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July 20, 2000

HAND DELIVERED

David R. Catanach, Examiner
Oil Conservation Division
New Mexico Department of Energy,
Minerals and Natural Resources
2040 South Pacheco Street
Santa Fe, New Mexico 87505

Re: Case 12374: Application of Yates Petroleum Corporation for Amendment of the Special Rules and Regulations for the South Big Dog-Strawn Pool, Lea County, New Mexico.

Case 12401: Application of Ocean Energy Resources, Inc. for Pool Creation and Special Pool Rules, Pool Contraction and Cancellation of Overproduction, Lea County, New Mexico.

Dear Mr. Catanach:

Pursuant to your request at the May 4, 2000 hearing on the above-referenced applications, enclosed is the pressure information which was referenced in the testimony of Yates Petroleum Corporation. As you will see, this information shows pressure communication between the Townsend State Well No. 5, the Shell Lusk Well No. 2 and the Schenck Well No. 1 and supports Yates testimony that the Townsend Well No. 5 is not producing from a separate Strawn pod in the South Big Dog-Strawn Pool. The enclosed volumetric calculations show that the pods as interpreted by Ocean are too small to contain the reserves already produced–again showing that the pods are larger than mapped.

Also enclosed in hard copy and on disc is Yates Petroleum Corporation's Proposed Order of the Division in these cases which, to assist you with your review of these applications, contains references to the transcript and exhibits presented on May 4.

We had hoped to file this information and order on the same date as Ocean filed its data and order. However, due to recent plans by Ocean Energy for additional development in this area, we have had to proceed. See pending Case No. 12450.

Your attention to this matter is appreciated.

Very truly yours,

William F. Carr

enc.

cc: James Bruce, Esq. (w/ enc.)
Marilyn Hebert, Esq. (w/ enc.)

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

APPLICATION OF YATES PETROLEUM CORPORATION FOR AMENDMENT OF THE SPECIAL RULES AND REGULATIONS FOR THE SOUTH BIG DOG-STRAWN POOL, LEA COUNTY, NEW MEXICO. **CASE NO. 12374**

APPLICATION OF OCEAN ENERGY RESOURCES, INC. FOR POOL CREATION AND SPECIAL POOL RULES, POOL CONTRACTION AND CANCELLATION OF OVERPRODUCTION, LEA COUNTY, NEW MEXICO. **CASE NO. 12401**
ORDER NO. R-____

YATES PETROLEUM CORPORATION'S PROPOSED ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a. m. on May 4, 2000 at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this ____ day of July, 2000, the Division Director, having considered the testimony, the record and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

(1) Due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) Division Cases 12374 and 12401 were consolidated for the purpose of presenting testimony and, in order to provide a comprehensive decision in these cases, one order should be entered for both cases.

(3) The applicant in Case 12374, Yates Petroleum Corporation ("Yates") seeks an order amending the Special Pool Rules and Regulations for the South Big Dog-Strawn Pool including the adoption of a special gas-oil ratio for the pool of 6,000 cubic feet of gas for each barrel of oil produced.

(4) The applicant in Case 12401, Ocean Energy, Inc. ("Ocean") seeks the following:

(a) the contraction of the horizontal limits of the South Big Dog-Strawn Pool by deletion of the S/2 SE/4 of Irregular Section 2 and the NE/4 of Section 11, both in Township 16 South, Range 35 East, NMPM;

(b) the creation of a new pool for the production of oil from the Strawn formation to comprise the acreage deleted from the South Big Dog-Strawn Pool;

(c) the promulgation of special rules and regulations for this new pool including provisions for 80-acre spacing and designated well location requirements;

(d) the establishment of a special top depth bracket allowable for this new pool of 750 barrels of oil per day for each standard spacing unit in the pool; a special gas-oil ratio for this new pool of 6,000 cubic feet of gas for each barrel of oil produced or, in the alternative, a casinghead allowable for each unit of 4,500,000 cubic feet of gas per day; and

(e) the cancellation of any over-production incurred on wells producing from the South Big Dog-Strawn Pool within its newly established

boundaries.

(5) David Petroleum Corporation ("David"), McMillan Production Company, Inc. ("McMillan") and Permian Exploration Corporation ("Permian") appeared at the hearing, in support of the adoption of a gas-oil ratio for the pool of 6,000 cubic feet of gas for each barrel of oil produced but opposed all other matters sought by Ocean.

(6) At the hearing, Ocean requested that the portions of its application be dismissed which seek the creation of a new Strawn pool and the establishment of a special top depth bracket allowable for this new pool of 750 barrels of oil per day for each standard spacing unit in the pool. Ocean stated its support for an increase in the pool gas-oil ratio to 6,000 cubic feet of gas per barrel of oil produced. *Testimony of Saunders at 55-56.* Ocean also requested the current overproduction of its Townsend State Well No. 5 be cancelled or, in the alternative, that it be allowed to produce the well at higher rates than currently allowed by the Division thereby permitting slower make up of the overproduction. *Tr. at p. 6, Testimony of Saunders at 52.*

(7) The South Big Dog-Strawn Pool was created on February 26, 1997 by Division Order No. R-9722-C and R-10448 and was subsequently enlarged to include the following described acreage located in Lea County, New Mexico:

TOWNSHIP 15 SOUTH, RANGE 35 EAST, NMPM

Section 32: W/2 SE/4

TOWNSHIP 16 SOUTH, RANGE 35 EAST, NMPM

Section 1: Lots 11, 12, 13 and 14
Section 2: Lots 2 through 16, SE/4
Section 3: Lots 9, 10, 15 and 16, SE/4
Section 11: NE/4
Section 12: NW/4

(8) The South Big Dog-Strawn Pool is governed by Special Pool Rules and Regulations which were adopted by Division Order No. R-9722-C and R-10448-A dated February 26, 1997, which provide for 80-acre spacing and proration units with wells to be located no closer than 330 feet to any quarter-quarter section line. The pool is also governed

by Division Rule 506.A which provides for a limiting gas-oil ratio of 2,000 cubic of gas per barrel of oil produced that results in an authorized producing rate of 445 barrels of oil per day for a standard 80-acre spacing and proration unit.

INCREASED GAS-OIL RATIO

(9) Yates geological evidence showed that the Strawn reservoir in this area is a thin algal-mound-type facies with the horizontal continuity limited by the selective porosity distribution. Accordingly, it is unlikely that a secondary gas cap could form in this reservoir. *Yates Exhibit Nos. 3 and 4, Testimony of Cummins at 11,17, 26.*

(10) Yates presented a PVT sample from its Runnels "ASP" Well No. 3 which is representative of reservoir fluid at initial conditions for the South Big Dog-Strawn Pool. This sample showed that this reservoir is a volatile crude oil system with unique oil properties. It was under saturated at initial conditions with no a primary gas cap. *Yates Exhibit No. 5, Testimony of Pearson at 18-19.*

(11) The PVT data showed that wells in this pool cannot produce the oil allowable without over-producing the pools gas allowable. *Testimony of Pearson at 19.*

(12) Yates also presented engineering evidence which showed:

(a) the primary drive mechanism in this reservoir is solution gas drive *(Testimony of Pearson at 21),*

(b) the producing GOR in this reservoir is independent of the oil rate (*See, Testimony of Pearson at 21 - 23),*

(c) this reservoir is not rate sensitive (*Testimony of Pearson at 25),*

(d) once the critical gas saturation has been reached in the reservoir wells cannot be operated at a GOR at or below 2,000 cubic feet of gas per barrel of oil produced *(Testimony of Pearson 19),*

(e) the wells in this pool are capable of producing at top allowable oil rates (*Testimony of Pearson at 29),* and

(f) the oil production rate is being limited by the gas allowable *(Testimony of Pearson at 26).*

(13) Yates evidence showed that it was curtailing the production from wells it operates in this pool to stay within the pool casinghead gas allowable. *Testimony of Pearson at 24.*

(14) Increasing the gas-oil ratio to 6,000 cubic feet of gas per barrel of oil produced in this volatile oil system will not cause waste for it will not result in oil being left in the ground which otherwise would be produced under a gas-oil ratio of 2,000 to 1. *See Testimony of Pearson at 34-35.*

(15) The application of Yates Petroleum Corporation for the amendment of the Special Rules and Regulations for the South Big Dog-Strawn Pool to increase the gas-oil ratio to 6,000 cubic of feet of gas per barrel of oil produced will not cause waste, will protect the correlative rights of all interest owners in this pool and should be approved.

PRODUCTION HISTORY OF THE TOWNSEND NO. 5

(16) The evidence showed that Ocean over produced the Townsend State Well No. 5 from the date of first production in late 1998 which resulted in a directive from the Oil Conservation Division in early 1999 to restrict production from the well and bring it into compliance with the pool allowables. *Testimony of Saunders at 58.*

(17) Upon completion of the of this period of Division ordered restriction of production rates, Ocean immediately and intentionally increased production rates to 750 barrels of oil per day which was a rate 60% in excess of the pool allowable rates. *See, Yates Exhibit 6, Testimony of Saundres at 59.*

(18) By letter dated March 13, 2000, the District Supervisor of the Oil Conservation Division's District Office in Hobbs, New Mexico wrote Ocean and, among other things:

(a) observed that the Townsend State Well No. 5 had been in an overproduced state since the onset of the initial allowable for this well on November 10, 1998;

(b) advised Ocean that the well was 54,000 barrels of oil overproduced; and

(c) directed that the well be shut-in until it can be brought into compliance with the South Big Dog-Strawn Pool regulations.

Yates Exhibit No. 7.

(19) Since March 2000, Ocean has been producing this well at Division authorized restricted rates. *Testimony of Saunders at 53.*

(20) The evidence establishes that Ocean has engaged in a pattern of blatant and knowing violation of the rules of the Oil Conservation Division and has intentionally overproduced the Townsend State Well No. 5 in excess of the Division's allowable limits for this pool.

OCEAN'S REQUEST FOR CANCELLATION OF OVERPRODUCTION OR, IN THE ALTERNATIVE, A SLOWER MAKE UP OF OVERPRODUCTION

(21) Ocean's requests that the current overproduction of the Townsend State Well No. 5 be cancelled or, in the alternative, that it be allowed to produce the well at higher rates than currently allowed by the Division thereby permitting slower makeup of overproduction is based on its conclusion that the well is completed in a separate pod and is not competing for reserves with any other well in this pool. *Testimony of Saunders at 55-57.* Ocean also testified that the Townsend State Well No. 5 would be the only well drilled into this porosity pod and that it would drain the entire structure. *Testimony of Saunders at 65.*

(22) Ocean based its conclusion that the Townsend State Well No. 5 was the only well completed in a single Strawn pod on the following evidence:

(a) An isopach map based on its seismic interpretation which showed the algal mounds in the South Big Dog-Strawn Pool and the Townsend State Well No. 5 as the only well completed in one small pod *(Ocean Exhibit No. 3, Testimony of Blome at 41)*, and

(b) Pressure data from the Townsend State Well No. 5 and the offsetting Runnels "ASP" Well No. 3 which showed no pressure communication between these wells. *Testimony of Saunders at 51-52.*

(23) Ocean requested that if it was required to make up the Townsend State Well No. 5 overproduction, it be permitted to produce the well at a rate of 300 barrels of oil per day which is only 100 barrels of oil per day less than the rate at which it produced the well

prior to being directed to make up the over production. *Testimony of Saunders at 63-64, 68.*

SUMMARY OF THE EVIDENCE

(24) Although Ocean testified that it relied on its geological interpretation of reservoir separation between the pods in this pool *(Testimony of Saunders at 62)* it admitted that the location of porosity pinch outs between the pods in the South Big Dog-Strawn Pool cannot be detected from the data presented. *See, Testimony of Blome at 45-46.*

(25) While Ocean presented no pressure data on wells in this pool other than the Townsend State Well No. 5 and the Runnels "ASP" Well No. 3, Yates testified that its pressure data showed communication between the Townsend State Well No. 5 located in the SE/4 of Section 2, and the Shell Lusk Well No. 2 and the Schenck Well No. 1 located in the NW/4 of that Section 11. *Testimony of Pearson at 72-73.*

(26) While Ocean testified that it had not prepared volumetric calculations on the pods shown on its geological interpretation *(Testimony of Saunders at 60)*, Yates testified that its volumetric calculations showed the production volumes from the Townsend State Well No. 5, the Runnels "ASP" Well Nos. 2 and 3, and the Shell Lusk "ANB" Well No. 2 cannot be explained by the porosity volumes predicted by Ocean's seismic methods. For example, Yates volumetric calculations show that the Townsend State Well No. 5 has produced 2.5 to 3.0 times more oil than could possibly fit into the pay that is detectable by Ocean's seismic interpretation. *Testimony of Pearson at 70-71,76, 80.* Accordingly, Yates concluded the size of the pod from which the Townsend State Well No. 5 is producing is much larger than shown on Ocean's seismic interpretation and extends to the southwest toward the Shell Lusk Well No. 2 and the Runnels "ASP" Well No. 3 . *Testimony of Pearson at 71, 76.*

(27) The evidence showed that the Townsend State Well No. 5 is not completed in a separate producing pod in the South Big Dog-Strawn Pool and that it competes with other wells in the pool for reserves. *See, Testimony of Pearson at 71.*

(28) Yates testified that it and other producers in this pool are curtailing production from wells they operate in the South Big Dog-Strawn Pool to meet current gas allowable limits. *Testimony of Pearson at 24.*

(29) To cancel the overproduction for wells in the South Big Dog-Strawn Pool would reward Ocean for its willful disregard of the rules of the Division, and would impair

the correlative rights of other owners in the pool who have operated their wells in accordance with the allowable limits for the South Big Dog-Strawn Pool.

(30) The application of Ocean Energy Resources, Inc. to cancel overproduction in the South Big Dog-Strawn Pool should be denied.

(31) The original reservoir pressure in the Townsend State Well No. 5 was 4150 psia which has declined to a current pressure of 1300 psia. *Testimony of Pearson at 27, Testimony of Saunders at 68.*

(32) The Strawn pod being produced in the Townsend State Well No. 5 is largely depleted and will not be able to make up its overproduction if allowed to produce at a restricted rate because there are insufficient remaining reserves available to the well. *Testimony of Pearson at 70.*

(33) The request of Ocean to permit it to increase the production rate of the Townsend State Well No. 5 to 300 barrels of oil per day should be denied.

(34) The current Division-authorized producing rate of 150 barrels of oil per day for the Townsend State Well No. 5 should only be increased if it is demonstrated to the satisfaction of the District Supervisor of the Oil Conservation Divison's District Office in Hobbs that an increase is necessary to prevent permanent damage to the well. Any request from Ocean for an increase in production rate shall be in writing with supporting data attached. Copies of all requests shall be provided to Yates, David, McMillan and Permian and all tests conducted to support such requests shall be made only after reasonable notice to Yates, David, McMillan and Permian who shall be permitted to witness all tests.

IT IS THEREFORE ORDERED THAT:

(1) The application of Yates Petroleum Corporation in Case 12374 for an order amending the Special Pool Rules and Regulations for the South Big Dog-Strawn Pool including the adoption of a special gas-oil ratio for the pool of 6,000 cubic feet of gas for each barrel of oil produced is hereby granted.

(2) At the request of Ocean Energy Resources, Inc., its application in Case 12401 for the contraction of the horizontal limits of the South Big Dog-Strawn Pool by deletion of the S/2 SE/4 of Irregular Section 2 and the NE/4 of Section 11, both in Township 16 South, Range 35 East, NMPM; the creation of a new pool for the production of oil from the Strawn

formation to comprise the acreage deleted from the South Big Dog-Strawn Pool; the promulgation of special pool rules for this new pool; and the establishment of a special top depth bracket allowable for this new pool of 750 barrels of oil per day for each standard spacing unit in the pool is hereby dismissed.

(3) The application of Ocean Energy Resources, Inc. in Case 12401 for the cancellation of any over-production incurred on wells producing from the South Big Dog-Strawn Pool is hereby denied.

(4) The request of Ocean Energy Resources, Inc. to permit it to increase the production rate of its Townsend State Well No. 5 is denied.

(5) The current Division-authorized producing rate for the Townsend State Well No 5 of 150 barrels of oil per day shall not be be increased unless it is demonstrated to the satisfaction of the District Supervisor of the Oil Conservation Divison's District Office in Hobbs that an increase is necessary to prevent permanent damage to the well. Any request by Ocean for an increase in production rate shall be in writing with supporting data attached. Copies of all requests shall be provided to Yates, David, McMillan and Permian and all tests conducted to support such requests shall be made only after reasonable notice to Yates, David, McMillan and Permian who shall be permitted to witness all tests.

(6) Jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE in Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

LORI WROTENBERY,
Director

S E A L

Ocean Energy Townsend #5 Volumetric Calculations

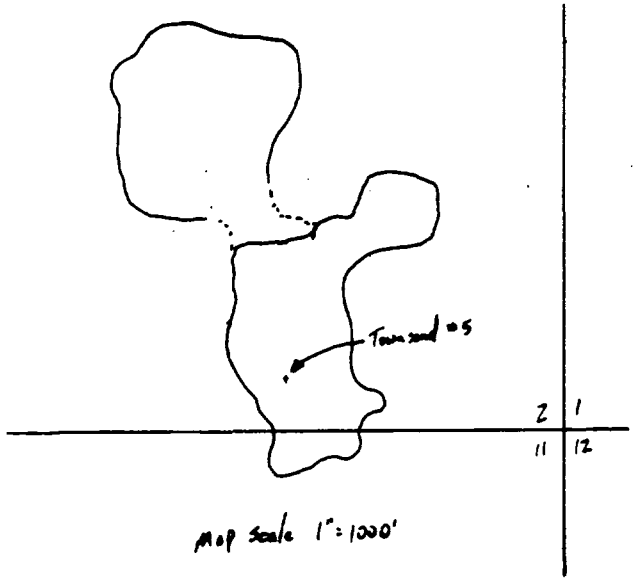
Main Strawn Pay Zone 11,450 - 11,542'

$$N\ (OOIP) = \frac{7758\, A\, h\, \phi\, (1-S_w)}{B_{oi}}$$

~~Too High~~ Small Case

Assuming:

A = 20.3 acres from seismic map
h = 91 ft from Townsend #5 openhole log
ϕ_{avg} = 0.069 from petrophysical analysis of zone
S_{wavg} = 0.32 from petrophysical analysis of zone
B_{oi} = 1.94 $\frac{RB}{STB}$ from Standings correlation for produced fluid
R_f = 0.18 for high-side solution gas drive reservoir



Map scale 1" = 1000'

Planimeting (Small Case)	Pass	Acreage
	1	20.64
	2	~~20.99~~
	3	20.28
	4	~~17.44~~
	5	19.93
		20.28 acres.

$$N = \frac{7758\,(20.3\text{ acres})\,(91\text{ ft})\,(0.069)\,(1-0.32)}{1.94\ \frac{RB}{STB}} = 346,612\ STB$$

Ocean Energy Townsend #5 Volumetric Calculations, Cont'd

Small Case Main Strawn pay zone calculations, cont'd

Recoverable 0.1 in Place = $N R_f$: (347,000 STB) (0.18)
= 62,460 STB

Large Case

A = 38.7 acres
h = 91 ft
ϕ_{avg} = 0.069
$S_{w_{avg}}$ = 0.32
B_{oi} = 1.94 $\frac{RB}{STB}$
R_f = 0.18

Planimetry (Large Case)	Pass	Acreage
	1	~~38.07~~
	2	~~39.85~~
	3	38.79
	4	38.43
	5	38.79
		38.67 acres

$$N = \frac{7758\ A\ h\ \phi\ (1-sw)}{B_{oi}} = \frac{7758\ (38.7\ \text{acres})(91.\ \text{ft})\ (0.069)\ (1-0.32)}{1.94\ \frac{RB}{STB}}$$
$$= 660,782$$

Recoverable 0.1 in Place = $N R_f$ = (661,000) (0.18)
= 119.000 STB

Updated Ocean Energy Townsend #5 Volumetric Calculations

Update reflects more accurate Formation Volume factor from actual PVT measurement rather than correlations

For Small Case:

$$N = \frac{7758\,(20.3 \text{ acres})\,(91 \text{ ft})\,(0.069)\,(1-0.32)}{2.65\ \frac{RB}{STB}} = 253{,}746 \text{ STB}$$

Small Case OOIP = 254 ~~mbst~~ MSTB

For Large Case:

$$N = \frac{7758\,(38.7 \text{ acres})\,(91 \text{ ft})\,(0.069)\,(1-0.32)}{2.65\ \frac{RB}{STB}} = 483{,}743 \text{ STB}$$

Large Case OOIP = 484 MSTB

From Ocean's Map:

Isopach (ft)	Area (acres)	Volume (acre-ft) (using frustrum of a pyramid method)	
0'	67.61		
20'	55.51	$\frac{1}{3}(20)\left(67.61+55.51+\left[(67.61)(55.51)\right]^{\frac{1}{2}}\right)$	= 1229
40'	45.90	$\frac{1}{3}(20)\left(55.51+45.90+\left[(55.51)(45.90)\right]^{\frac{1}{2}}\right)$	= 1013
60'	33.09	$\frac{1}{3}(20)\left(45.90+33.09+\left[(45.90)(33.09)\right]^{\frac{1}{2}}\right)$	= 786.4
80'	22.06	$\frac{1}{3}(20)\left(33.09+22.06+\left[(33.09)(22.06)\right]^{\frac{1}{2}}\right)$	= 547.8
100'	14.59	$\frac{1}{3}(20)\left(22.06+14.59+\left[(22.06)(14.59)\right]^{\frac{1}{2}}\right)$	= 363.9
120'	4.98	$\frac{1}{3}(20)\left(14.59+4.98+\left[(14.59)(4.98)\right]^{\frac{1}{2}}\right)$	= 187.3
		$\frac{1}{3}(20)\left(4.98+0+\left[(4.98)(0)\right]^{\frac{1}{2}}\right)$	= 33.2
			4160.6 acre-ft

$$N = \frac{7758\,(4160.9)\,(0.069)\,(1-0.32)}{2.65} = 571{,}543 \text{ STB}$$

Ocean's Map OOIP = 572 MSTB

Comparison of Initial Pressures for Section 11 Area Strawn Wells

7/13/99 DLP

Well	Gauge Depth	P*	API Gravity	Datum	P*@Datum	Date
Yates Shell Lusk #2	11,361	3,738	44	11,500	3,787	7/12/99
Ocean Townsend #5	11,490	4,109	44	11,500	4,112	10/23/98
Yates Runnels #3	10,875	3,936	46	11,500	4,152	5/8/99
Yates Runnels #2	11,359	4,231	45	11,500	4,280	9/4/98

Wellfile

11-16 S-35E

WELL TEST REPORT

FILED MAY 13 1999

COMPANY NAME : Yates Petroleum Corp

FIELD : Townsend

WELL NAME : Runnels 'ASP' #3

LOCATION : Lea County

PERF. INTERVAL :

ELEVATION :

GAUGE DEPTH : 10875 feet

GAUGE MODEL : II

GAUGE S/N : 20494

TEST TYPE : 1 HOUR FLOW, 3 DAY SHUT IN

COMMENTS :

TECHNICIAN : Standefer

REPORT DATE : 05/08/99

By:

Jarrel Services Inc.
HOBBS, NEW MEXICO

WELL TEST DATA REPORT Page: 1

OMPANY : Yates Petroleum Corp
IELD : Townsend
ELL : Runnels 'ASP' #3
OCATION : Lea County

TEST INT. :
GAUGE DEPTH : 10875 feet
GAUGE S/N : 20494
START DATE: 05/05/99 (MM/DD/YY)
START TIME: 13:11:00 (HH:MM:SS)

Day	Time HH:MM:SS	Delta Time Hours	Press PSIA	dp	Temp 'F	Record # in the DataFile
INSTRUMENTS ON BOTTOM WITH WELL FLOWING						
1	13:11:00	0.000	3841.0	0.0	165.4	1
1	13:16:00	0.083	3840.4	-0.6	167.3	2
1	13:21:01	0.167	3840.0	-0.4	168.6	3
1	13:26:00	0.250	3839.8	-0.2	169.2	4
1	13:31:00	0.333	3839.7	-0.1	169.5	5
1	13:36:00	0.417	3839.6	-0.1	169.7	6
1	13:41:00	0.500	3839.4	-0.2	169.8	7
1	13:46:00	0.583	3839.2	-0.2	169.9	8
1	13:51:00	0.667	3839.1	-0.2	169.9	9
1	13:56:00	0.750	3838.9	-0.2	170.0	10
1	14:01:00	0.833	3838.7	-0.2	170.0	11
1	14:06:01	0.917	3838.6	-0.1	170.0	12
1	14:11:00	1.000	3838.5	-0.1	170.0	13
SHUT WELL IN						
1	14:16:00	1.083	3893.5	55.0	169.8	14
1	14:21:01	1.167	3896.8	3.3	169.6	15
1	14:26:00	1.250	3898.9	2.1	169.2	16
1	14:31:00	1.333	3900.4	1.5	168.9	17
1	14:36:00	1.417	3901.6	1.3	168.6	18
1	14:41:00	1.500	3902.7	1.1	168.3	19
1	14:46:00	1.583	3903.7	1.0	167.9	20
1	14:51:01	1.667	3904.6	0.9	167.6	21
1	14:56:00	1.750	3905.3	0.7	167.4	22
1	15:01:00	1.833	3906.0	0.7	167.2	23
1	15:06:01	1.917	3906.6	0.6	167.0	24
1	15:11:00	2.000	3907.2	0.6	166.8	25
1	15:16:00	2.083	3907.7	0.5	166.6	26
1	15:21:00	2.167	3908.2	0.5	166.5	27
1	15:26:00	2.250	3908.6	0.4	166.4	28
1	15:31:00	2.333	3909.0	0.4	166.3	29
1	15:36:01	2.417	3909.4	0.4	166.1	30
1	15:41:00	2.500	3909.8	0.4	166.0	31
1	15:46:00	2.583	3910.2	0.4	165.9	32
1	15:51:01	2.667	3910.6	0.4	165.8	33
1	15:56:00	2.750	3910.9	0.4	165.7	34
1	16:01:00	2.833	3911.2	0.3	165.6	35
1	16:06:00	2.917	3911.6	0.3	165.4	36
1	16:11:00	3.000	3911.9	0.3	165.3	37
1	16:16:00	3.083	3912.3	0.3	165.2	38

Day	Time HH:MM:SS	Delta Time Hours	Press PSIA	dp	Temp 'F	Record # in the DataFile
1	16:21:01	3.167	3912.6	0.3	165.1	39
1	16:26:00	3.250	3912.9	0.3	164.9	40
1	16:31:00	3.333	3913.1	0.3	164.9	41
1	16:36:01	3.417	3913.4	0.2	164.8	42
1	16:41:00	3.500	3913.6	0.2	164.7	43
1	16:46:00	3.583	3913.8	0.2	164.7	44
1	16:51:00	3.667	3914.0	0.2	164.6	45
1	16:56:00	3.750	3914.2	0.3	164.6	46
1	17:01:00	3.833	3914.5	0.3	164.5	47
1	17:06:01	3.917	3914.7	0.2	164.4	48
1	17:11:00	4.000	3914.9	0.2	164.3	49
1	17:16:00	4.083	3915.1	0.2	164.2	50
1	17:21:01	4.167	3915.3	0.2	164.1	51
1	17:26:00	4.250	3915.5	0.2	164.1	52
1	17:31:00	4.333	3915.6	0.1	164.0	53
1	17:36:00	4.417	3915.8	0.2	164.0	54
1	17:41:00	4.500	3916.0	0.2	164.0	55
1	17:46:00	4.583	3916.2	0.1	163.9	56
1	17:51:01	4.667	3916.3	0.1	163.9	57
1	17:56:00	4.750	3916.4	0.1	163.9	58
1	18:01:00	4.833	3916.6	0.1	163.9	59
1	18:06:00	4.917	3916.7	0.1	163.9	60
1	18:11:00	5.000	3916.9	0.1	163.8	61
1	18:16:00	5.083	3917.0	0.1	163.8	62
1	18:21:00	5.167	3917.1	0.1	163.8	63
1	18:26:00	5.250	3917.2	0.1	163.7	64
1	18:31:00	5.333	3917.4	0.2	163.7	65
1	18:36:01	5.417	3917.6	0.2	163.6	66
1	18:41:00	5.500	3917.7	0.1	163.6	67
1	18:46:00	5.583	3917.9	0.2	163.5	68
1	18:51:00	5.667	3918.1	0.2	163.5	69
1	18:56:00	5.750	3918.2	0.2	163.4	70
1	19:01:00	5.833	3918.4	0.2	163.4	71
1	19:06:00	5.917	3918.6	0.2	163.3	72
1	19:11:00	6.000	3918.7	0.2	163.3	73
1	19:41:00	6.500	3919.6	0.9	163.0	74
1	20:11:00	7.000	3920.4	0.8	162.8	75
1	20:41:00	7.500	3921.1	0.7	162.7	76
1	21:11:00	8.000	3921.8	0.6	162.6	77
1	21:41:00	8.500	3922.4	0.6	162.5	78
1	22:11:00	9.000	3922.9	0.5	162.4	79
1	22:41:00	9.500	3923.4	0.5	162.3	80
1	23:11:00	10.000	3923.8	0.4	162.3	81
1	23:41:00	10.500	3924.2	0.4	162.2	82
2	00:11:00	11.000	3924.6	0.4	162.2	83

Day	Time HH:MM:SS	Delta Time Hours	Press PSIA	dp	Temp 'F	Record # in the DataFile
2	00:41:00	11.500	3925.0	0.4	162.2	84
2	01:11:00	12.000	3925.3	0.3	162.2	85
2	01:41:00	12.500	3925.7	0.4	162.1	86
2	02:11:00	13.000	3926.0	0.3	162.1	87
2	02:41:00	13.500	3926.3	0.3	162.1	88
2	03:11:00	14.000	3926.6	0.3	162.0	89
2	03:41:00	14.500	3926.9	0.3	162.0	90
2	04:11:00	15.000	3927.2	0.3	161.9	91
2	04:41:00	15.500	3927.4	0.2	161.9	92
2	05:11:00	16.000	3927.7	0.3	161.9	93
2	05:41:00	16.500	3927.9	0.2	161.8	94
2	06:11:00	17.000	3928.1	0.2	161.7	95
2	06:41:00	17.500	3928.3	0.2	161.7	96
2	07:11:00	18.000	3928.4	0.2	161.7	97
2	07:41:00	18.500	3928.6	0.2	161.6	98
2	08:11:00	19.000	3928.8	0.2	161.6	99
2	08:41:00	19.500	3928.9	0.1	161.6	100
2	09:11:00	20.000	3928.9	0.1	161.5	101
2	09:41:00	20.500	3929.1	0.1	161.5	102
2	10:11:00	21.000	3929.2	0.1	161.5	103
2	10:41:00	21.500	3929.3	0.1	161.5	104
2	11:11:00	22.000	3929.4	0.1	161.5	105
2	11:41:00	22.500	3929.5	0.1	161.5	106
2	12:11:00	23.000	3929.6	0.2	161.5	107
2	12:41:00	23.500	3929.7	0.0	161.5	108
2	13:11:00	24.000	3929.8	0.1	161.4	109
2	13:41:00	24.500	3929.9	0.1	161.4	110
2	14:11:00	25.000	3929.9	0.0	161.4	111
2	14:41:00	25.500	3930.0	0.1	161.4	112
2	15:11:00	26.000	3930.1	0.1	161.4	113
2	15:41:00	26.500	3930.2	0.0	161.4	114
2	16:11:00	27.000	3930.2	0.1	161.4	115
2	16:41:00	27.500	3930.3	0.1	161.4	116
2	17:11:00	28.000	3930.4	0.1	161.4	117
2	17:41:00	28.500	3930.4	0.0	161.4	118
2	18:11:00	29.000	3930.5	0.1	161.4	119
2	18:41:00	29.500	3930.5	0.0	161.4	120
2	19:11:00	30.000	3930.5	0.1	161.4	121
2	19:41:00	30.500	3930.6	0.1	161.4	122
2	20:11:00	31.000	3930.7	0.1	161.4	123
2	20:41:00	31.500	3930.7	0.0	161.4	124
2	21:11:00	32.000	3930.8	0.1	161.4	125
2	21:41:00	32.500	3930.8	0.0	161.4	126
2	22:11:00	33.000	3930.8	0.0	161.4	127
2	22:41:00	33.500	3930.9	0.1	161.4	128

Day	Time HH:MM:SS	Delta Time Hours	Press PSIA	dp	Temp 'F	Record # in the DataFile
2	23:11:00	34.000	3930.9	0.0	161.4	129
2	23:41:00	34.500	3930.9	0.1	161.4	130
3	00:11:00	35.000	3931.0	0.1	161.4	131
3	00:41:00	35.500	3931.0	0.0	161.4	132
3	01:11:00	36.000	3931.1	0.1	161.4	133
3	01:41:00	36.500	3931.1	0.0	161.4	134
3	02:11:00	37.000	3931.2	0.1	161.4	135
3	02:41:00	37.500	3931.2	0.0	161.4	136
3	03:11:00	38.000	3931.3	0.1	161.3	137
3	03:41:00	38.500	3931.3	0.0	161.3	138
3	04:11:00	39.000	3931.4	0.1	161.3	139
3	04:41:00	39.500	3931.4	0.1	161.3	140
3	05:11:00	40.000	3931.4	0.0	161.3	141
3	05:41:00	40.500	3931.5	0.1	161.3	142
3	06:11:00	41.000	3931.6	0.0	161.3	143
3	06:41:00	41.500	3931.6	0.1	161.3	144
3	07:11:00	42.000	3931.6	0.0	161.3	145
3	07:41:00	42.500	3931.7	0.1	161.3	146
3	08:11:00	43.000	3931.8	0.1	161.3	147
3	08:41:00	43.500	3931.8	0.0	161.3	148
3	09:11:00	44.000	3931.8	0.1	161.3	149
3	09:41:00	44.500	3931.9	0.0	161.3	150
3	10:11:00	45.000	3931.9	0.1	161.3	151
3	10:41:00	45.500	3931.9	0.0	161.3	152
3	11:11:00	46.000	3932.0	0.1	161.3	153
3	11:41:00	46.500	3932.0	0.0	161.3	154
3	12:11:00	47.000	3932.1	0.1	161.3	155
3	12:41:00	47.500	3932.2	0.1	161.3	156
3	13:11:00	48.000	3932.2	0.1	161.3	157
3	13:41:00	48.500	3932.2	0.0	161.3	158
3	14:11:00	49.000	3932.3	0.0	161.3	159
3	14:41:00	49.500	3932.3	0.1	161.3	160
3	15:11:00	50.000	3932.4	0.0	161.3	161
3	15:41:00	50.500	3932.4	0.0	161.3	162
3	16:11:00	51.000	3932.4	0.0	161.3	163
3	16:41:00	51.500	3932.5	0.1	161.3	164
3	17:11:00	52.000	3932.5	0.0	161.3	165
3	17:41:00	52.500	3932.6	0.1	161.3	166
3	18:11:00	53.000	3932.6	0.0	161.3	167
3	18:41:00	53.500	3932.6	0.0	161.3	168
3	19:11:00	54.000	3932.6	0.1	161.3	169
3	19:41:00	54.500	3932.6	0.0	161.3	170
3	20:11:00	55.000	3932.7	0.1	161.3	171
3	20:41:00	55.500	3932.8	0.1	161.3	172
3	21:11:00	56.000	3932.8	0.0	161.3	173

Day	Time HH:MM:SS	Delta Time Hours	Press PSIA	dp	Temp 'F	Record # in the DataFile
3	21:41:00	56.500	3932.8	0.0	161.3	174
3	22:11:00	57.000	3932.9	0.1	161.3	175
3	22:41:00	57.500	3932.9	0.0	161.3	176
3	23:11:00	58.000	3933.0	0.1	161.3	177
3	23:41:00	58.500	3933.0	0.0	161.3	178
4	00:11:00	59.000	3933.1	0.1	161.3	179
4	00:41:00	59.500	3933.1	0.0	161.3	180
4	01:11:00	60.000	3933.1	0.1	161.3	181
4	01:41:00	60.500	3933.1	0.0	161.3	182
4	02:11:00	61.000	3933.2	0.1	161.3	183
4	02:41:00	61.500	3933.2	0.0	161.3	184
4	03:11:00	62.000	3933.2	0.1	161.3	185
4	03:41:00	62.500	3933.3	0.0	161.3	186
4	04:11:00	63.000	3933.3	0.0	161.3	187
4	04:41:00	63.500	3933.4	0.1	161.3	188
4	05:11:00	64.000	3933.4	0.0	161.3	189
4	05:41:00	64.500	3933.4	0.1	161.3	190
4	06:11:00	65.000	3933.4	0.0	161.3	191
4	06:41:00	65.500	3933.5	0.1	161.3	192
4	07:11:00	66.000	3933.5	0.0	161.3	193
4	07:41:00	66.500	3933.6	0.1	161.3	194
4	08:11:00	67.000	3933.6	0.0	161.3	195
4	08:41:00	67.500	3933.6	0.0	161.3	196
4	09:11:00	68.000	3933.6	0.0	161.3	197
4	09:41:00	68.500	3933.7	0.0	161.3	198
4	10:11:00	69.000	3933.7	0.0	161.3	199
4	10:41:00	69.500	3933.7	0.0	161.3	200
4	11:11:00	70.000	3933.7	0.1	161.3	201
4	11:41:00	70.500	3933.7	0.0	161.3	202
4	11:50:00	70.650	3933.7	0.0	161.3	203

Flowing Pressure Gradient

Company : Yates Petroleum

Test date : 05/05/99 @ 1:11 pm

Data File : RUN3.BHP

Remarks:

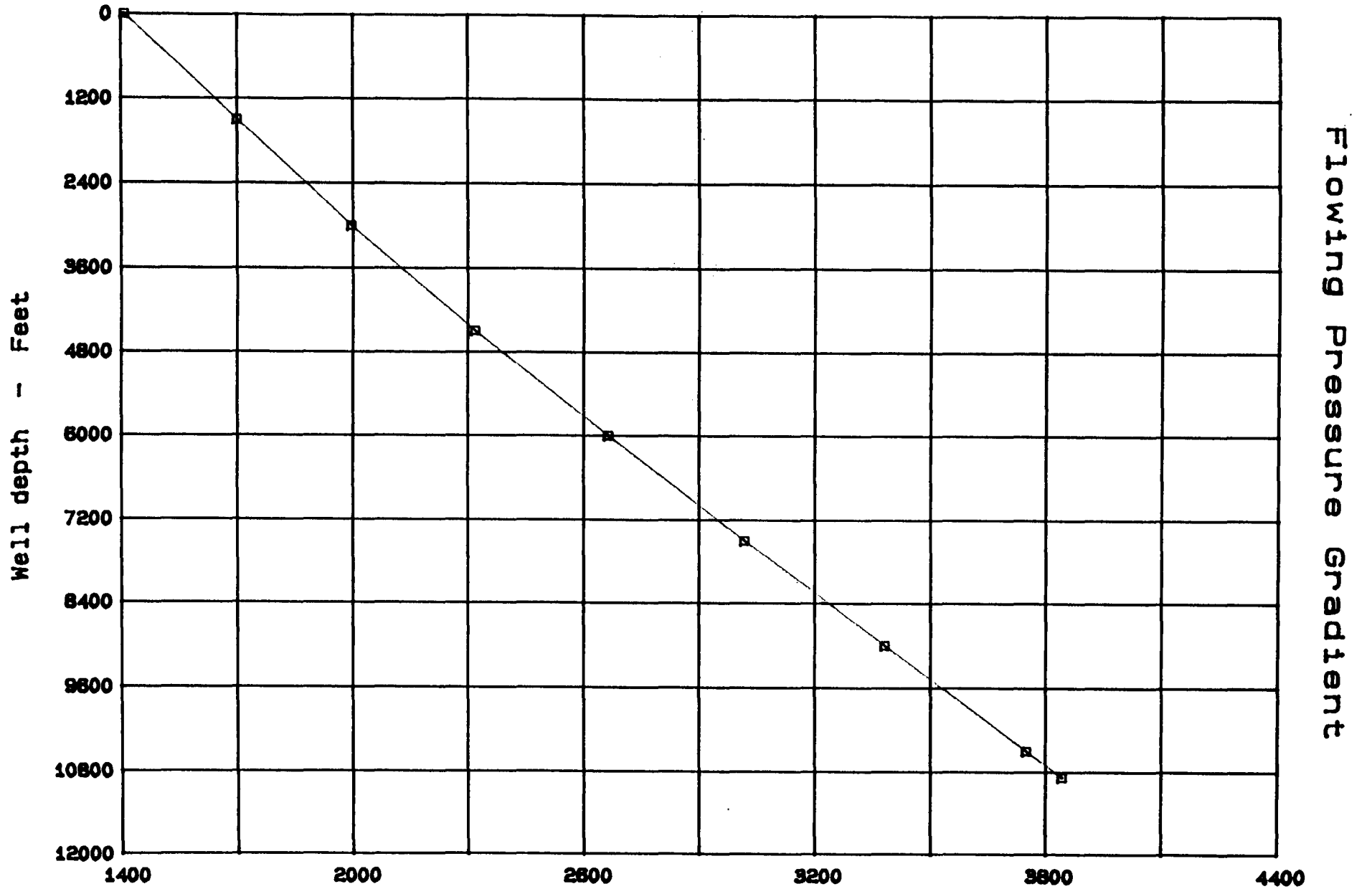
Depth (feet)	Pressure (psig)	Delta Pressure (psig)	Pressure Gradient (psig/ft)
Surface	1,408.00		
1,500	1,699.00	291.00	0.1940
3,000	1,995.00	296.00	0.1973
4,500	2,318.00	323.00	0.2153
6,000	2,662.00	344.00	0.2293
7,500	3,018.00	356.00	0.2373
9,000	3,381.00	363.00	0.2420
10,500	3,749.00	368.00	0.2453
10,875	3,841.00	92.00	0.2453

Jarrel Services Inc.

Company : Yates Petroleum | Well # : | Location :

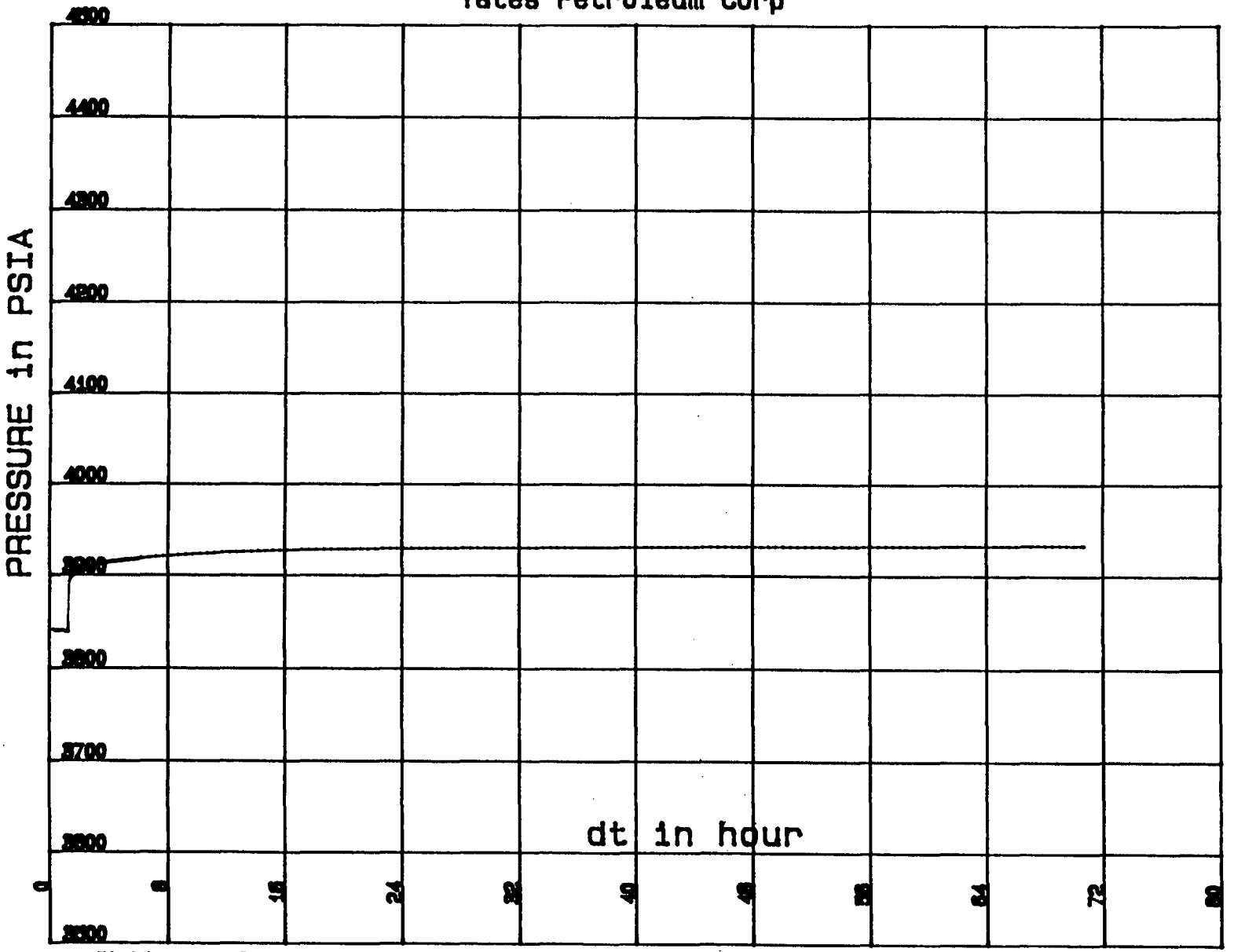
Lease : Runnels 'ASP' #3 | Field : Townsend | Test date : 05/05/99 @ 1:11 pm

County : Lea | State : New Mexico | File - RUN3



LINEAR PLOT

Yates Petroleum Corp



Field: Townsend
Start time: 05: 05: 99/13: 11: 00
Comments:

Test Interval:
Stop time: 05: 08: 99/11: 50: 00

Well: Runnels 'ASP' #3
Gauge Depth: 10875 feet

Jarrel Services Inc.

Shut-in Pressure Gradient

Company : Yates Petroleum

Test date : 05/08/99 @ 11:50 am

Data File : RUN3.BHP

Remarks: Fluid level @ 2496'

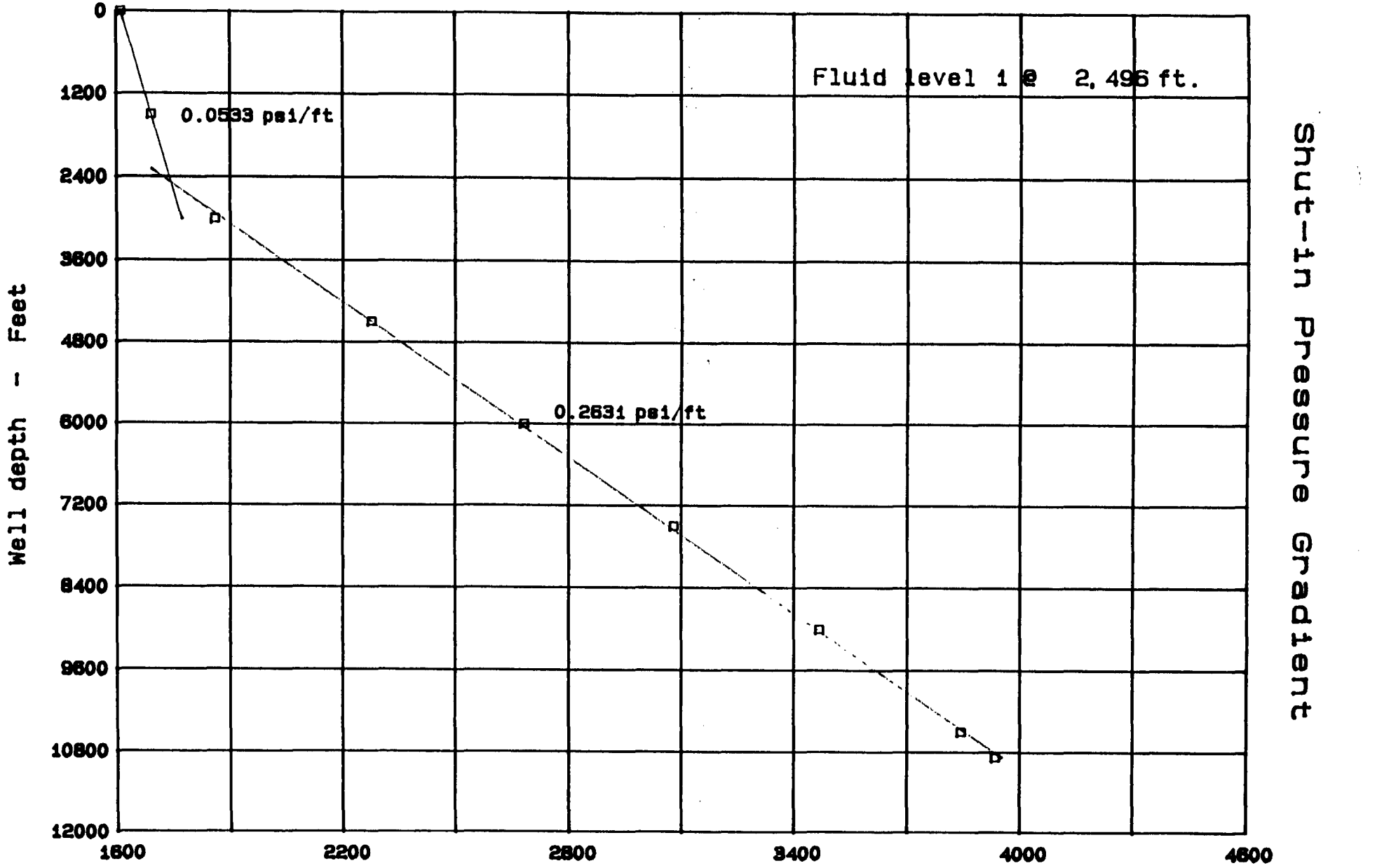
Depth (feet)	Pressure (psig)	Delta Pressure (psig)	Pressure Gradient (psig/ft)
Surface	1,612.00		
1,500	1,692.00	80.00	0.0533
3,000	1,858.00	166.00	0.1107
4,500	2,275.00	417.00	0.2780
6,000	2,681.00	406.00	0.2707
7,500	3,079.00	398.00	0.2653
9,000	3,466.00	387.00	0.2580
10,500	3,842.00	376.00	0.2507
10,875	3,934.00	92.00	0.2453

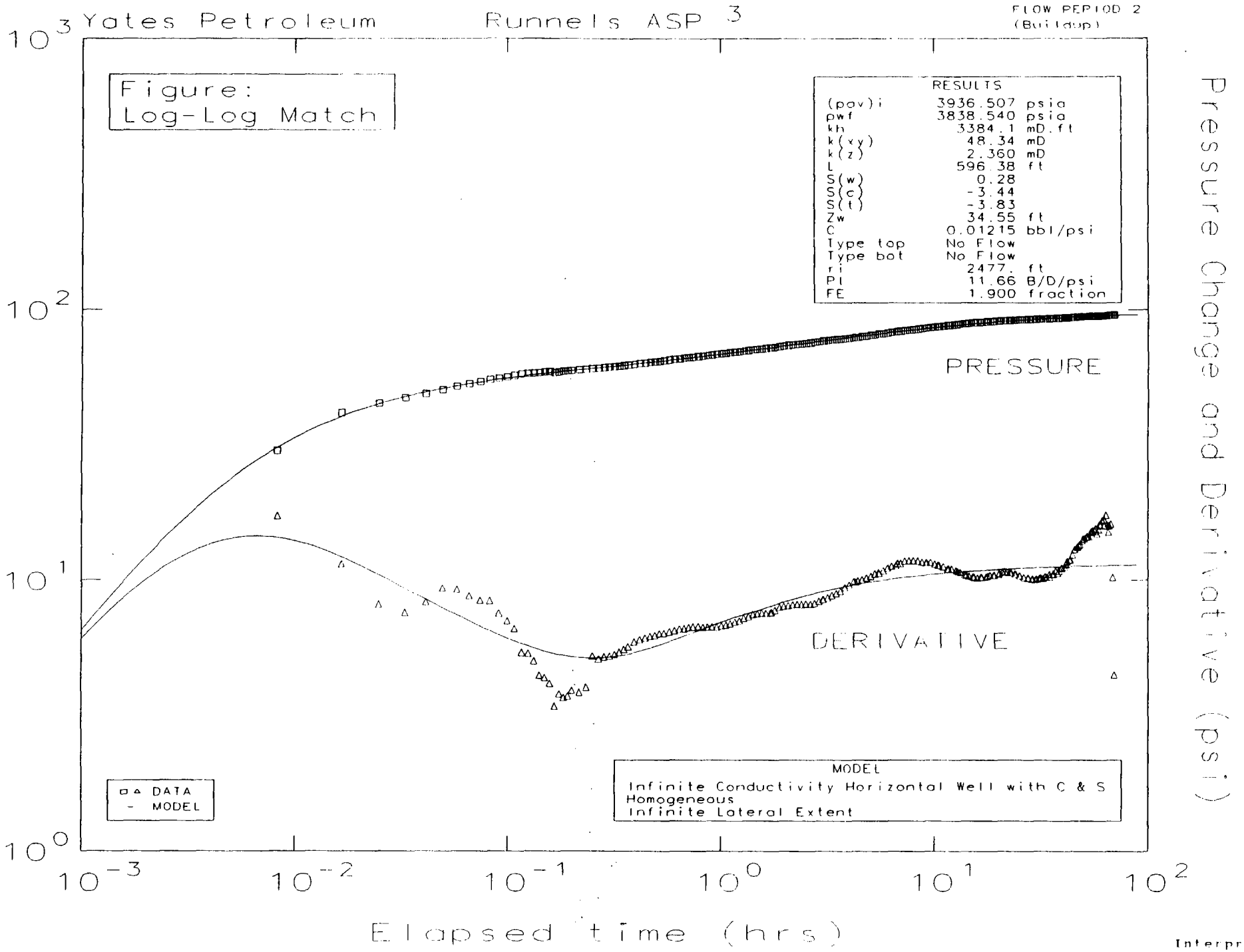
Jarrel Services Inc.

Company : Yates Petroleum | Well # : | Location :

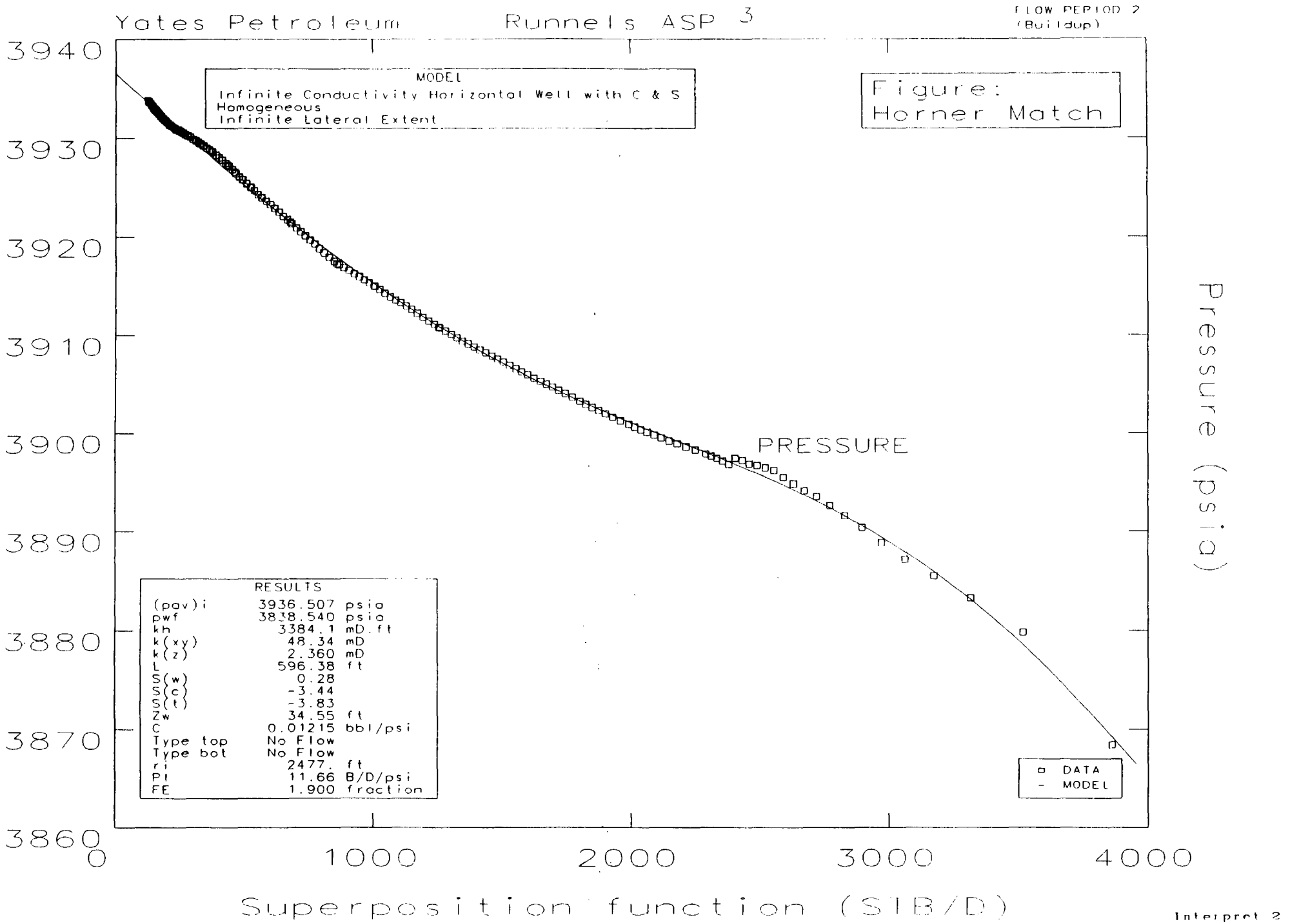
Lease : Runnels 'ASP' #3 | Field : Townsend | Test date : 05/08/99 @ 11:50 am

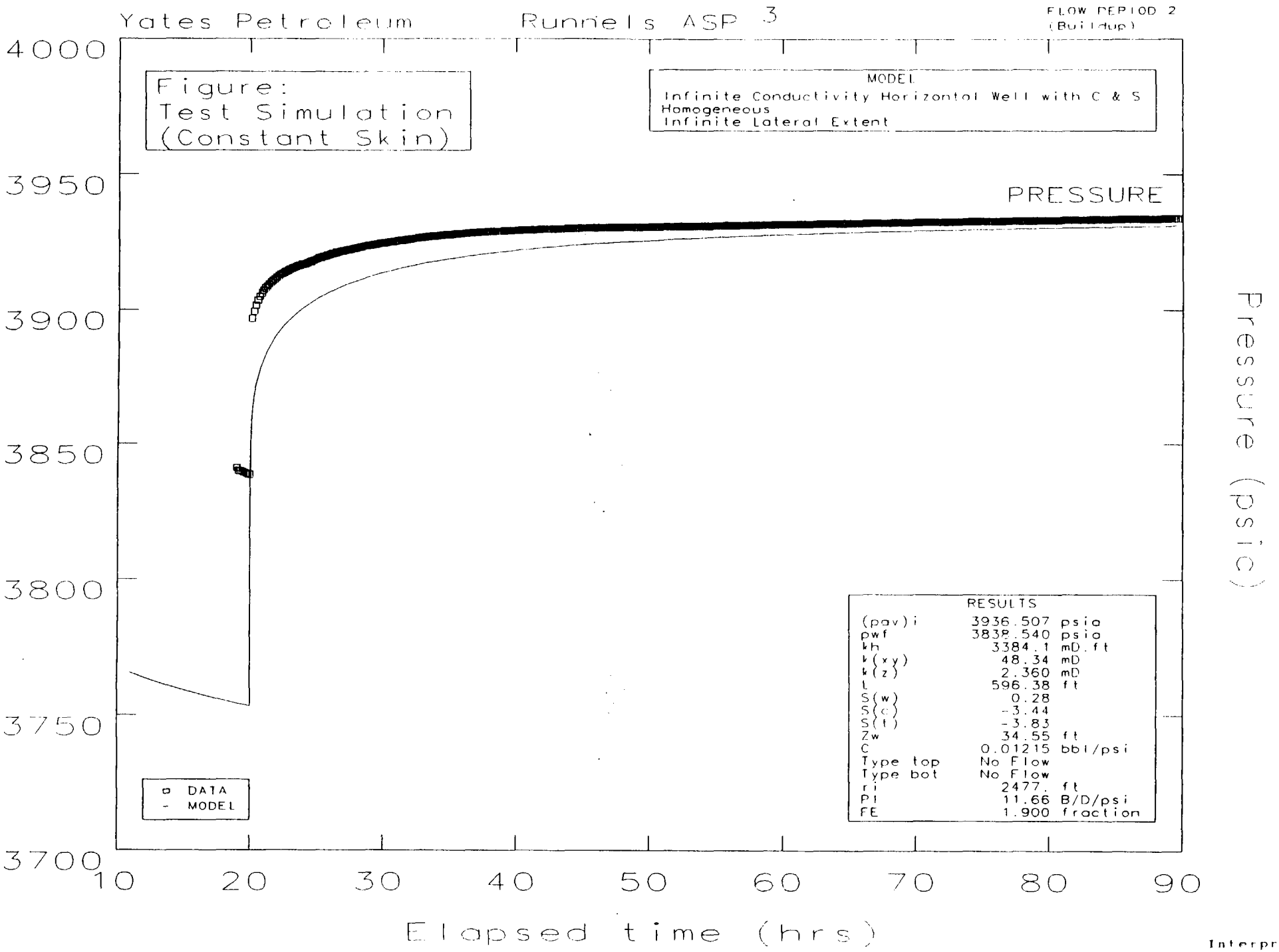
County : Lea | State : New Mexico | File - RUN3




Yates Petroleum
Runnels ASP 3
FLOW PERIOD 2
(Buildup)
Figure:
Log-Log Match
RESULTS
(pav)i 3936.507 psia
pwf 3838.540 psia
kh 3384.1 mD.ft
k(xy) 48.34 mD
k(z) 2.360 mD
L 596.38 ft
S(w) 0.28
S(c) -3.44
S(t) -3.83
Zw 34.55 ft
C 0.01215 bbl/psi
Type top No Flow
Type bot No Flow
ri 2477. ft
PI 11.66 B/D/psi
FE 1.900 fraction
PRESSURE
DERIVATIVE
DATA
MODEL
MODEL
Infinite Conductivity Horizontal Well with C & S
Homogeneous
Infinite Lateral Extent
Pressure Change and Derivative (psi)
Elapsed time (hrs)
10^3
10^2
10^1
10^0
10^{-3}
10^{-2}
10^{-1}
10^0
10^1
10^2

Interpret 2


Yates Petroleum
Runnels ASP 3
FLOW PERIOD 2
(Buildup)
MODEL
Infinite Conductivity Horizontal Well with C & S
Homogeneous
Infinite Lateral Extent
Figure:
Horner Match
PRESSURE
RESULTS
(pav)i 3936.507 psia
pwf 3838.540 psia
kh 3384.1 mD.ft
k(xy) 48.34 mD
k(z) 2.360 mD
L 596.38 ft
S(w) 0.28
S(c) -3.44
S(t) -3.83
Zw 34.55 ft
C 0.01215 bbl/psi
Type top No Flow
Type bot No Flow
ri 2477. ft
PI 11.66 B/D/psi
FE 1.900 fraction
DATA
MODEL
3940
3930
3920
3910
3900
3890
3880
3870
3860
0
1000
2000
3000
4000
Pressure (psia)
Superposition function (STB/D)
Interpret 2


Yates Petroleum
Runnels ASP 3
FLOW PERIOD 2
(Buildup)
Figure:
Test Simulation
(Constant Skin)
MODEL
Infinite Conductivity Horizontal Well with C & S
Homogeneous
Infinite Lateral Extent
PRESSURE
RESULTS
(pav)i 3936.507 psia
pwf 3838.540 psia
kh 3384.1 mD.ft
k(xy) 48.34 mD
k(z) 2.360 mD
L 596.38 ft
S(w) 0.28
S(c) -3.44
S(t) -3.83
Zw 34.55 ft
C 0.01215 bbl/psi
Type top No Flow
Type bot No Flow
ri 2477. ft
PI 11.66 B/D/psi
FE 1.900 fraction
DATA
MODEL
4000
3950
3900
3850
3800
3750
3700
10
20
30
40
50
60
70
80
90
Pressure (psia)
Elapsed time (hrs)

BAKER OIL TOOLS

Contractor	Patterson Drilling
Rig No.	56
Spot	1950' FNL & 350' FWL
Sec	11
Twp.	16 S
Rng.	35 E
Field	Wildcat
County	Lea
State	New Mexico
Elevation	4002' KB
Formation	Strawn

Surface Choke	1/8"- 1/4"- 1/2"
Bottom Choke	3/4"
Hole Size	8 3/4"
Core Hole Size	–
DP Size & Wt.	4 1/2" 16.60
Wt. Pipe	4 1/2" 20.00
I.D. of DC	2 1/4"
Length of DC	726'
Total Depth	11450'
Type Test	Conventional
Interval	11356'- 11450'

Mud Type	
Weight	10.1
Viscosity	40
Water Loss	
Filter Cake	
Resistivity @ °F	
148,000 Ppm.	
B.H.T.	173.3 °F
Co. Rep.	Tim Bussell
Tester	Mike Fraley
Baker Dist.	Hobbs NM

COMPANY YATES PETROLEUM CORP.
LEASE NAME & NO SHELL LUSK ANB #2
INTERVAL TESTED 11356'- 11450'

Pipe Recovery

Ran 1092' freshwater cushion = 8.26 bbl.
Flowed during test:
8.26 barrels cushion
71.04 barrels oil

Reverse circulated to test tank:
10.40 barrels gas cut mud
23.81 barrels oil

Tcp: 5,800 ppm Cl.
Middle: 44.0 Deg API @ 60 Deg F
Bottom: 119,000 ppm Cl.

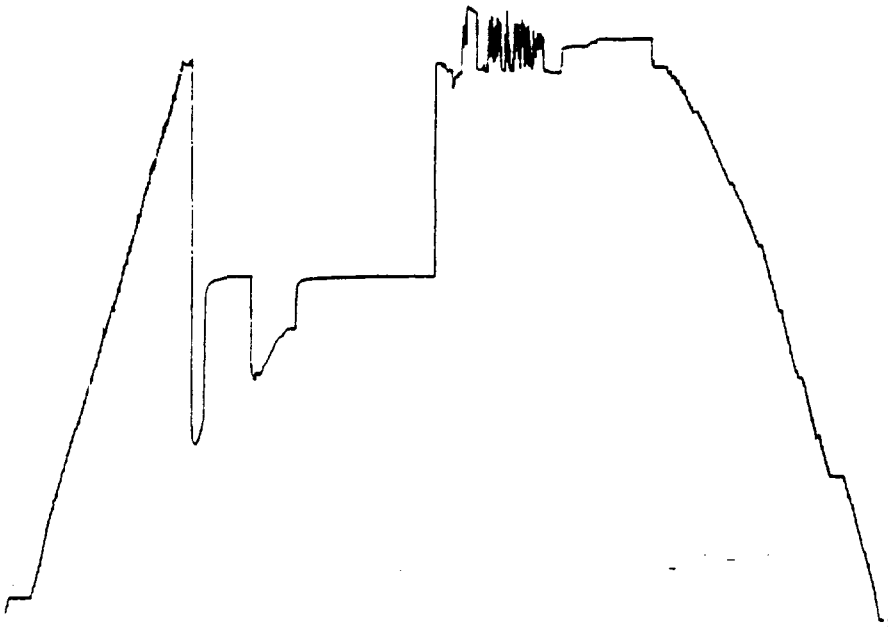
Pressure in Sampler:	1700	psig
Total Volume of Sampler:	2600	cc.
Total Volume of Sample:	1200	cc.
Oil:	1200	cc.
Water:	0	cc.
Mud:	Trace	cc.
Gas:	7.04	cu ft
Other:	0	

Gas/Oil Ratio 939/1 cu.-ft./bbl.
Gravity 44.0 °API @ 60 °F

COUNTY LEA
STATE NEW MEXICO
FORMATION STRAWN

Recorder Type	Electronic	
No. 21047	Cap. 10000	psi
Depth	11361	ft.
Inside		
Outside	X	

DATE 07-12-1999
TICKET # 201821
TEST # 1



Initial Hydrostatic	A	6001
Final Hydrostatic	K	5989
Initial Flow	B	2006
Final Initial Flow	C	2267
Intitial Shut-in	D	3748
Second Intitial Flow	E	2709
Second Final Flow	F	3197
Second Shut-in	G	3738
Third Initial Flow	H	
Third Final Flow	I	
Third Shut-in	J	

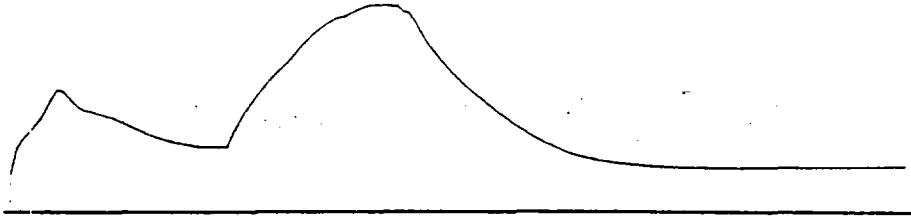
		Reported	Corrected	
Opened Tool @		19:05		hrs.
Flow No.	1	15	16	min.
Shut-in No.	1	60	59	min.
Flow No.	2	60	60	min.
Shut-in No.	2	180	180	min.
Flow No.	3			min.
Shut-in No.	3			min.

Yates Petroleum Corp.

Shell Lusk ANB #2

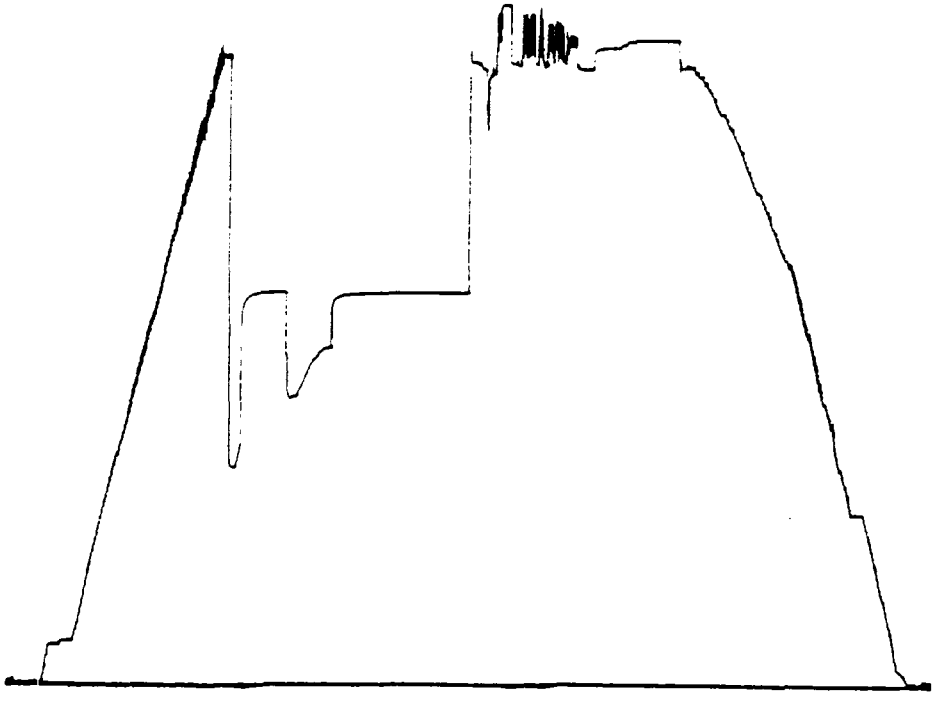
DST #1

07-12-1999



Recorder Type	Electronic
No. 21046	Cap. 10000 psi
Depth	Above Tool feet
Inside x	
Outside	

Initial Hydrostatic	
Final Hydrostatic	
Initial Flow	493
Final Initial Flow	1692
Initial Shut-In	879
Second Initial Flow	879
Second Final Flow	2875
Second Shut-In	586
Third Inital Flow	
Third Final Flow	
Third Shut-In	



Recorder Type	Mechanical
No. 16833	Cap. 6850 psi
Depth	11361 feet
Inside	
Outside x	

Initial Hydrostatic	6017
Final Hydrostatic	5995
Initial Flow	2077
Final Initial Flow	2293
Initial Shut-In	3748
Second Initial Flow	2737
Second Final Flow	3211
Second Shut-In	3738
Third Inital Flow	
Third Final Flow	
Third Shut-In	

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Shell Lusk ANB #2
DST #1

07-12-1999

TIME		CHOKE SIZE	SURFACE PRESSURE	FLOW RATE MCF/D	BOTTOM HOLE PRESSURE	REMARKS
19:05 Hrs	0 Min	1/8"	Strong Blow		2006	Begin flow #1:
	5		12.0 psi			
	10		150.0			
19:20	15	1/4"	270.0		2267	Gas to surface: Closed for shut-in #1:
19:28	8					Fluid to surface:
	60				3748	End of shut-in #1:
20:20	0	1/2"	40.0 psi		2709	Begin flow #2:
	5		70.0			
	10		72.0			
	15		50.0			
	20		10.0			Fluid to surface:
	25		200.0			Oil to surface:
	30		420.0			
	35		500.0			
	40		520.0			
	45		670.0			
	50		760.0			
	55		760.0			
21:20	60		760.0		3197	End of flow #2: Begin shut-in #2:
24:20	180				3738	End of shut-in #2: Pulled tool:

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DST #1

07-12-1999

This analysis has been made on the basis of the liquid recovery and equations applicable to liquid recovery tests, the Horner extrapolation method and comparative log/log analysis. A vertical model with skin was used for non-linear regression analysis.

The semi-log plot indicates a maximum initial reservoir pressure of 3752 psi and a maximum final reservoir pressure of 3741 psi which is equivalent to a subsurface pressure gradient of 0.329 psi/ft at gauge depth. The difference between the extrapolated initial and final reservoir pressures (11 psi) is insignificant.

The Average Production Rate which was used in this analysis has been calculated from analysis of the flow pressure curves using a liquid gradient for the recovered fluid of 0.349 psi/ft.

For purposes of this analysis a Pay Thickness of 30 feet and an Average Porosity of 6% has been used.

The calculated Skin Factors indicate significant well-bore damage was present at the time of this formation test.

The evaluation criteria used in the drillstem test analysis system indicate this is a good mechanical test and the results obtained in this analysis should be reliable within reasonable limits relative to the assumptions which have been made.

Oil Well Test - Buildup
Radial Flow Analysis

R1A

Yates Petroleum Corp.

Shell Lusk ANB #2, DST #1

Analysis Results

Total Sandface Rate ($q_t B_t$)	4813.019 bbl/d	Apparent Skin (s')	21.431
Semilog Slope (m)	21.88	Skin - Damage	21.431
Gas Permeability (k_g)	13.727 md	Skin - Inclination	0.000
Oil Permeability (k_o)	172.038 md	Pressure Drop Due to Skin (Δp_s)	407.53 psi
Flow Capacity (kh)	5161.138 md.ft	Damage Ratio (DR)	3.826
Total Mobility (k/μ_t)	1192.15 md/cp	Flow Efficiency (FE)	0.261
Total Transmissivity(kh/μ_t)	35764.41 md.ft/cp		

Reservoir Parameters

Net Pay (h)	30.000 ft
Total Porosity (ϕ_t)	6.00 %
Water Saturation (S_w)	20.00 %
Oil Saturation (S_o)	80.00 %
Gas Saturation (S_g)	0.00 %
Wellbore Radius (r_w)	0.36 ft
Formation Temperature (T)	173.3 °F
Formation Compressibility (c_f)	6.010e-6 psi^{-1}
Total Compressibility (c_t)	5.600e-5 psi^{-1}

Fluid Properties

Oil Compressibility (c_o)	6.17529e-5 psi^{-1}
Oil Formation Volume Factor (B_o)	1.593
Oil Viscosity (μ_o)	0.311 cp
Solution Gas Ratio (R_s)	1066 scf/bbl
Oil Gravity (γ_o)	44.00 ° API
Gas Gravity (G)	0.650
PVT Reference Pressure (p_{PVT})	3748.27 psi

Pressures

Initial Pressure (p_i)	3748.27 psi
Extrapolated Pressure (p*)	3740.82 psi
Ave. Reservoir Press	3739.89 psi
Final Flowing Pressure (p_{wfo})	3196.51 psi

Production and Times

Corrected Flow Time (t_c)	1.2500 hr
Cumulative Oil Production	72.953 bbl
Final Oil Rate	1400.700 bbl/d

Extended Rates Calculations

Specified Flowing Pressure	3196.51 psi
Specified Reservoir Pressure	3739.89 psi
Drainage Area	160.0 acres
Stabilized Rate @ Current Skin	1351.489 bbl/d
Stabilized Rate @ Skin of 0	4881.327 bbl/d
Stabilized Rate @ Skin of -4	9524.051 bbl/d
PI / II (Total Actual)	2.578 bbl/d/psi
PI / II (Total Ideal)	10.311 bbl/d/psi
Stab. PI / II (Total Actual)	2.487 bbl/d/psi
Stab. PI / II (Total Ideal)	9.948 bbl/d/psi

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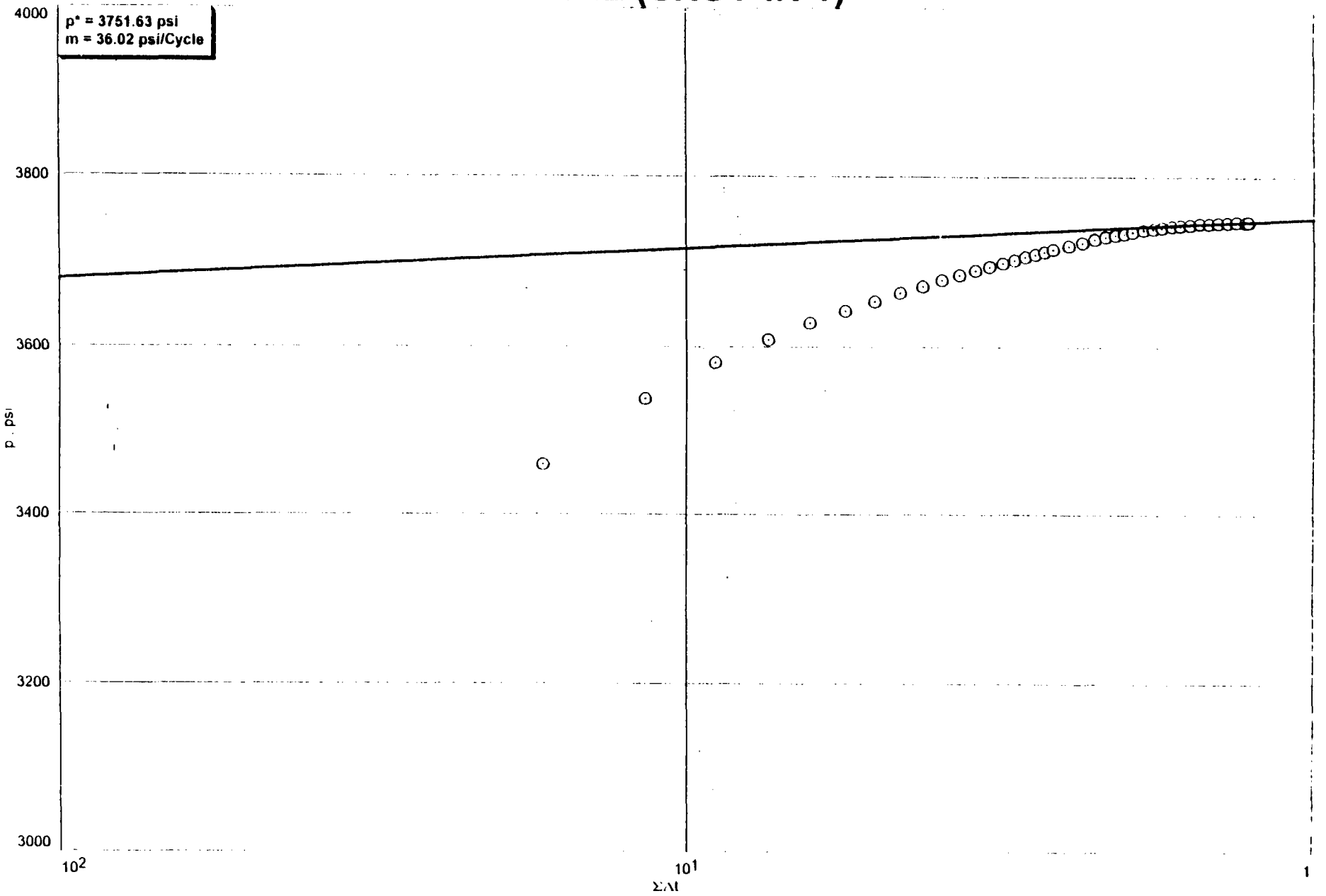
RADIAL (SHUT-IN 1)



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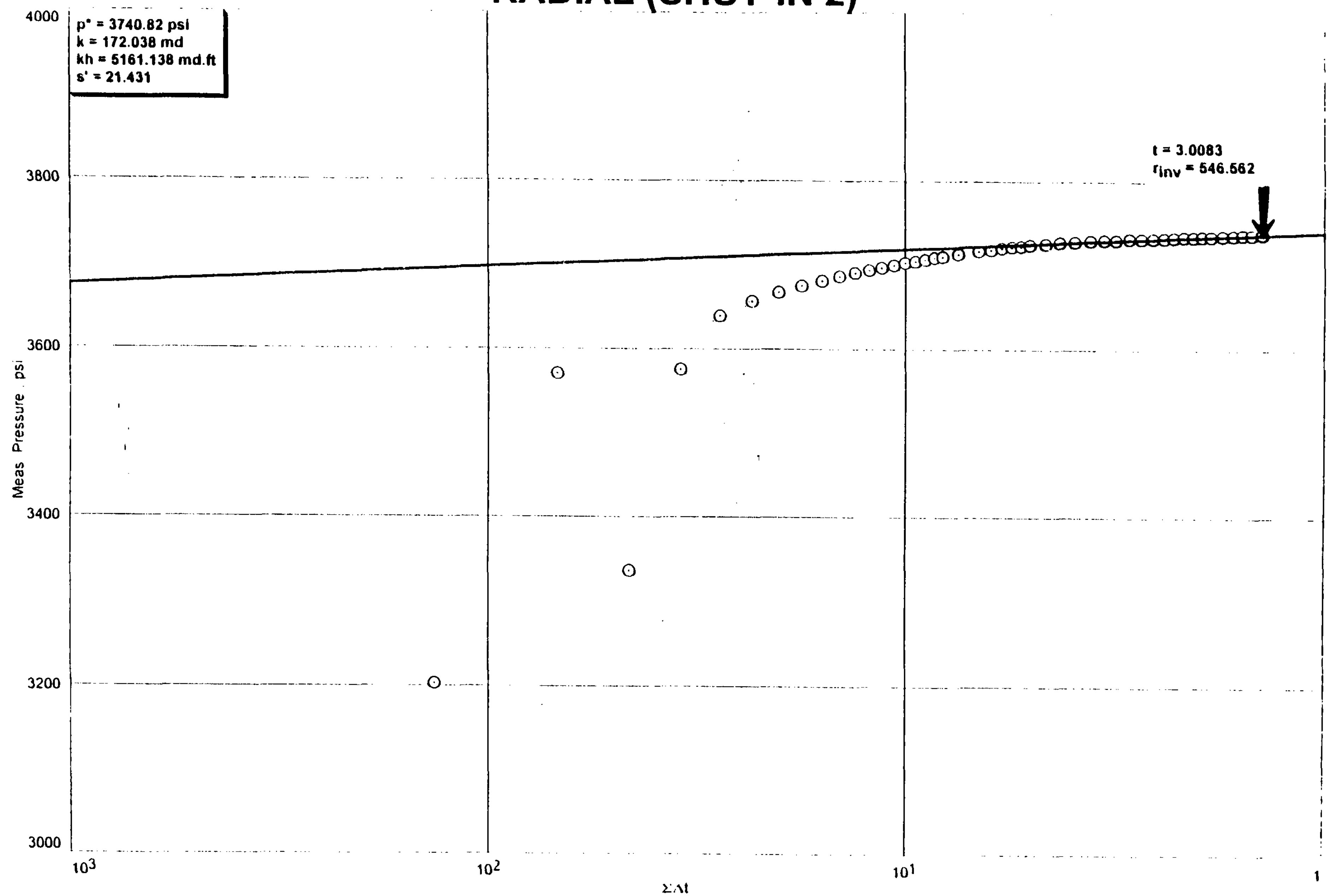
RADIAL (SHUT-IN 2)



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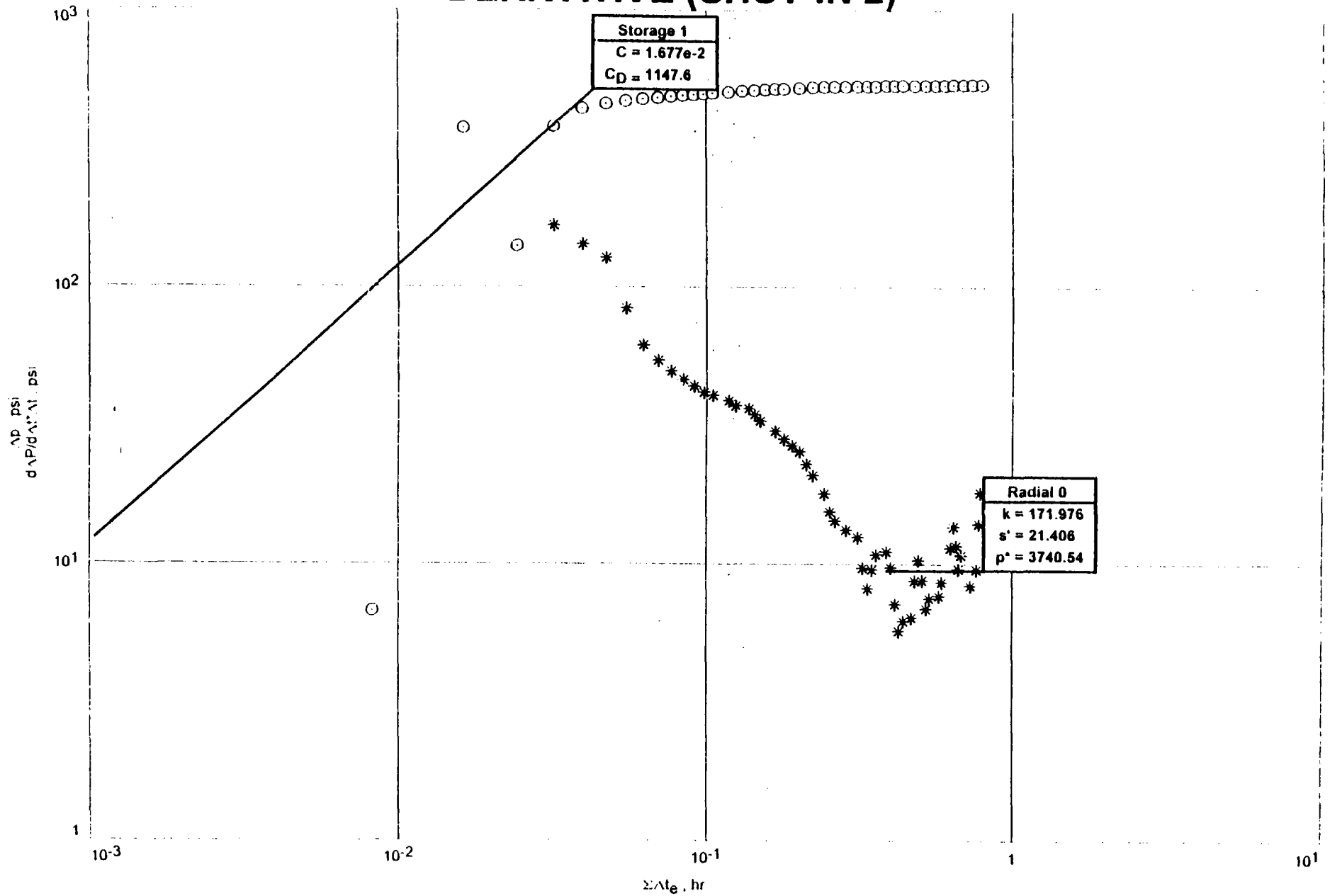
Shell Dusk ANR #2, DST #1

DERIVATIVE (SHUT-IN 2)



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Vertical Oil Well Model

Case Name : Vertical Model #1

Yates Petroleum Corp.

Shell Lusk ANB #2, DST #1

Model Parameters

Oil Permeability (k_o)	172.038 md
Gas Permeability (k_g)	13.727 md
Water Permeability (k_w)	0.000 md
Total Mobility $(k/\mu)_t$	1192.15 md/cp
Total Transmissivity $(kh/\mu)_t$	35764.42 md.ft/cp
Skin (s)	21.431

Formation Parameters

Net Pay (h)	30.000 ft
Total Porosity (ϕ_t)	6.00 %
Oil Saturation (S_o)	80.00 %
Gas Saturation (S_g)	0.00 %
Water Saturation (S_w)	20.00 %
Wellbore Radius (r_w)	0.36 ft
Formation Temperature (T)	173.3 °F
Formation Compressibility (c_f)	6.010e-6 psi^{-1}
Total Compressibility (c_t)	5.600e-5 psi^{-1}
Wellbore Storage Constant Dim. (C_D)	746.38

Fluid Properties

Oil Compressibility (c_o)	6.17529e-5 psi^{-1}
Gas Compressibility (c_g)	2.09094e-4 psi^{-1}
Water Compressibility (c_w)	2.91807e-6 psi^{-1}
Oil Formation Volume Factor (B_o)	1.593
Gas Formation Volume Factor (B_g)	0.000769 bbl/scf
Water Formation Volume Factor (B_w)	1.015
Oil Viscosity (μ_o)	0.311 cp
Gas Viscosity (μ_g)	0.0215 cp
Water Viscosity (μ_w)	0.360 cp
Solution Gas Ratio (R_s)	1066 scf/bbl
Oil Gravity (γ_o)	44.00 ° API
Gas Gravity (G)	0.650
PVT Reference Pressure (p_{PVT})	3748.27 psi
Bubble Point Pressure (P_{bp})	3748.27 psi

Production and Pressure

Q_tB_t	4813.019 bbl/d
Final Oil Rate	1400.700 bbl/d
Final Gas Rate	4.853 MMCF/D
Final Water Rate	0.000 bbl/d
Final Flowing Pressure (p_{wfo})	3196.51 psi
Final Measured Pressure	3737.72 psi
Initial Pressure (p_i)	3748.27 psi

Synthesis Results

Average Error	-0.03 %
Synthetic Initial Pressure (p_i)	3740.43 psi
Extrapolated Pressure at Specified Time	3740.43 psi
Pressure Drop Due To Skin (Δp_s)	407.06 psi
Flow Efficiency (FE)	0.252
Damage Ratio (DR)	3.973

Forecasts

Specified Flowing Pressure (p_{wfs})	3196.51 psi
3 - Month Constant Rate	1236.424 bbl/d
6 - Month Constant Rate	1223.347 bbl/d
Specified Forecast Time	12.00 month
Forecast Constant Rate @ Current Skin	1210.582 bbl/d
PI / II (Actual)	2.249 bbl/d/psi
Forecast Constant Rate @ Skin=0	3430.224 bbl/d
PI / II (Ideal)	6.499 bbl/d/psi
Forecast Constant Rate @ Skin=-4	5214.310 bbl/d

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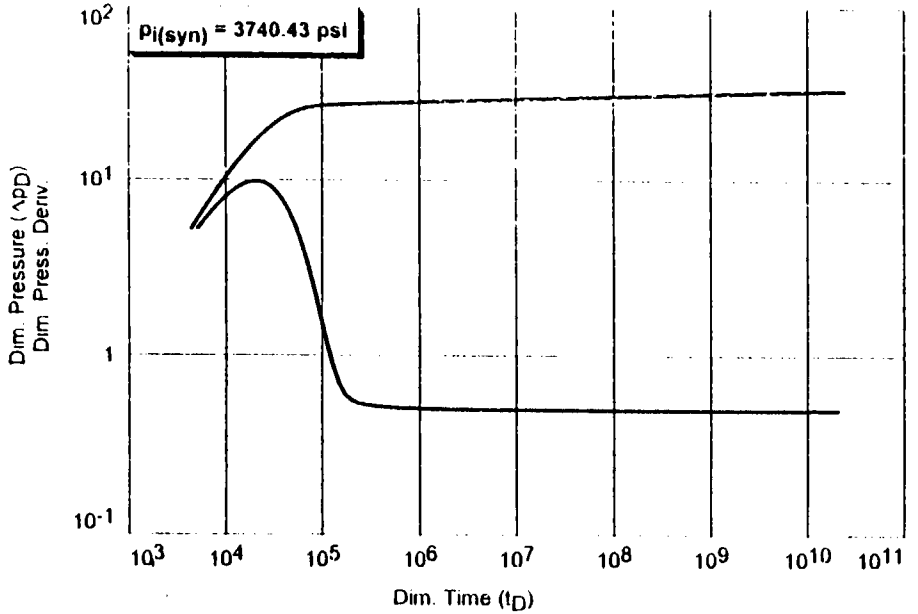
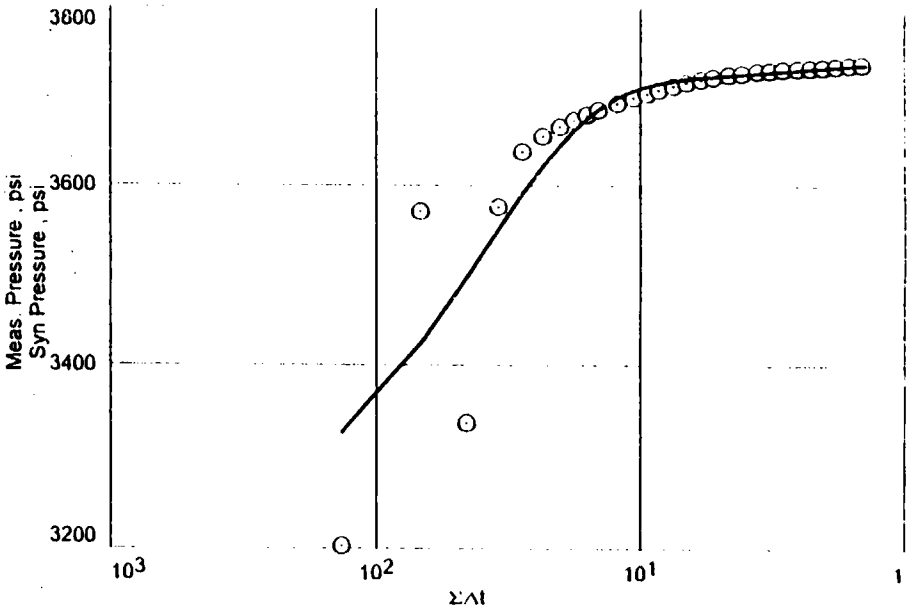
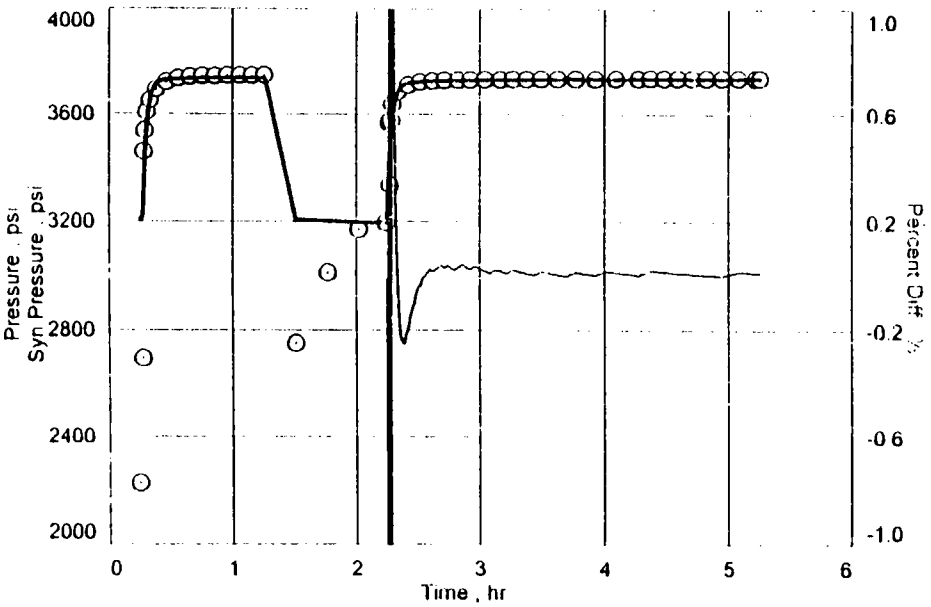
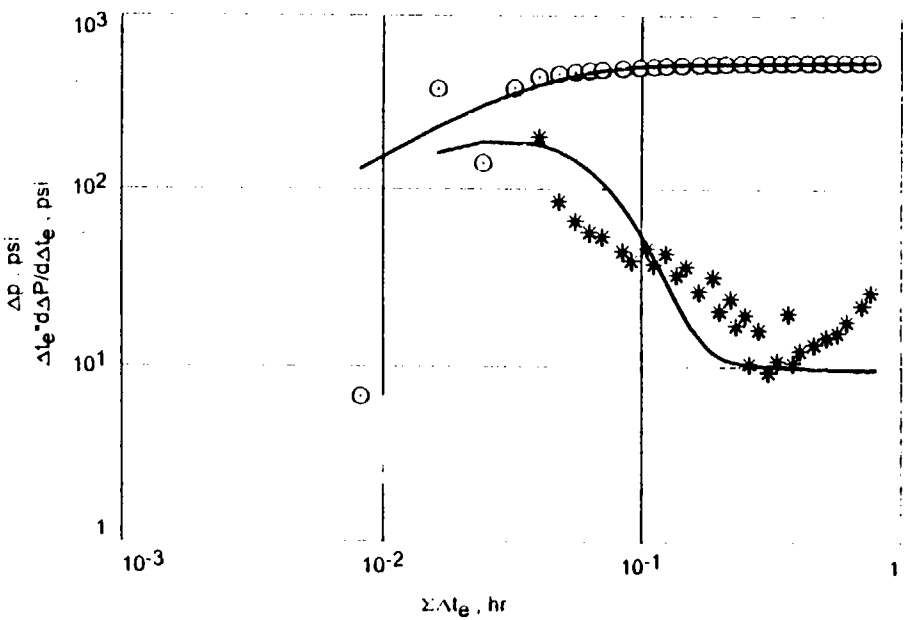
Vertical Model #1









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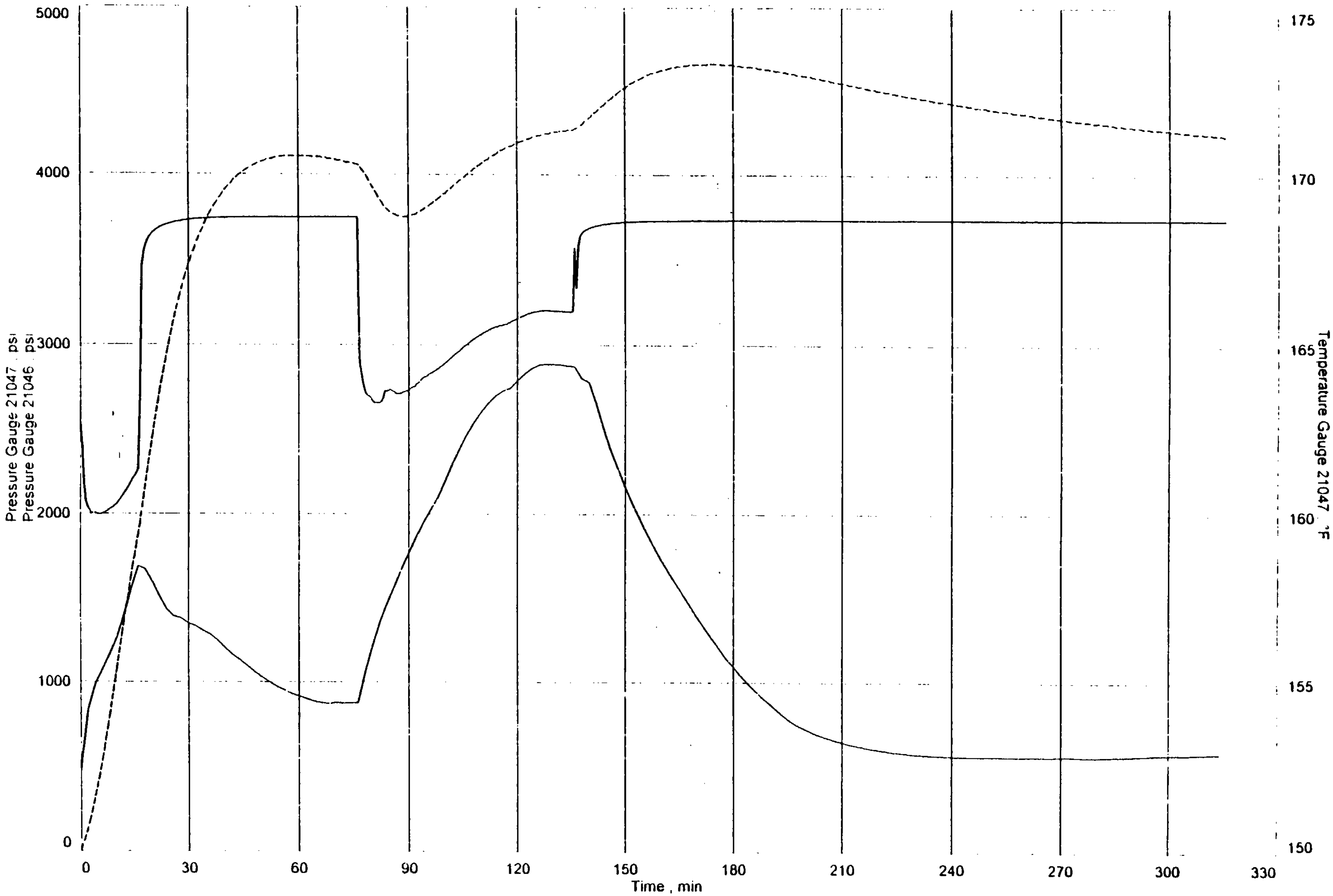

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Shell Lusk ANB #2

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Dave P

Jarrel Services Inc.
P.O. Box 1230
Hobbs. New Mexico 88240

Tel: (505)393-1736 Fax: (505)393-1737

B.H.P. TEST REPORT

Company : Yates Petroleum

Test date	: 10/25/99	Packr set at	: 11305
Lease	: Shell Lusk ANB #2	Perforations	: 11373 11445
Field	: Shoe Bar North	DW Tbg press	: 1610
County	: Lea	Well status	: Shut in
State	: New Mexico	Instrument #	: 20113
Formation	: Strawn	Tested by	: Harrah
Total depth	@ 0	Gauge set at	: 11250
Tubing size	: 2.3/8	B.H. Temp. F	: 172

Test type:

Flowing Pressure Gradient	- No
Bottom Hole Pressure Build-up Test	- No
Bottom Hole Pressure Draw-Down Test	- No
Shut-in Pressure Gradient	- Yes

Data File : SHELUSK2.BHP

Shut-in Pressure Gradient

Company : Yates Petroleum

Test date : 10/25/99

Data File : SHELUSK2.BHP

Remarks: EXTRAPOLATED TO MID-PERF. AT 11409'

Depth (feet)	Pressure (psig)	Delta Pressure (psig)	Pressure Gradient (psig/ft)
Surface	1,610.00		
1,500	1,706.00	96.00	0.0640
3,000	1,800.00	94.00	0.0627
4,500	1,892.00	92.00	0.0613
6,000	1,986.00	94.00	0.0627
7,500	2,084.00	98.00	0.0653
9,000	2,175.00	91.00	0.0607
10,500	2,270.00	95.00	0.0633
11,250	2,324.00	54.00	0.0720
11,409	2,335.45	11.45	0.0720

Jarrel Services Inc.

Company : Yates Petroleum
Lease : Shell Lusk ANB #2
County : Lea

Well # :
Field : Shoe Bar North
State : New Mexico

Location :
Test date : 10/25/99
File - SHELUSK2