336	1	0.82	(0.01)	0.82	0.03

Revenue & Taxes

Gas Price / MCF	Gross Revenue \$ 000's	Royalties \$ 000's 25%	Severance Tax \$ 000's 6%	Net Revenue \$ 000's
\$7.00	\$15.74	(\$3.94)	(\$0.94)	\$10.86
\$7.00	\$15.44	(\$3.86)	(\$0.93)	\$10.66
\$7.00	\$15.15	(\$3.79)	(\$0.91)	\$10.45
\$7.00	\$14.86	(\$3.72)	(\$0.89)	\$10.26
\$7.00	\$14.58	(\$3.65)	(\$0.87)	\$10.06
\$7.00	\$14.31	(\$3.58)	(\$0.86)	\$9.87
\$7.00	\$14.04	(\$3.51)	(\$0.84)	\$9.68
\$7.00	\$13.77	(\$3.44)	(\$0.83)	\$9.50
\$7.00	\$13.51	(\$3.38)	(\$0.81)	\$9.32
\$7.00	\$13.25	(\$3.31)	(\$0.80)	\$9.14
\$7.00	\$13.00	(\$3.25)	(\$0.78)	\$8.97
\$7.00	\$12.75	(\$3.19)	(\$0.77)	\$8.80
\$7.00	\$12.51	(\$3.13)	(\$0.75)	\$8.63
\$7.00	\$12.27	(\$3.07)	(\$0.74)	\$8.47
\$7.00	\$12.04	(\$3.01)	(\$0.72)	\$8.31
\$7.00	\$11.81	(\$2.95)	(\$0.71)	\$8.15
\$7.00	\$11.59	(\$2.90)	(\$0.70)	\$8.00
\$7.00	\$11.37	(\$2.84)	(\$0.68)	\$7.85
\$7.00	\$11.15	(\$2.79)	(\$0.67)	\$7.70
\$7.00	\$10.94	(\$2.74)	(\$0.66)	\$7.55
\$7.00	\$10.74	(\$2.68)	(\$0.64)	\$7.41
\$7.00	\$10.53	(\$2.63)	(\$0.63)	\$7.27
\$7.00	\$10.33	(\$2.58)	(\$0.62)	\$7.13
\$7.00	\$10.14	(\$2.53)	(\$0.61)	\$6.99
\$7.00	\$9.94	(\$2.49)	(\$0.60)	\$6.86
\$7.00	\$9.76	(\$2.44)	(\$0.59)	\$6.73
\$7.00	\$9.57	(\$2.39)	(\$0.57)	\$6.60
\$7.00	\$9.39	(\$2.35)	(\$0.56)	\$6.48
\$7.00	\$9.21	(\$2.30)	(\$0.55)	\$6.36
\$7.00	\$9.04	(\$2.26)	(\$0.54)	\$6.24
\$7.00	\$8.87	(\$2.22)	(\$0.53)	\$6.12
\$7.00	\$8.70	(\$2.17)	(\$0.52)	\$6.00
\$7.00	\$8.53	(\$2.13)	(\$0.51)	\$5.89
\$7.00	\$8.37	(\$2.09)	(\$0.50)	\$5.78
\$7.00	\$8.21	(\$2.05)	(\$0.49)	\$5.67
\$7.00	\$8.06	(\$2.01)	(\$0.48)	\$5.56
\$7.00	\$7.90	(\$1.98)	(\$0.47)	\$5.45
\$7.00	\$7.75	(\$1.94)	(\$0.47)	\$5.35
\$7.00	\$7.61	(\$1.90)	(\$0.46)	\$5.25
\$7.00	\$7.46	(\$1.87)	(\$0.45)	\$5.15
\$7.00	\$7.32	(\$1.83)	(\$0.44)	\$5.05
\$7.00	\$7.18	(\$1.80)	(\$0.43)	\$4.96
\$7.00	\$7.05	(\$1.76)	(\$0.42)	\$4.86
\$7.00	\$6.91	(\$1.73)	(\$0.41)	\$4.77
\$7.00	\$6.78	(\$1.70)	(\$0.41)	\$4.68
\$7.00	\$6.65	(\$1.66)	(\$0.40)	\$4.59
\$7.00	\$6.53	(\$1.63)	(\$0.39)	\$4.50
\$7.00	\$6.40	(\$1.60)	(\$0.38)	\$4.42
\$7.00	\$6.28	(\$1.57)	(\$0.38)	\$4.33
\$7.00	\$6.16	(\$1.54)	(\$0.37)	\$4.25
\$7.00	\$6.05	(\$1.51)	(\$0.36)	\$4.17
\$7.00	\$5.93	(\$1.48)	(\$0.36)	\$4.09
\$7.00	\$5.82	(\$1.45)	(\$0.35)	\$4.01
\$7.00	\$5.71	(\$1.43)	(\$0.34)	\$3.94

Month	Well Count	Capital Investment				Undiscounted Cash Flow		Project Returns	
		Acquisition Cost	Drilling Cost \$ 000's	Capital Investment \$ 000's	Cum Cap Investment \$ 000's	Undiscounted Cash Flow \$ 000's	Cum Undisc CF \$ 000's	ROI	NPV \$ 000's 10%
51	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$919.05	\$76,378.80	32.825x	\$17,913.48
52	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$901.57	\$77,280.37	33.200x	\$17,919.83
53	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$884.42	\$78,164.79	33.569x	\$17,925.49
54	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$867.60	\$79,032.39	33.930x	\$17,930.53
55	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$851.09	\$79,883.48	34.285x	\$17,935.04
56	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$834.90	\$80,718.37	34.633x	\$17,939.05
57	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$819.01	\$81,537.39	34.974x	\$17,942.63
58	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$803.43	\$82,340.81	35.309x	\$17,945.82
59	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$788.14	\$83,128.95	35.637x	\$17,948.67
60	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$773.14	\$83,902.10	35.959x	\$17,951.21
61	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$758.43	\$84,660.52	36.275x	\$17,953.47
62	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$743.99	\$85,404.51	36.585x	\$17,955.49
63	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$729.83	\$86,134.34	36.889x	\$17,957.29
64	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$715.94	\$86,850.28	37.188x	\$17,958.90
65	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$702.31	\$87,552.59	37.480x	\$17,960.33
66	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$688.94	\$88,241.52	37.767x	\$17,961.61
67	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$675.82	\$88,917.34	38.049x	\$17,962.75
68	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$662.95	\$89,580.29	38.325x	\$17,963.76
69	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$650.32	\$90,230.62	38.596x	\$17,964.67
70	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$637.94	\$90,868.55	38.862x	\$17,965.48
71	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$625.79	\$91,494.34	39.123x	\$17,966.20
72	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$613.87	\$92,108.21	39.378x	\$17,966.84
73	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$602.17	\$92,710.38	39.629x	\$17,967.41
74	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$590.70	\$93,301.08	39.875x	\$17,967.92
75	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$579.45	\$93,880.53	40.117x	\$17,968.38
76	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$568.40	\$94,448.93	40.354x	\$17,968.79
77	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$557.57	\$95,006.50	40.586x	\$17,969.15
78	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$546.94	\$95,553.45	40.814x	\$17,969.47
79	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$536.52	\$96,089.97	41.037x	\$17,969.76
80	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$526.29	\$96,616.26	41.257x	\$17,970.02
81	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$516.26	\$97,132.51	41.472x	\$17,970.25
82	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$506.41	\$97,638.93	41.683x	\$17,970.45
83	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$496.76	\$98,135.68	41.890x	\$17,970.63
84	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$487.28	\$98,622.97	42.093x	\$17,970.80
85	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$477.99	\$99,100.95	42.292x	\$17,970.94
86	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$468.87	\$99,569.82	42.487x	\$17,971.07
87	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$459.93	\$100,029.75	42.679x	\$17,971.18
88	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$451.15	\$100,480.90	42.867x	\$17,971.29
89	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$442.54	\$100,923.44	43.051x	\$17,971.38
90	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$434.09	\$101,357.54	43.232x	\$17,971.46
91	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$425.81	\$101,783.34	43.410x	\$17,971.53
92	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$417.68	\$102,201.02	43.584x	\$17,971.60
93	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$409.71	\$102,610.73	43.754x	\$17,971.66
94	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$401.88	\$103,012.61	43.922x	\$17,971.71
95	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$394.21	\$103,406.82	44.086x	\$17,971.75
96	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$386.68	\$103,793.50	44.247x	\$17,971.80
97	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$379.29	\$104,172.79	44.405x	\$17,971.83
98	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$372.04	\$104,544.83	44.560x	\$17,971.86
99	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$364.94	\$104,909.77	44.712x	\$17,971.89
100	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$357.96	\$105,267.73	44.862x	\$17,971.92
101	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$351.12	\$105,618.85	45.008x	\$17,971.94
102	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$344.41	\$105,963.26	45.151x	\$17,971.96
103	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$337.82	\$106,301.08	45.292x	\$17,971.98
104	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$331.36	\$106,632.44	45.430x	\$17,972.00
105	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$325.02	\$106,957.46	45.566x	\$17,972.01
106	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$318.81	\$107,276.27	45.698x	\$17,972.03
107	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$312.71	\$107,588.97	45.829x	\$17,972.04
108	1	\$0.00	\$0.00	\$0.00	(\$2.400)	\$306.72	\$107,895.69	45.957x	\$17,972.06

Month	Well Count	Capital Investment				Undiscounted Cash Flow		Project Returns	
		Acquisition Cost	Drilling Cost \$ 000's	Capital Investment \$ 000's	Cum Cap Investment \$ 000's	Undiscounted Cash Flow \$ 000's	Cum Undisc CF \$ 000's	ROI	NPV \$ 000's 10%
109	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$300.85	\$108,196.54	46.082x	\$17,972.06
110	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$295.09	\$108,491.64	46.205x	\$17,972.07
111	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$289.44	\$108,781.08	46.325x	\$17,972.07
112	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$283.90	\$109,064.98	46.444x	\$17,972.08
113	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$278.46	\$109,343.44	46.560x	\$17,972.09
114	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$273.13	\$109,616.56	46.674x	\$17,972.09
115	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$267.89	\$109,884.45	46.785x	\$17,972.10
116	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$262.76	\$110,147.21	46.895x	\$17,972.10
117	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$257.72	\$110,404.93	47.002x	\$17,972.10
118	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$252.78	\$110,657.71	47.107x	\$17,972.11
119	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$247.93	\$110,905.64	47.211x	\$17,972.11
120	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$243.18	\$111,148.82	47.312x	\$17,972.11
121	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$238.51	\$111,387.33	47.411x	\$17,972.11
122	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$233.93	\$111,621.26	47.509x	\$17,972.12
123	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$229.44	\$111,850.70	47.604x	\$17,972.12
124	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$225.04	\$112,075.73	47.698x	\$17,972.12
125	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$220.71	\$112,296.45	47.790x	\$17,972.12
126	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$216.47	\$112,512.92	47.880x	\$17,972.12
127	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$212.31	\$112,725.24	47.969x	\$17,972.12
128	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$208.23	\$112,933.47	48.056x	\$17,972.12
129	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$204.23	\$113,137.70	48.141x	\$17,972.13
130	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$200.30	\$113,338.01	48.224x	\$17,972.13
131	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$196.45	\$113,534.46	48.306x	\$17,972.13
132	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$192.67	\$113,727.13	48.386x	\$17,972.13
133	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$188.96	\$113,916.09	48.465x	\$17,972.13
134	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$185.32	\$114,101.42	48.542x	\$17,972.13
135	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$181.76	\$114,283.17	48.618x	\$17,972.13
136	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$178.25	\$114,461.43	48.692x	\$17,972.13
137	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$174.82	\$114,636.25	48.765x	\$17,972.13
138	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$171.45	\$114,807.70	48.837x	\$17,972.13
139	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$168.14	\$114,975.84	48.907x	\$17,972.13
140	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$164.90	\$115,140.74	48.975x	\$17,972.13
141	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$161.72	\$115,302.46	49.043x	\$17,972.13
142	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$158.60	\$115,461.06	49.109x	\$17,972.13
143	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$155.54	\$115,616.60	49.174x	\$17,972.13
144	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$152.53	\$115,769.13	49.237x	\$17,972.13
145	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$149.58	\$115,918.71	49.299x	\$17,972.13
146	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$146.69	\$116,065.41	49.361x	\$17,972.13
147	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$143.86	\$116,209.26	49.421x	\$17,972.13
148	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$141.07	\$116,350.34	49.479x	\$17,972.13
149	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$138.34	\$116,488.68	49.537x	\$17,972.13
150	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$135.67	\$116,624.35	49.593x	\$17,972.13
151	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$133.04	\$116,757.39	49.649x	\$17,972.13
152	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$130.46	\$116,887.85	49.703x	\$17,972.13
153	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$127.93	\$117,015.79	49.757x	\$17,972.13
154	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$125.45	\$117,141.24	49.809x	\$17,972.13
155	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$123.02	\$117,264.26	49.860x	\$17,972.13
156	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$120.63	\$117,384.89	49.910x	\$17,972.13
157	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$118.29	\$117,503.18	49.960x	\$17,972.13
158	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$115.99	\$117,619.17	50.008x	\$17,972.13
159	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$113.74	\$117,732.91	50.055x	\$17,972.13
160	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$111.53	\$117,844.43	50.102x	\$17,972.13
161	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$109.36	\$117,953.79	50.147x	\$17,972.13
162	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$107.23	\$118,061.01	50.192x	\$17,972.13
163	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$105.14	\$118,166.15	50.236x	\$17,972.13
164	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$103.09	\$118,269.25	50.279x	\$17,972.13
165	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$101.08	\$118,370.33	50.321x	\$17,972.13
166	1	\$0.00	\$0.00	\$0.00	(\$2,400)	\$99.11	\$118,469.44	50.362x	\$17,972.13

A Project report on "Exponential Decline Curve Analysis and
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