

February 2, 2000

**ANDERSON EXPLORATION LTD.**

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Calgary, Alta., T2P 2Z5

**Mr. Larry Sopko,**

**Re: Waterflood Performance Evaluation  
South Pierson Unit**

As requested, the evaluation of the waterflood performance of the South Pierson Unit is complete. A follow-up on the conclusions/recommendations made in the attached report, can significantly improve the performance of the waterflood.

The main problem with the waterflood is the ability to inject sufficient water volumes into the Spearfish formation to maintain the reservoir voidage. The application of horizontal well for both water injection and oil production is expected to achieve an incremental oil recovery of 4.1 MMBbl's to 5.7 MMBbl's.

Please note that the oil reserves and production volumes were reported in the Imperial system. However, since all the pressure data were measured in kPa, the metric units were used to report the pressure measurements. Three copies of the final report are attached.

Should you require further information, please me at (403) 216-5101.

Yours Truly,

**Petro Management Group Ltd.**



Saad Ibrahim, P.Eng.  
Principle Engineer

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### **CONCLUSIONS/RECOMMENDATIONS**

1. The two main productive formations in the South Pierson Unit are Spearfish and the Alida which have an OOIP estimate of 19.2 MMBbl and 3.2 MMBbl's, respectively.
2. The Spearfish formation has a low mobile water saturation. The water production contribution is mostly from wells completed in both the Spearfish and the Alida or as a result of formation cross-flow for wells that were stimulated wells using large fracture treatments.
3. The remaining oil reserves of South Pierson Unit of 1.28 MMBbl, was determined from decline analysis, based on the present oil production level of 400 b/d and a decline rate of 9.4% per year.
4. The recovery factors for the "as is case", based on the different estimates of the OOIP of 22.5 MMBbl's (volumetric) and the OOIP of 27.2 MMBbl's (material balance), are 15.8% and 13.1%, respectively.
5. The production and pressure history of the Unit suggests an under-saturated reservoir with a bubble pressure close to or below the reservoir pressure of 3 300 kPa. Therefore, the only dominant reservoir drives are:
  - a. Rock/fluid expansion drive: Typically results in a recovery factor less than 5%
  - b. Water drive by water injection: As discussed in this report, the response of waterflood is very poor.

Therefore, it is imperative to revamp the waterflood scheme to increase the recovery factor of the Unit since the solution gas drive is absent.

6. The performance of the waterflood of the South Pierson Unit (Spearfish formation) is considered poor because of the following:
  - a. The initial reservoir pressure of 10 600 kPa has declined by 69% to 3 300 kPa, while less than 10% of the OOIP has been recovered.

- b. The voidage replacement ratio was calculated at 0.28. As a result, the cumulative deficiency in water injection is 2.6 MMBbl's
  - c. Based on the spinner survey conducted in 1997, it is estimated that 80% of the injected water is taken by the "thief zone", the Alida.
  - d. The present water filter size of 3 microns is over-sized. The pore throat size distribution of the Spearfish formation varies from 0.006 to 8 microns, but averages at 1 micron.
  - e. Although water is injected above the formation fracture pressure, sufficient water volumes to maintain the reservoir voidage can not be injected. This is attributed to both the limited injectivity of the vertical injectors, and the damage made to the wellbore and the formation permeability from the fines present in the injected water.
- 6. The expected recovery factor under the 5-spot waterflood pattern of the Spearfish formation should be 34.1%, using the Dykstra-Parsons method.
  - 7. The potential incremental oil reserves, should the current waterflood scheme be revamped successfully, are estimated at **4.1 MMBbl's to 5.7 MMBbl's**.
  - 8. The averaged cumulative oil production for a typical Spearfish vertical wells is 34 Mbbl's/well compared to 57 Mbbl's/well for a horizontal well, demonstrating the benefit of horizontal well applications.
  - 9. In order to revamp the waterflood scheme and recover the incremental oil of up to 5.7 MMBbl's, the following recommendations are made:
  - 11. Water should not be injected in wells completed in both the Spearfish and the Alida formations.
    - a. A pilot program to drill four horizontal injectors is recommended to evaluate the potential of increasing water injectivity and, eventually, converting the 5-spot pattern into a line drive of injection and production (Figure 53)
    - b. The locations of the proposed horizontal injectors were selected, as such, to

take advantage of permeability trend in the field.

- c. The results from the flow/build up tests indicates that the wellbore of the existing horizontal wells are highly damaged ( $S = +20$  to  $+62$ ). Therefore, under-balance drilling with oil-base mud should be used for the pilot well to reduce potential wellbore damage.
- d. The line will increase the drainage area of the producers and also enhance the waterflood sweep efficiency.
- e. Based on the preliminary results from the laboratory tests to evaluate the optimum filter size/type, a filter size of 0.5 to 1.0 micron is recommended.
- f. Utilize the results from the PVT analysis, being performed on samples from the well 7-17-2-29W1, to confirm the reservoir bubble point pressure. Based on results of the PVT, a target for the pressuring up the reservoir should be set.

## DISCUSSION

## **DISCUSSION**

### **1. Background:**

The South Pierson Unit is located in the southwest corner of Manitoba (Figure 1). The field was discovered in 1985 by Home Oil and was placed on primary production in 1987. The field was developed with vertical wells which are completed in the Spearfish (Lower Amaranth) as the prime producing formation at an approximate depth of 1025 mKB (Figure 2). The Spearfish formation is a dolomitic sandstone with three correlatable sands (A, B, and C) across the Unit (Figure 3). Hydraulic fracture treatments were conducted on all the Spearfish completions to improve productivity. The core data of the Spearfish zone indicates an air permeability ranging from 0.5 mD to 10 mD and the formation porosity from 14% to 17%. The net pay map of the Spearfish formation is shown in Figure 4. The underlying Alida formation (Mississippian) has a lesser areal extent and is productive mostly in sections 16 and 17 (Figure 5).

During the early years of production, a development drilling program was implemented to reduce the well spacing to 40 acres. A 5-spot pattern waterflood scheme commenced in 1994 and approximately half of the producers were converted to injectors. The total number of wells in the Unit is 67. The well status and production data are summarized in Table 1.

### **2. Reservoir/Production Performance:**

The total oil production from the Unit peaked over 1000 B/d in 1994 and has since then been declining at 9.4% per year (Figure 6). The unit is currently producing oil at 400 B/d at a water-cut of approximately 58%. Most of the produced water is attributed to wells that are completed in or fractured into the underlying Alida zone. The produced solution gas is being flared because of absence of a pipeline in the vicinity. The average producing GOR, as of September 1999, is approximately 51 m<sup>3</sup>/m<sup>3</sup> which is comparable to the initial GOR, which suggests a low bubble point pressure.

The initial oil rate from a typical Spearfish well is in the range 40 to 50 b/d and the



cumulative oil production averaged 35 MBbl/well as of April 1999, as shown in the Histogram plots (Figures 7 and 8). The average oil recovery, based on decline analysis, is estimated at 45 MBbl/well (Figure 9).

The initial reservoir pressure of 10 600 kPa has sharply declined to 3 300 kPa, as concluded from the December 1999 pressure survey. The voidage replacement ratio for the Unit is very low ( $VRR = 0.28$ ), confirming a very poor pressure response from the waterflood scheme (Table 2). As discussed in this report, the Alida "thief zone" has been taking most of the injected water because of the large permeability contrast between the Spearfish and Alida formations.

### 3. Fluid Properties:

Fluid samples were collected from the well 2-16-2-29W1 in 1993 and a complete PVT study was performed by Hycal. Further, an earlier PVT study was conducted by Core Laboratories on fluid samples obtained from the well 6-19-2-29W1. The following data was obtained from the PVT studies.

	Hycal	Core Lab.
Bubble Point Pressure, kPa(a)	7 677	4 644
GOR used in recombination, $m^3/m^3$	62.3	44.4
Reservoir Temperature, °C	45	42
Oil Density, API degree	36.8	36.3

The current reservoir pressure has declined below both estimates of the bubble point pressure ( $P_b$ ), reported by Hycal and Core Laboratories. However, the current producing GOR of the Unit of  $50.7 m^3/m^3$  (Table 3) has not escalated as expected, suggesting that the ( $P_b$ ) is close or lower than the current reservoir pressure of 3300 kPa.

In order to confirm the estimate of ( $P_b$ ), oil and gas samples were collected from the well 7-17-2-29W1 in December 1999 by Hycal and results from the PVT study will become available in February 2000.

## 2. Rock Properties:

Several cores were cut from both the Spearfish and the Alida formation (Table 4). The composite porosity/permeability cross-plot (Figure 10) of the all Spearfish data indicates an average air permeability of approximately 5.0 mD. The cross-plots of maximum horizontal permeability ( $k_{max}$ ) vs. horizontal permeability at  $90^\circ$  ( $k_{90}$ ) (Figures 11 through 14), exhibits an approximately  $45^\circ$  straight line relationship, which indicates the absence of preferential directional permeability trends in the Spearfish formation. Also, the  $K_v/K_h$  vs  $K_h$  cross-plot is shown in Figure 15. The core cross-plots were used in the design of the proposed horizontal wells, as discussed in the report.

Several special core analysis studies were conducted including:

- I. Waterflood Evaluation Study, by Hycal in 1997
- II. Formation Damaged Study, by Hycal June 21, 1996

## 3. Reservoir Drive Mechanism:

The type and the effectiveness of reservoir drive mechanisms have a major impact on the reservoir performance and the expected ultimate oil recovery. The review of the pressure and production history of the field indicates that the dominant reservoir drive mechanism is the rock/fluid expansion and there is also a limited pressure response from the waterflood scheme implemented in 1994.

The pressure history of the Unit indicates a significant decline in the reservoir pressure. While less than 10% of OOIP has been recovered, the initial reservoir pressure of 10 600 kPa has declined by 69% to 3 300 kPa, as confirmed from the recent pressure survey conducted in December 1999 (Table 5). The ultimate oil recovery for reservoirs under rock/fluid expansion drive mechanism is typically less than 5%. The solution gas drive has not contributed into the field performance because of the limited amount of solution gas content and the fact that the reservoir is believed to be highly under-saturated. Although the recent work on the PVT to confirm the bubble point pressure ( $P_b$ ) is still in progress, the producing GOR has been fairly constant through the production history suggesting a low ( $P_b$ ).

The plot of reservoir pressure versus the cumulative oil production (Figure 16) exhibits a linear relationship which is typical of under-saturated reservoirs. The ultimate oil recovery from straight line extrapolation of 3.5 MMBbl, is consistent with the estimate of the ultimate oil recovery of 3.55 MMBbl from decline analysis.

#### 4. Original Oil -in-Place (OOIP):

##### a. Volumetric Method:

The volumetric estimate of the OOIP is 22.4 MMBbl, including the Spearfish (A, B, and C sands) and the Alida. The most recent net pay maps were based on 12% porosity cut-off and core permeability of 0.5 mD. The OOIP estimate was subdivided as follows:

Speafish "C" Sand	14.0	MMBbl
Speafish "A" & "B" Sands	5.3	MMBbl
Sub-total	19.2	MMBbl
Alida	3.2	MMBbl
Total	<u>22.4</u>	MMBbl

##### b. Material Balance Method:

Material balance calculations were performed using the production and pressure data up to the start of waterflood. The OOIP was calculated at 27.2 MMBbl using the material balance equation for under-saturated reservoirs (Table 6).

#### 7. Pressure History:

The initial reservoir pressure of the Spearfish formation of 10 600 kPa, was determined from pressure surveys conducted on the initial producers in 1987.

The reservoir pressure declined to 7 080 kPa in 1994, as indicated from the RFT survey (Table 7) conducted on the development wells. The most recent pressure survey, conducted during December 1999 and January 2000, confirmed that the reservoir pressure has declined to 3 300 kPa. The pressure survey included 6 fall-off tests, 10 buildup tests and 3 static gradients. A summary of the analysis results is shown in Table 5. The detailed analyses are attached in Appendix 2.

## **7. Alida Re-completion Program:**

The majority of the producers within the Unit were initially completed in the Spearfish formation. A re-completion program, to produce the Aida oil reserves, was implemented in 1996/1997. Results from this program showed that the well re-completed in North/Northeast part of the pool experienced an increase in oil producing rate. However, wells re-completed in the Southwest part of the Unit produced mostly water from Alida because of the proximity of oil/water contact estimated at 562 mSS. Decline analysis technique (rate vs. cumulative oil production) was used to estimate the incremental oil production of 173.0 Mbbbl from the Alida (Table 8 and Figures 17-36), which represents approximately 7.6% of the Unit total production. Based on the Alida volumetric OOIP estimate of 3.19 MMBbl, the recovery factor, as of April 1999 is 5.4%. The well 1-16 is the only horizontal producer completed in Alida.

## **8. Ultimate Oil Recovery:**

The ultimate oil recovery was determined for the "as is case", as discussed below, to reflect the Unit present performance. Also, the upside potential of the Unit was evaluated to quantify the incremental reserves, should further field developments and improvements are implemented to the waterflood scheme.

### **a. Present Performance "as is case"**

The cumulative oil production as of the end of April 1999 is 2.27 MMBbl. The remaining oil reserves of 1.28 MMBbl, based on present Unit performance, was determined from decline analysis performed on each individual well (Table 1 and Appendix 3). Therefore, the ultimate oil recovery of 3.55

MMBbl was concluded. Furthermore, the oil ultimate recovery was also determined at 3.5 MMBbl from the extrapolation of the linear plot of the reservoir pressure versus the cumulative oil production (Figure 16). The close agreement between the two methods places high confidence in the estimate of the ultimate oil recovery. The corresponding recovery factor was determined as follows:

	Volumetric Method	Material Balance
OOIP, MMBbl	22.5	27.2
Ultimate Oil Recovery, MMBbl	3.55	3.55
Recovery Factor	15.8%	13.1%

The API empirical method<sup>1</sup> (Bulletin D14), was also used to estimate recovery factors using various reservoir parameters (Table 9). The primary and secondary oil recovery factors were estimated at 15.8% and 32.4%, respectively.

b. Upside Case:

It is evident from the Unit performance that the response of the waterflood scheme has been ineffective. Significant incremental oil reserves could be recovered should a program of field improvements is successfully carried out. In order to quantify the upside potential of the Unit, the theoretical oil recovery from a five-spot pattern waterflood was evaluated using the Dykstra-Parsons<sup>2</sup> method. The expected oil recovery from a five-spot pattern waterflood project is estimated using two parameters, as follows:

i. Permeability Variance, "V"

A statistical method using the permeability variance "V" is used to measure the degree of the formation heterogeneity. A value of  $V=0$  represents a homogeneous reservoir. Conversely, a value of  $V=1$  represents a heterogeneous reservoir. All available core data from the Spearfish formation (Appendix 1) were used and the permeability variance of 0.69 was determined (Figure 37), indicating a moderate heterogeneous reservoir.

## II. Fluid Mobility Ratio, "M"

The fluid mobility ratio "M" is used to measure the sweep efficiency of the waterflood. The fluid mobility ratio less than the value of one, is considered favourable. The mobility ratio was calculated, using fluid properties and relative permeability data, at 1.78 (Table 10) which is considered slightly unfavourable.

Based on the values of the Mobility ratio of 1.78 and the permeability variance of 0.69, the waterflood recovery factor was determined at 34.1%.

Based on the above discussion, the incremental oil recovery for the upside case, should the waterflood scheme performance is improved, is estimated between 4.1 MMBbl to 5.7 MMBbl based on the Volumetric and the material balance estimates of the OOIP, as shown in the table below:

(MMBbl's)

	Volumetric Method	Material Balance
OOIP	22.5	27.2
Recovery Factor	34.1%	34.1%
Ultimate Oil Recovery (as is case)	3.55	3.55
Ultimate Oil Recovery (Upside case)	7.67	9.28
Incremental Oil Reserves*	4.1	5.7

\* as of end of April 1999.

In order to identify areas in the Unit for potential development drilling, a bubble map of injection/production volumes is presented in Figure 38. The bubbles were drawn to scale, by using the actual reservoir parameters (Table 11).

## 9. **Waterflood Performance:**

The waterflood scheme (five-spot pattern) has been in operation since 1994. The response of the waterflood has been poor, since most of the injected water

benefited the Alida formation, rather than, the spearfish formation which holds most of the reserves. The recent pressure survey conducted in December 1999 of the Spearfish formation indicates clearly the lack of pressure support from water injection since the current reservoir of 3 300 kPa is substantially lower the initial reservoir pressure of 10 600 kPa. Further, the calculation of the Voidage calculations indicates that the Unit VRR of the spearfish formation is 28.7% (Table 2). Accordingly, the deficiency in water injection volume was calculated at 2.6 MMBbl ( $412.3 \text{ E}^3\text{m}^3$ ). The water injection volumes were prorated between the Alida and the Spearfish as shown in Table 12. The main problems that have negatively affected the performance of the waterflood are as follows:

a. Thief zone (Alida)

The Alida formation has been acting as a "thief zone" because of the large contrast between the Alida and Spearfish formations. Most of the injected water has been entering the Alida formation because of the following:

- The Speafish and the Alida are commingled in several injectors.
- Behind casing communication.
- Formation cross-flow.

A spinner and temperature survey conducted on the water injectors that are completed in both the spearfish and the Alida formations in 1997. It was concluded that approximately 80% of injected water has been benefiting the Alida formation (Figures 39 through 43). The proration of water injection volumes, based on the results of the spinner survey is as follows:

Well	Alida	Spearfish	Total
08-09-02-29W1	100%	0.0%	100%
10-09-02-29W1	82%	18%	100%
04-16-02-22W1	72%	28%	100%
02-16-02-22W1	93%	7%	100%
04-16-02-22W1	50%	50%	100%
08-17-02-22W1	68%	32%	100%
14-17-02-22W1	100%	0.0%	100%

Average      80.4%      19.6%

- Behind casing communication

A temperature survey was conducted on the Spearfish injector 14-09, because of its suspected high water injectivity. Results from the survey (Figure 44 ) confirmed behind casing communication between the Spearfish and the Alida, possibly due to poor cement bond. For this reason, water injection for the well 14-09 stopped since 1998.

- Formation cross-flow:

The production plots for most of the wells completed in the Spearfish show low producing water-cut because of the formation low mobile water saturation. However, it was observed that wells that were stimulated using large fracture treatments have exhibited high producing water-cuts, such as 16-05 08-08 and 16-09. Therefore, as these wells were converted into water injectors, a significantly higher water injectivity than typically expected for Spearfish was experienced.

b. Injection Pressure

In order to ensure that the injected water stays in the Spearfish formation and eliminate formation communication with the Alida, the bottom hole injection pressure should be maintained below the formation fracture pressure. Based on the current reservoir pressure of 3 300 kPa, the formation fracture pressure was estimated at 1606 psi (11 075 kPa) as shown in Table 13.

The formation fracture pressure was also confirmed from fall-off tests conducted on the wells 2-9, 2-17 and 4-17 (Figures 45 to 47). Water was injected at a bottom hole pressure between of 15 000 kPa to 17 000 kPa. During the fall-off period, as the bottom hole pressure declined close to approximately 11 000 kPa, an abrupt pressure anomaly occurred. The fact that this pressure anomaly was duplicated for three injectors at the same BHP and confirmed by six different pressure recorders, it is concluded that



the formation fracture pressure is approximately 11 000 kPa.

Therefore, it is apparent that water has been injected above the formation fracture pressure.

c. Water filtering:

In the early stage of the waterflood project, injection water was filtered using a 5 micron filter. Later, the filter size was reduced to 3 microns. A mercury injection capillary pressure study was conducted, by Hycal on May 18, 1993, on three core plugs, with a typical Spearfish air permeabilities of 3.6 mD to 9.7 mD. The pore throat size distribution, ranged from 0.006 to 8 microns but averaged 1 micron (Figures 48 - 50). The rule of thumb in selecting the filter size; the filter size should be 1/3 of the average rock pore throat to prevent bridging. This rule suggests a filter size less than one micron. Laboratory tests are being performed on core samples to optimize the filter size in order to reduce wellbore and formation damage. The preliminary results indicates that a filter size of 0.5 to 1.0 micron is recommended.

d. Water Quality

The produced water (Spearfish and Alida) is mixed at the battery with make-up water from the water source A3-16-2-9W1 (Tilston formation). Water samples have been collected at conduct water compatibility tests to evaluate potential scaling tendencies. Other laboratory tests to examine bacterial, oxygen, and oil contamination contents are recommended to ensure acceptable quality of the injected water.

e. Wellbore/Formation Damage.

The Unit cumulative water injection as of the end of April 1999 is 3.3 MMBbl, as shown on the injection plot (Figure 51). The current water injection rate of approximately 600 BWPD is declining sharply at an annual rate 47%, which reflects a major injectivity problem. The results from the 1999 pressure survey indicates that the average formation effective permeability to oil and water are 8.1 mD and 0.3 mD, respectively (Table 5). The large

discrepancy between the effective permeability to oil and water suggests formation damage in the injector, probably due to fines plugging. Also the high values of the fracture face skin ( $S_f$ ) of 0.26 indicates that the fracture treatments has been reduced. Typically, the acceptable value of ( $S_f$ ) is 0.0 to 0.1. Further, the wellbore of the existing horizontal wells are highly damaged ( $S = +20$  to  $+62$ ). Therefore, under-balance drilling with oil-base mud should be used for the pilot well to reduce potential wellbore damage.

Another diagnostic tool commonly used to evaluate the efficiency of water injection is the Hall Plot<sup>3</sup> (A plot of cumulative water injection vs. WHIP times injection days). The curving up of the data on the Hall plot suggests a decrease in water injectivity; conversely, the curving down indicates an improvement in injectivity (Appendix 4). Based on the shape of the Hall plots, the injectors were classified in Table 14, to illustrate the degree of damage/improvement to the water injectors.

## 10. Horizontal Injector Pilot Project

The review of the waterflood performance indicates that sufficient water volumes, necessary to maintain the reservoir pressure, could not be injected utilizing the vertical injectors. In addition, the total volume of the injected water is declining sharply at approximately 47% per year, which points to the fact that the performance of the Unit will continue to deteriorate. Further, the use of large fracture treatments on the vertical wells, proved to cause more harm than benefits by establishing communication with the "thief zone, the Alida. Acid treatment will be attempted on several vertical injectors to improve injectivity. However, if injectivity of the vertical wells could not be improved significantly, horizontal injectors should be considered.

A pilot program that includes the drilling of four horizontal injectors will allow for the opportunity to evaluate the potential of resolving water injectivity problems. Further, the results from the pilot project will be used to expand horizontal applications, including both injectors and producers, to the rest of the field. The central locations of the four proposed horizontal wells (Figure 53), enjoy a relatively high pay thickness and good formation permeability. The direction of the lateral sections will be the NE-SW direction to form line injection pattern. The core cross-plots indicates the absence of preferential directional permeability trends;  $K_h$  is

similar to  $K_{90}$ . Therefore, it is expected that the performance of the horizontal injectors will be independent to the orientation of the lateral section. The length of the lateral section is expected to be between 600 m to 800 m. The strategy of drilling the horizontal wells; under-balance vs. conventional, mud type, ...etc, is currently being discussed with the drilling department.

A prediction of the horizontal injectors was prepared using the WEM Model. The following input assumptions were made:

- Horizontal length is 800 m.
- Pay thickness is 4 m.
- Wellhead injection pressure is 3 892 kPa
- Skin factor = 0.
- The  $K_h/K_v$  ratio is 10.

The injectivity of the horizontal well was determined for a wide range of formation permeabilities (Figure 54) and the results are summarized below:

Formation Permeability mD	Injection Rate $m^3/d$ (b/d)
0.4	10.9 (69)
1	27.6 (174)
2	56.7 (357)
4	110.5 (695)
6	164.2 (1033)

Although the benefits of the horizontal wells is well recognized by the performance of the five existing producers (Figure 52), the pilot project includes only horizontal injectors only because of the urgent need to pressure up the reservoir

## 11. Unit Ownership

Anderson Exploration Ltd. has 100% ownership of the South Pierson Unit.

## 12. References

1. "Statistical Analysis of crude Oil Recovery and Recovery Efficiency", API Bul D14, second edition April 30, 1984, by American Petroleum Institute.
2. "The Reservoir Engineering Aspects of Waterflooding", by Forrest Craig. SPE monograph 3. PP 79 - 80
3. "How to Analyze Waterflood Injection Well Performance", by Hall, H.N. World Oil (Oct. 1963) PP 128 - 130.

## TABLES

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**Summary Results of Production/Dcline Analysis**  
**South Plerson Unit**

Prod. (P): 26      Prod. Uneconom. P(U): 1      Shutin(S): 10      Total: 67

Well	Well Status	Initial (Max) Bopd	Last Daily Production			Daily Injection		Cum. Production		Decline Analysis		Proved Rem. Reserves		Probable	Ultimate Recovery	
			Oil Bopd	GOR Sd/mbbl	WOR	Initial	Recent	MBbl	Water MBbl	Type	%*/Yr	MBbl	Non-Producing MBbl		Prev. MBbl	P + Prob MBbl
00/10-04-02-29W1/0	Inj	10	1.5		5.000	28.0	1.0	0.9	3.2		65.7%	0.0	0.0		0.9	0.9
00/12-04-02-29W1/0	Inj	4	0.8		5.100	22.0	0.4	0.4	1.8		53.0%	0.0	0.0		0.4	0.4
00/13-04-02-29W1/0	SI	40	7.4		0.010			19.4	2	Hyp	17.4%	0.0	4.4		23.8	23.8
00/14-04-02-29W1/0	Inj	48	10.0		0.300	40.0	10.0	47.4	13.4		38.9%	0.0	0.0		47.4	47.4
00/16-04-02-29W1/0	Inj	50	10.0		0.250	90.0	8.0	16.3	5.2		39.6%	0.0	0.0		16.3	16.3
00/16-05-02-29W1/0	Inj	40	20.0		1.400	100.0	20.0	73.1	80.8		36.8%	0.0	0.0		73.1	73.1
00/01-08-02-29W1/0	P	80	23.0		0.004	50.0	10.0	50.9	0.8	Hyp	10.1%	51.7	0.0	31.8	102.6	134.4
00/02-08-02-29W1/0	Inj	60	20.0		0.010			13.1	0.1		25.6%	0.0	0.0		13.1	13.1
00/03-08-02-29W1/0	P	30	10.0		0.600	80.0	25.0	23.1	3.8		4.6%	45.0	0.0	17.1	68.1	68.1
00/06-08-02-29W1/0	Inj	80	10.0		0.200	300.0	83.0	98.4	0.8	Exp	7.1%	137.2	0.0	76.2	236.6	236.6
00/07-08-02-29W1/0	P	80	44.7		0.0400			76.2	159		19.9%	0	0	110.3	110.3	110.3
00/08-08-02-29W1/0	Inj	60	20		4.8000			48.3	0.7	Exp	11.6%	62	0	12.2	76.2	76.2
00/10-08-02-29W1/0	P	70	21.7		0.0050	70.0	6.0	22.2	0.3		58.0%	0	0	12.2	12.2	12.2
00/10-08-02-29W1/0	Inj	70	20		0.0100			12.8	2.8	Hyp	9.0%	7.8	0	31.6	31.6	31.6
00/11-08-02-29W1/0	P	40	6.7		0.4000	80.0	1.0	15.2	3.4		93.0%	0	0	15.2	15.2	15.2
00/12-08-02-29W1/0	Inj	50	10		0.0500			16.2	0.3	Hyp	3.7%	9.2	0	25.4	25.4	25.4
00/13-08-02-29W1/0	P	30	6		0.0007			16.2	0.3	Hyp	17.0%	0	0	6.7	6.7	6.7
00/14-08-02-29W1/0	Inj	35	8		0.1500	78.0	1.1	6.7	1.1		5.5%	18.2	0	7.3	40.6	47.9
00/15-08-02-29W1/0	P	48	7.3		0.0600			22.4	0.9	Hyp		0	0	55.2	55.2	55.2
00/16-08-02-29W1/0	Inj	150	14		0.0200	130.0	6.0	55.2	9.3			0	0	16.7	16.7	16.7
00/02-08-02-29W1/0	Inj	60	10		0.140	40.0	10.0	16.7	2.5		37.7%	0	0	111.7	92.5	204.2
00/03-08-02-29W1/0	P	70	29		0.004			57.1	1.4	Exp	22.4%	35.4	0	39.6	39.6	39.6
00/04-08-02-29W1/0	Inj	30	15		2.200	490.0	30.0	39.6	113.6			0	0	20.3	20.3	20.3
00/05-08-02-29W1/0	SI	60	0.7		40.000			20.3	7.7			0	0	30.1	30.1	30.1
00/06-08-02-29W1/0	Inj	90	20		1.000	90.0	47.0	30.1	16.2		18.0%	0	0	74.2	74.2	74.2
00/07-08-02-29W1/0	P	50	15		9.000			32.3	169.1	Hyp	12.9%	41.9	0	25.1	25.1	25.1
00/08-08-02-29W1/0	Inj	30	7		0.450	110.0	40.0	25.1	87.1		33.3%	0	0	37.9	100.8	138.7
00/09-08-02-29W1/0	P	130	17.7		0.005			67.9	1.5	Hyp	23.1%	32.9	0	18.4	18.4	18.4
00/10-08-02-29W1/0	Inj	50	14		0.007	210.0	72.0	18.4	1.3		12.5%	0	52.6	119.2	119.2	119.2
00/11-08-02-29W1/0	SI	70	23.9		0.03			66.6	3.6	Exp	26.0%	0	0	72.6	72.6	72.6
00/12-08-02-29W1/0	Inj	58	27		0.01	180.0	32.9	72.6	13.6		8.1%	0	32.3	75	88.4	88.4
00/13-08-02-29W1/0	SI	70	10		24			42.7	116.2	Hyp		0	0	52.7	52.7	52.7
00/14-08-02-29W1/0	SI	44	18		18	550.0	200.0	52.7	558.7		40.9%	0	0	106.7	106.7	106.7
00/15-08-02-29W1/0	P	80	21.4		0.02			43.8	1.8	Exp	12.8%	62.9	0	112	112	112
00/16-08-02-29W1/0	Inj	67	30		0.15	150.0	40.0	112	13.3		22.8%	0	0	93.3	93.3	93.3
00/04-15-02-29W1/0	Inj	52	20		0.04	140.0	17.0	93.3	6.8		13.8%	0	0	0.3	22.7	23
00/05-15-02-29W1/0	P	38	5.6		0.02			22	2.5			0.7	0	54.6	54.6	54.6
00/01-18-02-29W1/0	P	70	10.5		0.006			31	1.3	Exp	8.4%	23.6	0	42.8	43.8	43.8
02/01-18-02-29W1/0 HZ	P	100	7.1		0.80			32.3	1.2	Exp	18.2%	10.5	0	34.6	34.6	34.6
00/02-18-02-29W1/0	Inj	50	15		0.005	180.0	60.0	34.6	0.8		8.8%	119.5	0	218	218	218
00/03-18-02-29W1/0	P	160	34.4		0.80			98.5	33.4		15.5%	0	0	45.8	45.8	45.8
00/04-18-02-29W1/0	Inj	70	16		0.006	100.0	40.0	45.8	0.9		14.3%	0	20.9	55.2	55.2	55.2
00/05-18-02-29W1/0	SI	70	14		0.005			34.3	1.3	Exp	12.9%	0	0	37.4	37.4	37.4
00/06-18-02-29W1/0	SI	60	8		0.005	77.0	18.0	37.4	2.3		23.1%	4.6	0	35.4	35.4	35.4
00/07-18-02-29W1/0	P	58	8.1		0.005			30.8	2.6	Exp		0	0	18.4	18.4	18.4
00/08-18-02-29W1/0	Inj	18	6		0.03	18.0	4.0	18.4	1.3			0	0	22.3	22.3	22.3
00/10-18-02-29W1/0	Inj	46	9		0.03	60.0	8.0	22.3	1.3			0	0	77.2	77.2	77.2
00/11-18-02-29W1/0	P	1000	25.2		0.004			43.8	1.1	Exp	20.2%	33.4	0			

**Table 1**

Well	Well Status	Initial (Max) Bopd	Last Daily Production		Daily Injection		Cum. Production		Decline Analysis		Proved Rem. Reserves		Probable		Ultimate Recovery	
			Oil Bopd	GOR Sg/Bbl	WOR	Initial	Recent	Oil MBBbl	Water MBBbl	Type	%/yr	Producing MBBbl	Non-Producing MBBbl	MBbl	Prov. MBBbl	P + Prob MBBbl
00/12-18-02-29W1/0	SI	20	8		0.005	35.0	3.7	17.1	0.2		30.4%	0	0		17.1	17.1
00/13-16-02-29W1/0	P	30	8.1		0.01			21.9	0.9	Har	23.2%	6.1	0		28	28
00/14-18-02-29W1/0	P	100	14.9		0.70			36.8	7.4	Exp	23.6%	14.9	0		51.7	51.7
00/15-18-02-29W1/0	P	60	14		0.02			33.5	0.9	Exp	18.2%	19.7	0		53.2	53.2
00/01-17-02-29W1/0	P	100	13.7		0.005			30.7	0.3	Exp	8.1%	38.9	0	17.1	69.6	86.7
00/02-17-02-29W1/0	SI	48	12		0.003	40.0	0.8	30.7	0.4			0	0		30.7	30.7
00/03-17-02-29W1/0	P	51	13.4		0.010			30.2	0.6	Exp		36.2	0	63.7	66.4	130.1
00/04-17-02-29W1/0	Inj	28	7		0.020	60.0	0.4	14.5	2.3			0	0		14.5	14.5
00/05-17-02-29W1/0	P(U)	30	5		0.010			10.5	1.5			0	0		10.5	10.5
00/06-17-02-29W1/0	Inj	20	3		8.000	100.0	60.0	11.9	78.7		15.7%	0	0		11.9	11.9
00/07-17-02-29W1/0	P	40	5.8		0.015			14.4	0.7	Exp	4.9%	4.9	9		28.3	28.3
00/08-17-02-29W1/0	Inj	20	6		0.015	300.0	60.0	13.9	0.4		56.6%	0	0		13.9	13.9
00/09-17-02-29W1/0	P	100	9.3		1.000			26.3	5.2	Exp	22.8%	6.4	0		32.7	32.7
00/10-17-02-29W1/0	P	60	12.7		1.100			29.5	6.8	Exp	55.5%	3.9	0		33.4	33.4
00/11-17-02-29W1/0	P	40	16.5		0.180			24.8	2.7	Hyp	7.9%	0	35.3	17.7	60.1	77.8
00/12-17-02-29W1/0	SI	16	6		0.030	8.0	3.0	11.1	1.8			0	0		11.1	11.1
00/14-17-02-29W1/0	Inj	28	6		5.000	550.0	65.0	15.5	33.4		59.3%	0	0		15.5	15.5
00/08-18-02-29W1/0	Inj	42	7.5		0.150	10.0	0.7	16.9	2.1			0	0		16.9	16.9
00/16-18-02-29W1/0	SI	1	0.4		4.000	8.0	0.3	0.1	0.2			0	0		0.1	0.1
Total										2270		827.5	154.5	301.9	3252	3553.9

Notes:

P: Producing  
P(U): Uneconomic producer  
SI: Shutin  
Inj: Injector

Total Proved  
Total Probable  
Total Proved + Prob.

Remaining	Ultimate
982.0	3252.0
301.9	MBbl
1283.9	MBbl
	3553.9

Table 1



Table 2

**South Pierson Unit  
Spearfish Formation  
Calculation of Voidage Replacement Ratio (VRR)**

$\text{Voidage Replacement Ratio (VRR)} = \{\text{Volume of Wtr. Inj.}\} / \{(\text{Oil Volume} \cdot \text{Bo}) + \text{Wtr. Volume}\}$
--

	Wtr. Inj. Vol. (E3m3)	Oil Vol. (E3m3)	VRR (%)	Additional Wtr. Vol. (E3m3)
<b>Section 4</b>	11.10	13.41	69.56%	15.96
<b>Section 5</b>	5.70	11.60	41.29%	13.80
<b>Section 8</b>	43.10	78.56	46.11%	93.48
<b>Section 9</b>	43.00	106.30	33.99%	126.50
<b>Section 15</b>	3.80	17.50	18.25%	20.83
<b>Section 16</b>	26.90	77.76	29.07%	92.53
<b>Section 17</b>	31.60	38.64	68.72%	45.98
<b>Section 18</b>	0.70	2.71	21.71%	3.22
<b>Total Field</b>	<b>165.90</b>	<b>346.48</b>	<b>28.69%</b>	<b>412.31</b>

Additional water volume to replace cumulative production in the South Pierson Unit = 412.31 E3m3.

**NOTE:**

- \* All produced water is assumed to come from the Alida Formation.
- \* All oil produced and water injected are prorated to the Spearfish Formation.
- \* Bo = 1.19

**Table 3**

**GOR Data (as of Septmeber 1999)**  
South Pierson Field

**South Pierson Unit**

	Well	Q <sub>o</sub> (Bbl/m)	GOR	GOR*Oil
1	1-8	115.8	54.4	6300
2	3-8	54	61.1	3299
3	5-8	22.1	58.8	1299
4	7-8	200.2	53.4	10691
5	9-8	96.7	53.8	5202
6	11-8	31.3	73.5	2301
7	13-8	28	48.4	1299
8	15-8	35.4	115.8	4099
9	3-9	130.2	49.2	6406
10	7-9	75.1	83.9	6301
11	9-9	82.7	43.5	3597
12	11-9	248.6	46	11344
13	15-9	114.3	60	6858
14	1-16	58	41.4	2401
15	2/1-16 HZ	48.6	16.5	802
16	3-16	194.9	64.8	12591
17	5-16	145.4	53	7706
18	7-16	54.1	53.6	2900
19	11-16	75.3	23.9	1800
20	13-16	11.6	103.4	1199
21	14-16	80.9	17.3	1400
22	15-16	48.8	62.2	3098
23	1-17	53.7	80.1	4301
24	3-17	81.1	50.2	4071
25	5-17	49.1	20.4	1002
26	7-17	35.6	47.8	1702
27	9-17	47.5	71.6	3401
28	10-17	59.9	10	599
29	11-17	59.9	8.3	497

Total 2337.8 118465  
Ave GOR **50.7**

**Lyleton**

	Well	Q <sub>o</sub> (Bbl/m)	GOR	GOR*Oil
1	12-30	10.1	128.7	1300
2	9-24	14.4	125	1800
3	7-25	21.5	116.3	2500
4	9-25	4.5	133	599
5	10-25	181.2	39.7	7194

231.7 13392.46  
Ave GOR **57.8**

**East Pierson**

	Well	Q <sub>o</sub> (Bbl/m)	GOR
6-34		44.4	36

**Non-Unit**

	Well	Q <sub>o</sub> (Bbl/m)	GOR	GOR*Oil
1	16-7	14.5	165.5	2400
2	6-10	20.4	29.4	600
3	8-10	36	141.7	5101
4	10-10	21.2	202.8	4299
5	11-10	51.9	142.6	7401
6	12-10	95.6	78.5	7505
7	13-10	65.2	72.1	4701
8	14-10	41.1	136.3	5602
9	6-11	14	28.6	400
10	11-11	138.1	84	11600
11	4-14	39.4	96.4	3798
12	5-15	32.5	89.2	2899
13	6-15	25.7	105.1	2701
14	12-15	67.4	16.3	1099
15	13-15	14.1	14.2	200
16	9-16	12.8	23.4	300
17	16-16	18.1	55.2	999
18	14-18	20.4	59	1204
19	2-19 HZ	131.7	26.6	3503
20	4-19	13.9	208.6	2900
21	11-19	42.6	65.7	2799
22	16-19	25.1	87.6	2199
23	4-20	14	171.4	2400
24	12-20	23.4	85.5	2001
25	1-21	58.3	48	2798
26	2-21	65.5	88.5	5797
27	8-21	13.4	134.3	1800
28	2-30	46.5	101.1	4701
29	4-30	28.3	35.3	999
30	6-30	34.5	92.8	3202
31	12-30	28.2	95.7	2699
32	4-31	28.5	10.5	299
33	7-15 HZ	74.7	38.8	2898

Total 1264.9 91402  
Ave GOR **72.3**

**Table 3**

Table 4

PERSON-UNIT PROPERTY  
LIST OF WELLS CORED - GROUP

LOCATION	CORE ID	TOP DEPTH m	BASE DEPTH m	SHOW TYPE	RECOVERY AMOUNT	TYPE	FLUID	RPT	DIG	FORMATIONS
00/16-04-002-28W1/0	1	1022	1032	OIL/WTR	9.7 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	SPRF/WTRS
00/16-05-002-28W1/0	1	1019	1037	OIL/WTR	18.0 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	AMRN/SPRF
00/06-08-002-28W1/0	1	1020	1039			DIAMOND, CONVENTIONAL				AMRN/JRSC/SPRF
00/16-08-002-28W1/0	1	1017	1035	OIL/WTR	17.6 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	AMRN/SPRF/JRSC
00/04-09-002-28W1/0	1	1019	1032.6							AMRN/JRSC/SPRF
00/04-09-002-28W1/0	2	1032.6	1050							ALID/AMRN/MSSU/SPRF/PLZU/JRSC
00/08-09-002-28W1/0	1	1010.5	1028.5	OIL/WTR	18.4 m	DIAMOND, CONVENTIONAL	FRESH WTR, NATIVE CLAYS, GEL	YES	Y	SPRF/WTRS
00/12-09-002-28W1/0	1	1020	1039							ALID/WTRS/SPRF/PLZU/MSSU
00/12-09-002-28W1/0	2	1039	1056							ALID
00/14-09-002-28W1/0	1	1022	1040	OIL/WTR	17.3 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	ALID/SPRF/WTRS/MSSU/PLZU
00/14-09-002-28W1/0	2	1040	1059	OIL/WTR	12.1 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	ALID
00/16-09-002-28W1/0	1	1010	1029	OIL/WTR	18.0 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	SPRF/WTRS
00/16-09-002-28W1/0	2	1029	1048	OIL/WTR	14.3 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	ALID/SPRF/WTRS/MSSU/PLZU
00/04-15-002-28W1/0	1	1010.5	1028.7	OIL/WTR	18.2 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	ALID/MSSU/AMRN/PLZU/SPRF
00/02-16-002-28W1/0	1	1013	1029							AMRN/JRSC/SPRF
00/06-16-002-28W1/0	1	1013	1025	OIL/WTR	10.9 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	SPRF/WTRS
00/07-16-002-28W1/0	1	1029	1045.6	OIL/WTR	17.4 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	ALID/MSSU/SPRF/WTRS/PLZU/JRSC
00/06-16-002-28W1/0	1	1010	1029							SPRF/WTRS
00/08-16-002-28W1/0	2	1029	1039							ALID
00/10-16-002-28W1/0	1	1010.5	1028.5	OIL/WTR	15.7 m	ROLLER BIT	AIR/GAS, DRY	YES	Y	SPRF/WTRS
00/06-17-002-28W1/0	1	1017	1035	OIL/WTR	17.5 m	DIAMOND, CONVENTIONAL	WATER BASE, UNDIFFERENTIATED	YES	Y	SPRF/WTRS
00/08-17-002-28W1/0	1	1018	1025							AMRN/JRSC/SPRF
00/14-17-002-28W1/0	1	1018	1038.1	OIL/WTR	18.1 m	UNKNOWN	UNKNOWN	YES	Y	ALID/PLZU/SPRF/MSSU/AMRN
00/06-18-002-28W1/0	1	1024.5	1037.5							ALID/AMRN/JRSC/MSSU/PLZU/SPRF

Table 5

## Results of 1999 Pressure Survey

## Producing wells

Well	Pressure (kPa)	Oil Permeability (mD)	Skin Factor	Fracture Half Length, xf (m)	Fracture Flow Capacity, kfw	Fractured Face Skin, sf	Rate (m3/d)
15-09-02-29W1	3423.49	11.558	-2.612				3.60
07-16-02-29W1	3252.09	5.539	-3.499	9.32	141.946	0.010	2.00
03-08-02-29W1	2982.48	5.146	-4.03	10.29	46820.875	0.620	1.30
01-08-02-29W1	3560.17	10.496	-4.442	21.29	858.402	0.068	3.10
07-17-02-29W1	2698.00						
13-16-02-29W1	3360.00						
<b>Average</b>	<b>3212.71</b>	<b>8.185</b>	<b>-3.846</b>	<b>13.63</b>	<b>15940.408</b>	<b>0.233</b>	<b>2.50</b>

## Injection wells

Well	Pressure (kPa)	Water Permeability (mD)	Skin Factor	Fracture Half Length, xf (m)	Fracture Flow Capacity, kfw (mD.m)	Fractured Face Skin, sf	Rate (m3/d)
04-17-02-29W1	9401.98	0.271	-3.037	3.61	40769.502	0.810	1.00
10-08-02-29W1	6910.12	0.051	-4.932	25.70	166.809	0.197	1.50
02-08-02-29W1	5791.92	0.306	-4.734	22.77	150.298	0.358	3.00
16-05-02-29W1	8678.69	0.791	-5.159	50.40	101.298	0.015	6.90
02-17-02-29W1	9288.85	0.315	-2.405	2.03	188116.090	1.870E-07	1.50
02-09-02-29W1	5415.75	0.075	-5.455	42.77	30651.616	0.194	1.40
06-16-02-29W1	7649.00						
<b>Average</b>	<b>7590.90</b>	<b>0.302</b>	<b>-4.287</b>	<b>24.58</b>	<b>43359.292</b>	<b>0.262</b>	<b>2.55</b>

\* Pressure Gradients

## Horizontal wells

Well	Pressure (kPa)	Oil Permeability (mD)			Skin Factor	Effective Length (m)	Actual Length (m)	Rate (m3/d)
		Kx	Ky	Kz				
102/01-16-002-29W1	1470.20	26.1	18.2	3.6	20.5	284.2	660.0	2.70
100/11-11-002-29W1	3356.00	3.7	2.9	1.4	62.1	1300.0	1300.0	4.30
191/11-10-002-29W1	3868.40	4.6	1.0	0.5	47.7	763.0	770.0	1.60
<b>Average</b>	<b>2898.20</b>	<b>11.47</b>	<b>7.37</b>	<b>1.83</b>	<b>43.43</b>	<b>782.40</b>	<b>910.00</b>	<b>2.87</b>

TABLE 6

**Determination of OOIP**

Material Balance (above bubble point pressure)

**Field: South Pierson Unit****Zone : Spearfish/Alida**

$$N = [ (N_p B_o) + (W_p - W_e) ] / [ B_o (P_i - P) C_e ]$$

where:  $C_e = C_o + (S_w C_w) / S_o + C_f / S_o$ 

Bo = Oil Formation Factor at P		RB/STB	
Bob = Oil Formation Factor at Pb	1.178	RB/STB	
Boi = Oil Formation Factor at Pi	1.102	RB/STB	
Ce = Effective Compressibility to Oil	8.32E-05	1/psi	
Cf = Formation Compressibility	3.90E-06	1/psi	
Co = Oil Compressibility	7.47E-05	1/psi	
Cw = Water Compressibility	3.00E-06	1/psi	
N = OOIP at Np = 0	27.22	MMBLS	
Np = Cumulative Oil Prod. at time, t		MBBLS	
P = Reservoir Pressure at time, t		psi	
Pb = Bubble Point Pressure	673.5	psi	
Pi = Initial Reservoir Pressure	1536.3	psi	
So = Oil Saturation	60.0	%	
Sw = Water Saturation	40.0	%	
We = Cumulative Water Influx at time, t	0.0	MBBLS	(assumed)
Wp = Cumulative Water Prod. at time, t		MBBLS	

DATE	Bo (RB/STB)	Wp (MBBLS)		Np (MBBLS)	P (psi)	(Pi - P) (psi)	N (MMBLS)
01-Dec-85	1.1021	0.0	0	0.0	1536.3	0.0	0.0
01-Jan-94	1.1433	0.0	0	1092.0	1036.0	500.3	27.22

**Notes:**

OOIP estimate represents both the Spearfish and the Alida

Table 7

**RFT Pressure Survey (1993/1994)**  
**South Pierson Unit (Spearfish Formation)**

<b>Sand</b>	<b>Average Pressure (mPa)</b>
C1	6.99
C2	7.46
C3	7.04

**Table 8**  
**South Pierson Unit**  
**Proration of Oil Production Volumes**

Well	Proration		Cumulative Oil Production			Comments
	Alida %	Spearfish %	Total	Alida	Spearfish	
			E3m3			
South Pierson Unit						
00/05-09-02-29W1/0	0.00%	100.00%	3.2	0.0	3.2	Alida completed in Jan. 1997
00/07-09-02-29W1/0	0.00%	100.00%	5.1	0.0	5.1	Alida completed in Jul. 1996
00/08-09-02-29W1/0	60.00%	40.00%	4.0	2.4	1.6	Isolate Alida in 1991, Perf SF
00/11-09-02-29W1/0	0.00%	100.00%	10.6	0.0	10.6	Alida completed in Aug. 1996
00/13-09-02-29W1/0	0.00%	100.00%	6.8	0.0	6.8	Alida completed in Jun 1996 (Wet)
00/05-15-02-29W1/0	22.70%	77.30%	3.5	0.8	2.7	Alida completed in April 1996
00/03-16-02-29W1/0*	63.00%	37.00%	15.7	9.9	5.8	Alida initial completion. SF added in 1994
00/09-16-02-29W1/0	8.00%	92.00%	3.0	0.2	2.8	Alida completed in July 1996
00/11-16-02-29W1/0	24.60%	75.40%	7.0	1.7	5.3	Alida completed in Apr. 1996
00/13-16-02-29W1/0	0.00%	100.00%	3.5	0.0	3.5	Alida completed in Jan. 1997
00/14-16-02-29W1/0	19.96%	80.04%	5.9	1.2	4.7	Alida completed in Jun. 1996
00/15-16-02-29W1/0	8.00%	92.00%	5.3	0.4	4.9	Alida completed in Jun. 1996
00/01-17-02-29W1/0	0.00%	100.00%	4.9	0.0	4.9	Alida is wet
00/09-17-02-29W1/0	43.00%	57.00%	4.2	1.8	2.4	Alida completed in Jul. 1996
00/10-17-02-29W1/0	57.60%	42.40%	4.7	2.7	2.0	Alida completed in Jul. 1997
00/11-17-02-29W1/0	32.00%	68.00%	3.9	1.3	2.7	Alida completed in Jul. 1996
Total Oil Production			91.2	22.4	68.9	E3m3
			100.0%	24.5%	75.5%	
Pierson Non-Unit						
00/03-21-02-29W1/0	0.33	0.67	1.2	0.4	0.8	Alida completed in Aug. 1996
00/12-10-02-29W1/0	0.182	0.818	5.3	1.0	4.3	Alida completed in Mar. 1996
00/13-10-02-29W1/0	0.231	0.769	4.5	1.1	3.5	Alida completed in Jun. 1996
00/12-15-02-29W1/0	0.137	0.863	3.1	0.4	2.7	Alida completed in Mar. 1996
Total Oil Production			14.1	2.8	11.3	E3m3
			100%	20.0%	80.0%	

**Note:**

Decline analysis was used to prorate the Spearfish/Alida production volumes. Core data was used only for the 3-16

Table 9

## API RECOVERY FACTORS (Bulletin D14)

### South Pierson Unit

#### WATER AND SOLUTION GAS DRIVE MECHANISMS

Phi:	0.165	Effective Porosity	(frac.)
Sw:	0.4	Water Saturation	(frac.)
k:	5	Absolute Permeability	(mD)
P <sub>a</sub> :	6000	Abandonment Pressure	kPa
B <sub>o</sub> :	1.05	Oil Formation Vol Factor	(Rm3/Sm3)
U <sub>o</sub> :	1.25	Oil Viscosity	(cp)
P:	10600	Reservoir Pressure	kPa
U <sub>w</sub> :	0.5	WTR Viscosity <D=1.0>	(cp)

#### Recovery Factors:

Solution gas drive	15.80%	(at abandonment pressure of 2000 kPa)
Waterflood	32.40%	(at abandonment pressure of 6000 kPa)



Table 10

### Recovery Efficiency (Er) Dykstra - Parsons Method

Field: South Pierson Unit	Formation: Spearfish
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## 1. Mobility Ratio (M) :

$$M = \frac{K_{rw}}{U_w} \cdot \frac{U_o}{K_{ro}}$$

Where :

Kro :	Relative Permeability to Oil at Swi	0.596
Krw :	Relative Permeability to Water at Sor	0.425
Uw :	Water Viscosity	0.5 cp
Uo :	Oil Viscosity	1.25 cp

$$M = 1.78$$

## 2. Permeability Variance (V) :

$$V = 0.69$$

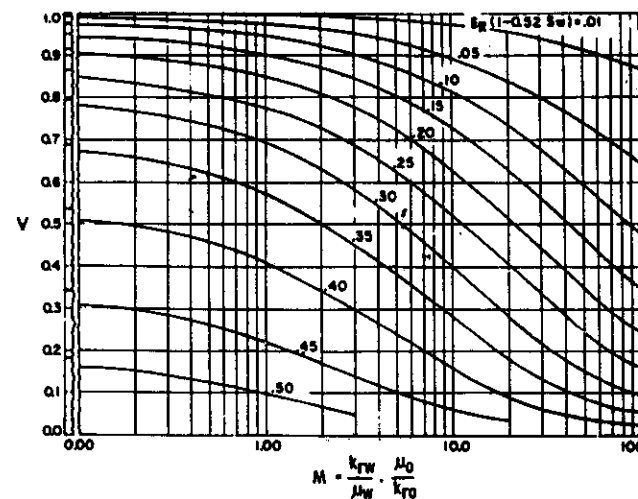
See attached figure.

3. Recovery Efficiency (Er):  
(by Dykstra-Parsons)
$$Er (1-.52 Sw) = 0.27 \quad (\text{Figure 8.3, SPE Monograph Vol 3})$$

Where :

Sw :	Formation Water Saturation =	40.0%
------	------------------------------	-------

$$Er = 34.1\%$$



Note : Relative Perm. data from Special Core Study by Hycal Report (May 1993)  
Recovery efficiency is calculated at a WOR of 25

Table 10

Table 11

Drainage Radius - Spearfish Formation

Well IPL	Well Status	Cumulative Prod./Inj.		Radius		Diameter		Area		Radius	
		Oil Prod. E3m3	Wtr. Inj E3m3	Oil Prod. m	Wtr. Inj. m	Oil Prod. m	Wtr. Inj. m	Oil Prod. m2	Wtr. Inj. m2	Oil Prod. cm	Wtr. Inj. cm
100100400229W100	Inj	0.14	1.30	23.190	67.377	46.38	134.75	2151.08	18158.45	0.46	1.35
100120400229W100	Inj	0.06	1.1	14.728	60.127	29.46	120.25	867.66	14461.03	0.29	1.20
100130400229W100	Prod	3.08	0	85.154	0.000	170.31	0.00	29004.86	0.00	1.70	0.00
100140400229W100	Inj*	7.54	5.1	148.456	116.413	296.91	232.83	88156.91	54207.89	2.97	2.33
100160400229W100	Inj*	2.59	3.6	105.448	118.534	210.90	237.07	44476.71	56200.82	2.11	2.37
100160500229W100	Inj*	11.6	5.7	142.936	95.533	285.87	191.07	81723.36	36506.52	2.86	1.91
100010800229W100	Prod	8.076	0	122.446	0.000	244.89	0.00	59971.85	0.00	2.45	0.00
100020800229W100	Inj	2.08	6.8	59.765	103.033	119.53	206.07	14287.50	42462.85	1.20	2.06
100030800229W100	Prod	3.67	0	101.928	0.000	203.86	0.00	41556.97	0.00	2.04	0.00
100050800229W100	Prod	2.43	0	65.421	0.000	130.84	0.00	17119.64	0.00	1.31	0.00
100060800229W100	Inj	2.72	7.6	55.803	88.937	111.61	177.87	12455.77	31638.98	1.12	1.78
100070800229W100	Prod	15.8	0	143.179	0.000	286.36	0.00	82000.47	0.00	2.86	0.00
100080800229W100	Inj*	12.1	13.3	151.946	151.888	303.89	303.78	92349.75	92280.37	3.04	3.04
100090800229W100	Prod	7.68	0	107.921	0.000	215.84	0.00	46587.81	0.00	2.16	0.00
100100800229W100	Inj	1.94	3.4	44.597	56.293	89.19	112.59	7955.73	12675.46	0.89	1.13
100110800229W100	Prod	3.78	0	86.203	0.000	172.41	0.00	29723.98	0.00	1.72	0.00
100120800229W100	Inj	2.42	3.00	53.427	56.718	106.85	113.44	11417.79	12867.53	1.07	1.13
100130800229W100	Prod	2.58	0	69.153	0.000	138.31	0.00	19128.50	0.00	1.38	0.00
100140800229W100	Inj	0.94	2.4	40.906	62.320	81.81	124.64	6693.08	15535.19	0.82	1.25
100150800229W100	Prod	3.56	0	91.827	0.000	183.65	0.00	33729.11	0.00	1.84	0.00
100160800229W100	Inj*	8.78	6.6	131.268	108.515	262.54	217.03	68625.40	47101.64	2.63	2.17
100020900229W100	Inj	0.38	4.7	30.405	101.954	60.81	203.91	3697.81	41578.20	0.61	2.04
100030900229W100	Prod	9.08	0	148.858	0.000	297.72	0.00	88635.09	0.00	2.98	0.00
100040900229W100	Inj*	6.3	10.1	120.104	144.994	240.21	289.99	57699.51	84093.09	2.40	2.90
100050900229W100	Prod	3.23	0	76.322	0.000	152.64	0.00	23300.46	0.00	1.53	0.00
100060900229W100	Inj	4.79	9.9	108.118	148.201	216.24	296.40	46757.94	87854.16	2.16	2.96
100070900229W100	Prod	5.14	0	129.664	0.000	259.33	0.00	67250.68	0.00	2.59	0.00
100080900229W100	Inj	1.6	0	63.593	0.000	127.19	0.00	16176.32	0.00	1.27	0.00
100090900229W100	Prod	10.79	0	178.375	0.000	356.75	0.00	127270.58	0.00	3.57	0.00
100100900229W100	Inj	2.93	5	73.870	92.008	147.74	184.02	21827.39	33861.92	1.48	1.84
100110900229W100	Prod	10.59	0	153.476	0.000	306.95	0.00	94218.99	0.00	3.07	0.00
100120900229W100	Inj*	11.54	3	162.551	79.022	325.10	158.04	105690.85	24978.14	3.25	1.58
100130900229W100	Prod	6.79	0	107.982	0.000	215.96	0.00	46640.44	0.00	2.16	0.00
100140900229W100	Inj*	8.38	6.3	132.072	109.185	264.14	218.37	69772.28	47685.55	2.64	2.18
100150900229W100	Prod	6.96	0	124.422	0.000	248.84	0.00	61922.96	0.00	2.49	0.00
100160900229W100	Inj	17.8	4	195.471	88.350	390.94	176.70	152835.02	31222.68	3.91	1.77
100041500229W100	Inj*	14.8	3.8	225.456	108.925	450.91	217.85	203322.09	47458.47	4.51	2.18
100051500229W100	Prod	2.7	0	103.033	0.000	206.07	0.00	42462.85	0.00	2.06	0.00
100011600229W100	Prod	4.93	0	108.061	0.000	216.12	0.00	46709.13	0.00	2.16	0.00

Table 11

Well IPL	Well Status	Cumulative Prod/Inj.			Radius			Diameter			Area			Radius		
		Oil Prod. E3m3	Wtr. Inj. E3m3	Wtr. Inj. E3m3	Oil Prod. m	Wtr. Inj. m	Wtr. Inj. m	Oil Prod. m	Wtr. Inj. m	Wtr. Inj. m	Oil Prod. m2	Wtr. Inj. m2	Wtr. Inj. m2	Oil Prod. cm	Wtr. Inj. cm	Wtr. Inj. cm
100201600229W100	Prod	5.14	0	0	110.339	0.000	0.000	220.68	220.68	0.00	48698.77	0.00	0.00	2.21	0.00	0.00
100021600229W100	Inj*	5.5	1.8	1.8	120.543	65.751	65.751	241.09	241.09	131.50	58122.22	17292.56	17292.56	2.41	1.32	1.32
100031600229W100	Prod	5.8	0	0	111.580	0.000	0.000	223.16	223.16	0.00	49600.17	0.00	0.00	2.23	0.00	0.00
100041600229W100	Inj	7.28	10.1	10.1	113.492	127.457	127.457	226.98	226.98	254.91	51521.59	64981.02	64981.02	2.27	2.55	2.55
100051600229W100	Prod	5.45	0	0	106.604	0.000	0.000	213.21	213.21	0.00	45457.99	0.00	0.00	2.13	0.00	0.00
100061600229W100	Inj	5.95	7.1	7.1	99.842	103.989	103.989	199.68	199.68	207.98	39873.65	43254.83	43254.83	2.00	2.08	2.08
100071600229W100	Prod	4.9	0	0	111.651	0.000	0.000	223.30	223.30	0.00	49863.78	0.00	0.00	2.23	0.00	0.00
100081600229W100	Inj*	2.9	1	1	89.264	49.978	49.978	178.53	178.53	99.96	31872.11	9991.26	9991.26	1.79	1.00	1.00
100091600229W100	Prod*	2.8	0	0	86.008	0.000	0.000	172.02	172.02	0.00	29589.49	0.00	0.00	1.72	0.00	0.00
100101600229W100	Inj	3.55	6.3	6.3	77.120	97.955	97.955	154.24	154.24	195.91	23790.16	38381.05	38381.05	1.54	1.96	1.96
100111600229W100	Prod	5.3	0	0	125.015	0.000	0.000	250.03	250.03	0.00	62514.74	0.00	0.00	2.50	0.00	0.00
100121600229W100	Inj	2.72	0.6	0.6	89.110	39.904	39.904	178.22	178.22	79.81	31762.21	6369.43	6369.43	1.78	0.80	0.80
100131600229W100	Prod	3.48	0	0	86.429	0.000	0.000	172.86	172.86	0.00	29880.10	0.00	0.00	1.73	0.00	0.00
100141600229W100	Prod	4.7	0	0	102.933	0.000	0.000	205.87	205.87	0.00	42380.87	0.00	0.00	2.06	0.00	0.00
100151600229W100	Prod	4.9	0	0	128.504	0.000	0.000	257.01	257.01	0.00	66053.31	0.00	0.00	2.57	0.00	0.00
100161600229W100	Prod	2.46	0	0	79.457	0.000	0.000	158.91	158.91	0.00	25253.73	0.00	0.00	1.59	0.00	0.00
100011700229W100	Prod*	4.88	0	0	113.545	0.000	0.000	227.09	227.09	0.00	51570.26	0.00	0.00	2.27	0.00	0.00
100021700229W100	Inj	4.88	0.5	0.5	93.921	28.664	28.664	187.84	187.84	57.33	35284.92	3286.60	3286.60	1.88	0.57	0.57
100031700229W100	Prod	4.8	0	0	104.835	0.000	0.000	209.67	209.67	0.00	43961.53	0.00	0.00	2.10	0.00	0.00
100041700229W100	Inj	2.3	5.8	5.8	61.526	93.156	93.156	123.05	123.05	186.31	15141.79	34712.40	34712.40	1.23	1.86	1.86
100051700229W100	Prod	1.67	0	0	93.305	0.000	0.000	186.61	186.61	0.00	34823.32	0.00	0.00	1.87	0.00	0.00
100061700229W100	Inj*	1.89	11.1	11.1	71.476	165.156	165.156	142.95	142.95	330.31	20435.24	109105.92	109105.92	1.43	3.30	3.30
100071700229W100	Prod	2.28	0	0	73.500	0.000	0.000	147.00	147.00	0.00	21608.87	0.00	0.00	1.47	0.00	0.00
100081700229W100	Inj*	2.2	13.5	13.5	70.870	167.386	167.386	141.74	141.74	334.77	20089.95	112072.02	112072.02	1.42	3.35	3.35
100091700229W100	Prod	2.4	0	0	84.662	0.000	0.000	169.32	169.32	0.00	28670.57	0.00	0.00	1.69	0.00	0.00
100101700229W100	Prod	2	0	0	60.244	0.000	0.000	120.49	120.49	0.00	14517.21	0.00	0.00	1.20	0.00	0.00
100111700229W100	Prod	2.7	0	0	85.233	0.000	0.000	170.47	170.47	0.00	28058.68	0.00	0.00	1.70	0.00	0.00
100121700229W100	Inj	4.17	0.7	0.7	94.611	36.959	36.959	189.22	189.22	73.92	35804.61	5463.97	5463.97	1.89	0.74	0.74
100141700229W100	Inj*	2.46	0	0	101.198	0.000	0.000	202.40	202.40	0.00	40964.16	0.00	0.00	2.02	0.00	0.00
100081800229W100	Inj*	2.69	0.7	0.7	90.444	43.990	43.990	180.89	180.89	87.98	32720.72	7740.62	7740.62	1.81	0.88	0.88
100161800229W100	Inj*	0.02	0	0	12.735	0.000	0.000	25.47	25.47	0.00	648.74	0.00	0.00	0.25	0.00	0.00

Table 12

**South Pierson Unit**  
**Proration of Water Injection Volumes**

Well	Water Injection Proration		Cumulative Water Injection			Comments
	Alida	Spearfsh	Total	Alida	Spearfsh	
	%	%		E3m3		
00/10-04-02-29W1/0	0	1	1.3	0.0	1.3	SF completion - 5.5 T frac.
00/12-04-02-29W1/0	0	1	1.1	0.0	1.1	SF completion - 1.7 T frac.
00/14-04-02-29W1/0	0.22	0.78	6.5	1.4	5.1	SF completion - 4.5 T frac.
00/16-04-02-29W1/0	0.24	0.76	4.7	1.1	3.6	SF completion - 12.3 T frac.
00/16-05-02-29W1/0	0.52	0.48	11.8	6.2	5.7	<b>SF completion - 27 T frac.</b>
00/02-08-02-29W1/0	0	1	6.8	0.0	6.8	SF completion - 1.5 T frac.
00/06-08-02-29W1/0	0.23	0.77	9.9	2.3	7.6	SF completion - 6.6 T frac.
00/08-08-02-29W1/0	0.68	0.32	41.5	28.2	13.3	SF completion - 3.0 T frac.
00/10-08-02-29W1/0	0	1	3.4	0.0	3.4	SF completion - 6.7 T frac.
00/12-08-02-29W1/0	0.18	0.82	3.6	0.6	3.0	SF completion - 9.5 T frac.
00/14-08-02-29W1/0	0.14	0.86	2.7	0.4	2.4	SF completion - 5.6 T frac.
00/16-08-02-29W1/0	0.14	0.86	7.6	1.1	6.6	<b>SF completion - 25 T frac.</b>
00/02-09-02-29W1/0	0.13	0.87	5.4	0.7	4.7	SF completion - 4.7 T frac.
00/04-09-02-29W1/0	0.8	0.2	50.5	40.4	10.1	<b>SF + Alida completion - 3 T frac.</b>
00/06-09-02-29W1/0	0.35	0.65	15.3	5.4	9.9	SF completion - 6.7 T frac.
00/08-09-02-29W1/0	1	0	26.5	26.5	0.0	<b>SF + Alida completion - 3.3 T frac. (spinner survey)</b>
00/10-09-02-29W1/0	0.82	0.18	27.9	22.8	5.0	<b>SF + Alida completion - (spinner survey)</b>
00/12-09-02-29W1/0	0.8	0.2	15.1	12.1	3.0	<b>SF + Alida completion - (no spinner survey)</b>
00/14-09-02-29W1/1	0.91	0.09	69.7	63.4	6.3	<b>SF completion - 15% HCL + 12 T frac.</b>
00/16-09-02-29W1/0	0.8	0.2	20.0	16.0	4.0	SF completion - no info on frac.
00/04-15-02-29W1/0	0.7	0.3	12.7	8.9	3.8	<b>SF completion - 32 T frac. (Spinner survey)</b>
00/02-16-02-29W1/0	0.93	0.07	25.6	23.8	1.8	<b>SF + Alida completion - 2.8 T frac. (spinner survey)</b>
00/04-16-02-29W1/0	0.5	0.5	20.3	10.1	10.1	<b>SF + Alida completion - 5.9 T frac. (spinner survey)</b>
00/06-16-02-29W1/0	0.06	0.94	7.5	0.5	7.1	SF completion - 6.2 T frac.
00/08-16-02-29W1/0	0.06	0.94	1.1	0.1	1.0	<b>SF + Alida completion - 3.2 T frac.</b>
00/10-16-02-29W1/0	0.11	0.89	7.1	0.8	6.3	SF Open Hole - 5.7 T frac.
00/12-16-02-29W1/1	0.8	0.2	3.0	2.4	0.6	<b>SF + Alida completion - 0.5 T frac.</b>
00/02-17-02-29W1/0	0	1	0.5	0.0	0.5	SF completion - 4.0 T frac.
00/04-17-02-29W1/0	0.136	0.864	6.7	0.9	5.8	SF completion - 6.0 T frac.
00/06-17-02-29W1/0	0.4	0.6	18.5	7.4	11.1	SF completion - 12.0 T frac.
00/08-17-02-29W1/0	0.68	0.32	42.1	28.6	13.5	<b>SF + Alida completion - 2.8 T frac. (spinner survey)</b>

Table 12

Table 12

Well	Water Injection Proration		Cumulative Water Injection			Comments
	Alida	Spearfish	Total	Alida	Spearfish	
	%	%		E3m3		
00/12-17-02-29W1/1	0.13	0.87	0.8	0.1	0.7	SF completion - 4.0 T frac.
00/14-17-02-29W1/0	1	0	46.8	46.8	0.0	SF + Alida completion - (spinner survey)
00/08-18-02-29W1/0	0.11	0.89	0.7	0.1	0.7	SF completion - 6.5 T frac.
00/16-18-02-29W1/0	0.82	0.18	0.2	0.2	0.0	SF completion - 4.2 T frac.
Total: 35 injectors			Alida Spearfish			
			Total Wtr. Injection Vol.	524.7	359.1	E3m3
			%	100%	68.4%	
					165.6	
					31.6%	

**Notes:**

Injection water volumes are proration as follow:

1. Wells injecting into both Spearfish and Alida:

- If spinner survey is run, results were used.
- If no spinner data is available, 80% of the injected water was allocated to the Alida based on the average results from the spinner survey.

2. Well completed only in the Spearfish:

- If the well produced clean oil prior to conversion to water injection, all injected water volumes are allocated to the Spearfish.
- If the well produced water prior to conversion to water injection, the % of the water injection volumes allocated to the Alida was assumed to equal to the well's producing water cut.

Temp. survey conducted on 14-9 indicated a water leak into & below the Alida.

Table 13

# Estimate of Fracture Pressure/Gradient

## South Pierson Unit

Field :	South Pierson	Zone :	Spearfish
Well :	Typical Well	Lithology:	Dol/SS

$$P \text{ (frac)} = \text{NOB} \left( \frac{u}{1 - u} \right) + P \text{ (PV)} \quad \text{Psi/ft}$$

Where :

P (frac) :	Fracture Pressure Gradient	0.475 Psi/ft
NOB :	Net Overburden Pressure Gradient (Overburden Grad.- Pore Pressure Grad.)	0.858 Psi/ft
u :	Poisson's Ratio "u" =	0.27 Limestone 0.33 Sandstone
P (PV) :	Pore Pressure Gradient	0.142 Psi/ft
P :	Current 'Reservoir Pressure	479 Psi
D :	Depth	3378 ft

### Summary Results:

Fracture Pressure Gradient	0.475 Psi/ft
Fracture (Parting) Pressure	1606 Psi
	11075 KPa

### Note:

Overburden gradient is 1.0 Psi/ft

Table 14

## Hall Plots

### Wellbore Condition

Neutral	Slight Damage	High Damage	Improved
16-4	8-17	16-8	14-17
6-8	16-5	14-4	4-9
6-17	2-8	10-8	14-9
	8-8	12-8	8-9
	2-9	14-8	12-9
	6-9	16-9	
	10-9	4-15	
	2-16	8-16 *	
	4-16	2-17 *	
	16-16	12-17 *	
	10-16	8-18 *	
	12-16		
	4-17		

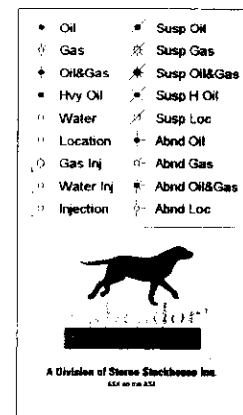
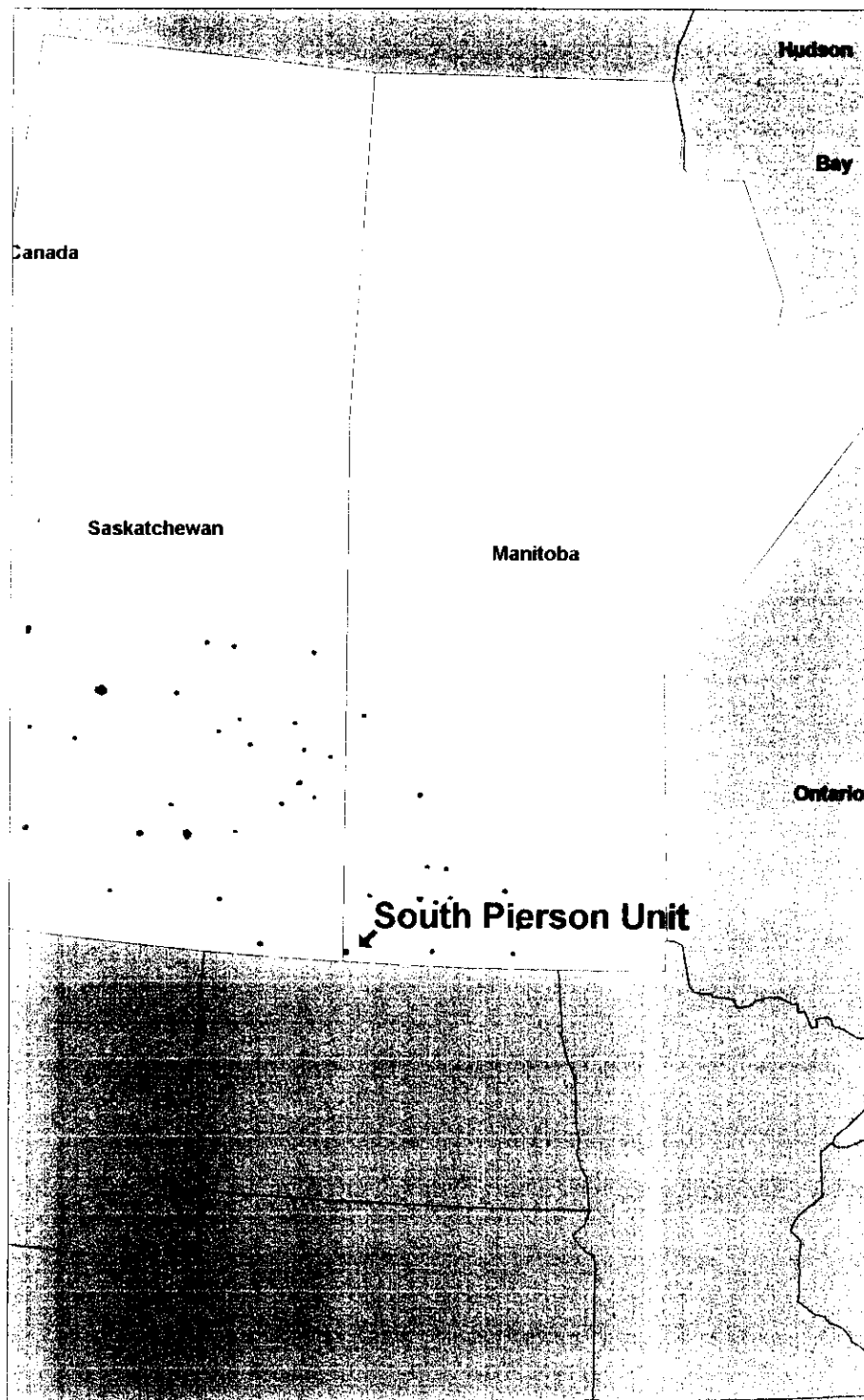
\* Limited History

## FIGURES



## **FIGURES**

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## South Pierson Unit Location Map

Projection:  
Longitude / Latitude  
Longitude / Latitude (NAD 27 for  
Canada)

Scale 1:10,000,000

Notes Figure 1

Miles 100 200  
Km 100 200 300 400

South Pierson Unit Location Map

C:\lab\user\pierson-unit\pierson-unit.cfg

February 04, 2000

Sara Michalski

2-29W1

2-29W1

R.29

T.2

T.2

T.1

T.1

1-29W1

1-29W1

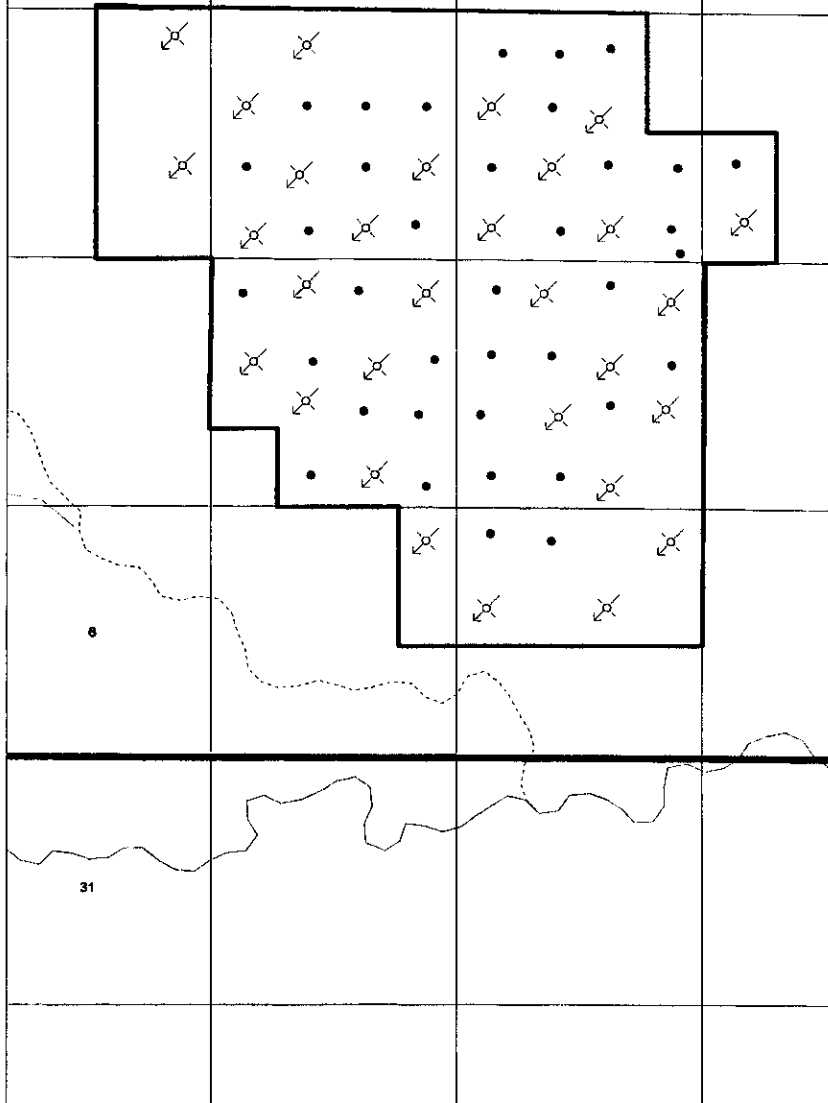
R.29

# South Pierson Unit

- |             |                |
|-------------|----------------|
| • Oil       | ✕ Susp Oil     |
| ✕ Gas       | ✕ Susp Gas     |
| ✕ Oil&Gas   | ✕ Susp Oil&Gas |
| ✕ Hvy Oil   | ✕ Susp H Oil   |
| ✕ Water     | ✕ Susp Loc     |
| ○ Location  | ✕ Abnd Oil     |
| ✕ Gas Inj   | ✕ Abnd Gas     |
| ✕ Water Inj | ✕ Abnd Oil&Gas |
| ✕ Injection | ✕ Abnd Loc     |



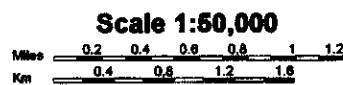
**Labrador**  
A Division of Starna Stackhouse Inc.  
© 2000 Starna Stackhouse Inc.



## Well Location Map

Notes: Figure 2

Projection:  
Longitude / Latitude  
Longitude / Latitude (NAD 27  
for Canada)



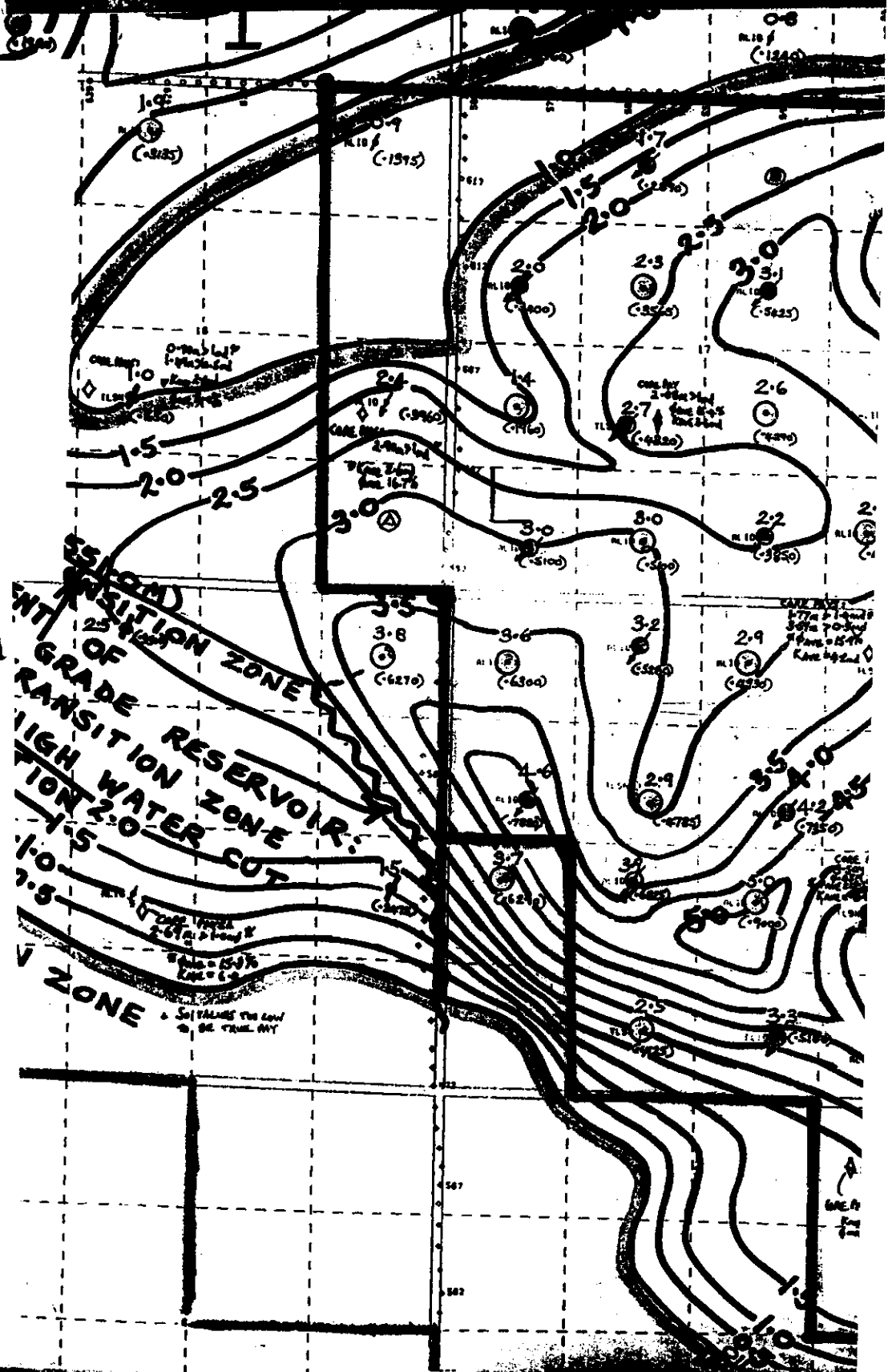
Well Location Map

C:\Lab\user\pierson-unit\pierson-unit.clg

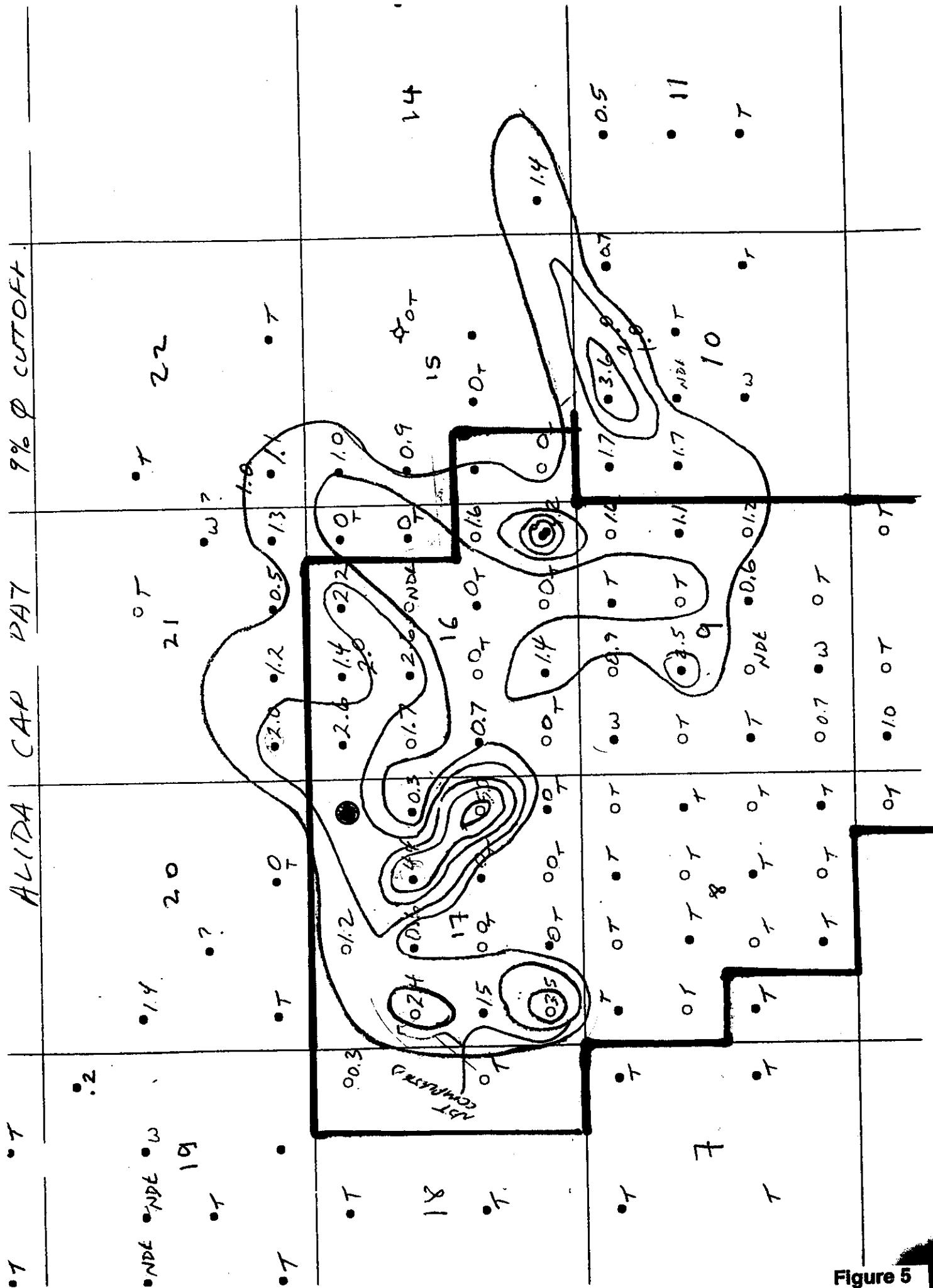
February 04, 2000

Sara Michalek





TRANSITION ZONE  
RESERVOIR  
WATER CUT  
SOIL VALUES FOR ROAD  
BE TRAIL HAY

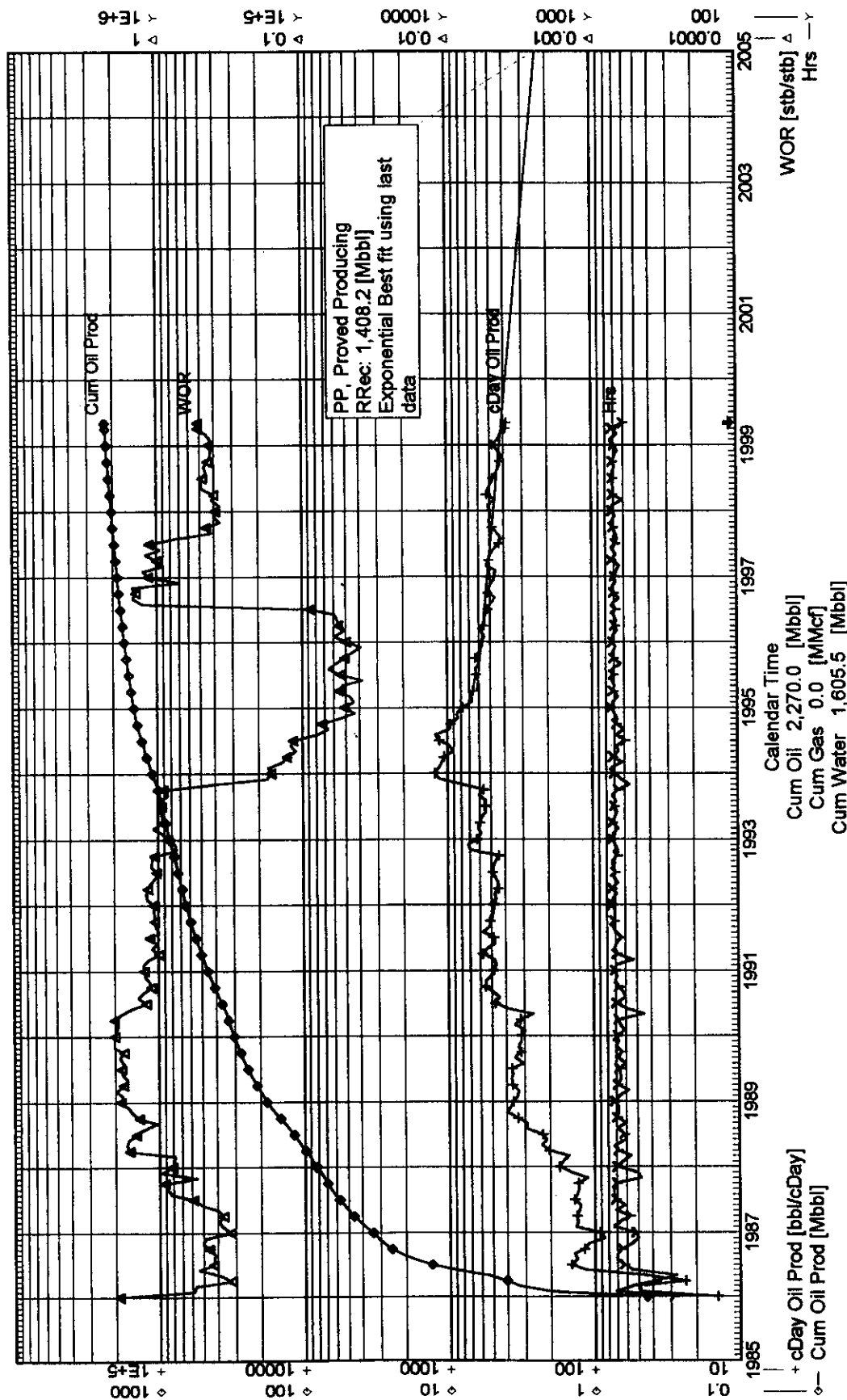


**Figure 5**

Group: South Pierson Unit  
Total Wells: 67

Primary: OIL  
Last On: Apr-1999

Field:  
Pool:  
Unit:  
Oper:  
Source Date: n/a



Serv 100.0%  
Exp 9.422%/Yr

c:\data\decline\pierson\pierson.dpd  
01-Nov-99 17:09 [pierson]

Figure 6

# Histogram (South Pierson Unit) Vertical Wells

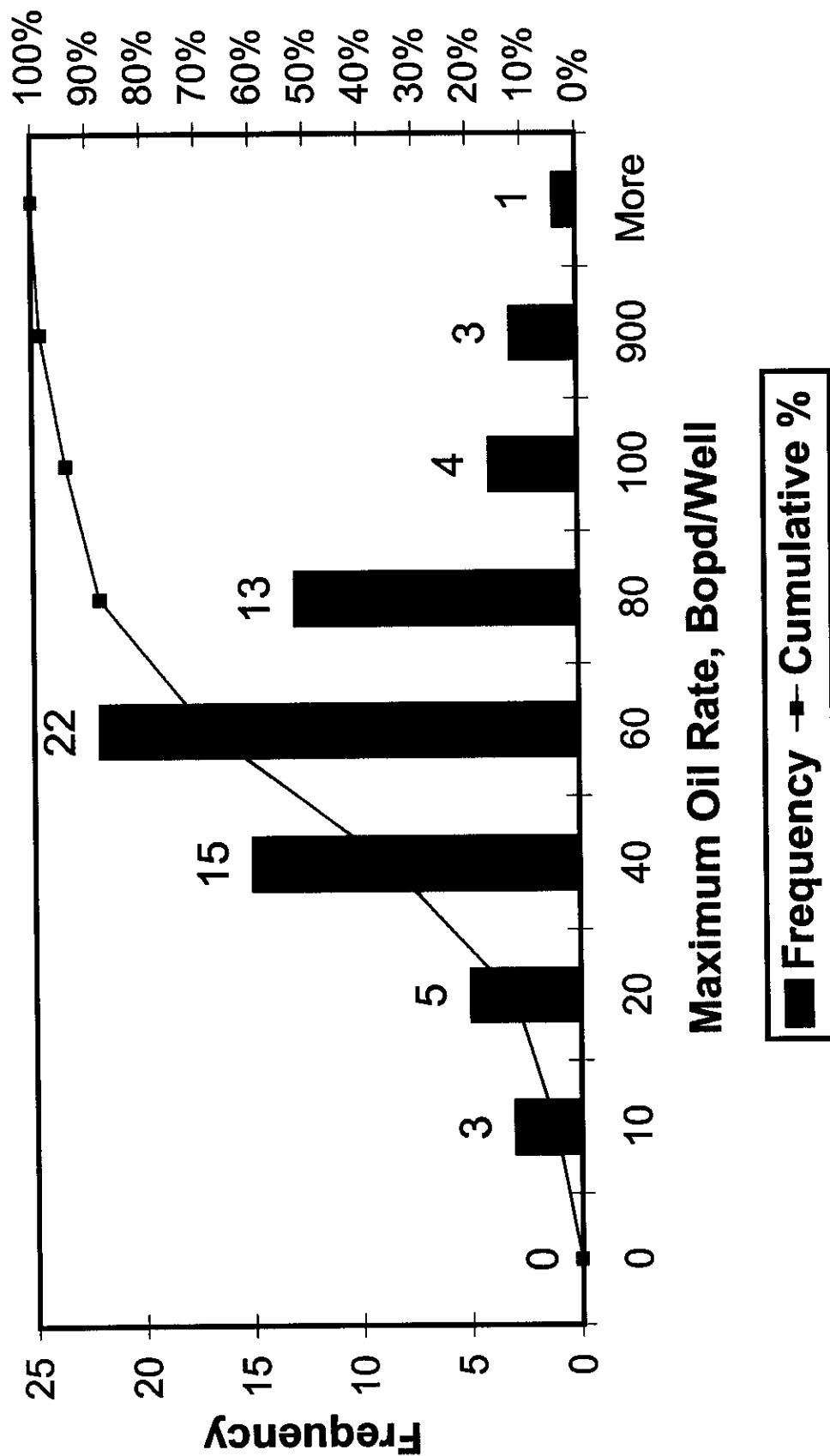


Figure 7



# Histogram (South Pierson Unit) Exclude (Horizontal & Injector Wells)

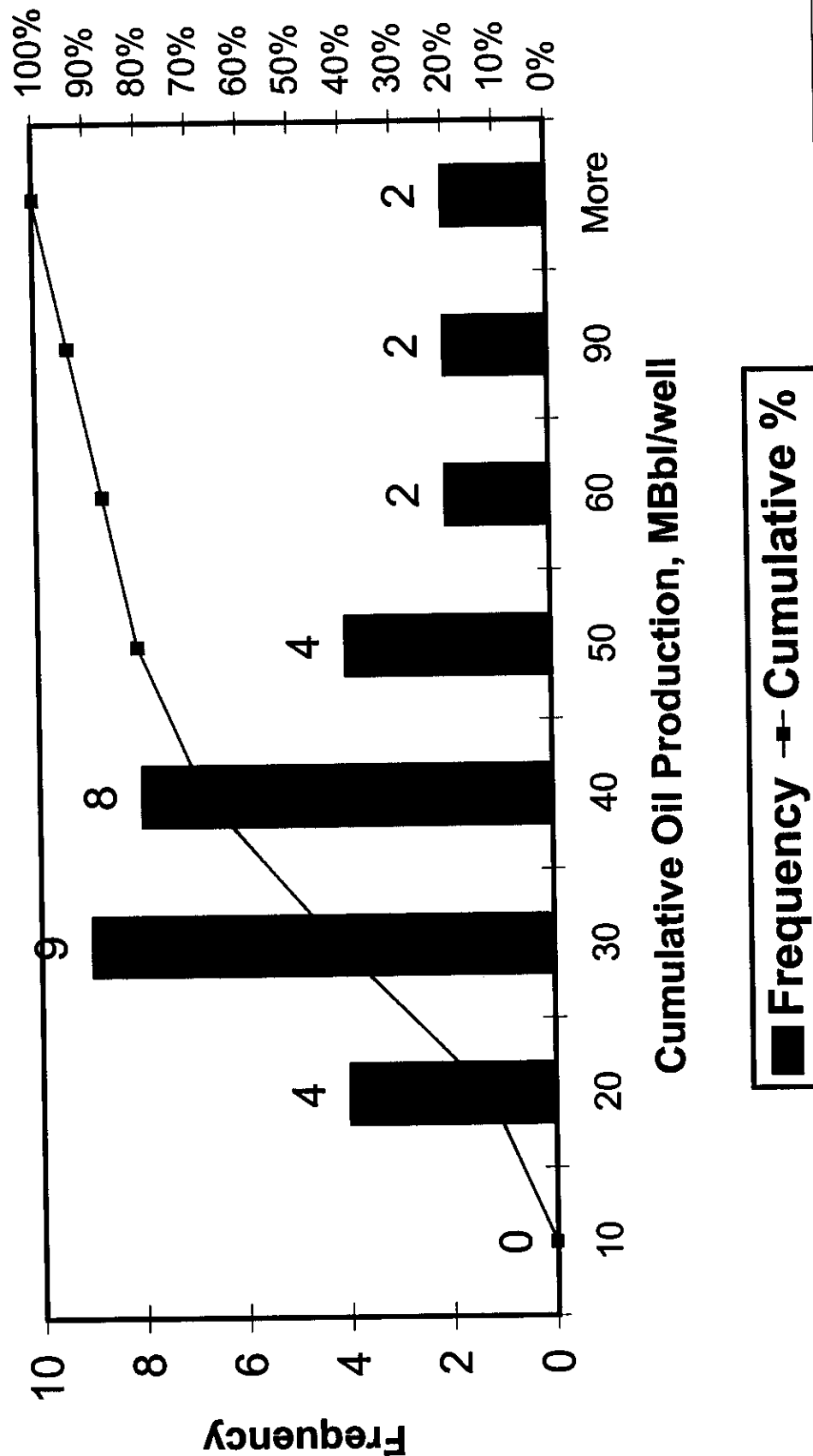


Figure 8

# Histogram (South Pierson Unit) Vertical Wells

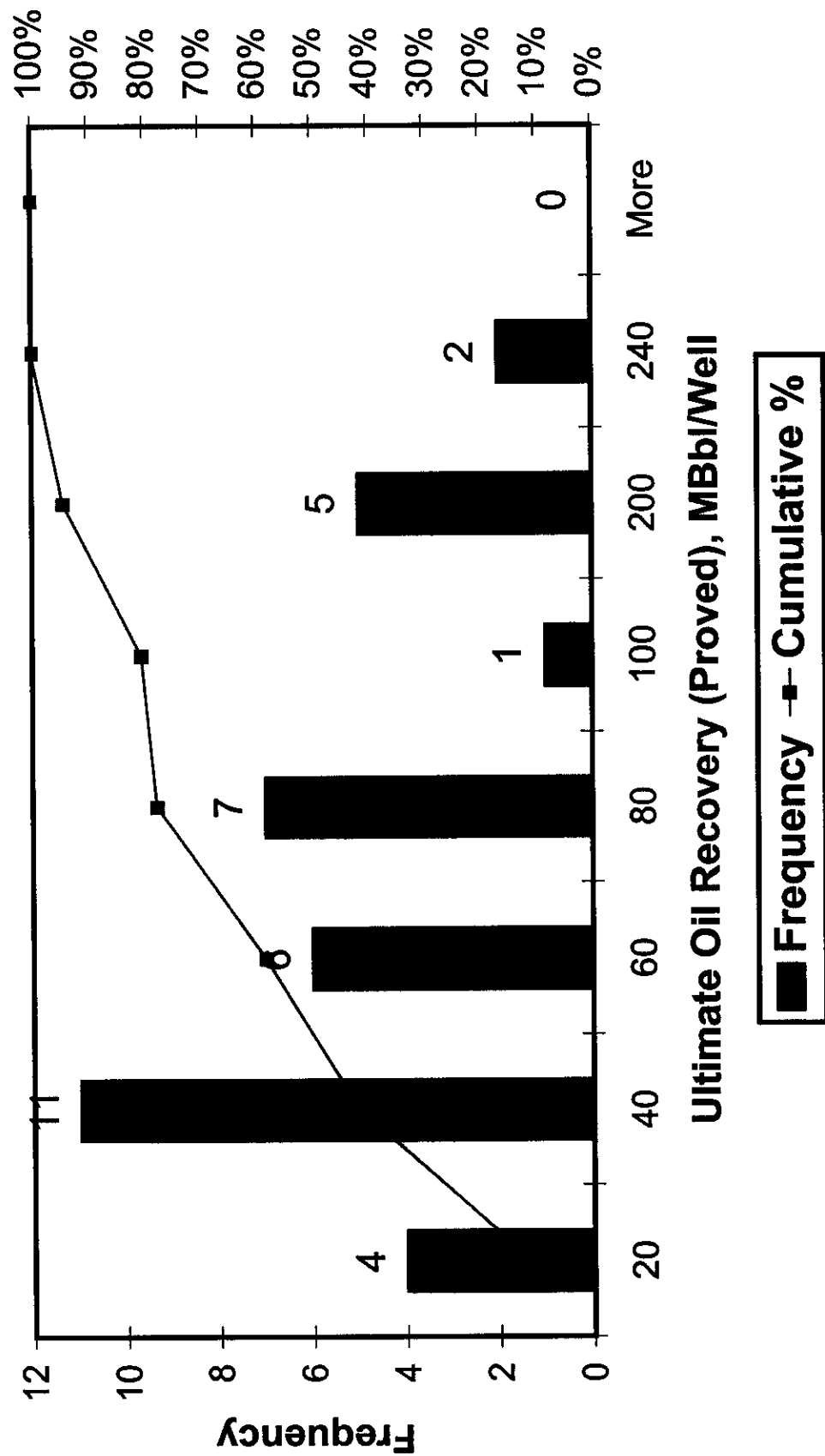
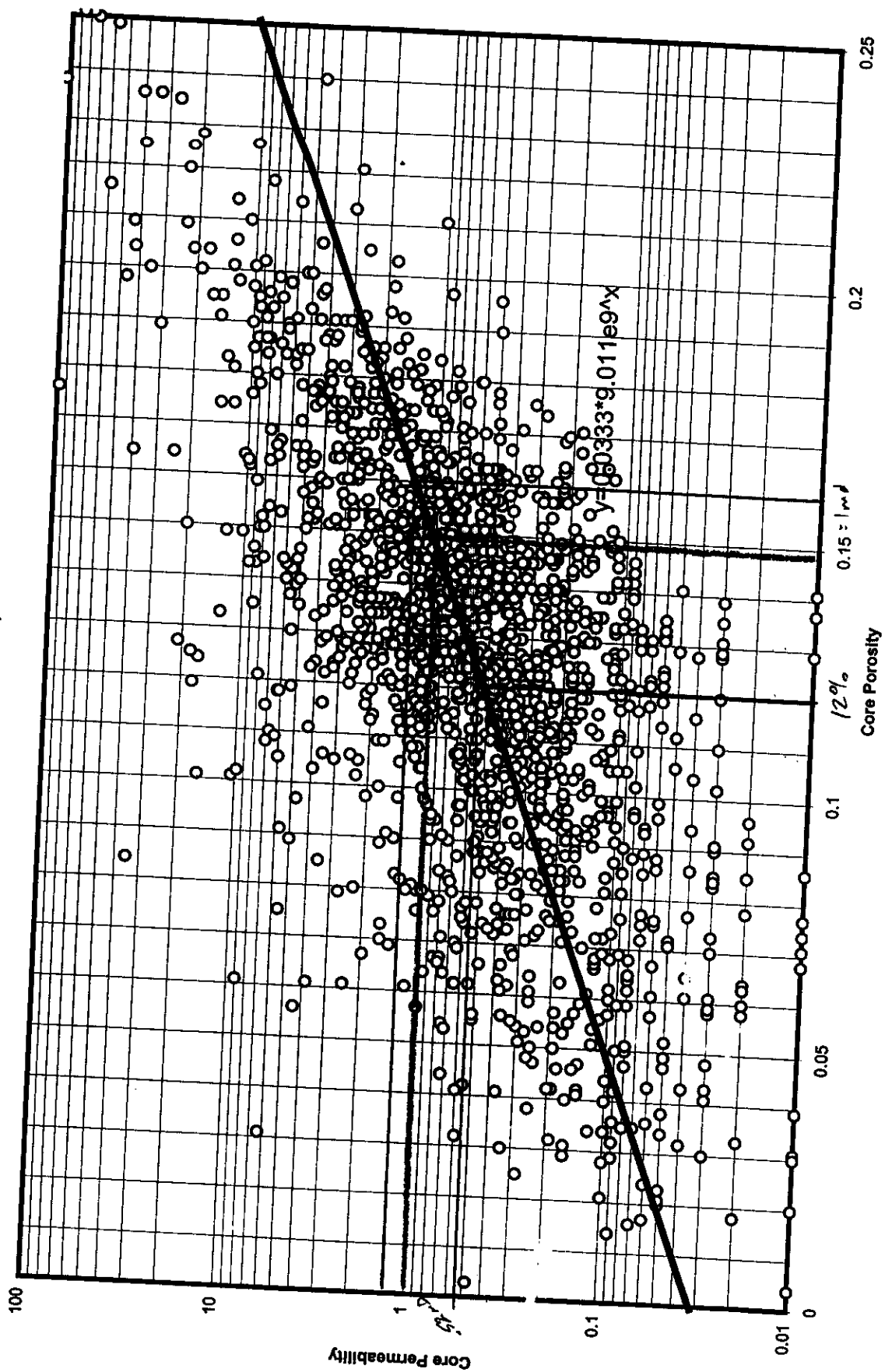


Figure 9

Core Porosity vs. Permeability Cross-Plot  
(Spearfish)



Pierson-Unit Property (Group) K90 vs Kmax

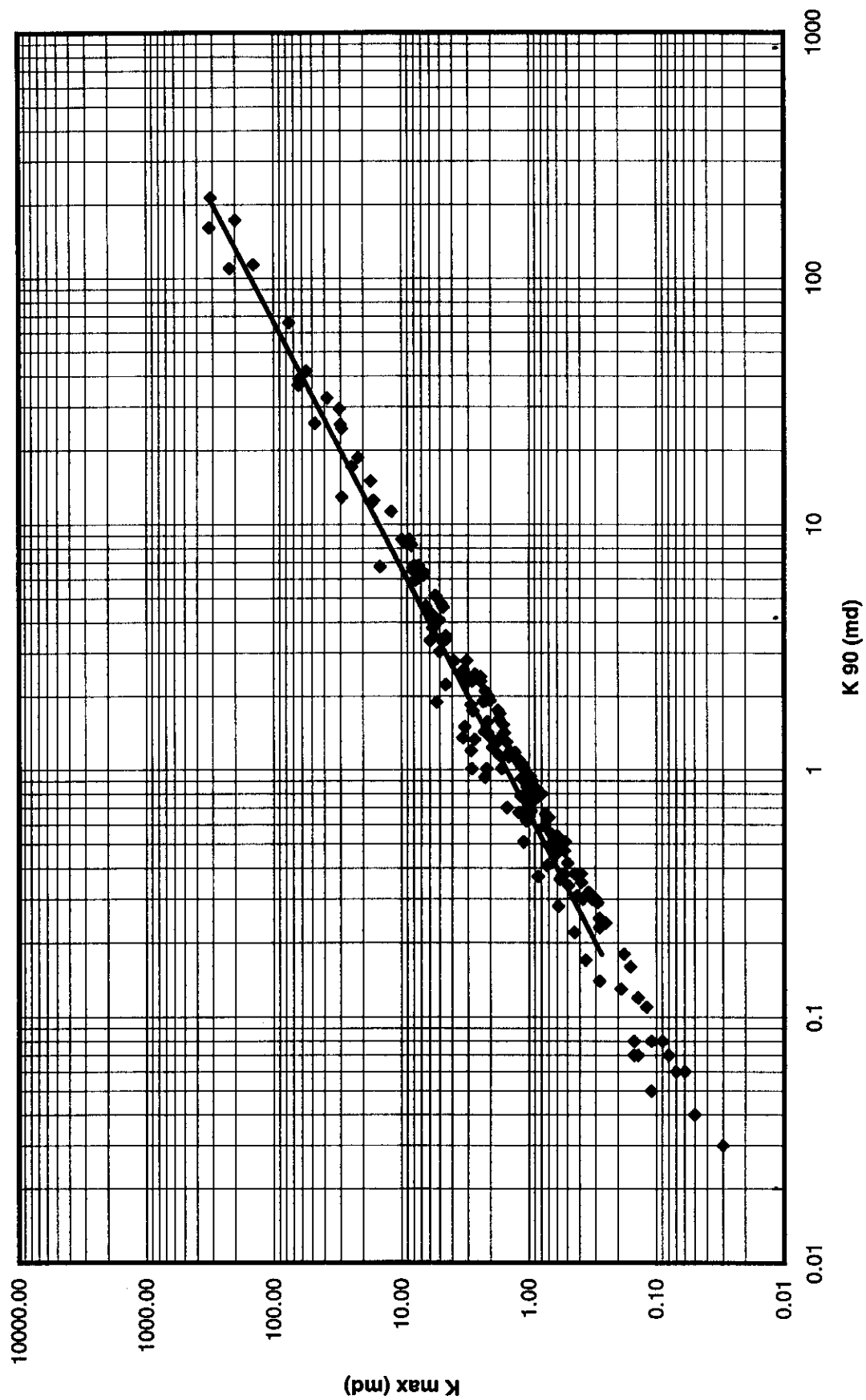


Figure 11

Well - 16-09-002-29W1 (Spear Fish Formation) K 90 vs K max

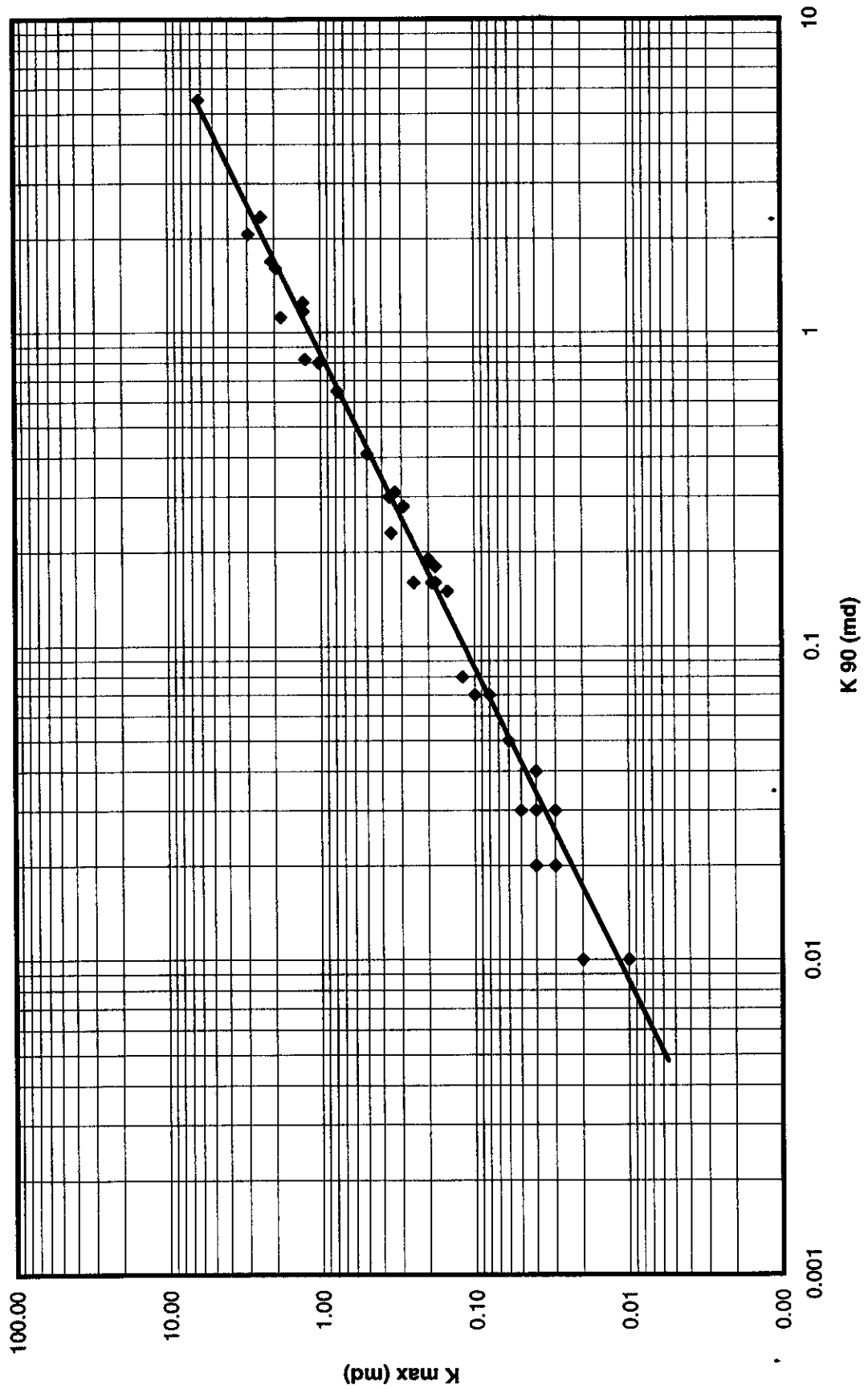


Figure 12

Well - 00/14-17-002-29W1 K 90 vs K max

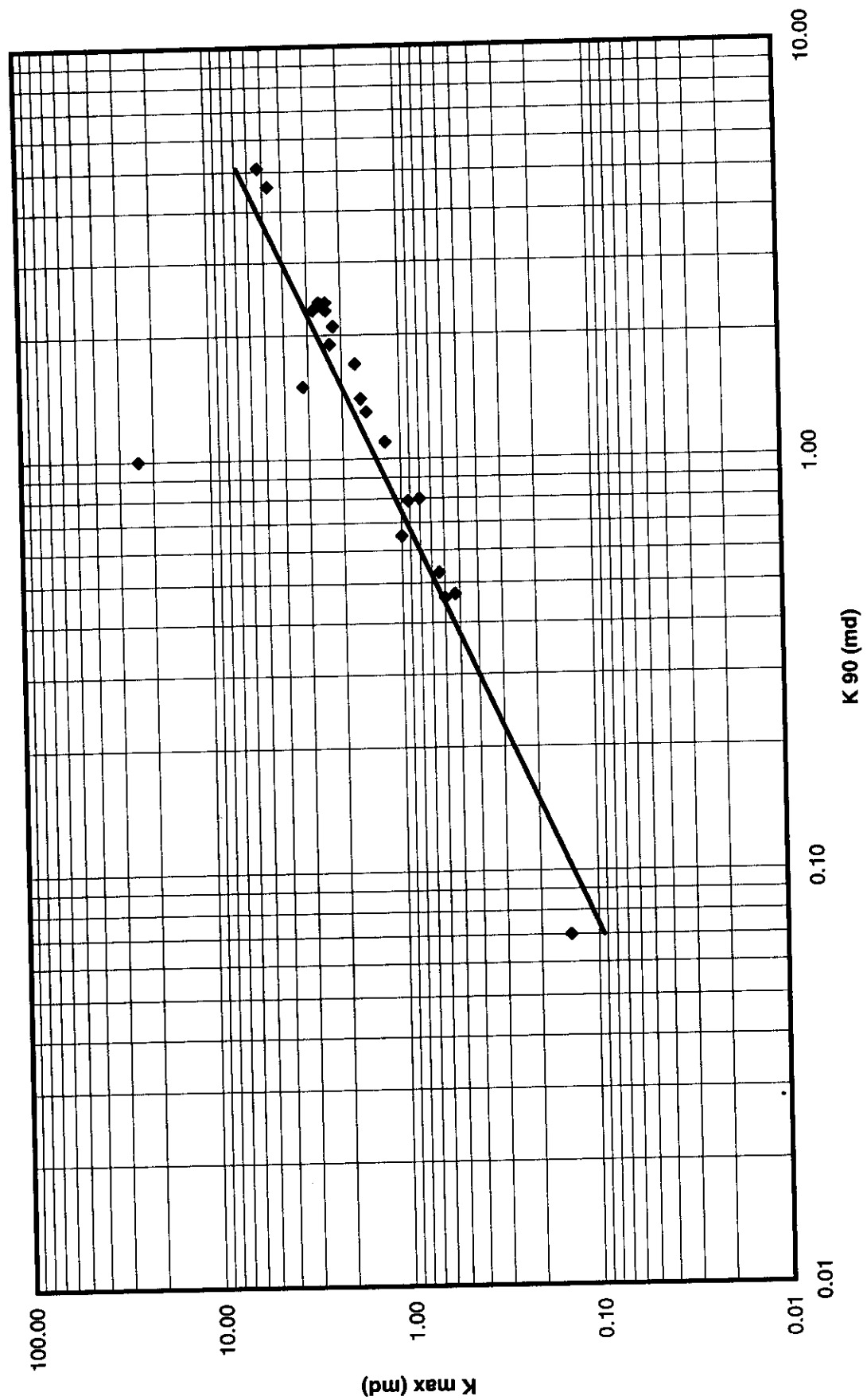


Figure 13

Well - 00/16-04-002-29W1 K 90 vs K max

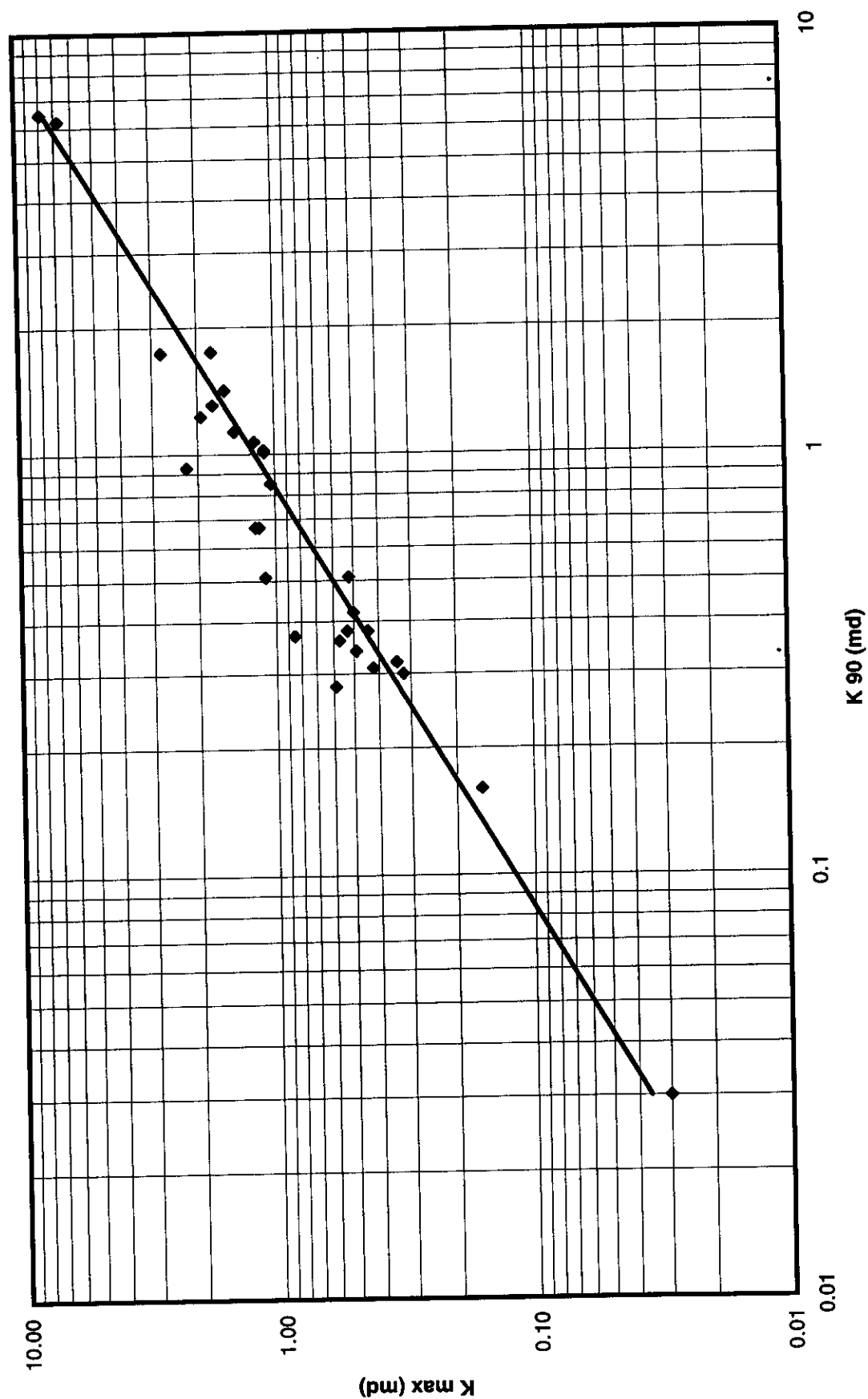


Figure 14

Pierson-Unit Group (Spear Fish Formation) Kh/Kv vs Kh

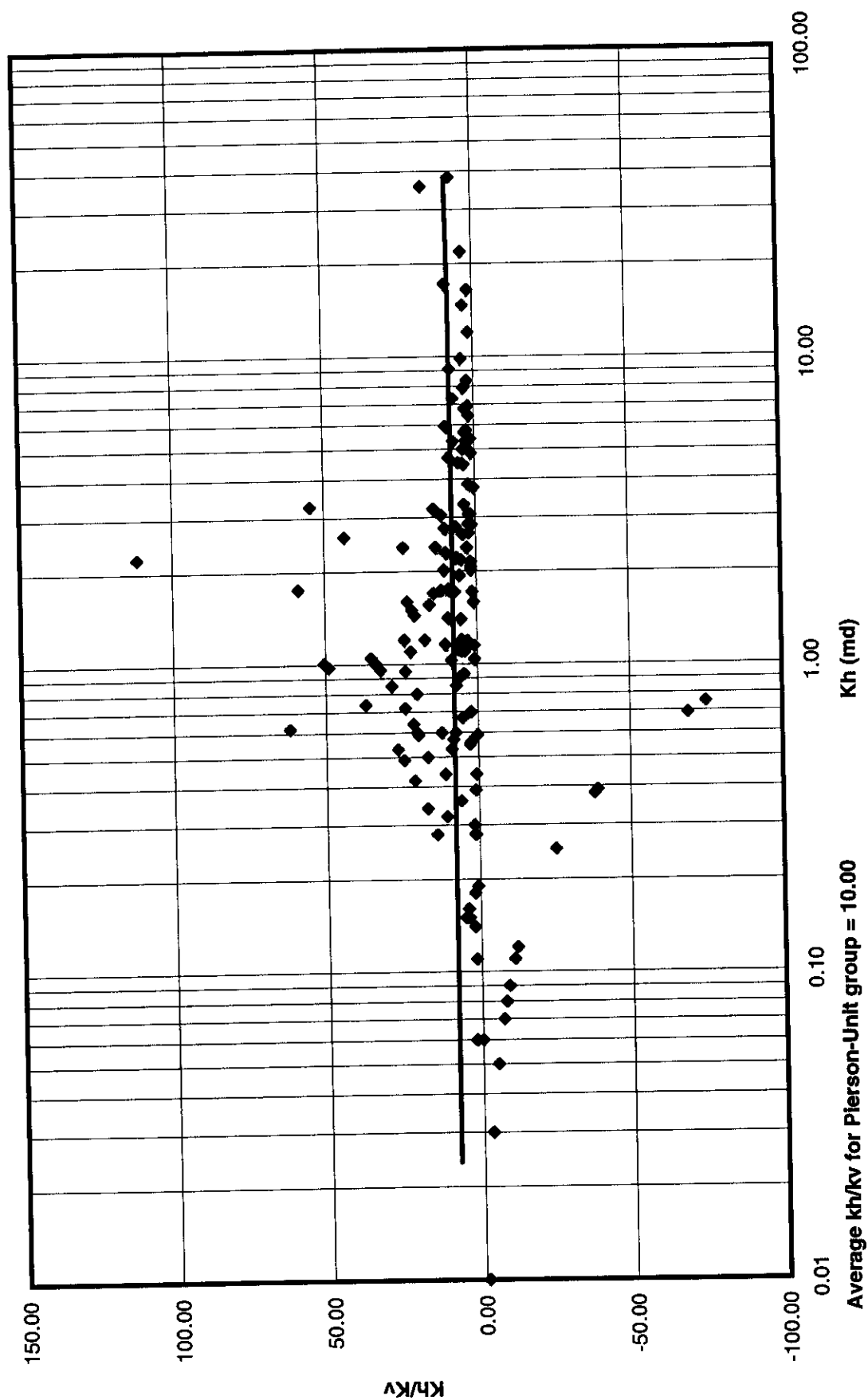


Figure 15



# South Pierson Unit - Pressure vs Cumulative Oil

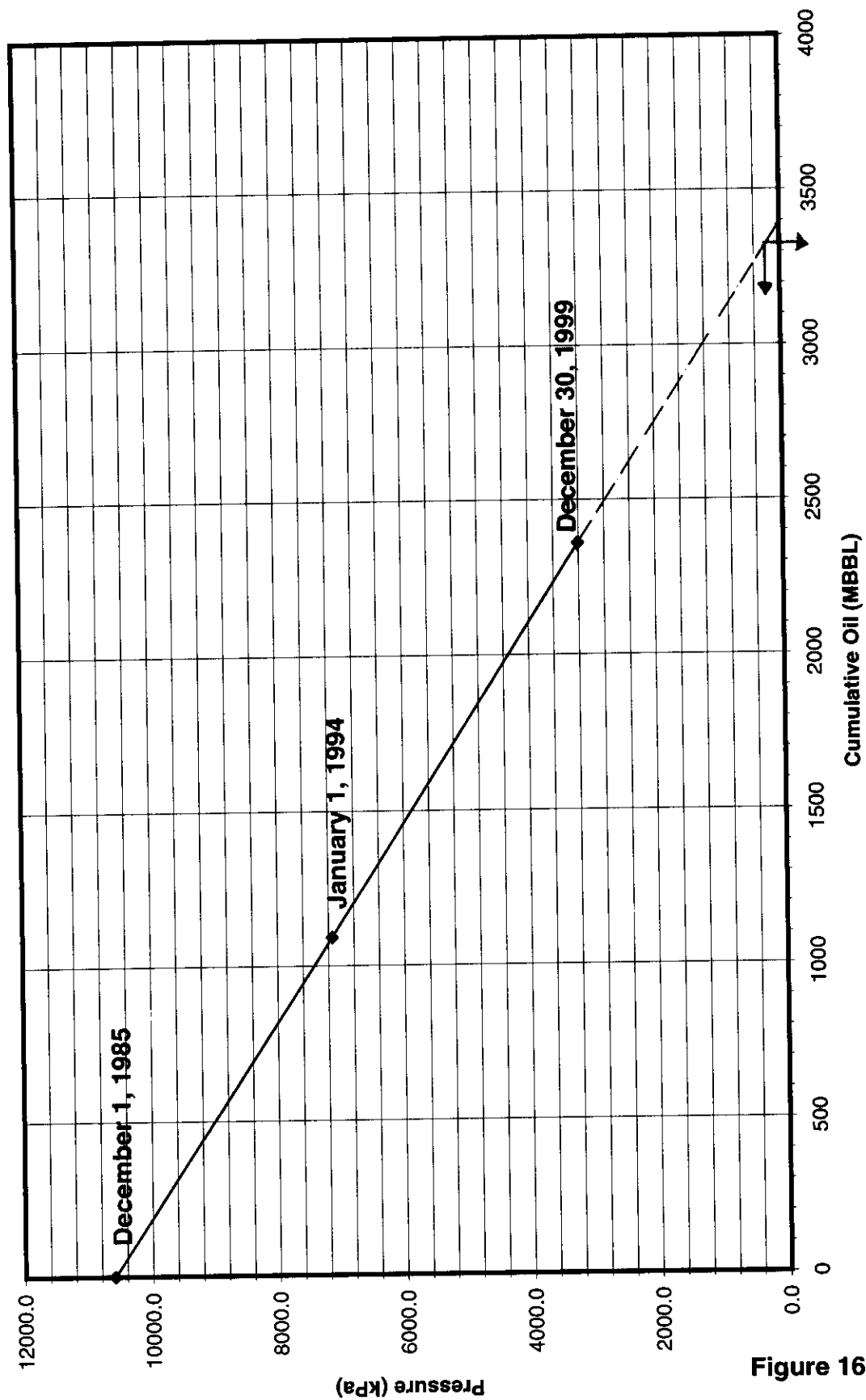
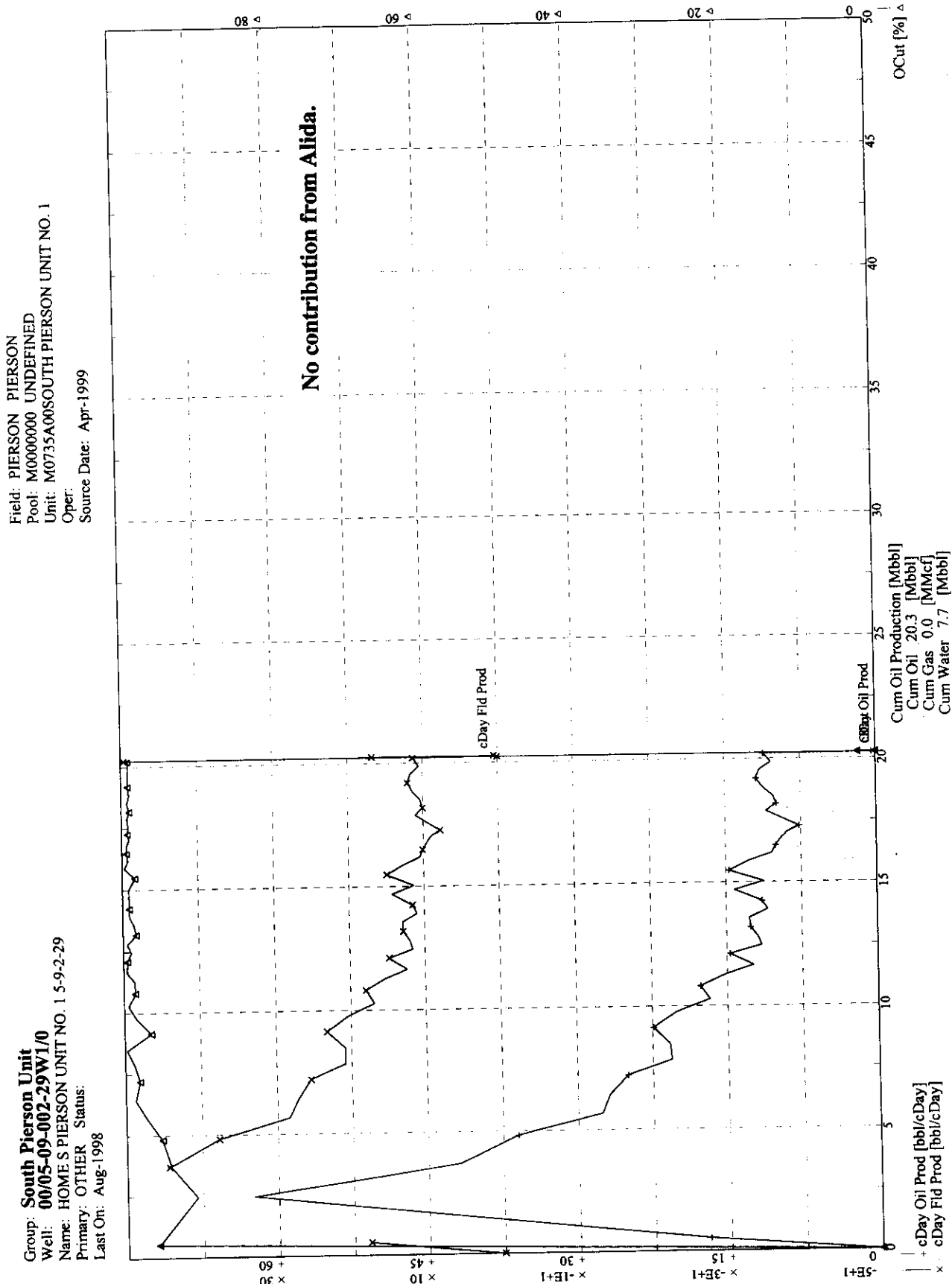


Figure 16



**Figure 17**

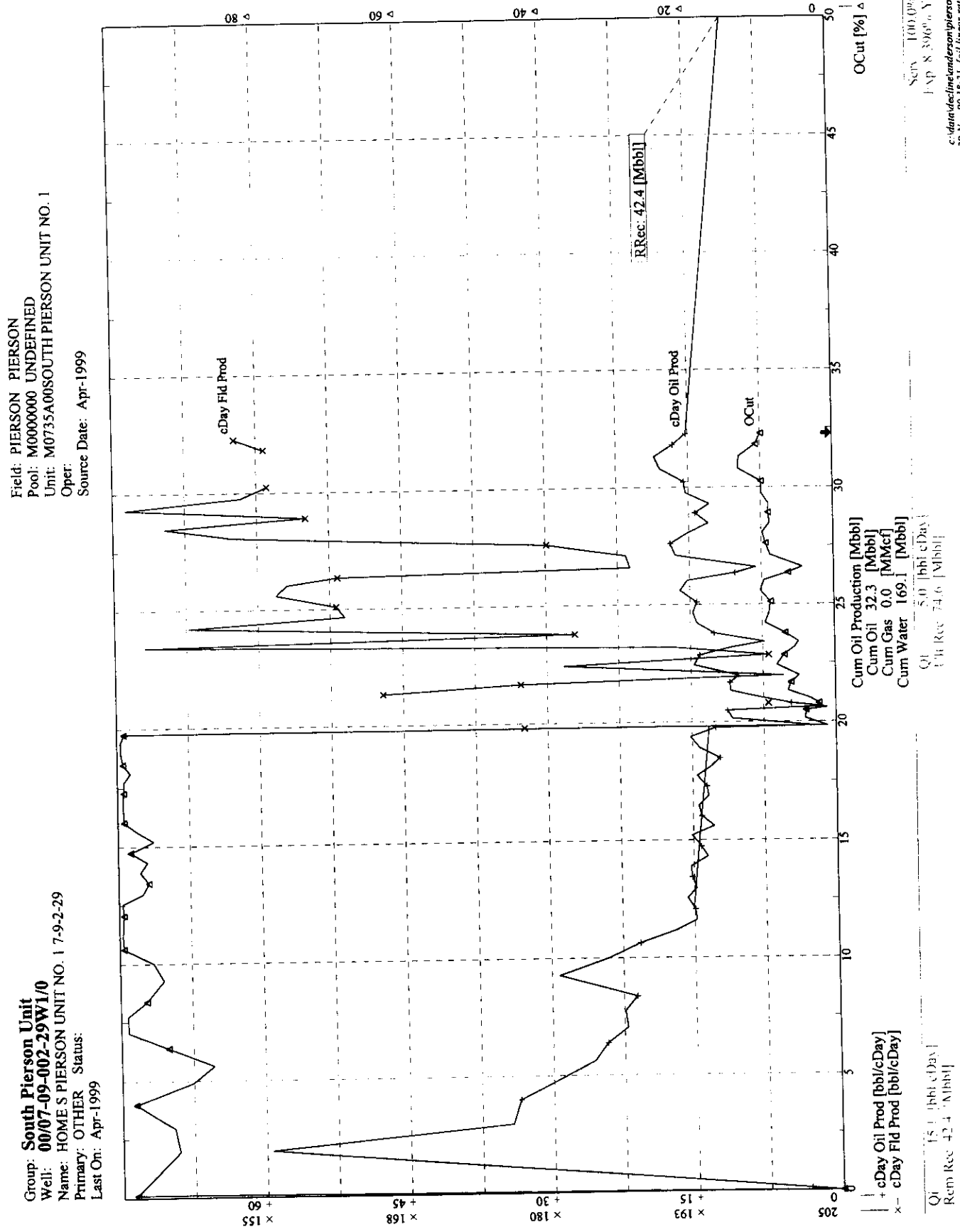
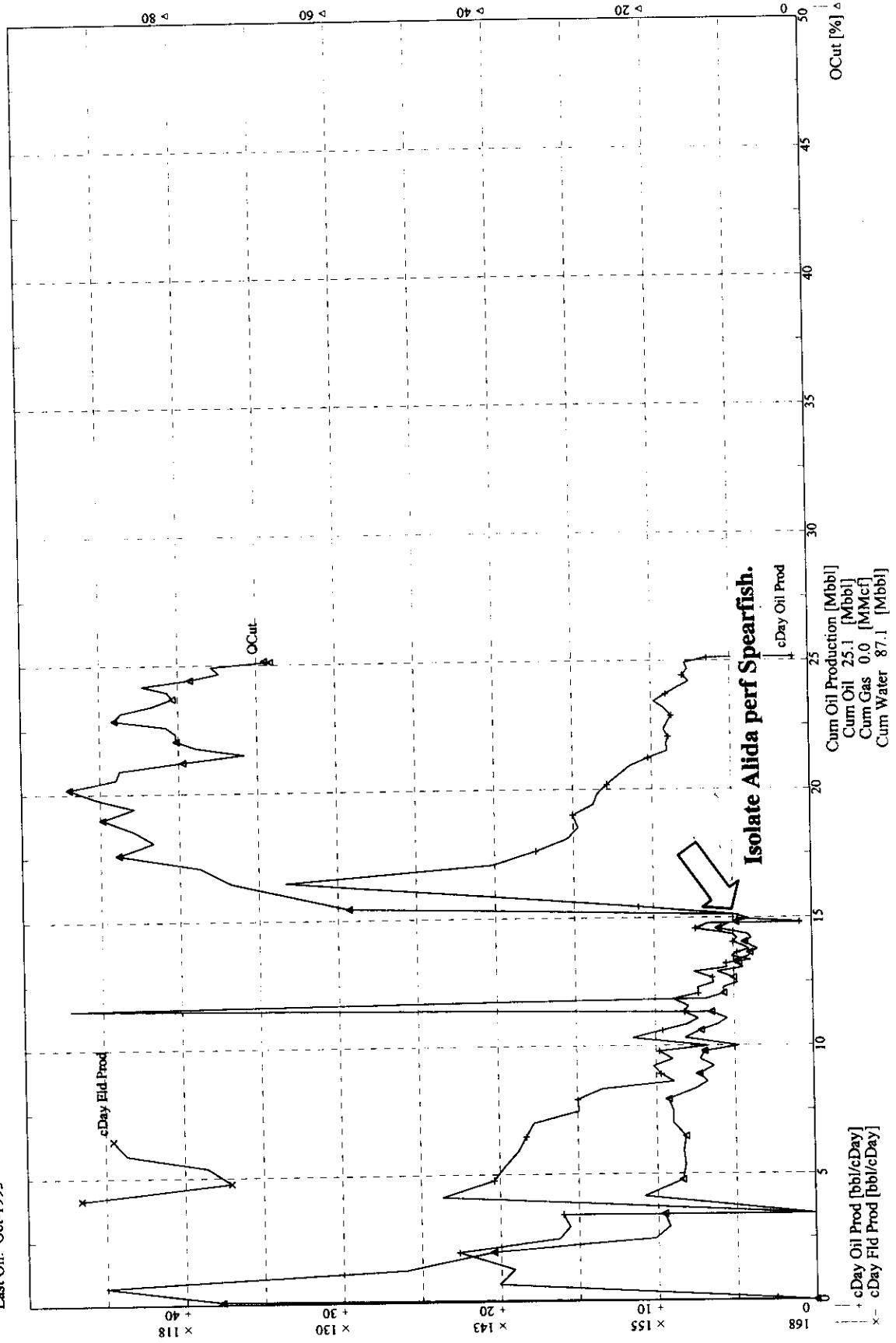


Figure 18

c:\data\incl\pierson\pierson.dpd  
 29-Nov-99 18:21 [oil linear rate-cum (cday)]

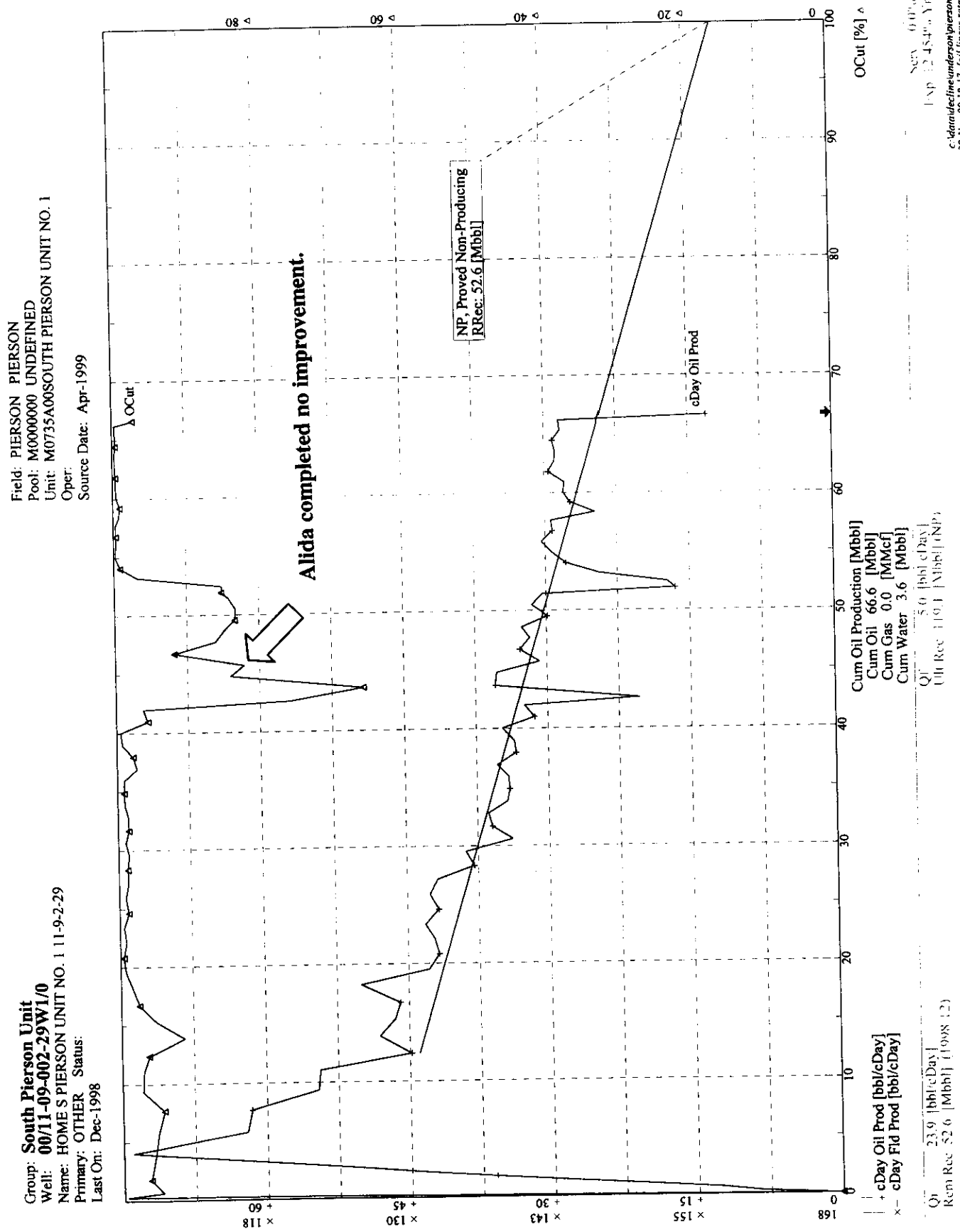
Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/08-09-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO1 WIW 8-9-2-2  
 Primary: OTHER Status:  
 Last On: Oct-1993



c:\data\decline\pierson\pierson.dpd  
 29-Nov-99 18:16 [oil linear rate-cum (clatv)]

Figure 19

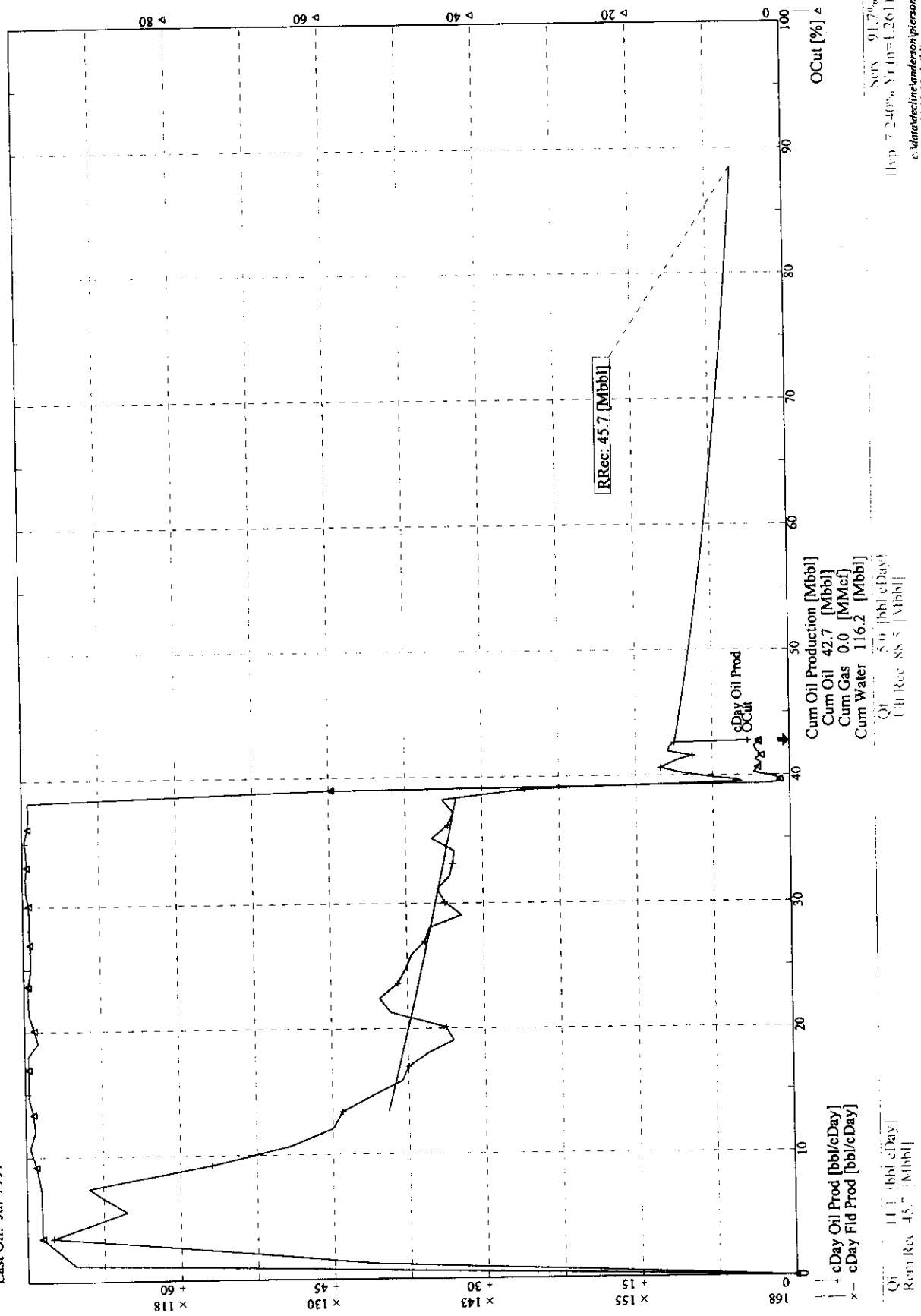


c:\data\decline\pierson\pierson.dpd  
29-Nov-99 18:17 [oil linear rate cum (cday)]

Figure 20

Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/13-09-002-29W1/0  
 Name: HOME S PIERSON UNIT NO. 1 13-9-2-29  
 Primary: OTHER Status:  
 Last On: Jul-1997

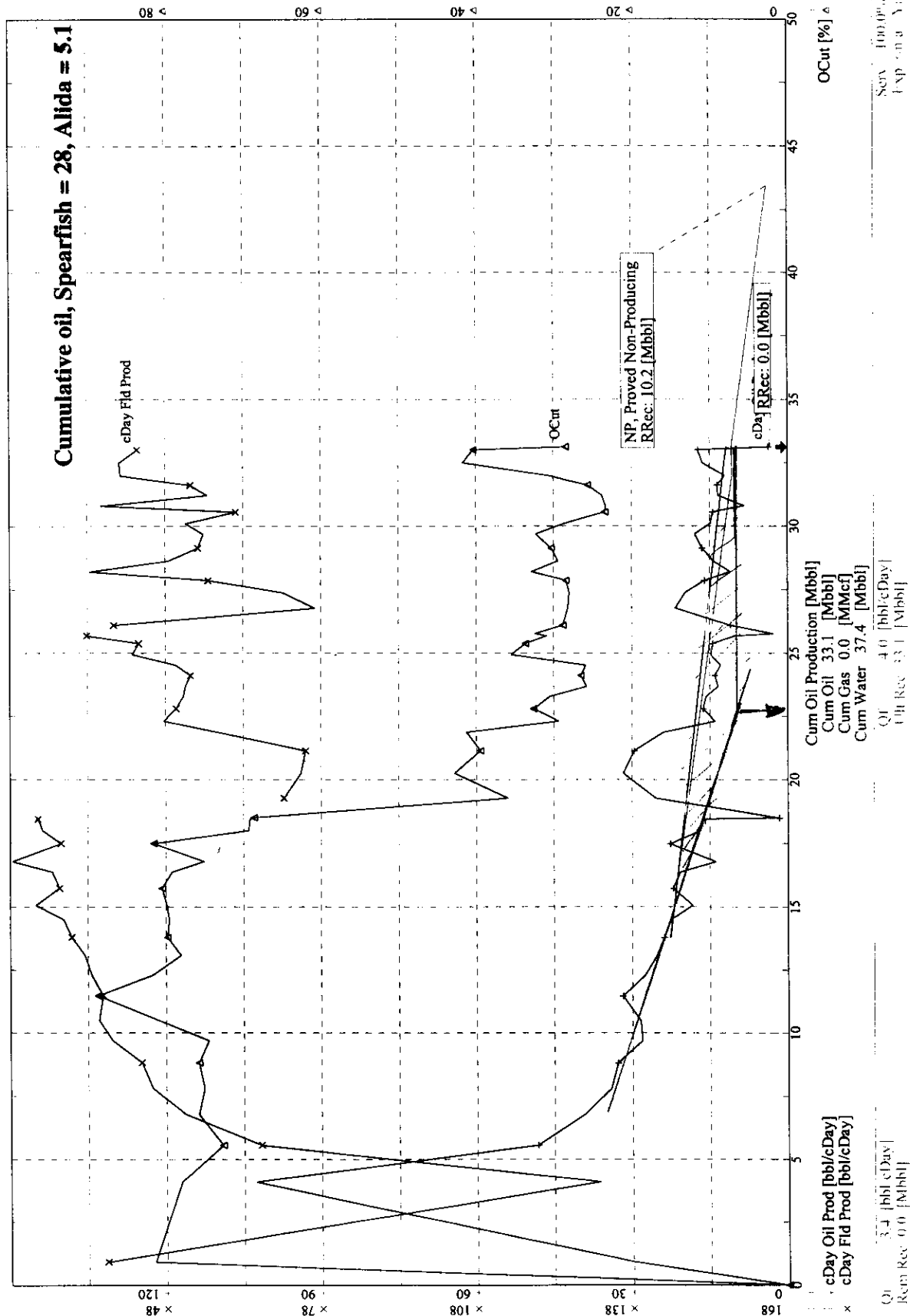


c:\data\decline\anderson\pierson\pierson.dpd  
 29-Nov-99 18:18 [oil linear rate-cum (cuto)]

Figure 21

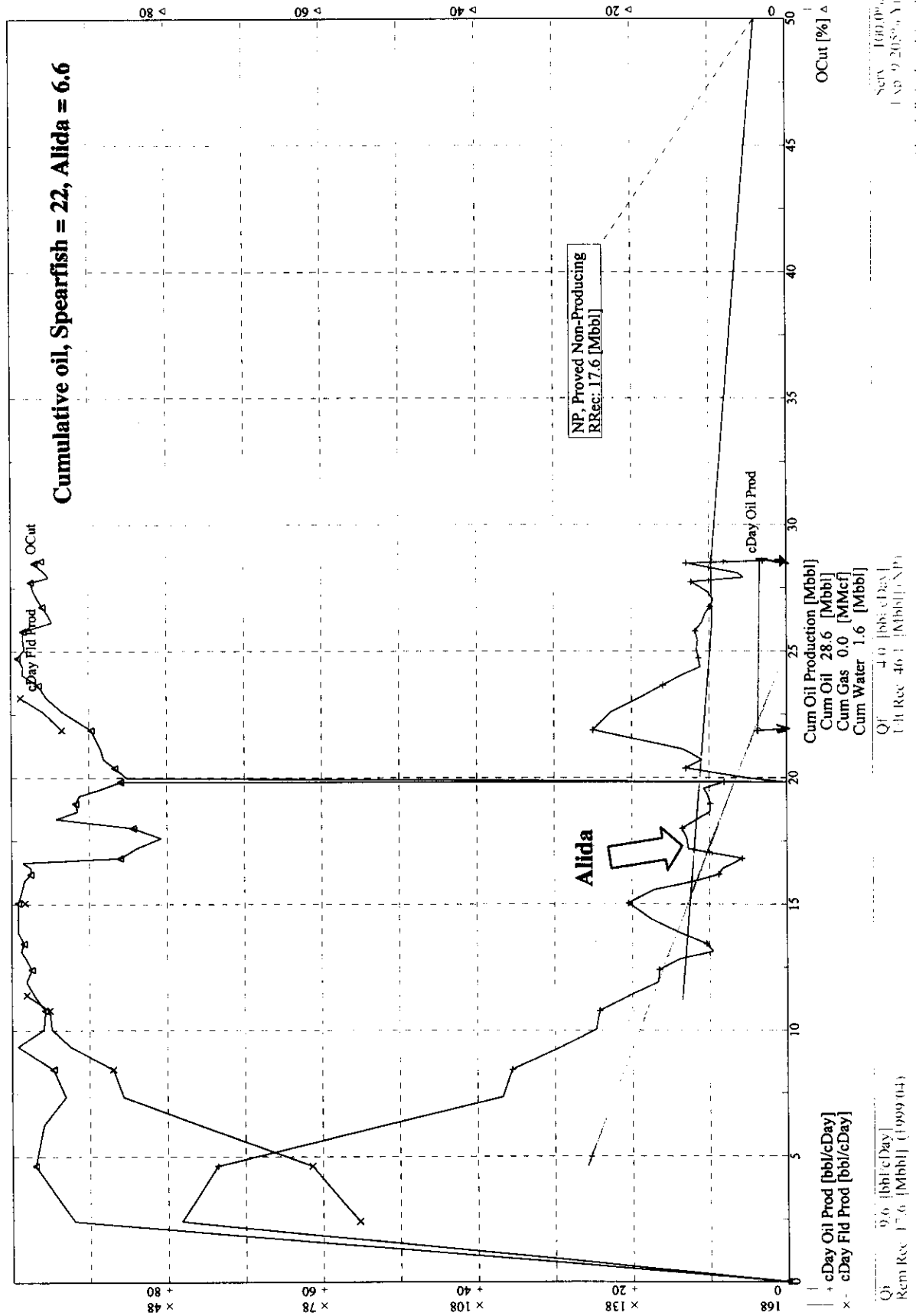
Group: **Pierson Non-Unit**  
 Well: **00/12-10-002-29W1/0**  
 Name: HOME PIERSON 12-10-2-29  
 Primary: OTHER Status:  
 Last On: Oct-1998

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit:  
 Oper:  
 Source Date: Apr-1999



**Figure 22**

Field: PIERSON PIERSON  
Pool: M0000000 UNDEFINED  
Unit:  
Oper:  
Source Date: Apr-1999



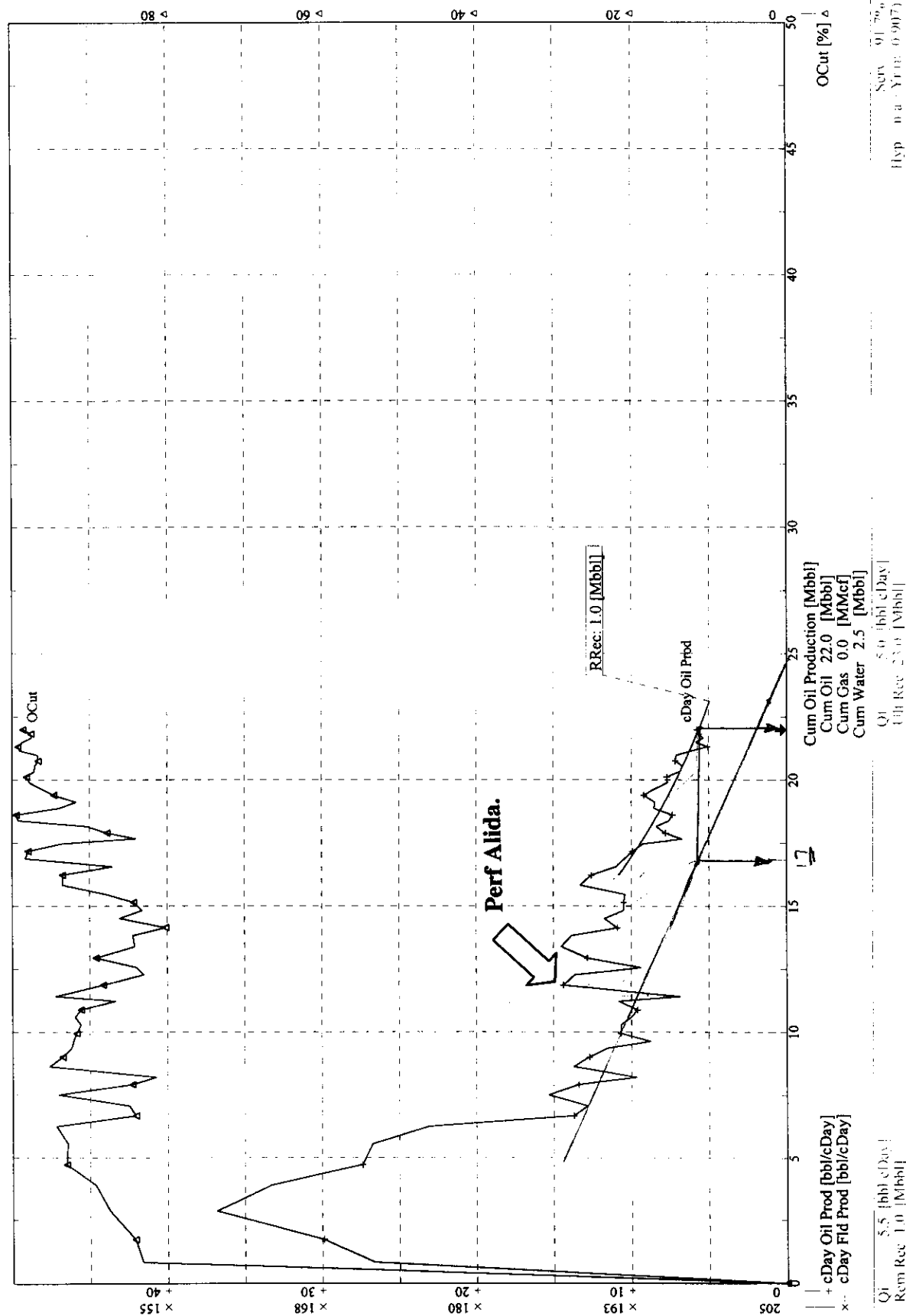
DECPRO v3.10  
Petro-Sofi Systems Ltd.

```
c:\data\decline\anderson\pierson\non-unit.apd
29-Nov-99 18:35 [oil linear rate-cum (cday)]
```

### Figure 23



Group: **South Pierson Unit**  
Well: **00/05-15-002-29W1/0**  
Name: **HOME S. PIERSON UNIT NO. 1** 5-15-2-29  
Primary: **OTHER** Status:  
Last On: **Apr-1999**

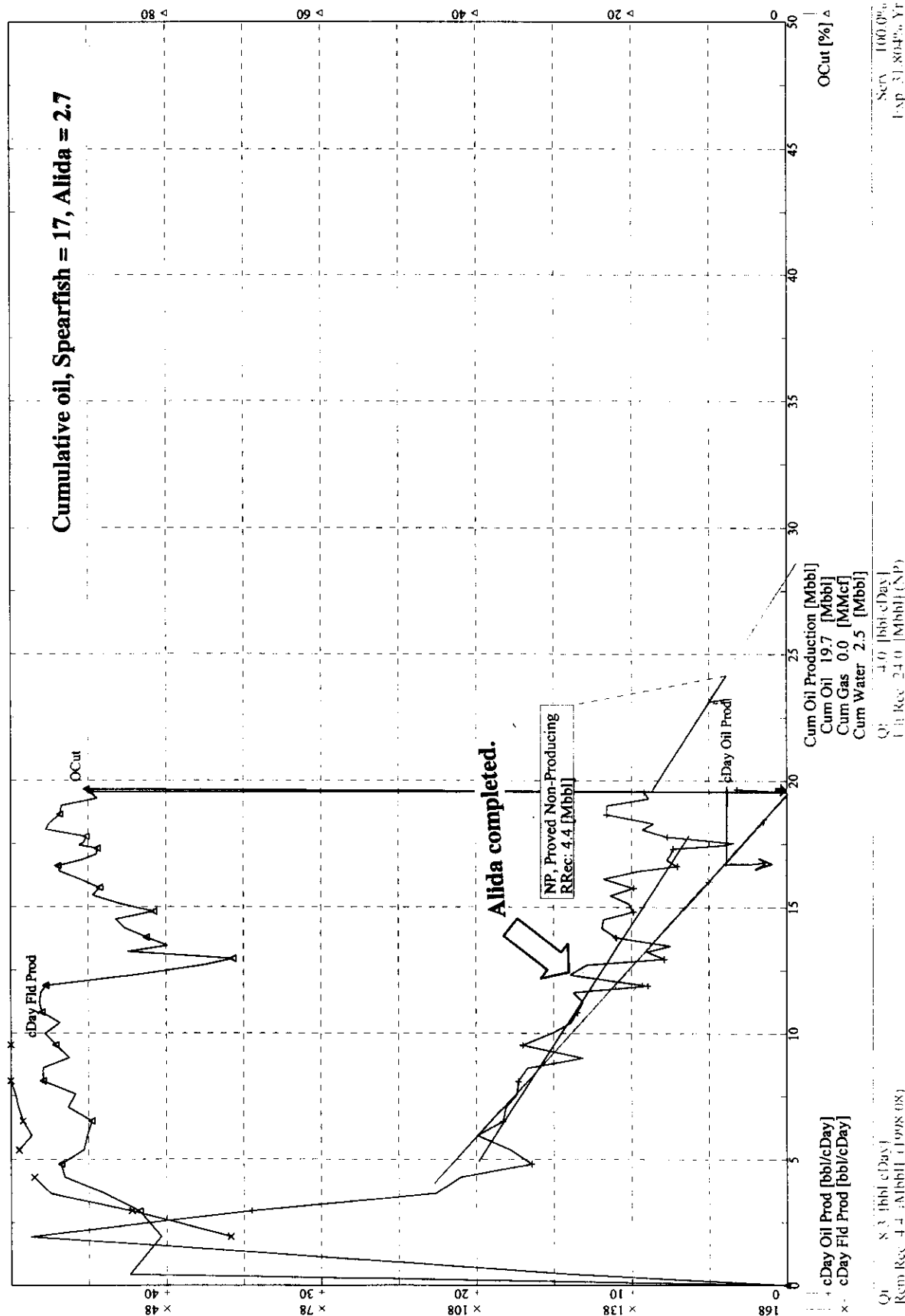


```
c:\data\decline\anderson\pierson\pierson.dpd
29-Nov-99 18:31 {oil linear rate-cum (cday)}
```

DECPRO v3.10  
Param-Soft Systems Ltd

**Figure 24**

Group: **Pierson Non-Unit**  
Well: **00/12-15-002-29W1/0**  
Name: **HOME PIERSON 12-15-2-29**  
Primary: **OTHER** Status:  
Last On: **Aug-1998**



```
data\decline\anderson\pierson\mon-unit.dpd
29-Nov-99 18:37 foil linear rate-cum (cdav))
```

**Figure 25**

Group: South Pierson Unit  
 Well: 00/03-16-002-29W1/0  
 Name: HOME S PIERSON UNIT NO. 1 3-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

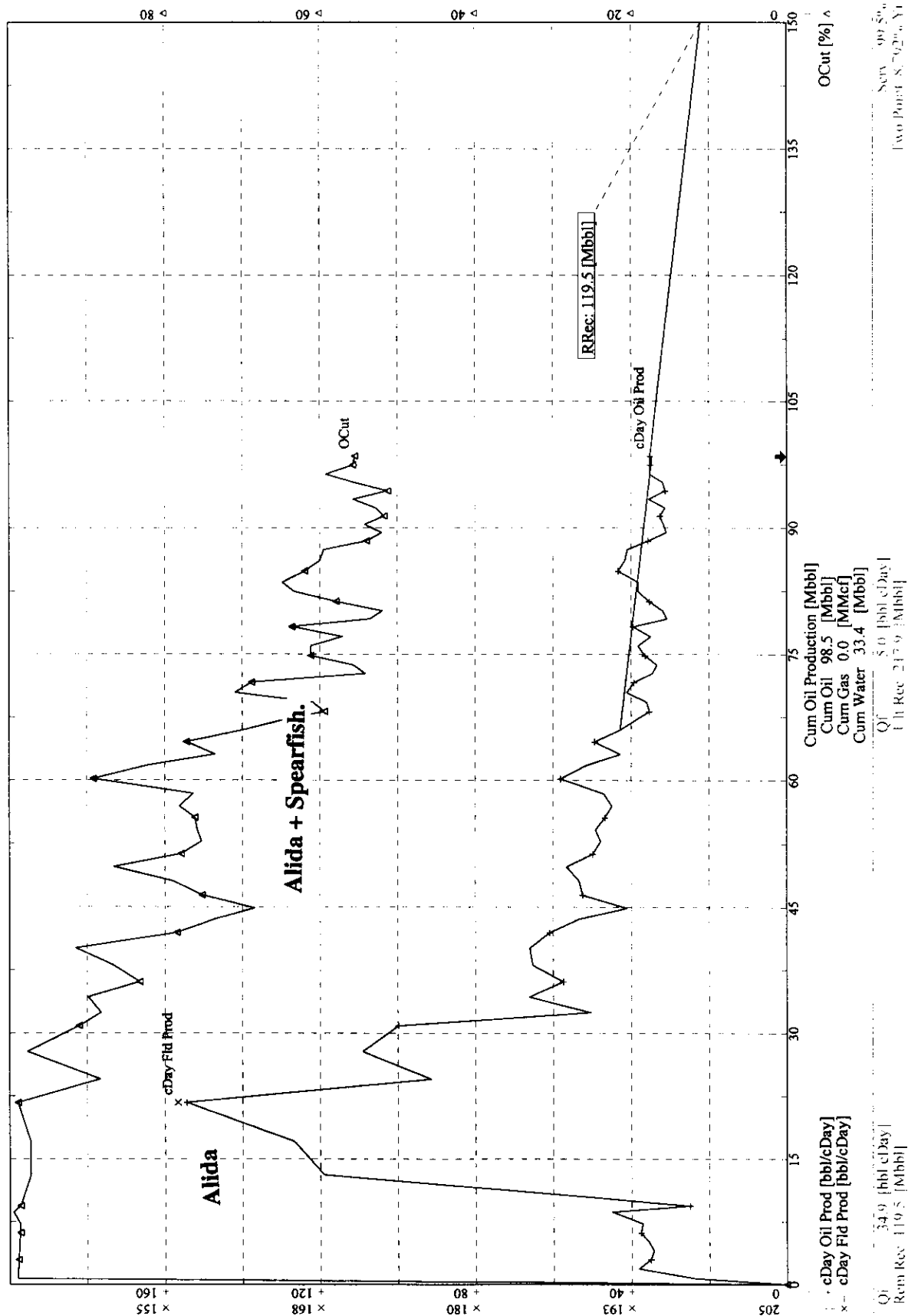
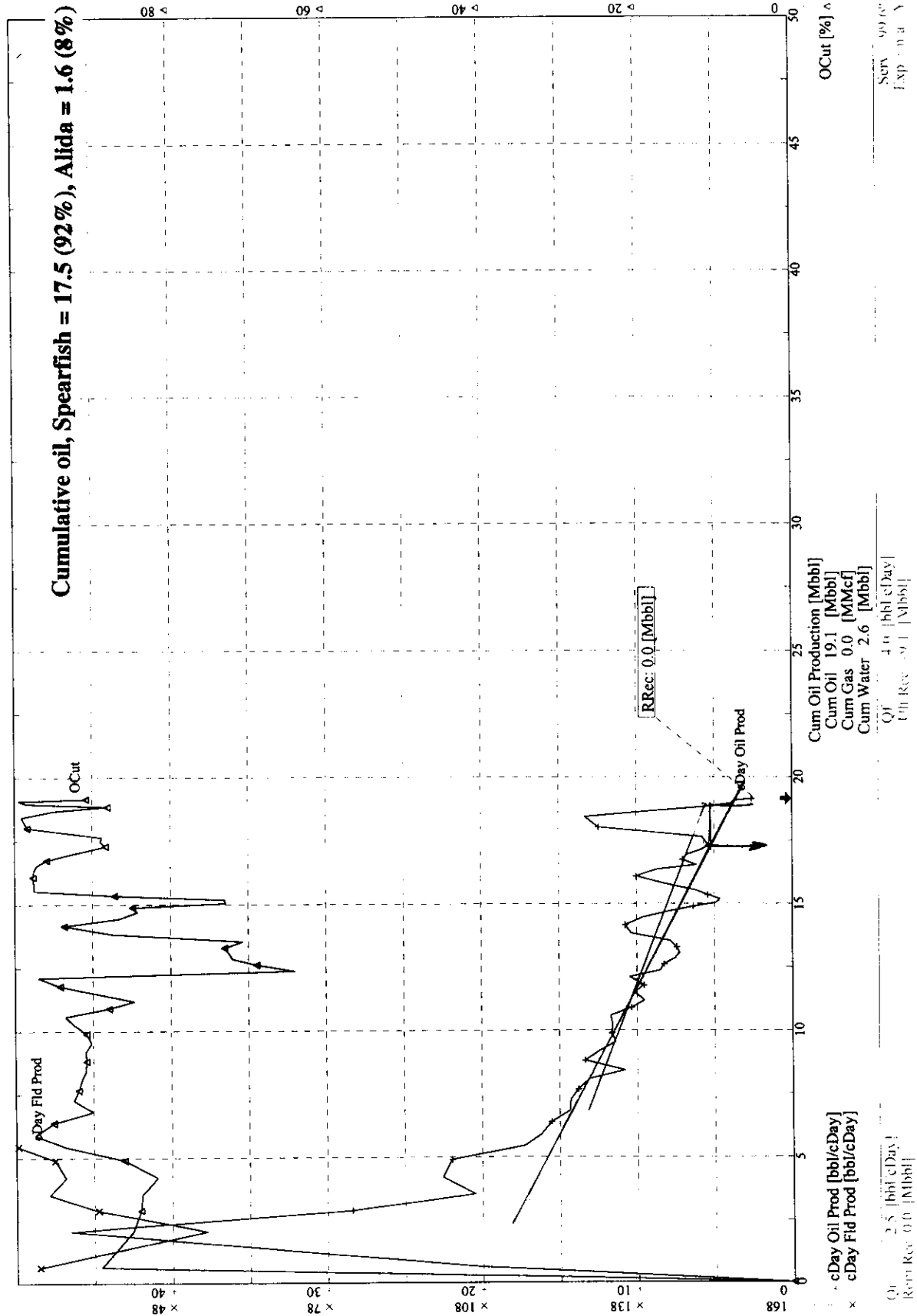


Figure 26

Group: **Pierson Non-Unit**  
 Well: **00/09-16-002-29W1/0**  
 Name: **HOME PIERSON PROV. 9-16-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Mar-1999**

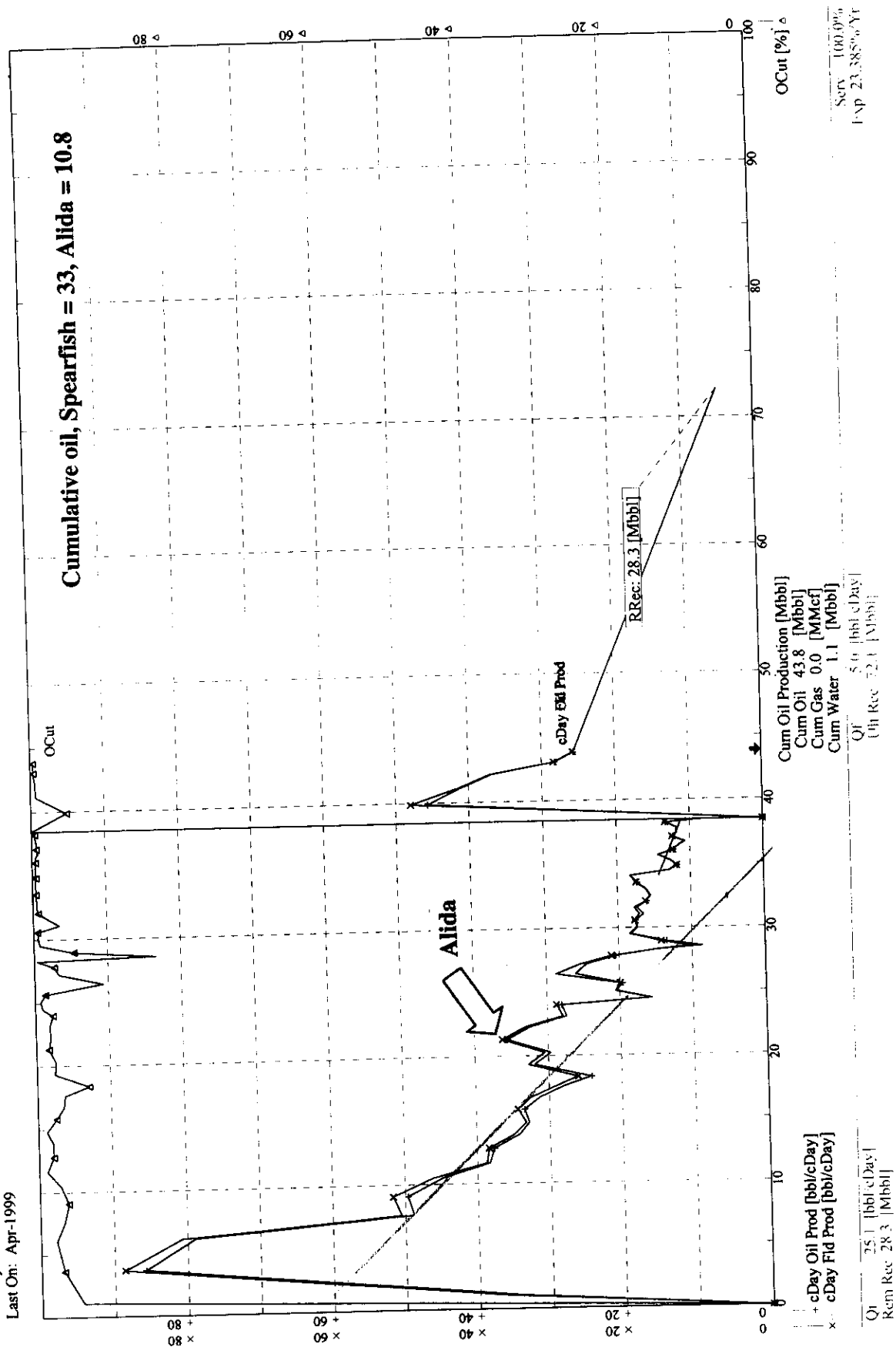
Field: **PIERSON PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit:  
 Oper:  
 Source Date: **Apr-1999**



**Figure 27**

Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/11-16-002-29W1/0  
 Name: HOME S. PIERSON NO.1 PROV 11-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

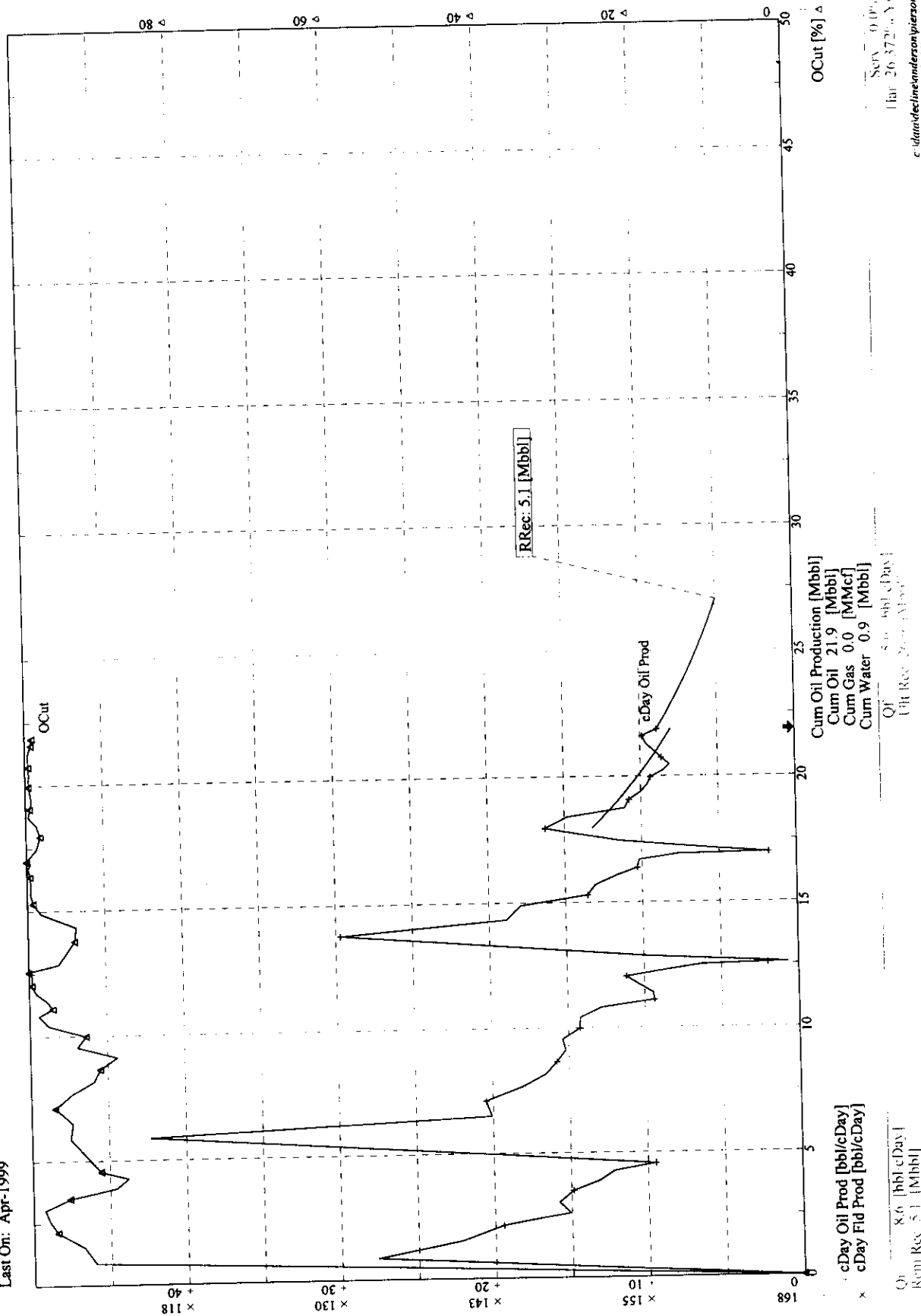


c:\data\decline\anderson\pierson\pierson.dpd  
 29-Nov-99 17:53 [oil linear rate-cum (cday)]

Figure 28

Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/13-16-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO.1 13-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999



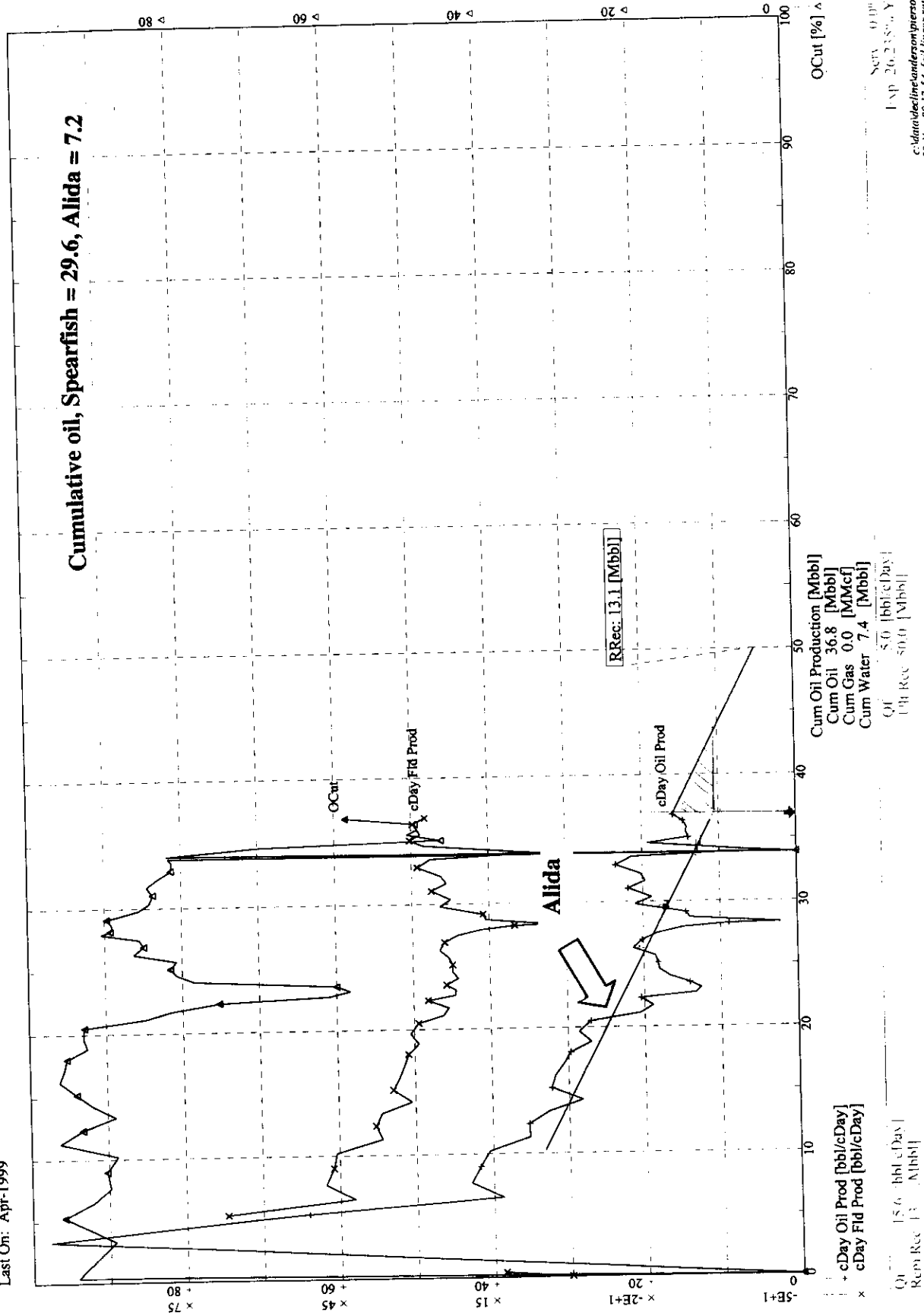
c:\data\decline\pierson\pierson.dpd  
 29-Nov-99 17:54 [oil linear rule-cum (cday)]

Figure 29

Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

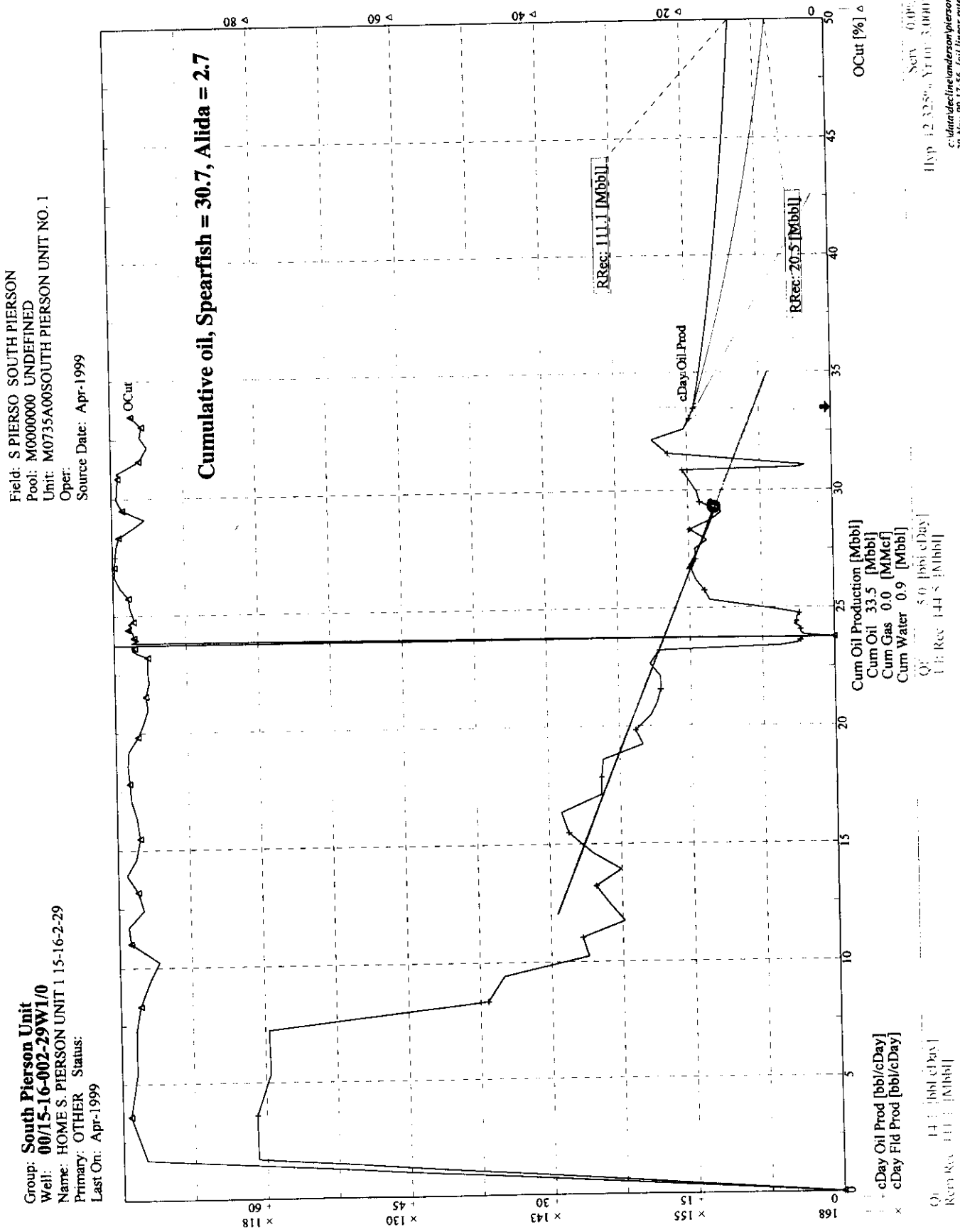
Group: South Pierson Unit  
 Well: 00/14-16-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO.1 14-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Cumulative oil, Spearfish = 29.6, Alida = 7.2



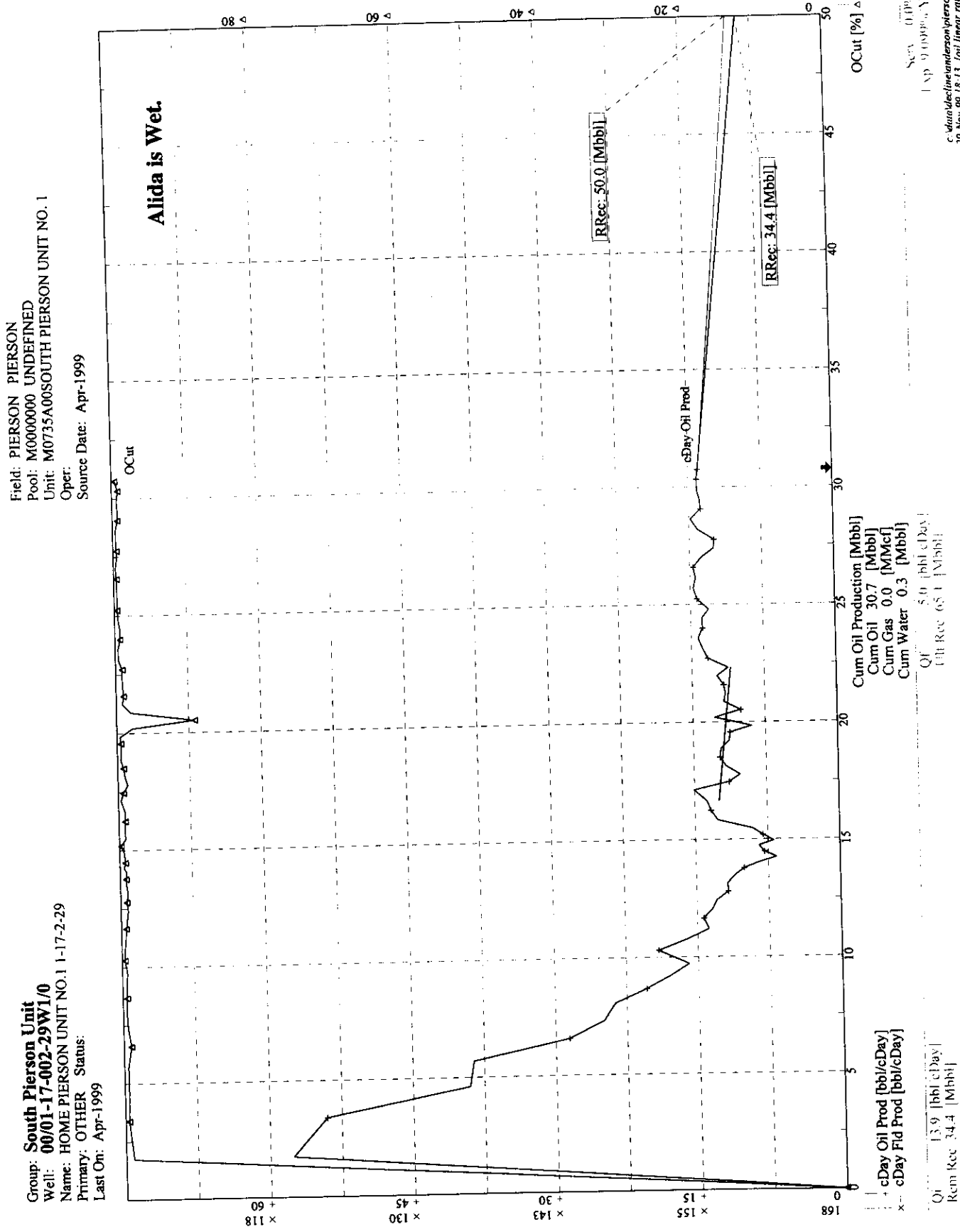
c:\data\decline\underson\pierson\pierson.dpd  
 29-Nov-99 17:54 [oil linear rate-cum (cday)]

Figure 30



**Figure 31**



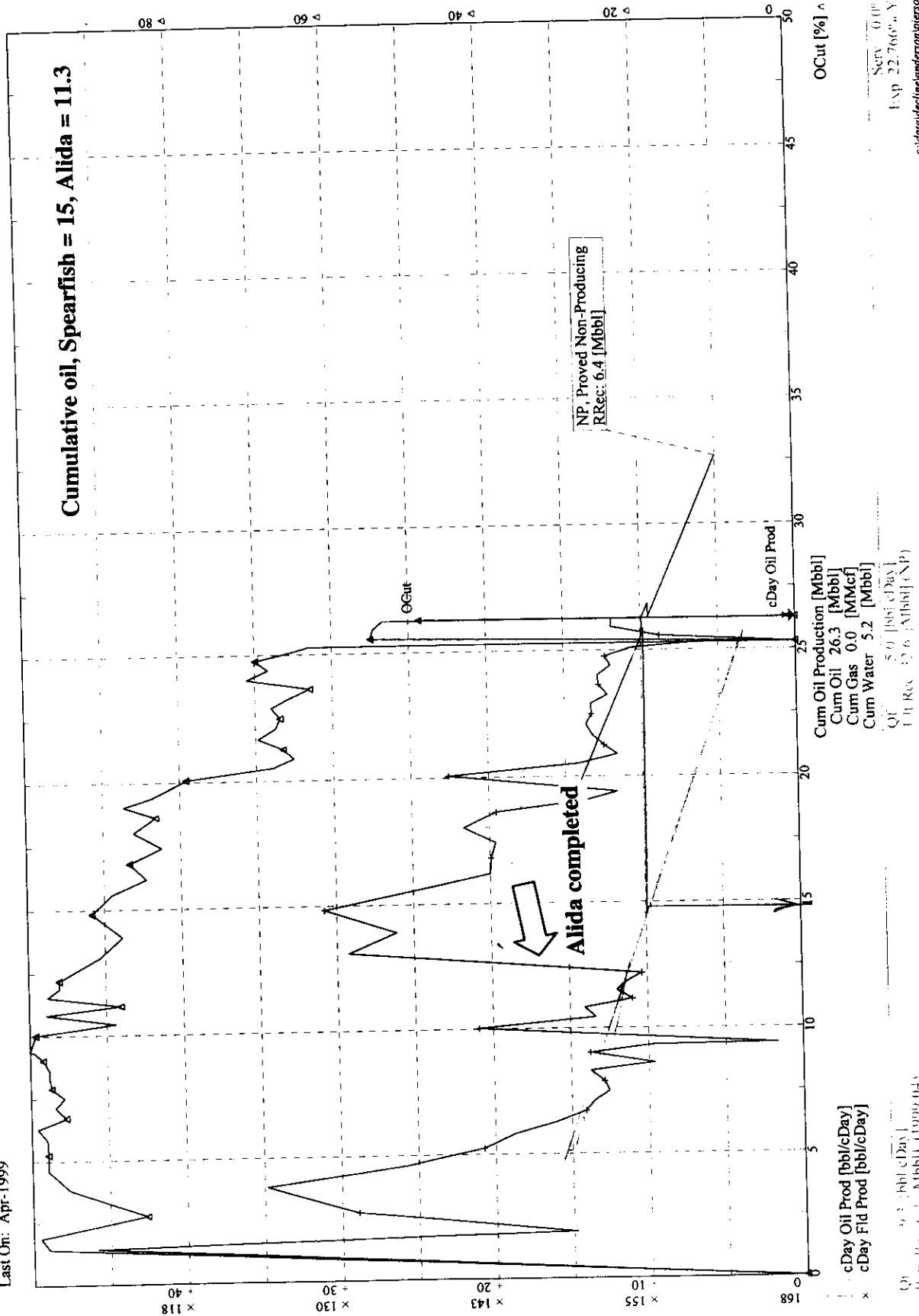


c:\data\dec\pierson\pierson.dpd  
 29-Nov-99 18:13 [oil linear rate-cum (cday)]

Figure 32

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/09-17-002-29W1/0  
 Name: HOME S. PIERSON NO.1 9-17-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

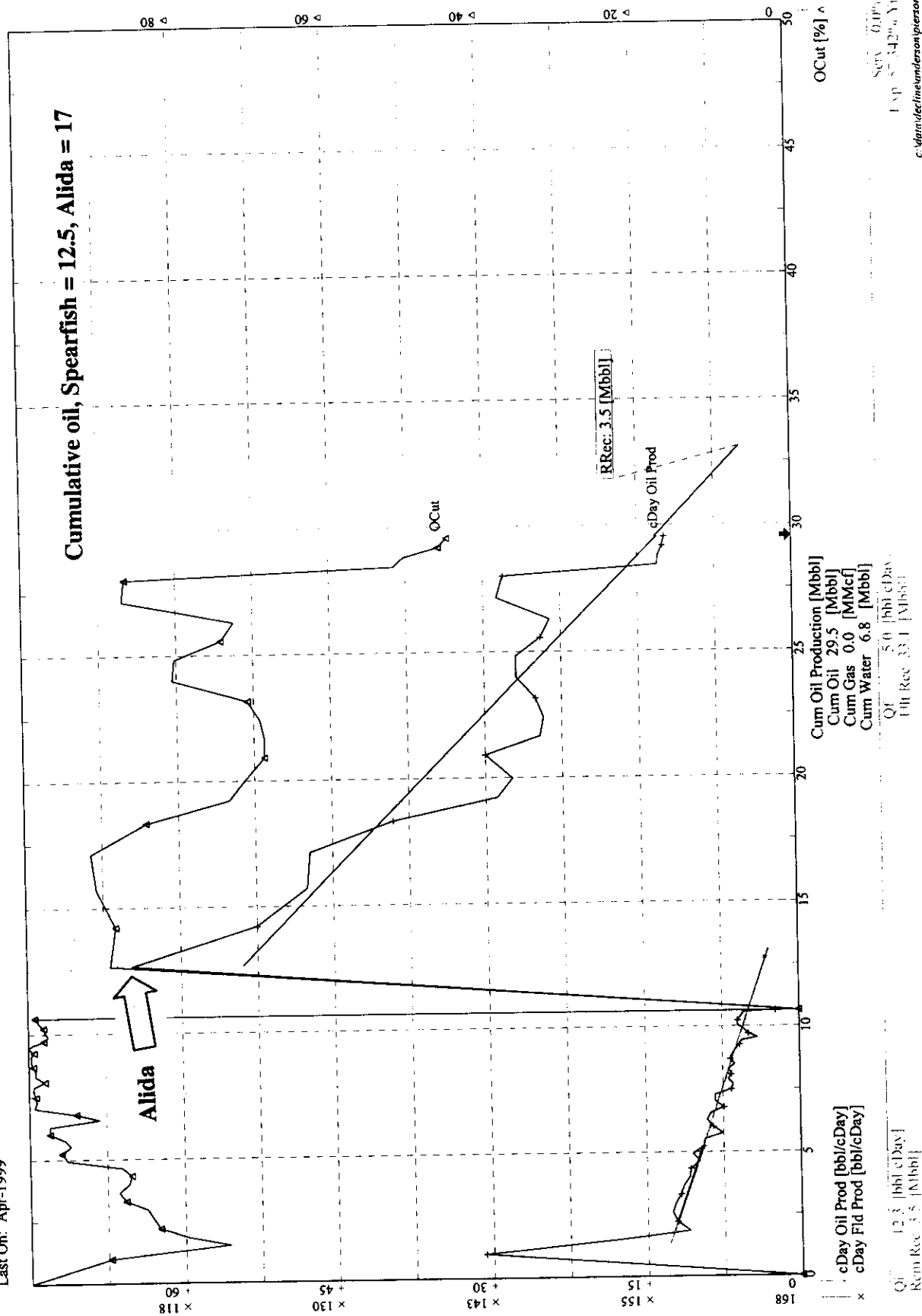


c:\data\decl\anderson\pierson\pierson.dpl  
 29-Nov-99 18:15 [oil linear nite-cum (c/day)]

Figure 33

Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT-NO. 1  
 Oper:  
 Source Date: Apr-1999

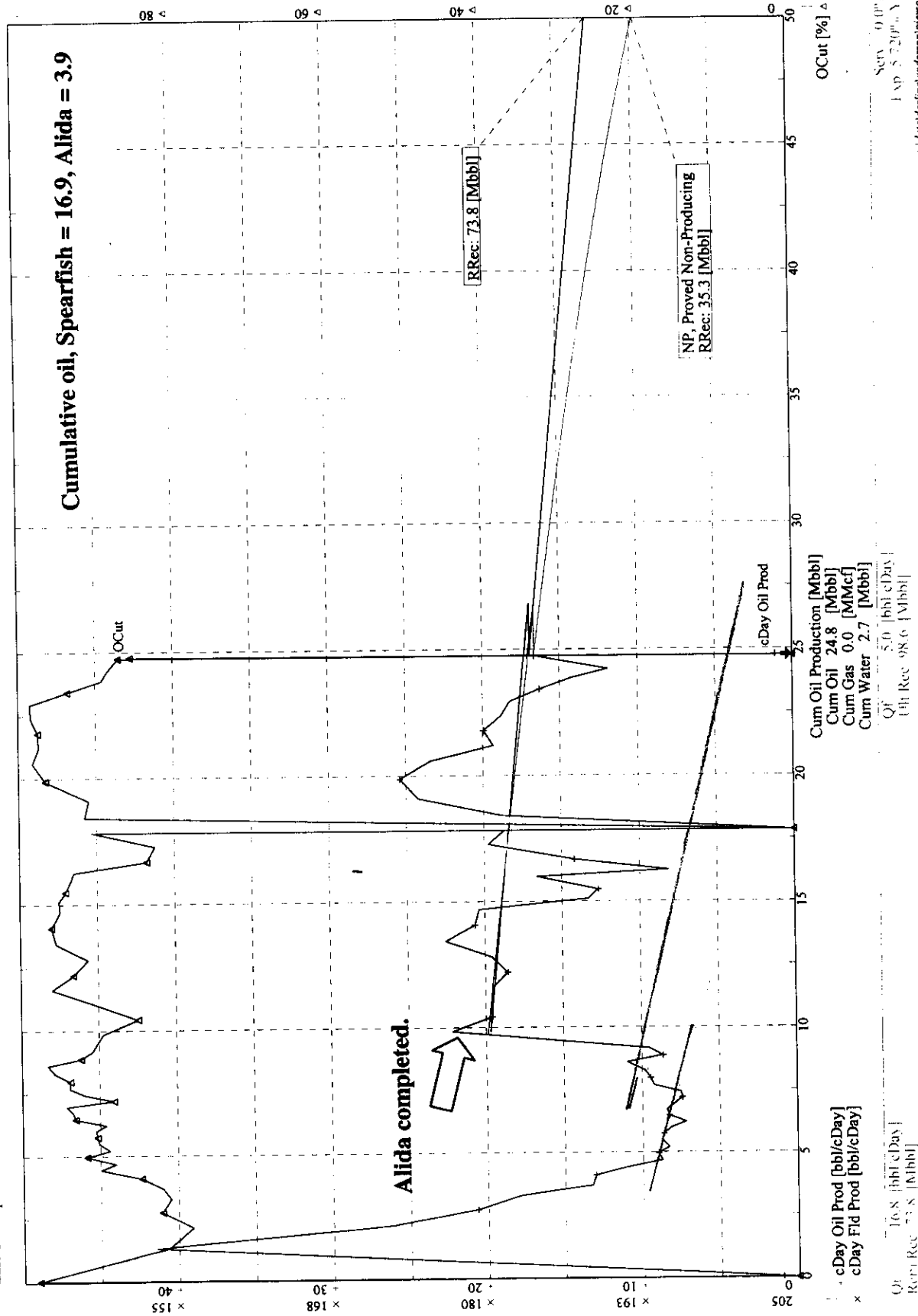
Group: South Pierson Unit  
 Well: 00/10-17-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO1 10-17-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999



c:\data\decl\decl\pierson\pierson.dpl  
 29-Nov-99 18:15 [oil linear rate-cum (cday)]

Figure 34

Group: **South Pierson Unit**  
Well: **00/11-17-002-29W1/0**  
Name: **HOME S. PIERSON UNIT NO.1 11-17-2-29**  
Primary: **OTHER** Status:  
Last On: **Apr-1999**



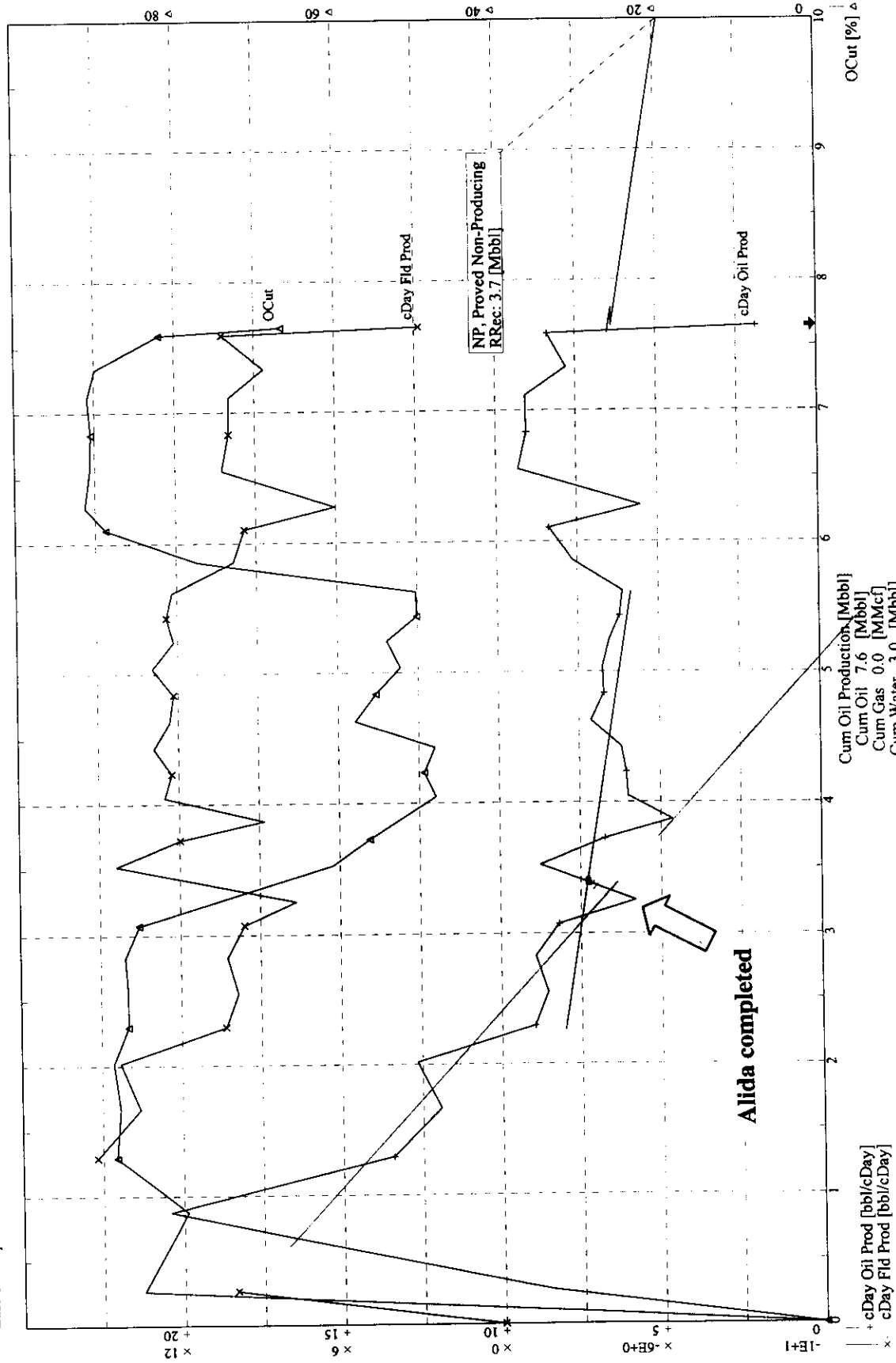
```
c:\data\decline\underson\pierson\pierson.dpd
29-Nov-99 18:32 [oil linear rate-cum (cdny)]
```

DECPRO v3.10  
Petro-Soft Systems Ltd.

**Figure 35**

Group: **Pierson Non-Unit**  
 Well: **00/03-21-002-29W1/0**  
 Name: **HOME PIERSON 3-21-2-29 (WPM)**  
 Primary: **OTHER** Status:  
 Last On: **Apr-1998**

Field: **PIERSON PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit:  
 Oper:  
 Source Date: **Apr-1999**



NP 2.0 [bbl/cDay]  
 Ubl Rev 11.3 [Mbbl] (NP)  
 Qb Rev 2.0 [bbl/cDay]  
 Cum Water 3.0 [Mbbl]  
 Cum Gas 0.0 [MMcf]  
 Cum Oil 7.6 [Mbbl]  
 Cum Oil Production [Mbbl]

Figure 36

11-11 REUFFEL & GOSSEN CO. MADE IN U.S.A.

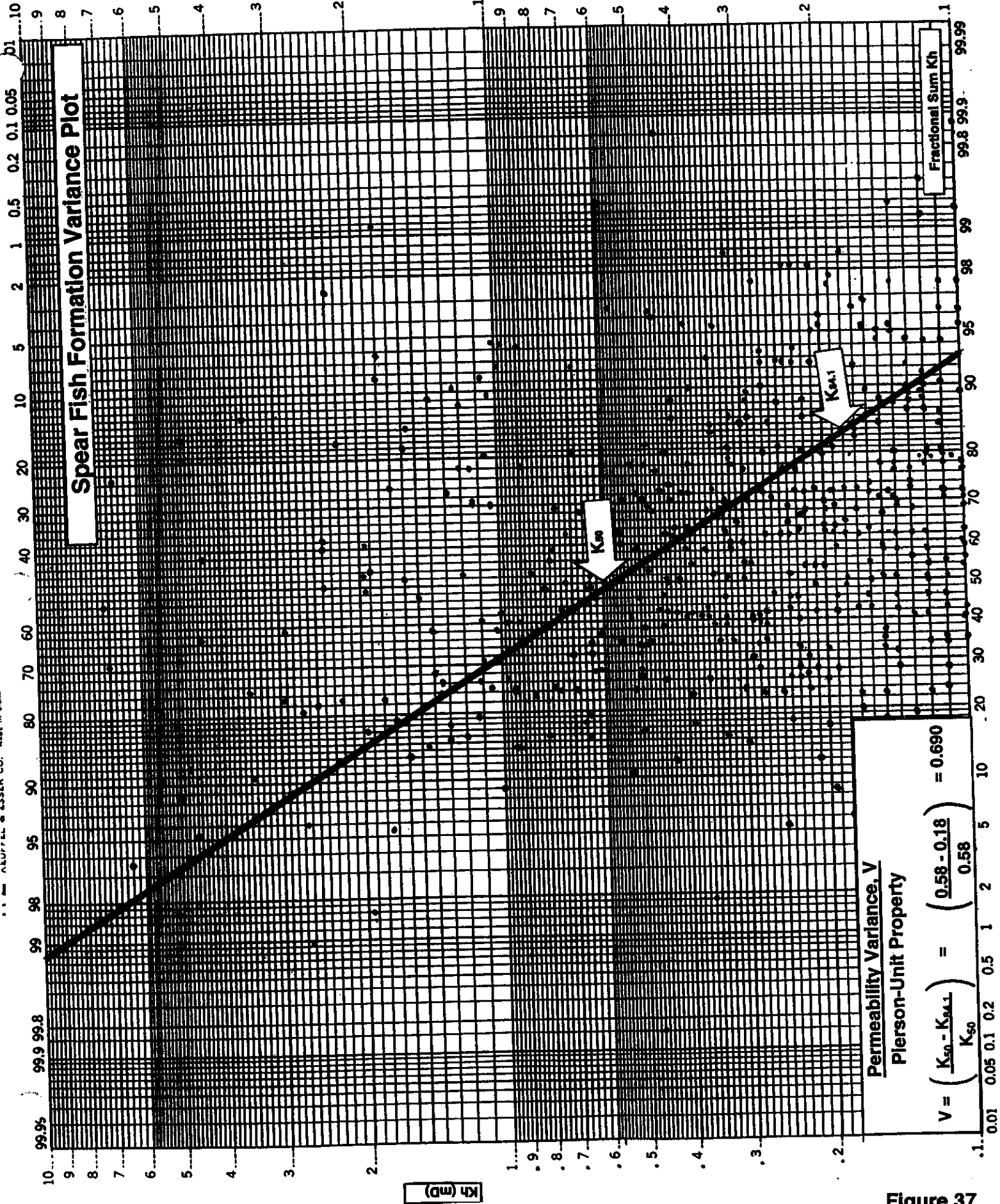


Figure 37

# FIGURE 38

NOT SCANNED  
(Oversized)

FOR AVAILABILITY  
CONTACT THE  
PETROLEUM BRANCH  
(Engineering Section)

**COLLAR LOCATOR**

REPRESENTS 20%

17.9 M3/DAY  
OR 100%

**COLLAR LOCATOR**

REPRESENTS 20%

**COLLAR LOCATOR**

0.0 256.0

**INJECTING TEMPERATURE (DEG.C)**

29.0

39.0

**PERCENTAGE PROFILE (%)**

0.0

100.0

INJECTION PRESSURE = 2750 KPA  
100% INJECTION = 17.9 M3/DAY

1025

08-09

1050

**INJECTING TEMPERATURE (DEG.C)**

29.0

39.0

**PERCENTAGE PROFILE (%)**

0.0

100.0

**INJECTING TEMPERATURE (DEG.C)**

28.0

38.0

**0.5 HR SHUT IN TEMPERATURE (DEG.C)**

28.0

**1.0 HR SHUT IN TEMPERATURE (DEG.C)**

Figure 39



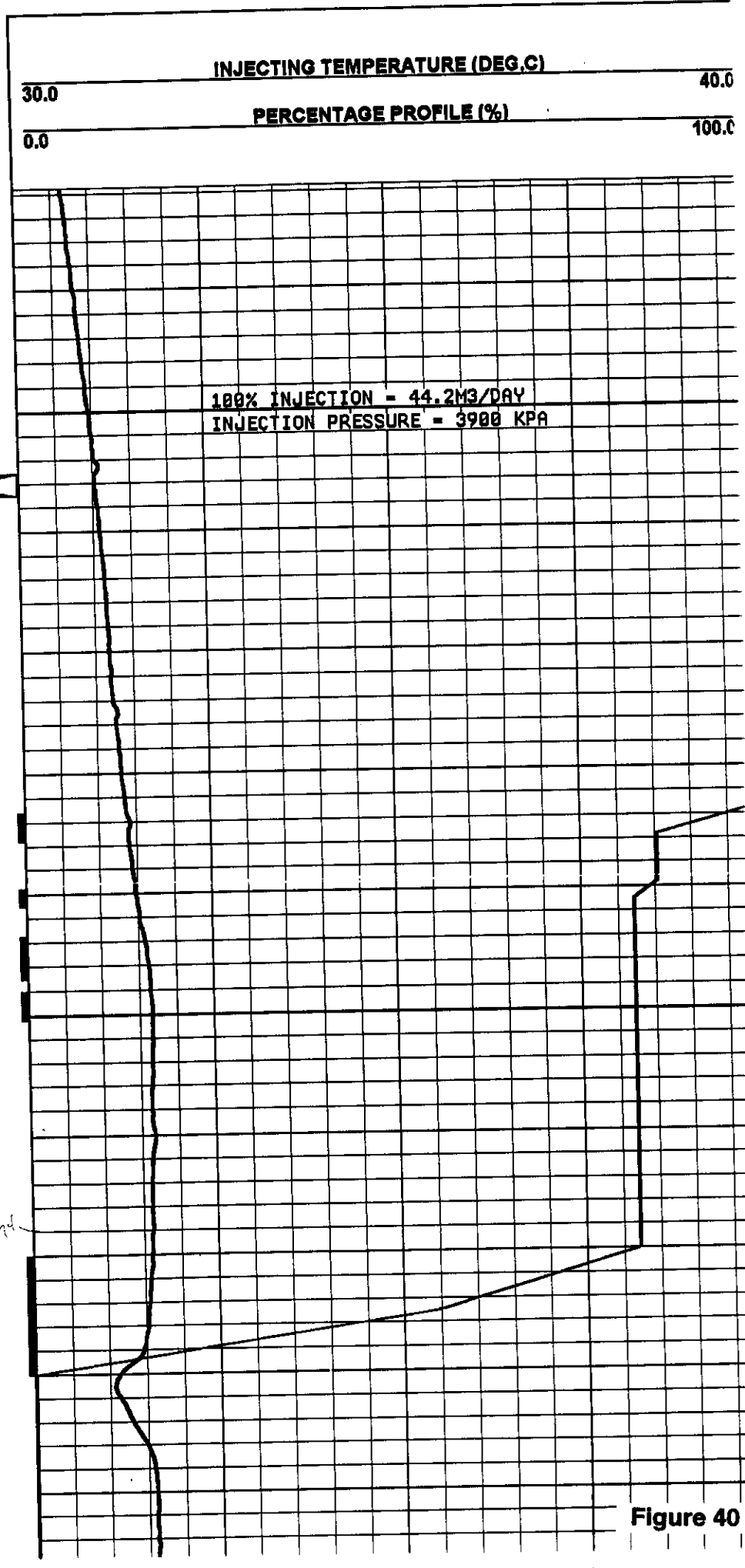
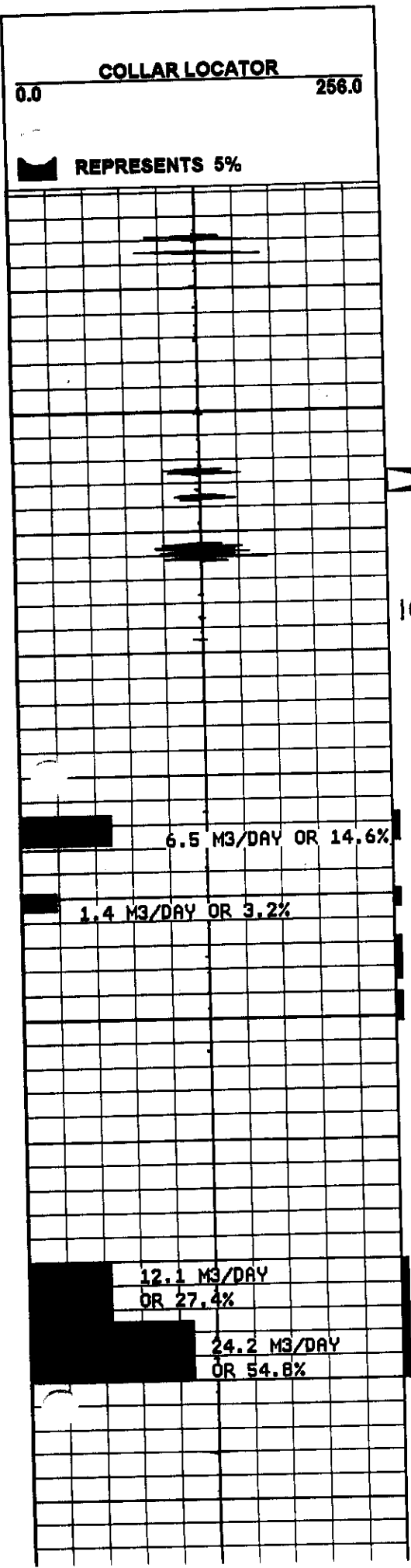
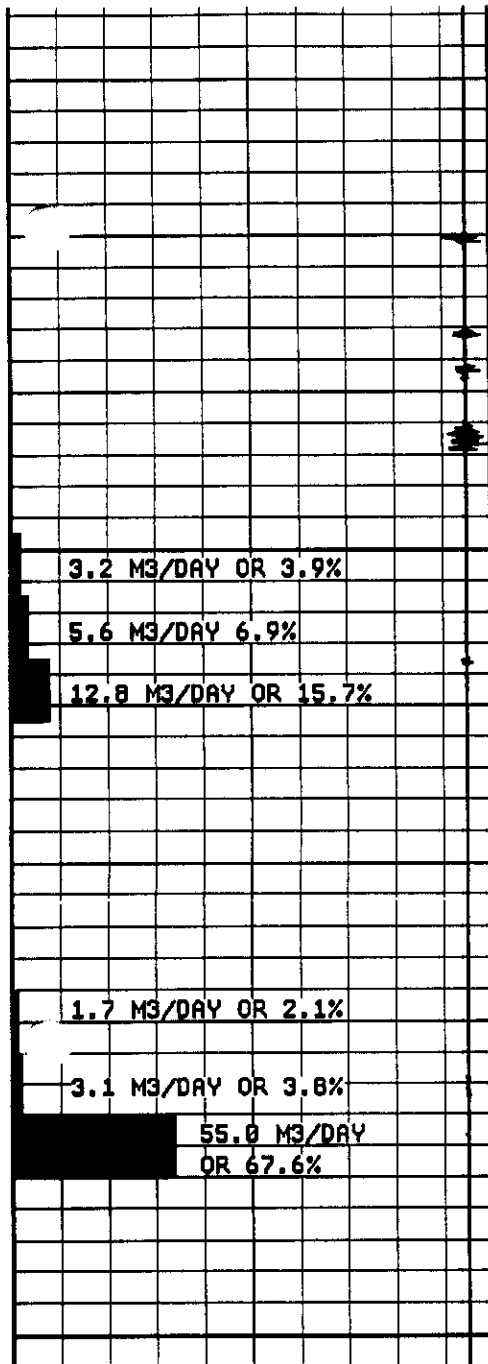


Figure 40

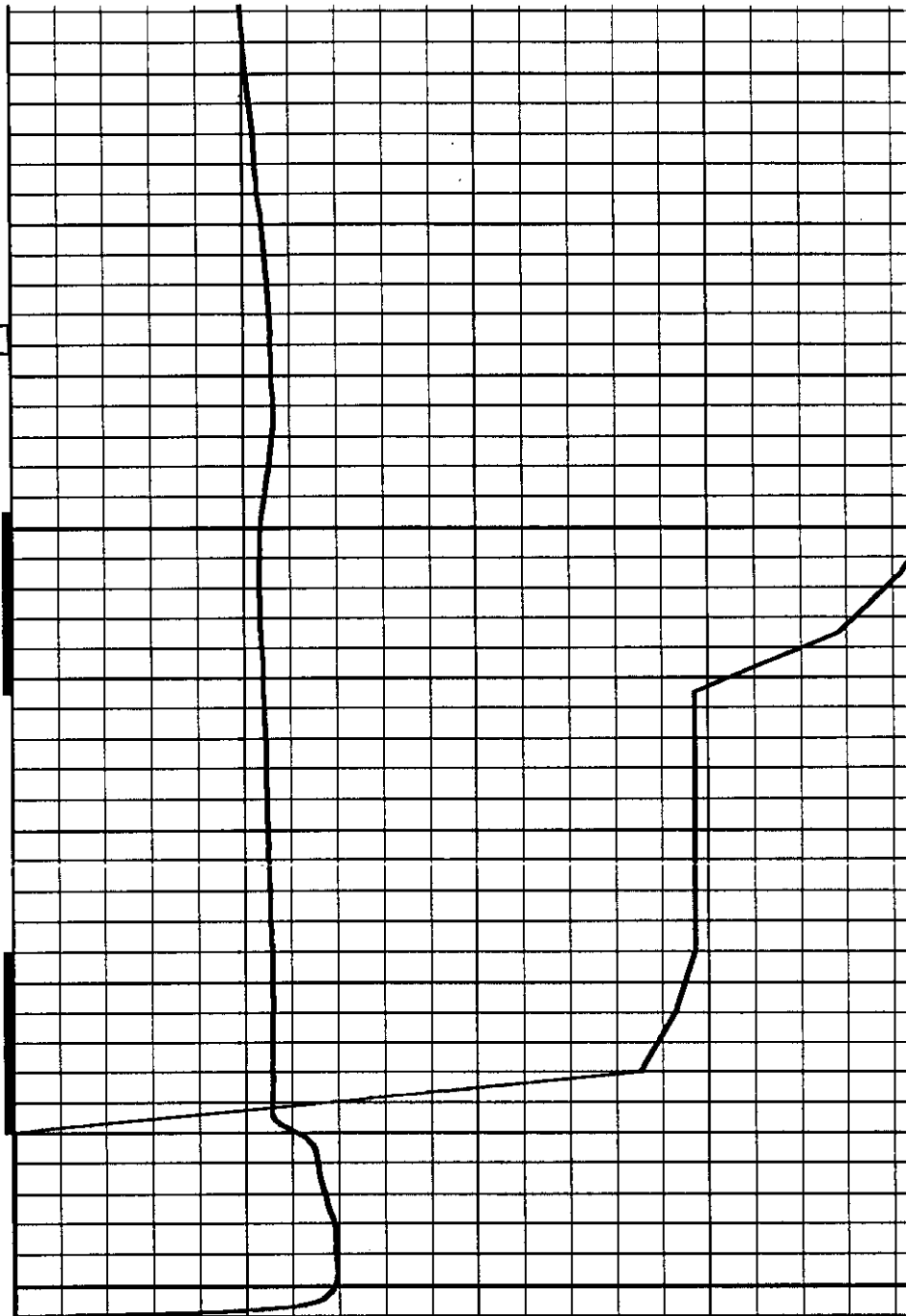


1025

08-17

1050

COLLAR LOCATOR



16.0

32

0.0

100

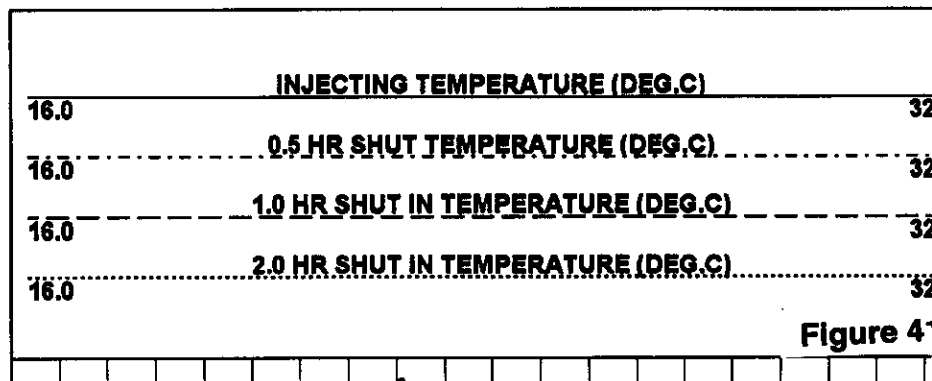
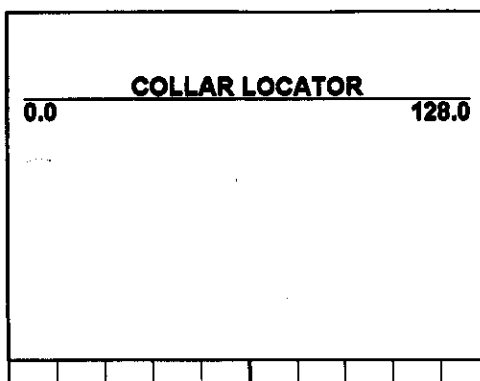


Figure 41

**COLLAR LOCATOR**

**INJECTING TEMPERATURE (DEG.C)**

14.0

44.0

**PERCENTAGE PROFILE (%)**

0.0

100.0

REPRESENTS 20%

100% = 42.4 M3/DAY

INJECTION PRESSURE= 1.8 MPa

1000

14-17

1025

Alida

100% OR 42.4 M3/DAY

**Figure 42**

COLLAR LOCATOR

INJECTING TEMPERATURE (DEG.C)

26.0

34.0

PERCENTAGE PROFILE (%)

0.0

100.0

REPRESENTS 10%

100% INJECTION = 18.8 M3/DAY  
INJECTION PRESSURE = 3.4 MPA

1000

02-16

1025

Alida

1.3 M3/DAY OR 6.9%

17.5 M3/DAY  
OR 93.1%

COLLAR LOCATOR

INJECTING TEMPERATURE (DEG.C)

26.0

34.0

PERCENTAGE PROFILE (%)

0.0

Figure 43 0.0

REPRESENTS 100%

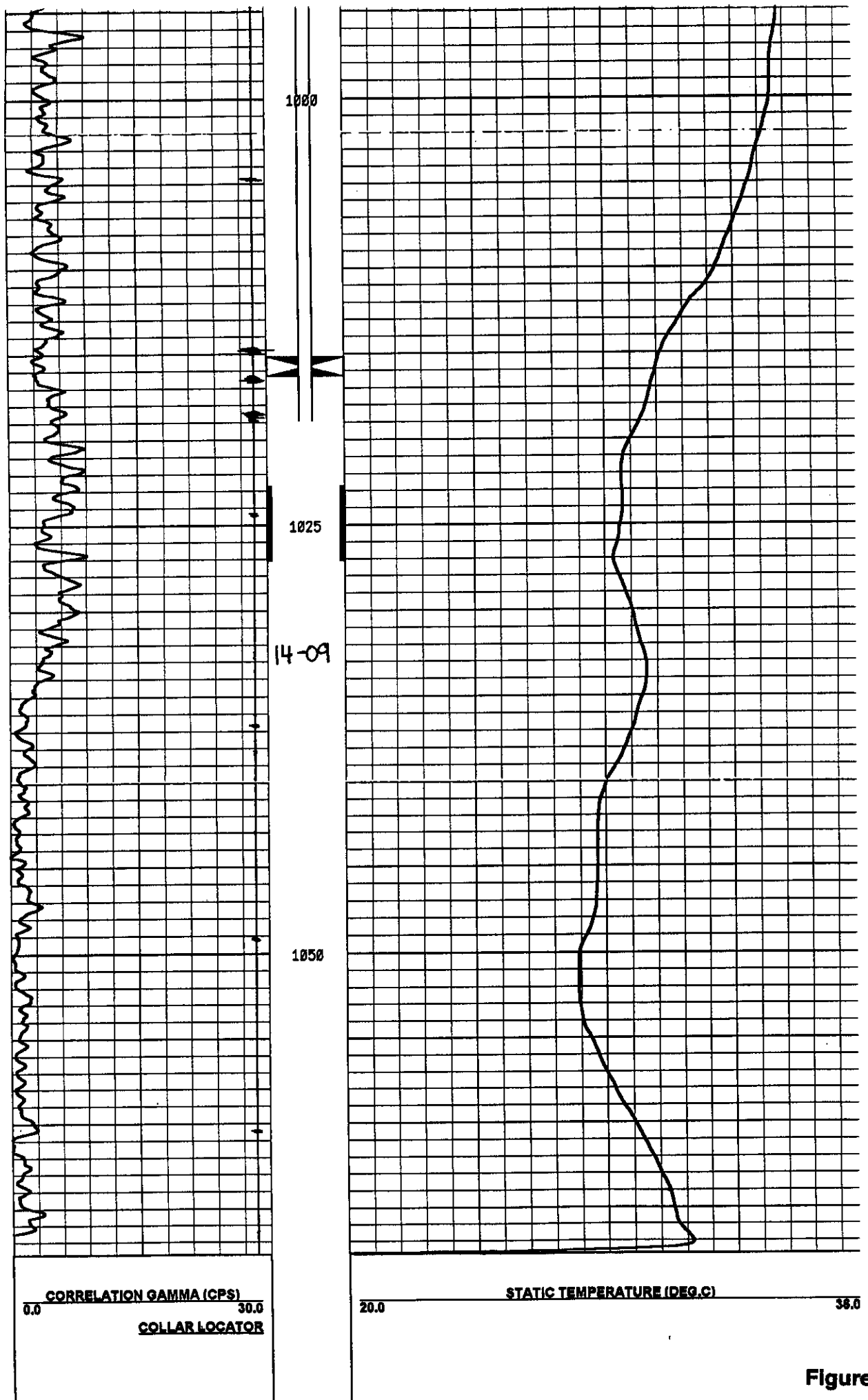


Figure 44

Home Pierson 02-09-02-29W1  
 Spearfish (1024 - 1028.5 mKB)  
 Fall-off Test  
 Test Date: Dec. 11 - 30, 1999

# Strip Chart

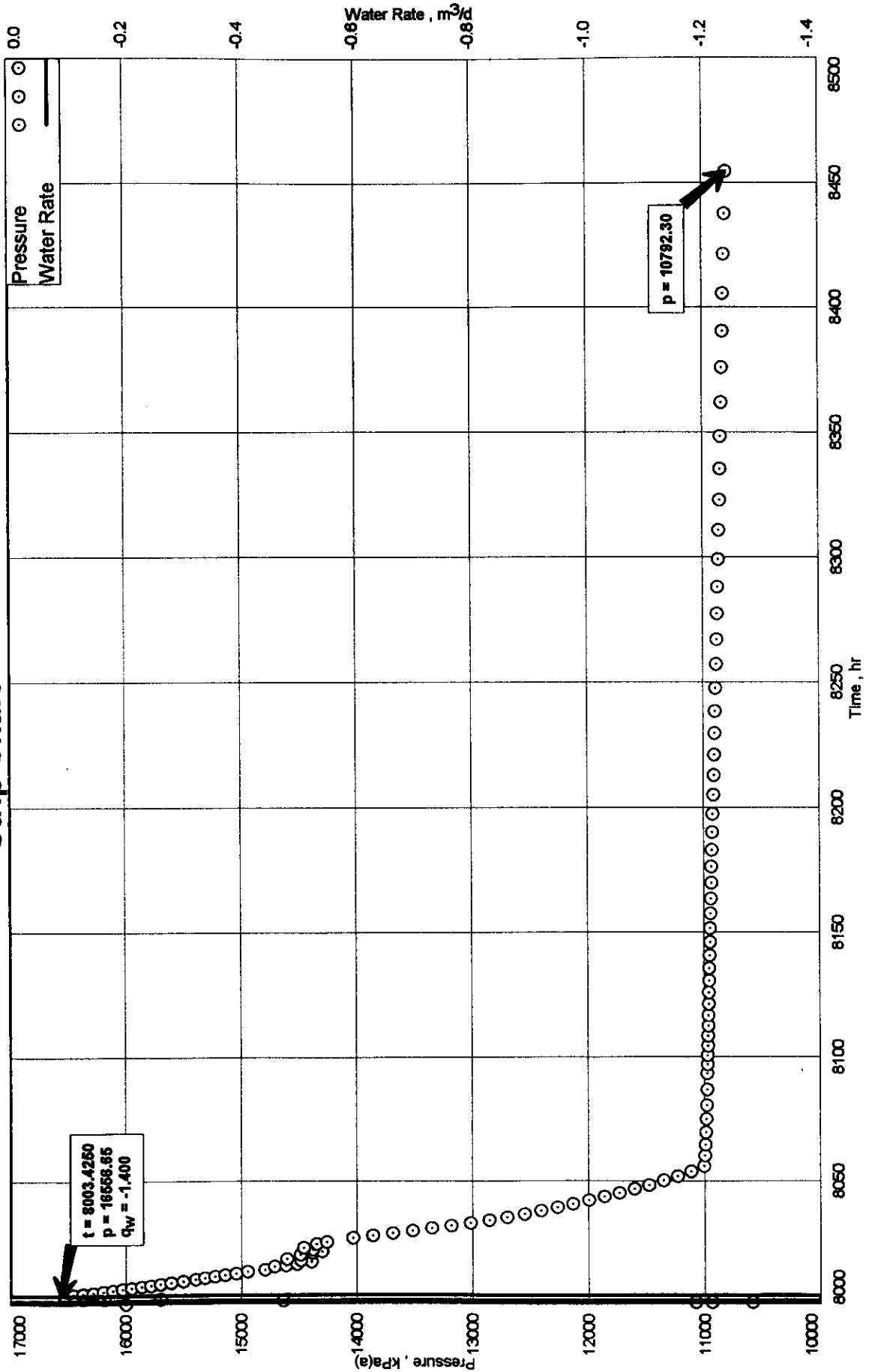


Figure 45

Home Pierson 02-17-02-29W1  
 Spearfish (1024 - 1030 mKB)  
 Fall-off Test  
 Test Date: Dec. 11 - 31, 1999

# Strip Chart

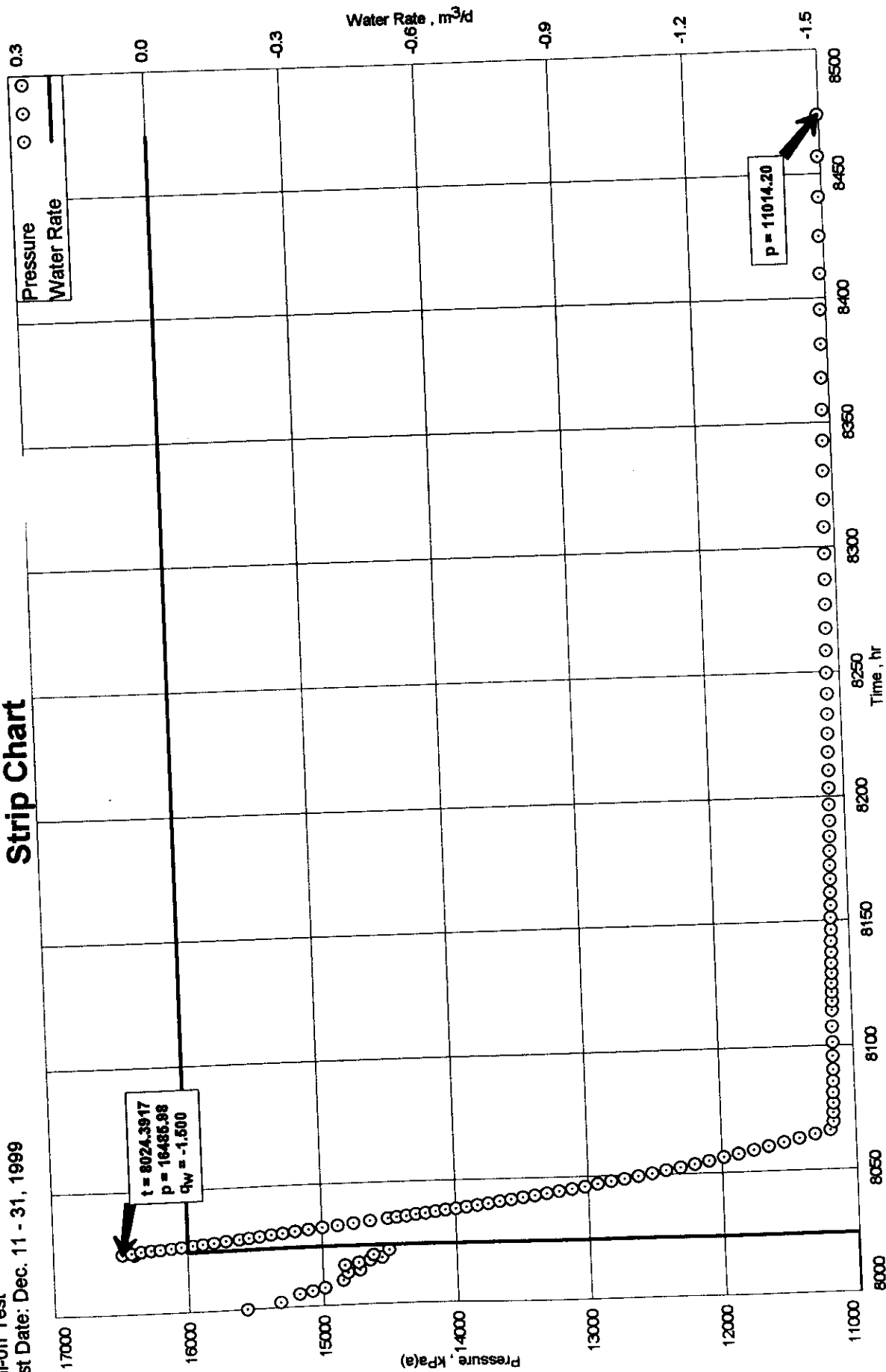


Figure 46

Home Pierson 04-17-02-29W1  
 Spearfish (1025 - 1031 mKB)  
 Fall-off Test  
 Test Date: Dec. 11 - 31, 1999

# Strip Chart

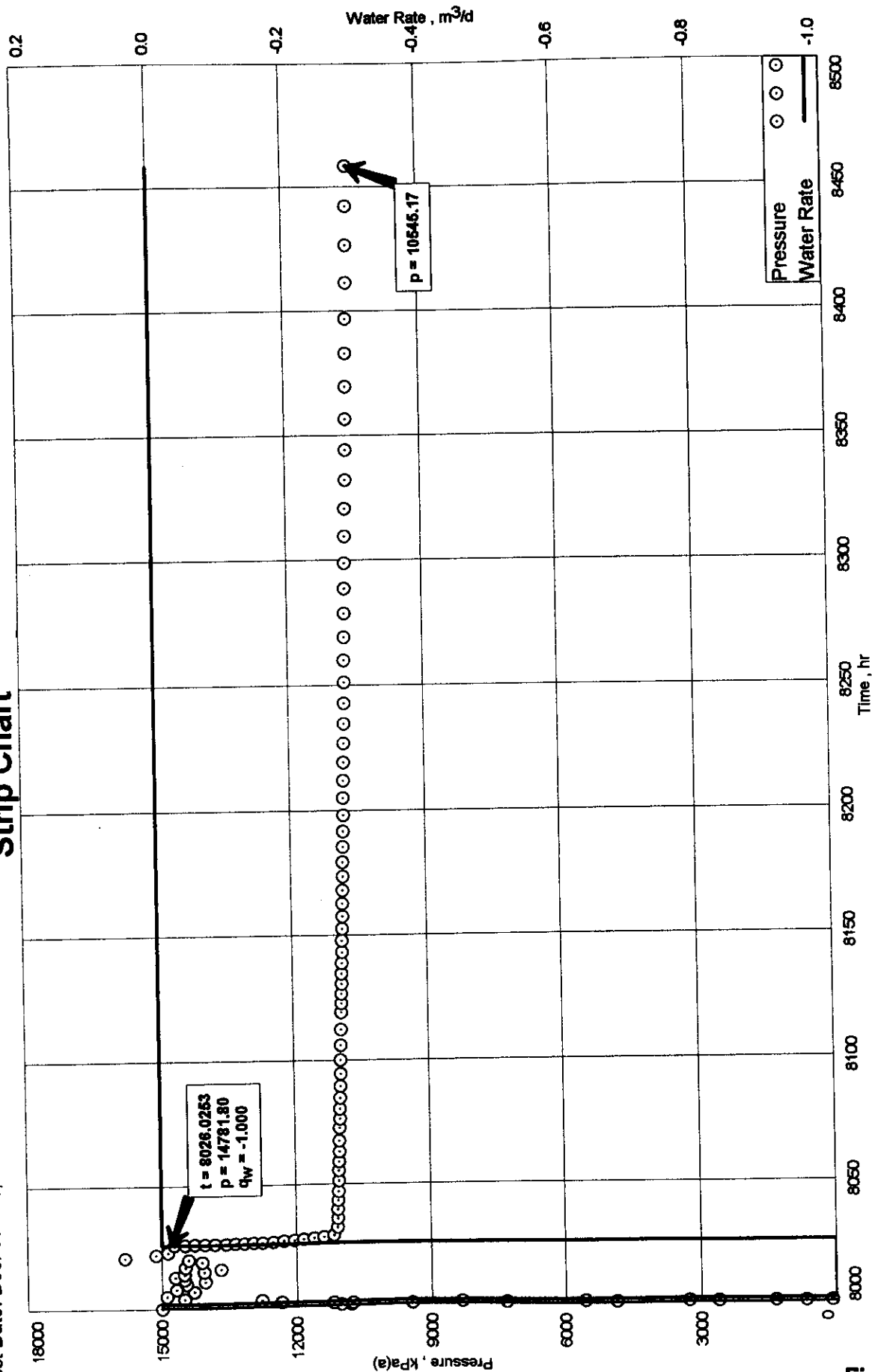
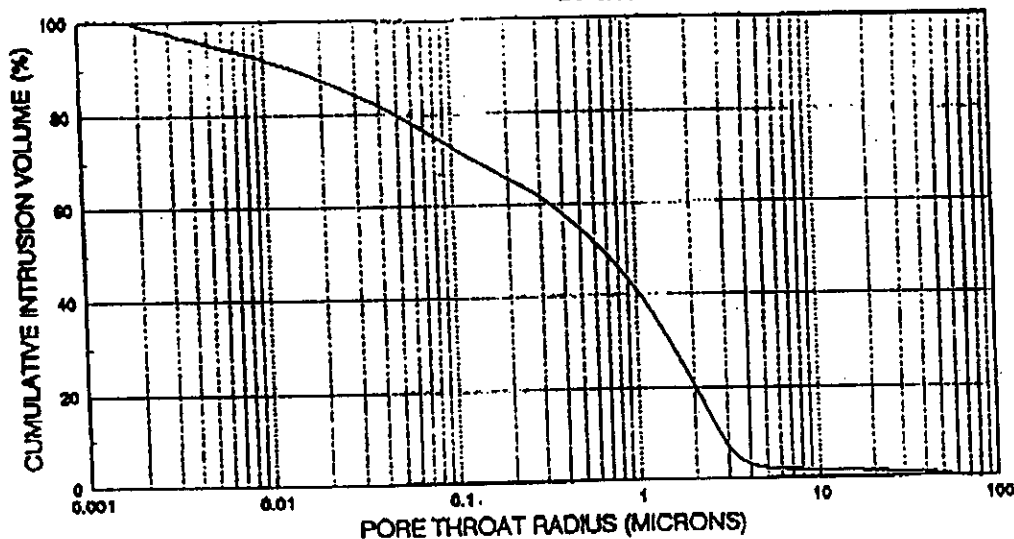


Figure 47

P M G



# HOME - PIERSON RELATIVE PERMEABILITY STUDY MERCURY INJECTION CAPILLARY PRESSURE TEST SAMPLE #40



Depth: 1019.17  
Formation: Spearfish

Gas Permeability: 9.73  
Porosity: 19.7%

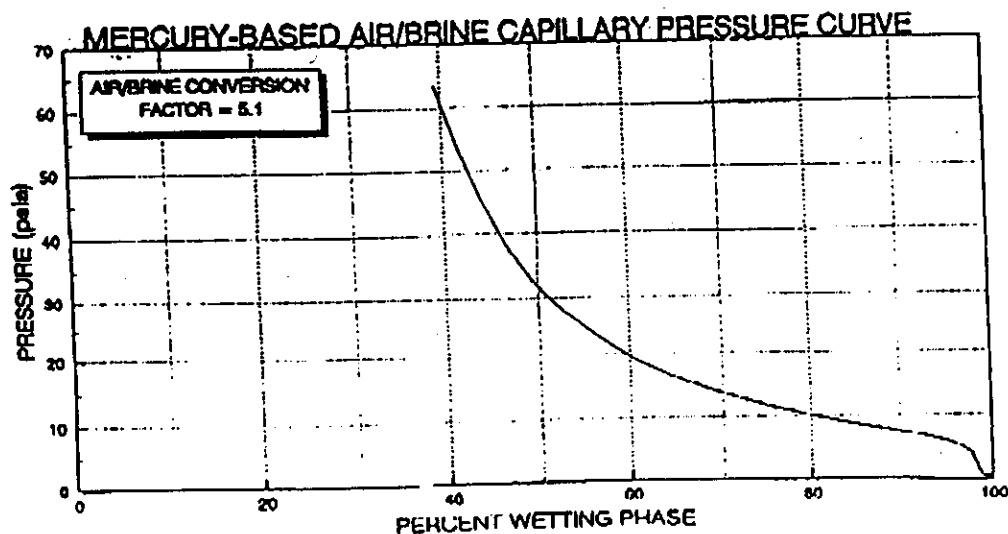
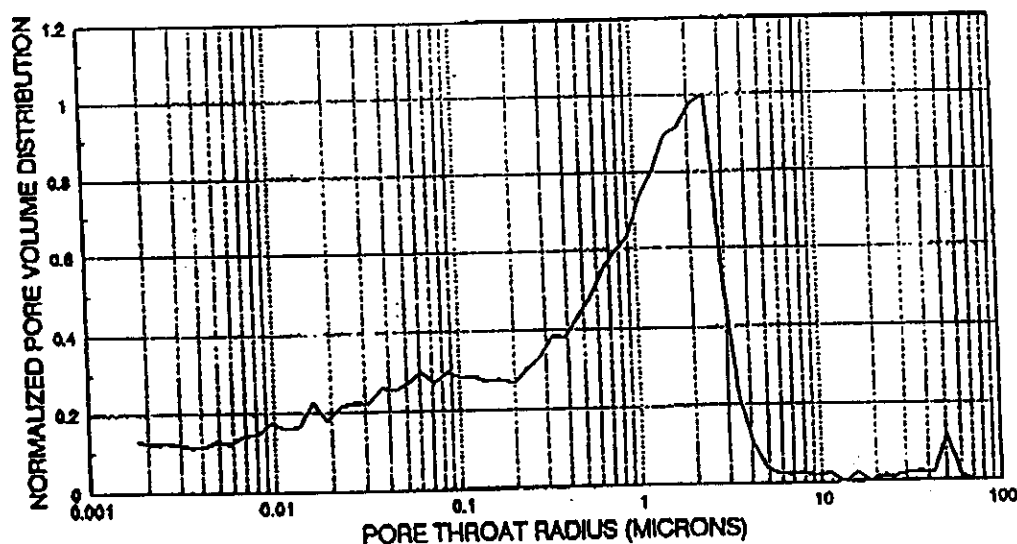
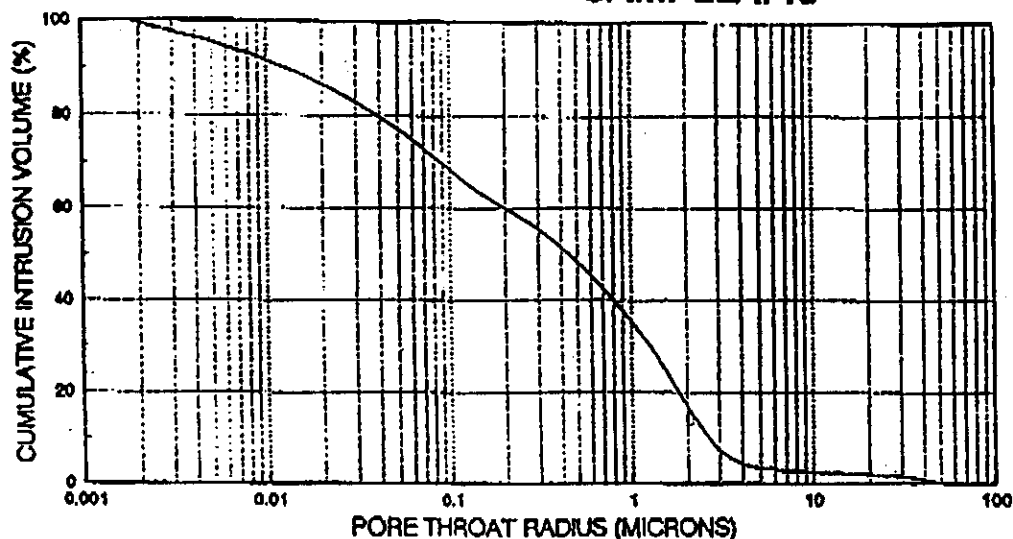


Figure 48

Hycal

# HOME - PIERSON RELATIVE PERMEABILITY STUDY MERCURY INJECTION CAPILLARY PRESSURE TEST SAMPLE #43



Depth: 1019.62  
Formation: Spearfish

Gas Permeability: 4.38  
Porosity: 21.3%

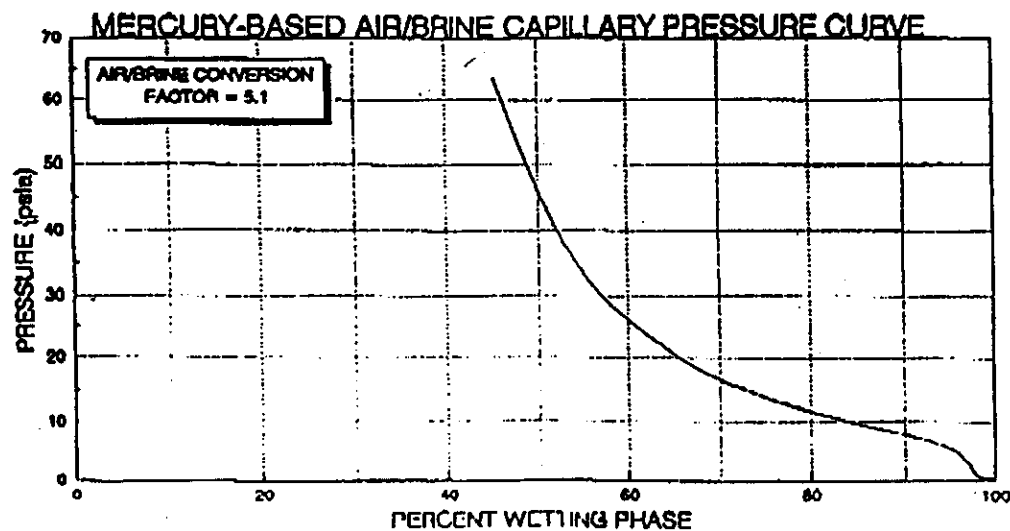
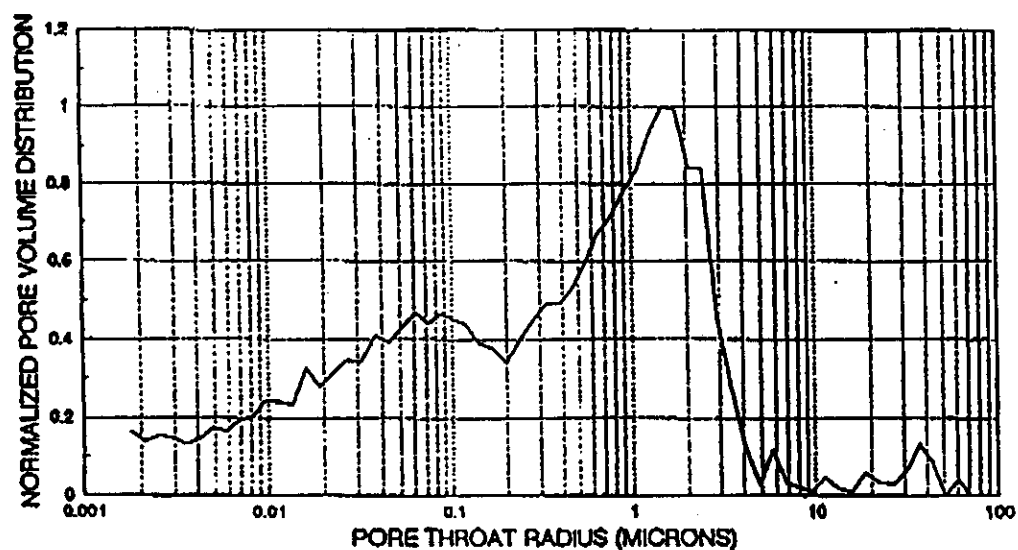
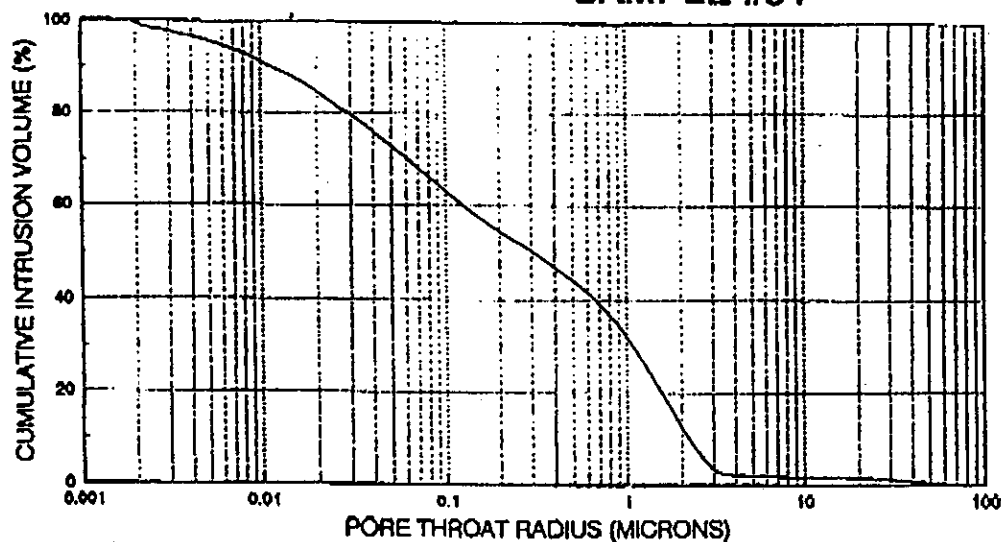


Figure 49  
Hycal

# HOME - PIERSON RELATIVE PERMEABILITY STUDY MERCURY INJECTION CAPILLARY PRESSURE TEST SAMPLE #54



Depth: 1021.69  
Formation: Spearfish

Gas Permeability: 3.61  
Porosity: 15.0%

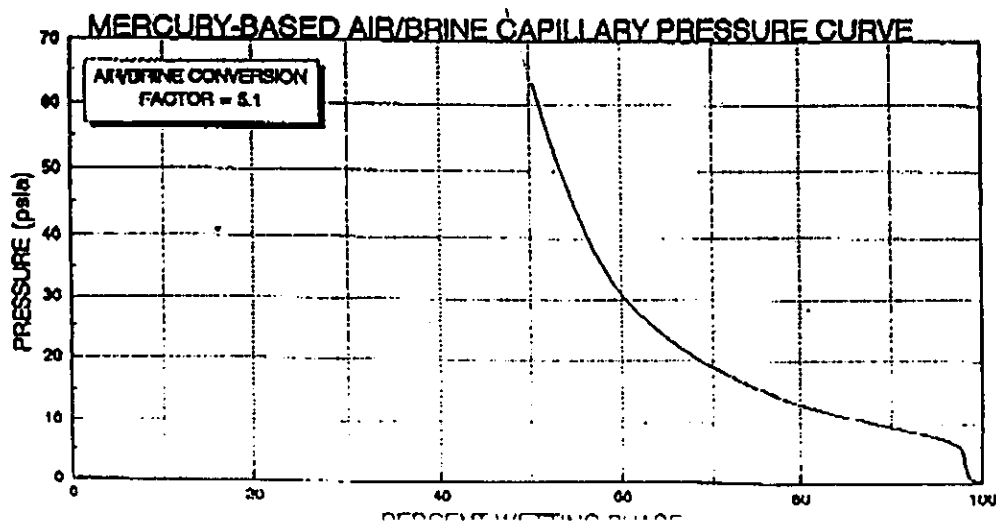
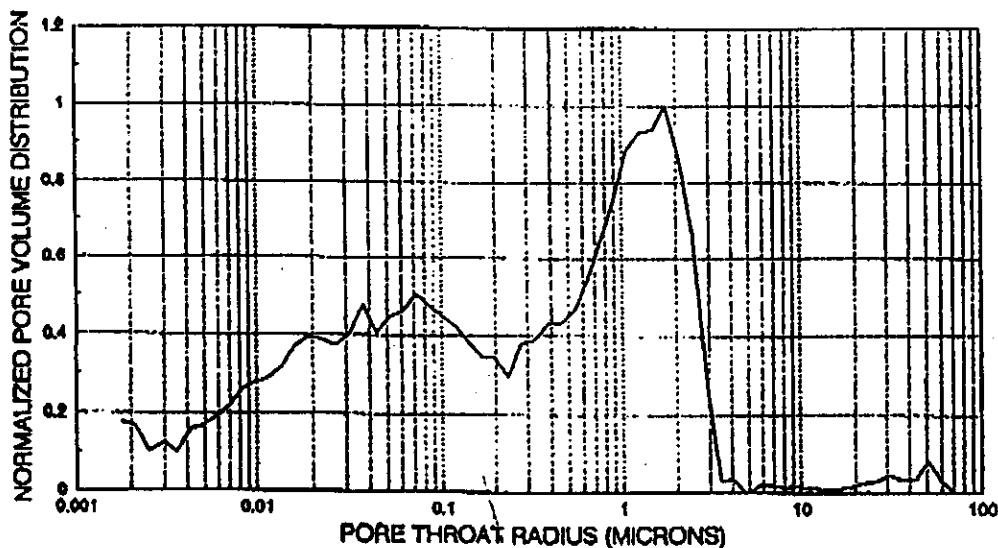
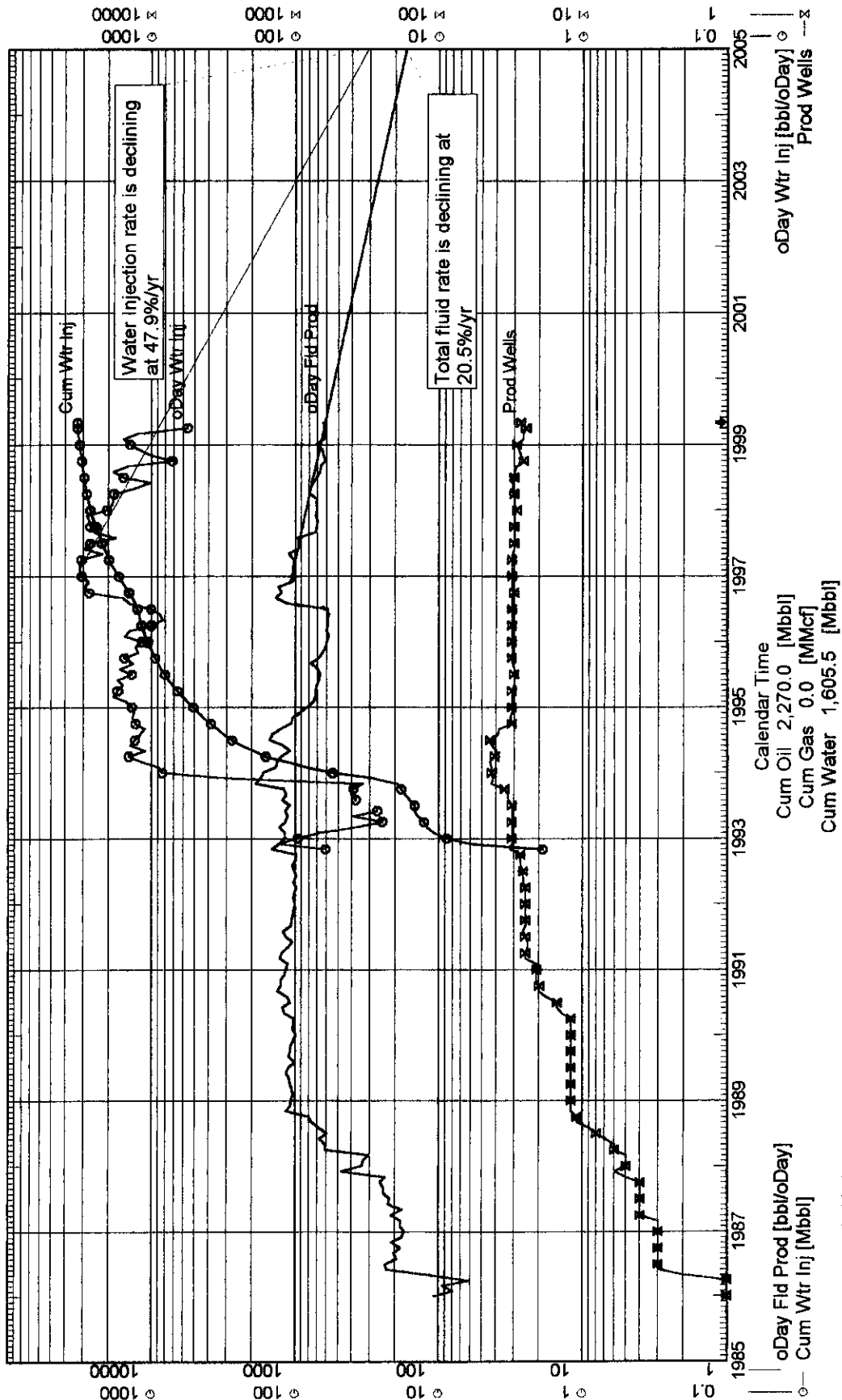


Figure 50

Group: **South Pierson Unit**  
Total Wells: 67

Field:  
Pool:  
Unit:  
Oper:  
Source Date: n/a

Primary: OIL  
Last On: Apr-1999



Init oDay Fld Prod 608.3 [bbl/oDay]  
Rem Rec 0.0 [Mbbl] (1999/04)

Final oDay Fld Prod 1.0 [bbl/oDay]  
Ult Rec n/a [Mbbl] (PP)

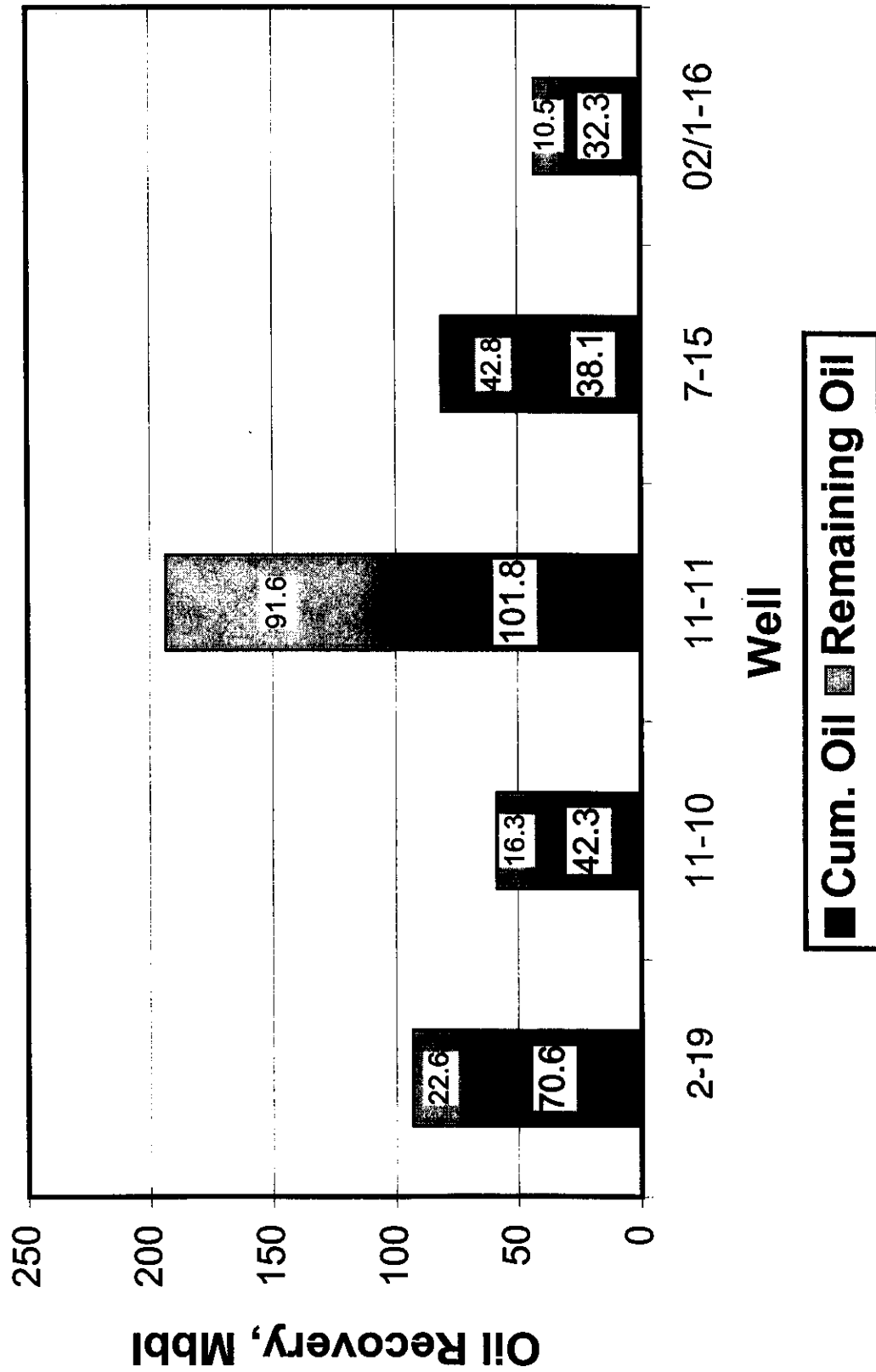
Serv 47.8%  
Two Point 20.448%/Yr

c:\data\decline\anderson\pierson\pierson.dpd  
11-Nov-99 17:08 [water injector]

DECPRO v3.11 Evaluation  
Petro-Soft Systems Ltd.

Figure 51

# Oil Recovery of Horizontal Wells Pierson Field



Cumulative average = 57.0 MBbl

Figure 52

2-29W1

2-29W1

R.29

T.2

T.2

T.1

T.1

1-29W1

1-29W1

R.29

# South Pierson Unit

## Horizontal Injector Pilot Project

- |             |                |
|-------------|----------------|
| • Oil       | ✕ Susp Oil     |
| ✕ Gas       | ✕ Susp Gas     |
| ✕ OM&Gas    | ✕ Susp OM&Gas  |
| ✕ Hvy Oil   | ✕ Susp Hvy Oil |
| ✕ Water     | ✕ Susp Loc     |
| □ Location  | ✕ Abnd Oil     |
| ✕ Gas Inj   | ✕ Abnd Gas     |
| ✕ Water Inj | ✕ Abnd OM&Gas  |
| ✕ Injection | ✕ Abnd Loc     |



**Labrador**  
A Division of Stene Stockhouse Inc.  
SINCE 1947

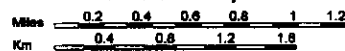
## Horizontal Injector Pilot Project Map

Projection:

Longitude / Latitude  
Longitude / Latitude (NAD 27  
for Canada)

Scale 1:50,000

Notes: Figure 53



Horizontal Injector Pilot Project Map

C:\Labuser\pierson-unit\pierson-unit.clg

February 04, 2000

Sara Michalski

Sensitivity of Permeability ( L = 800 m )

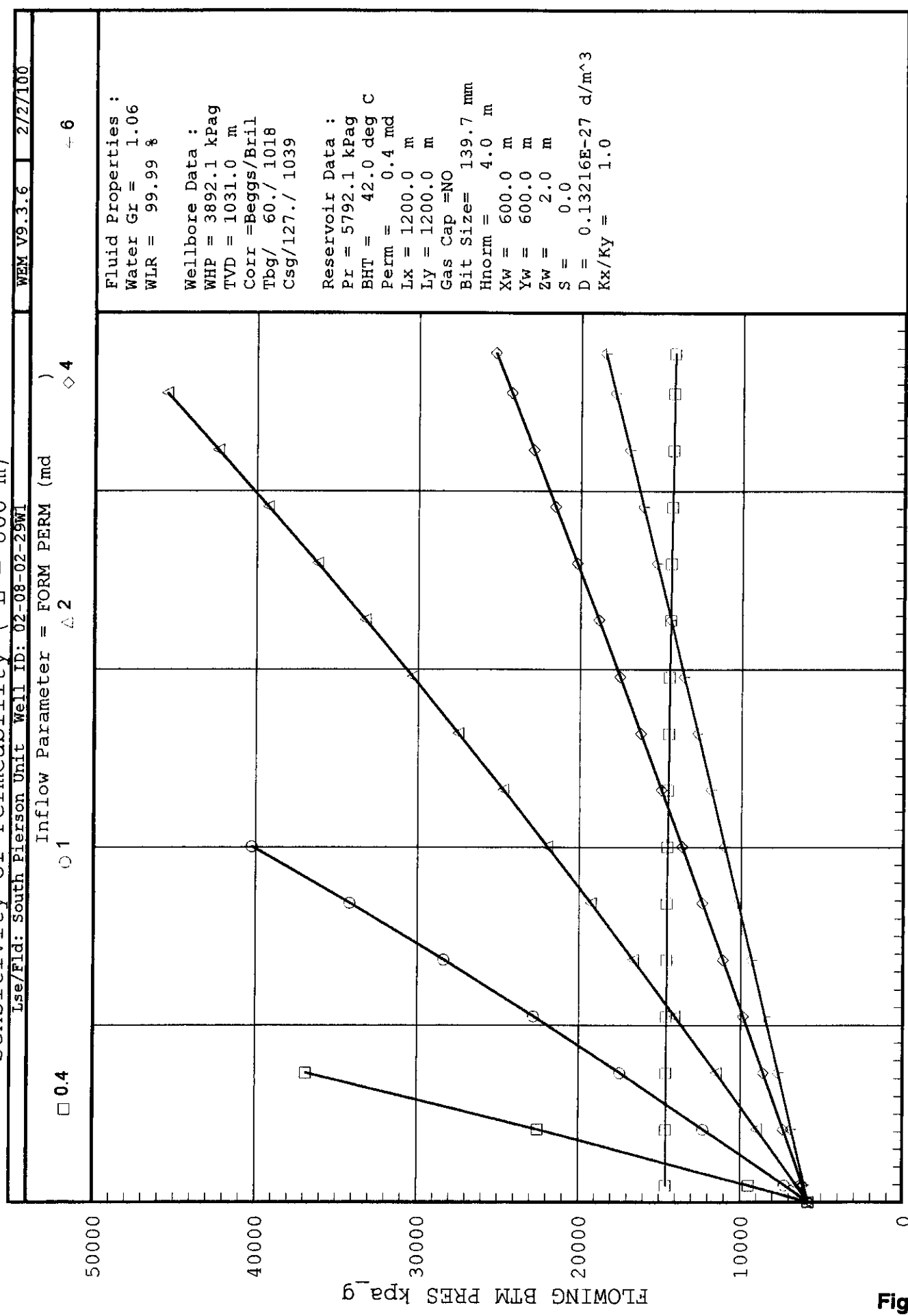


Figure 54

## APPENDICES



## **APPENDICES**

Appendix 1	Routine Core Analysis Data
Appendix 2	Flow/Buildup and Fall-off Well Test Analysis
Appendix 3	Individual Well Production/Injection Plots
Appendix 4	Hall Plots

## **Appendix 1**

Well - 07-16-002-29W1

DEPTH m	LENGTH m	Kmax mD	K90 mD	Kvert mD	Porosity	Grain Density kg/m3	Pore Vol Oil	Pore Vol Water
1028.00	1.20							
1029.20	1.20	0.08	-0.01	-0.01	0.055	2880		0.247
1030.40	0.10	2.66			0.164	2860	0.060	0.113
1030.50	0.30	0.19	0.13	0.24	0.143	2850		0.280
1030.80	0.10	3.58			0.228	2840	0.114	0.174
1030.80	0.10							
1030.90	0.10	3.58			0.228	2840	0.114	0.174
1030.90	0.10	0.47			0.191	2860		0.236
1031.00	0.10	1.16			0.119	2850	0.074	0.188
1031.20	1.10	0.11	0.05	0.07	0.124	2870		0.567
1032.30	1.50	0.06	0.06	3.13	0.064	2870		0.209
1033.80	0.30	0.01	-0.01	-0.01	0.036	2860	0.107	0.152
1034.10	0.40	1.12			0.154	2840	0.038	0.211
1034.50	0.20	3.15			0.173	2870	0.036	0.213
1034.60	0.10	0.93			0.152	2860	0.049	0.344
1034.70	0.10	2.07	2.00	1.20	0.198	2840	0.119	0.259
1034.90	0.20	0.18	0.18	0.10	0.093	2840	0.063	0.404
1035.10	1.00	-0.01	-0.01	-0.01	0.072	2820		0.259
1036.10	0.20	0.05	0.04	-0.01	0.061	2830	0.153	0.226
1036.30	0.20	-0.01	-0.01	-0.01	0.045	2860		0.343
1036.50	0.30	0.08	0.07	-0.01	0.115	2850		0.365
1036.80	0.50	3.76	0.04	7.44	0.105	2870		0.408
1037.30	0.90	-0.01	-0.01	-0.01	0.013	2820		0.298
1038.20	0.10	6.87			0.125	2810	0.083	0.182
1038.40	0.20	3.08	2.40	1.43	0.155	2790	0.061	0.397
1038.60	0.20	5.67	3.80	1.80	0.182	2720		0.378
1038.80	0.10	10.20			0.177	2700	0.058	0.275
1039.00	0.30	5.77	4.32	2.22	0.194	2760	0.024	0.351
1039.30	0.30	2.02	1.92	1.13	0.164	2740		0.392
1039.60	0.50	1.15	1.03	1.17	0.136	2710		0.486
1040.10	0.20	5.02	4.09	2.09	0.159	2740	0.025	0.294
1040.30	0.40	2.67	1.33	1.13	0.110	2770		0.175
1040.80	0.40	1.04	0.92	1.19	0.120	2800		0.246
1041.10	0.20	1.72	1.61	1.20	0.118	2830	0.079	0.270
1041.30	0.30	1.19	1.06	0.38	0.138	2760		0.395
1041.60	0.30	2.84	1.84	2.30	0.167	2740	0.032	0.492
1041.90	0.10	6.92	6.50	3.56	0.167	2740	0.049	0.443
1042.00	0.10	2.84	1.84	2.30	0.167	2740	0.032	0.492
1042.20	0.30	16.50	12.50	10.00	0.201	2720	0.024	0.349
1042.50	0.50	5.41	5.14	4.33	0.180	2720	0.025	0.373
1043.00	0.30	8.36	8.27	3.87	0.180	2710	0.023	0.424
1043.30	0.50	4.86	4.76	4.09	0.143	2720		0.267
1043.80	0.30	0.06	0.06	0.03	0.075	2870		0.294
1044.10	0.30	9.85	8.67	2.44	0.169	2740		0.407
1044.40	0.20	38.20	32.60	5.35	0.131	2770	0.053	0.384
1044.60	0.40	17.20	12.20	1.88	0.139	2760		0.339

1045.00	0.20	14.70	6.75	4.53	0.164	2750		0.507
1045.20	0.20	2.15	1.01	1.20	0.135	2770		0.398

Well - 06-16-002-29W1

DEPTH m	LENGTH m	Kmax mD	K90 mD	Kvert mD	Porosity	Grain Density kg/m3	Pore Vol Oil	Pore Vol Water
1013.00	0.30	0.75	0.59	-0.01	0.142	2690	0.072	0.722
1013.30	0.30	0.95	0.90	0.04	0.148	2680	0.275	0.470
1013.60	0.30	0.67	0.55	0.13	0.141	2710	0.162	0.684
1013.90	0.20	0.96	0.68	0.03	0.146	2700	0.123	0.686
1014.10	0.30	1.16	0.78	0.11	0.132	2690	0.206	0.589
1014.40	0.40	1.03	0.77	0.12	0.144	2700	0.146	0.708
1014.80	0.20	0.25	0.24	-0.01	0.123	2740	0.097	0.765
1015.00	0.40	0.91	0.85	0.16	0.138	2690	0.234	0.528
1015.40	0.30	0.98	0.94	0.02	0.120	2710	0.175	0.564
1015.70	0.20	0.39	0.35	-0.01	0.104	2720	0.222	0.504
1015.90	0.10	0.52			0.119	2750	0.097	0.646
1016.00	0.20	0.60	0.54	0.05	0.143	2700	0.090	0.711
1016.20	0.20	3.06	2.29	0.27	0.173	2690	0.230	0.427
1016.40	0.30	1.40	1.16	0.27	0.158	2690	0.302	0.284
1016.70	0.30	1.41	1.19	0.15	0.157	2700	0.159	0.555
1017.00	0.20	1.76	1.30	0.03	0.150	2720	0.046	0.839
1017.20	0.20	0.60	0.48	0.08	0.125	2680	0.323	0.425
1017.40	0.20	0.62	0.52	0.01	0.141	2730	0.124	0.616
1017.60	0.10	0.11			0.084	2770	0.107	0.717
1017.80	0.20	0.38	0.30	-0.01	0.128	2710	0.289	0.509
1018.00	0.30	0.69	0.49	-0.01	0.144	2700	0.089	0.787
1018.30	0.20	2.12	1.57	-0.01	0.118	2750	0.122	0.735
1018.50	0.10	1.13			0.126	2710	0.084	0.734
1018.60	0.20	0.74	0.66	0.02	0.135	2710	0.170	0.522
1018.70	0.30	1.05	0.62	0.03	0.076	2740	0.192	0.502
1019.00	0.10	4.35			0.152	2720	0.058	0.827
1019.10	0.10	2.18	1.92	0.44	0.171	2680	0.177	0.645
1019.20	0.20	3.27	2.55	0.06	0.170	2660	0.219	0.587
1019.40	0.20	0.72	0.41	0.03	0.137	2710	0.145	0.682
1019.60	0.20	0.11	0.08	-0.01	0.123	2730		0.891
1019.90	0.30	0.28	0.25	0.02	0.126	2710	0.062	0.743
1020.20	0.20	2.23	1.43	0.02	0.132	2720	0.067	0.627
1020.40	0.20	1.01	0.80	0.02	0.149	2690	0.149	0.456
1020.60	0.10	0.10			0.073	2790		0.848
1020.80	0.20	0.85	0.79	0.03	0.132	2710	0.109	0.567
1021.00	0.30	1.11	1.05	0.18	0.160	2680	0.227	0.378
1021.20	0.20	2.80	1.01	0.40	0.141	2710	0.216	0.295
1021.50	0.20	0.57	0.49	0.07	0.103	2730	0.138	0.692
1021.60	0.30	4.50	2.23	1.10	0.177	2690	0.250	0.440
1021.90	0.10	2.02	1.36	0.19	0.177	2690	0.191	0.403
1022.00	0.20	1.15	0.92	0.17	0.106	2720	0.224	0.380
1022.30	0.30	0.56	0.48	0.24	0.106	2720	0.113	0.663
1022.50	0.30	1.72	1.15	0.24	0.179	2690	0.189	0.420
1022.90	0.30	7.32	6.80	1.06	0.180	2700	0.270	0.295
1023.20	0.20	2.85	1.20	1.21	0.139	2720	0.281	0.311
1023.40	0.20	0.15	0.08	0.03	0.046	2740	0.209	0.380

1023.50	0.20	0.36	0.17	0.06	0.056	2750	0.195	0.278
1023.70	0.10	5.01	3.03	1.31	0.157	2720	0.215	0.431
1023.90	1.10							

Well - 14-17-002-29W1

DEPTH m	LENGTH m	Kmax mD	K90 mD	Kvert mD	Porosity	Grain Density kg/m3	Pore Vol Oil	Pore Vol Water
1018.00	1.10							
1019.10	0.30	2.60	2.40	0.06	0.147	2730	0.059	0.862
1019.40	2.00							
1021.40	0.30	0.64	0.53	0.03	0.124	2710	0.140	0.573
1021.70	1.70							
1023.50	0.20	24.00	1.00	0.04	0.123	2730	0.141	0.759
1023.60	0.40							
1024.00	0.20	1.00	0.65	0.03	0.120	2720	0.042	0.958
1024.30	0.20	0.92	0.79	-0.01	0.137	2710	0.148	0.762
1024.50	0.20	1.50	1.30	0.07	0.130	2710	0.244	0.615
1024.80	0.20	1.60	1.40	0.07	0.128	2690	0.248	0.625
1025.00	0.20	4.70	4.60	0.55	0.177	2710	0.245	0.502
1025.20	0.20	1.70	1.70	0.12	0.186	2730	0.249	0.382
1025.50	0.20	1.20	1.10	0.07	0.080	2740	0.181	0.611
1025.70	0.20	2.20	2.10	0.33	0.151	2720	0.096	0.324
1026.00	0.10	2.30	1.90	0.23	0.156	2730	0.204	0.499
1026.20	0.20	5.30	5.10	0.76	0.171	2720	0.186	0.455
1026.40	0.20	2.40	2.40	0.1	0.137	2760	0.232	0.357
1026.70	0.70	0.14	0.07	-0.01	0.042	2720	0.206	0.529
1027.40	0.70	2.80	2.30	0.42	0.144	2740	0.241	0.432
1028.10	0.50	2.40	2.30	0.18	0.129	2730	0.291	0.689
1028.60	0.70	3.20	1.50	0.23	0.123	2730	0.141	0.831
1029.30	0.30	0.53	0.47	0.02	0.120	2710	0.120	0.741
1029.60	0.40							
1030.00	0.20	0.60	0.46	0.03	0.116	2730	0.125	0.594
1030.20	0.50	0.80	0.80	0.04	0.140	2720	0.062	0.857
1030.70	5.40							

Well - 16-09-002-29W1

Spears Fish Formation

DEPTH m	LENGTH m	Kmax mD	K90 mD	Kvert mD	Porosity	Grain Density kg/m3	Pore Vol Oil	Pore Vol Water
1010.00	0.30	1.11			0.155	2730	0.162	0.684
1010.30	0.20	0.36			0.148	2670	0.047	0.789
1010.60	0.30	0.64			0.129	2720	0.201	0.525
1010.90	0.30	0.75			0.139	2720	0.301	0.397
1011.10	0.30	0.40			0.149	2720	0.203	0.473
1011.40	0.20	0.37			0.137	2750	0.038	0.808
1011.60	0.20	0.27			0.136	2750	0.095	0.734
1011.70	0.20	1.04			0.143	2730	0.256	0.449
1012.00	0.30	0.63			0.146	2720	0.079	0.726
1012.30	0.20	0.34			0.116	2740	0.117	0.670
1012.50	0.20	0.41			0.136	2740		0.874
1012.70	0.30	0.51			0.145	2730	0.133	0.684
1013.00	0.30	0.77			0.128	2730	0.281	0.492
1013.30	0.20	0.36			0.098	2740	0.315	0.368
1013.50	0.20	0.62			0.180	2720	0.185	0.573
1013.70	0.30	0.95			0.159	2700	0.259	0.456
1014.00	0.30	0.29			0.145	2720	0.079	0.673
1014.30	0.40	0.62			0.143	2710	0.157	0.660
1014.70	0.30	0.75			0.149	2710	0.159	0.552
1015.00	0.20	0.21			0.138	2750		0.878
1015.20	0.30	0.36			0.120	2730	0.142	0.563
1015.50	0.20	0.51			0.136	2740	0.062	0.780
1015.70	0.20	0.21			0.108	2770	0.098	0.702
1016.00	0.20	2.77			0.145	2710	0.149	0.565
1016.20	0.20	0.55			0.128	2720	0.203	0.533
1016.40	0.30	0.77			0.149	2720	0.225	0.573
1016.70	0.30	0.80			0.156	2710	0.135	0.635
1017.00	0.30	0.34			0.130	2740	0.112	0.640
1017.20	0.30	0.37			0.066	2840	0.164	0.659
1017.50	0.20	0.08			0.131	2750		0.831
1017.70	0.10	1.18			0.152	2710	0.044	0.754
1017.80	0.10	0.10			0.119	2730	0.117	0.665
1018.00	0.20	1.28			0.154	2690	0.148	0.562
1018.20	0.20	0.83			0.143	2700	0.212	0.429
1018.40	0.20	1.93			0.158	2700	0.244	0.429
1018.60	0.20	0.92			0.197	2780	0.155	0.452
1018.80	0.10	1.57			0.188	2690	0.241	0.441
1018.90	0.10	0.83			0.182	2700	0.205	0.371
1019.00	0.10	2.04			0.186	2700	0.254	0.388
1019.20	0.20	9.73			0.185	2700	0.277	0.394
1019.30	0.20	1.37			0.111	2740	0.181	0.312
1019.50	0.10	1.38			0.098	2730	0.165	0.432
1019.60	0.10	4.38			0.196	2700	0.265	0.356
1019.70	0.20	4.55			0.163	2710	0.244	0.472
1020.00	0.20	23.00			0.209	2690	0.254	0.448
1020.20	0.10	0.09			0.069	2750	0.237	0.460



1020.30	0.20	0.19			0.042	2790	0.269	0.298
1020.50	0.20	0.29			0.051	2760	0.288	0.306
1020.80	0.10	0.23			0.054	2760	0.214	0.332
1020.90	0.20	0.23			0.054	2750	0.250	0.377
1021.10	0.20	0.22			0.104	2760	0.172	0.256
1021.30	0.20	2.47			0.186	2700	0.231	0.407
1021.50	0.20	2.43			0.136	2720	0.260	0.418
1021.70	0.20	3.61			0.151	2720	0.204	0.358
1021.90	0.20	0.94			0.158	2700	0.252	0.302
1022.10	0.20	1.81			0.176	2700	0.186	0.530
1022.40	0.20	0.33			0.147	2710	0.134	0.409
1022.60	0.20	0.55			0.135	2720	0.158	0.553
1022.80	0.30	0.37			0.121	2750	0.116	0.438
1023.10	0.30	0.10			0.099	2770	0.064	0.712
1023.40	0.20	0.17			0.053	2800	0.088	0.584
1023.70	0.30	1.32			0.159	2720	0.187	0.316
1023.90	0.20	2.47			0.164	2720	0.182	0.501
1024.20	0.10	1.50			0.165	2710	0.164	0.418
1024.30	0.20	0.07			0.131	2730	0.128	0.622
1024.50	0.30	0.91			0.143	2720	0.202	0.555
1024.90	0.20	0.18			0.112	2750	0.178	0.515
1025.10	0.30	0.51			0.139	2710	0.094	0.700
1025.40	0.20	0.13			0.116	2750	0.068	0.727
1025.60	0.20	0.12			0.107	2740		0.545
1025.80	0.20	0.14			0.070	2780	0.055	0.641
1026.00	0.30	0.22			0.087	2760	0.078	0.462
1026.30	0.10	1.04			0.138	2790	0.063	0.675
1026.50	0.30	0.25			0.098	2790	0.067	0.709
1026.80	0.40	0.02			0.078	2780		0.844
1027.10	0.20	0.35			0.114	2740		0.685
1027.30	0.20	0.31			0.114	2730		0.686
1027.60	0.20	0.03			0.058	2770		0.563
1027.70	0.30	0.52			0.131	2730		0.738
1028.00	0.10	0.28			0.025	2740		0.797
1028.10	0.10	0.03	0.02	0.01	0.070	2770		0.765
1028.20	0.10	0.02	0.01	-0.01	0.085	2800		0.911
1028.30	0.10	0.08			0.068	2830		0.903
1028.50	0.30	-0.01	-0.01	-0.01	0.068	2760		0.845
1028.70	0.10	0.03			0.030	2870		0.781
1028.80	0.20	0.78	0.65	0.02	0.049	2860	0.203	0.315
1029.00	0.30	0.59	0.14	0.03	0.032	2860		0.195
1029.20	0.10	0.02	0.01	-0.01	0.058	2790		0.687
1029.40	0.20	0.01	-0.01	-0.01	0.031	2790		0.823
1029.60	0.10	0.08			0.059	2810	0.109	0.549
1029.70	0.10	0.33	0.31	0.19	0.064	2820	0.189	0.632
1029.80	0.20	6.22	5.53	0.02	0.118	2860	0.156	0.291
1030.00	0.30	0.03	0.03	0.01	0.043	2750		0.716
1030.30	0.20	0.03	0.02	-0.01	0.041	2750		0.768
1030.50	0.20	0.01	0.01	-0.01	0.034	2750		0.575
1030.70	0.10	0.36			0.076	2730	0.094	0.525
1030.80	0.10	0.12	0.08	0.2	0.054	2740		0.801
1030.90	0.30	0.05	0.03	0.12	0.037	2750	0.098	0.408

1031.20	0.20	0.04	0.03	0.04	0.056	2730	0.101	0.424
1031.40	0.10	1.08			0.114	2730	0.082	0.643
1031.50	0.10	0.35	0.23	0.32	0.084	2750		0.812
1031.60	0.10	0.13	0.07	0.06	0.066	2770		0.536
1031.70	0.10	0.42	0.14	0.14	0.071	2750	0.073	0.614
1031.90	0.10	0.71			0.107	2720	0.047	0.579
1032.00	0.10	2.95	2.07	0.42	0.121	2750	0.056	0.656
1032.10	0.20	0.50	0.41	0.27	0.094	2740	0.075	0.543
1032.30	0.10	0.25			0.114	2730	0.042	0.705
1032.30	0.20	1.03	0.8	0.26	0.107	2750		0.571
1032.50	0.10	1.29	1.17	0.35	0.114	2750	0.061	0.687
1032.70	0.10	0.95			0.115	2760		0.736
1032.80	0.10	0.29	0.28	0.23	0.124	2760	0.050	0.605
1032.90	0.20	2.44	2.35	0.57	0.128	2750	0.074	0.437
1033.10	0.10	3.54			0.122	2760	0.047	0.594
1033.10	0.10	1.26	0.82	0.83	0.117	2750	0.054	0.742
1033.30	0.10	0.20	0.19	0.09	0.096	2760	0.078	0.478
1033.40	0.20	2.09	1.69	0.48	0.140	2740	0.074	0.480
1033.60	0.10	2.84			0.173	2730	0.062	0.594
1033.70	0.20	1.30	1.25	0.22	0.136	2790	0.070	0.569
1033.90	0.20	0.36	0.3	0.13	0.139	2770	0.094	0.444
1034.10	0.20	1.81	1.12	0.13	0.157	2770	0.054	0.528
1034.30	0.10	3.71			0.172	2780	0.095	0.484
1034.30	0.10		1.28		0.170	2760	0.061	0.446
1034.50	0.20	18.80	7.97	12.4	0.164	2760	0.080	0.402
1034.70	0.20	0.19	0.16	0.08	0.099	2760	0.032	0.455
1034.90	0.10	0.15			0.134	2740	0.082	0.497
1035.00	0.20	1.95	1.61	0.2	0.114	2760	0.056	0.578
1035.20	0.20	0.04	0.02	0.03	0.068	2780	0.039	0.614
1035.40	0.20	0.08	0.07	0.04	0.062	2810		0.711
1035.60	0.00							
1035.70	0.10	0.18	0.16	0.18	0.087	2820		0.756
1035.80	0.20	0.54			0.090	2830		0.648
1036.00	0.20	0.04	0.04	-0.01	0.057	2810		0.743
1036.20	0.10	0.05			0.052	2830		0.860
1036.30	0.30	0.10	0.07	0.06	0.068	2790		0.846
1036.60	0.10	0.15	0.15	0.09	0.094	2770		0.794
1036.70	0.20	0.18	0.18	0.1	0.088	2780		0.753
1036.90	0.10	0.06			0.057	2780		0.794
1037.00	0.30	0.08	0.07	0.05	0.063	2790		0.814
1037.30	0.30	0.06	0.05	0.03	0.089	2900		0.748
1037.60	0.30	0.06	0.05	0.03	0.078	2780		0.842
1037.80	0.20	0.18	0.07	0.11	0.086	2760		0.777
1038.00	0.10	0.05			0.059	2750		0.890
1038.10	0.40	0.25	0.16	0.04	0.071	2750		0.844

Alida Formation

1038.50	0.20	57.60	38.7	47.2	0.129	2890	0.410	0.134
1038.70	0.10	12.20			0.095	2860	0.147	0.376
1038.80	0.40	1.41	0.45	0.41	0.076	2860	0.187	0.302
1039.20	0.10	23.80			0.128	2860	0.181	0.388
1039.20	0.10	3.74	3.48	1.35	0.074	2870	0.110	0.308

1039.40	0.20	35.20	34.6	27.2	0.148	2870	0.151	0.247
1039.60	0.40	3.25	0.57	0.4	0.063	2860	0.166	0.328
1040.00	0.10	17.00			0.144	2860	0.149	0.404
1040.20	0.40	0.59	0.33	0.17	0.058	2860		0.561
1040.50	0.10	7.13	2.27	9.93	0.097	2860	0.101	0.506
1040.70	0.10							
1040.70	0.20	1.28			0.083	2850	0.119	0.509
1040.90	0.30	0.44	0.19	0.11	0.085	2890	0.075	0.524
1041.20	0.30	0.88	0.59	0.13	0.119	2880	0.028	0.636
1041.50	0.10	0.52			0.172	2860	0.101	0.545
1041.60	0.20	0.52			0.172	2860	0.101	0.545
1041.80	0.20	1.83	1.17	-0.01	0.048	2870	0.084	0.461
1042.10	0.20	1.83	1.17	-0.01	0.048	2870	0.084	0.461
1042.30	0.70							

Well - 16-04-002-29W1

DEPTH m	LENGTH m	Kmax mD	K90 mD	Kvert mD	Porosity	Grain Density kg/m3	Pore Vol Oil	Pore Vol Water
1022.00	0.20	1.20	1.07	0.05	0.158	2720	0.090	0.614
1022.20	0.10	0.79			0.157	2730	0.107	0.593
1022.40	0.20	0.52	0.51	0.01	0.145	2750	0.034	0.819
1022.60	0.10	1.41			0.147	2720	0.176	0.501
1022.70	0.20	1.10	1.01	0.05	0.117	2720	0.109	0.538
1022.90	0.10	0.26			0.136	2760		0.887
1023.00	0.30	0.50	0.42	0.03	0.117	2740	0.164	0.705
1023.30	0.10	0.39			0.149	2720	0.049	0.758
1023.50	0.30	0.44	0.38	0.04	0.130	2730		0.899
1023.80	0.10	0.36			0.142	2760		0.941
1023.90	0.10	0.42			0.120	2730	0.117	0.648
1024.00	0.20	1.75	1.75	0.19	0.121	2730	0.145	0.522
1024.20	0.10	1.08			0.136	2720	0.191	0.333
1024.30	0.20	0.34	0.32	0.02	0.062	2770	0.176	0.282
1024.50	0.20	1.56	1.42	0.1	0.120	2720	0.256	0.380
1024.70	0.10	0.46			0.146	2730	0.085	0.732
1024.80	0.20	1.44	1.13	0.07	0.141	2720	0.160	0.450
1025.10	0.10	0.48			0.118	2770	0.058	0.841
1025.20	0.20	0.32	0.3	0.03	0.116	2740		0.924
1025.40	0.10	0.30			0.122	2750	0.076	0.728
1025.50	0.10	0.40			0.138	2720	0.101	0.695
1025.70	0.20	1.04	0.85	0.02	0.100	2780	0.093	0.512
1025.90	0.30	0.49	0.34	0.02	0.121	2720	0.054	0.800
1026.20	0.10	0.57			0.134	2720	0.161	0.545
1026.30	0.20	1.10	1.02	0.26	0.122	2710	0.154	0.388
1026.50	0.10	0.64			0.120	2740	0.214	0.418
1026.70	0.20	1.10	0.51	0.21	0.120	2730		0.766
1026.90	0.30	1.74	1.31	0.15	0.160	2690	0.194	0.442
1027.20	0.10	1.99			0.124	2720	0.178	0.341
1027.30	0.10	0.53	0.38	0.06	0.072	2740	0.164	0.470
1027.50	0.10	0.84			0.126	2730	0.104	0.552
1027.60	0.20	0.85	0.37	0.12	0.076	2730	0.154	0.452
1027.80	0.30	2.22	0.93	0.35	0.139	2710	0.144	0.480
1028.10	0.10	2.12			0.134	2730	0.171	0.440
1028.20	0.10	1.06			0.104	2750	0.145	0.410
1028.40	0.30	0.03	0.03	-0.01	0.043	2760	0.120	0.368
1028.70	0.10	1.16	0.67	0.18	0.061	2760	0.155	0.294
1028.80	0.10	0.51			0.055	2770	0.172	0.329
1028.90	0.20	0.16	0.16	0.04	0.040	2760		0.650
1029.20	0.20	7.92	6.46	2.38	0.121	2730	0.177	0.422
1029.40	0.10	4.56			0.158	2730	0.228	0.649
1029.50	0.20	6.76	6.22	2.19	0.167	2700	0.121	0.537
1029.80	0.20	1.20	0.67	0.24	0.130	2730	0.117	0.604
1030.00	0.10	0.62			0.123	2750	0.119	0.428
1030.10	0.20	2.76	1.74	0.27	0.165	2710	0.139	0.592
1030.40	0.10	1.47			0.147	2740	0.113	0.669

1030.50	0.20	1.94	1.23	0.35	0.148	2710	0.082	0.550
1030.70	0.30	0.42	0.31	0.02	0.118	2720	0.154	0.553
1031.00	0.10	0.42			0.131	2720	0.129	0.573
1031.10	0.10	0.51			0.127	2730	0.061	0.801
1031.20	0.10	0.57	0.36	0.07	0.117	2710	0.124	0.693
1031.40	0.20	0.59	0.28	0.03	0.110	2740	0.062	0.745
1031.50	0.10	0.17			0.125	2750		0.853
1031.70	0.40							

Well - 14-09-002-29W1

DEPTH m	LENGTH m	Kmax mD	K90 mD	Kvert mD	Porosity	Grain Density kg/m3	Pore Vol Oil	Pore Vol Water
1022.00	0.10	3.29			0.190	2880		0.870
1022.10	0.10	0.85			0.153	2730	0.121	0.698
1022.20	0.10	1.04			0.139	2740	0.127	0.511
1022.30	0.10	0.05			0.034	2900		0.918
1022.40	0.10	0.19			0.152	2770		0.859
1022.50	0.10	2.86			0.221	2720	0.159	0.536
1022.60	0.10	1.24			0.155	2740	0.147	0.644
1022.70	0.20	5.11			0.164	2720	0.246	0.478
1022.90	0.10	1.77			0.151	2720	0.263	0.463
1023.00	0.20	6.85			0.164	2740	0.229	0.412
1023.10	0.10	4.43			0.191	2710	0.220	0.560
1023.20	0.20	1.19			0.176	2710	0.212	0.409
1023.40	0.10	1.08			0.179	2730	0.229	0.553
1023.50	0.10	3.31			0.191	2710	0.248	0.354
1023.60	0.10	2.96			0.191	2720	0.252	0.316
1023.80	0.10	14.10			0.174	2720	0.295	0.416
1023.90	0.10	0.90			0.140	2730	0.200	0.540
1024.00	0.10	0.31			0.084	2750	0.231	0.450
1024.10	0.10	1.01			0.098	2780	0.176	0.384
1024.20	0.10	1.16			0.125	2800	0.192	0.419
1024.30	0.10	4.09			0.160	2730	0.187	0.414
1024.40	0.10	19.80			0.228	2710	0.195	0.381
1024.60	0.10	19.00			0.200	2730	0.221	0.577
1024.70	0.10	5.66			0.091	2770	0.206	0.142
1024.80	0.10	13.30			0.183	2720	0.280	0.400
1025.00	0.10	1.09			0.125	2750	0.246	0.313
1025.10	0.10	2.55			0.122	2730	0.260	0.375
1025.20	0.20	0.24			0.047	2760	0.316	0.306
1025.40	0.10	0.84			0.067	2760	0.270	0.467
1025.50	0.10	2.46			0.124	2760	0.212	0.333
1025.60	0.10	19.90			0.150	2740	0.224	0.304
1025.70	0.10	34.70			0.200	2730	0.237	0.407
1025.90	0.10	12.90			0.133	2750	0.196	0.376
1026.00	0.10	10.80			0.177	2720	0.182	0.355
1026.10	0.10	5.30			0.200	2720	0.221	0.435
1026.20	0.10	2.41			0.184	2720	0.195	0.398
1026.30	0.20	0.79			0.148	2730	0.219	0.417
1026.50	0.10	1.81			0.203	2730	0.148	0.621
1026.60	0.10	0.83			0.165	2720	0.137	0.579
1026.80	0.10	0.59			0.151	2720	0.179	0.522
1026.90	0.20	35.00			0.171	2700	0.201	0.559
1027.10	0.10	0.59			0.157	2720	0.134	0.667
1027.20	0.10	0.68			0.105	2730	0.062	0.744
1027.30	0.10	0.30			0.102	2770	0.162	0.522
1027.50	0.10	0.42			0.131	2750	0.126	0.686
1027.60	0.20	0.21			0.141	2760	0.063	0.791

1027.80	0.10	0.19			0.093	2780	0.156	0.618
1027.90	0.20	0.16			0.093	2770	0.121	0.589
1028.10	0.10	0.41			0.109	2750	0.127	0.654
1028.20	0.10	0.24			0.145	2720	0.155	0.594
1028.30	0.10	1.15			0.166	2710	0.158	0.579
1028.40	0.10	2.06			0.153	2730	0.228	0.550
1028.50	0.30	1.47			0.158	2710	0.074	0.820
1028.70	0.10	0.58			0.143	2740	0.116	0.719
1028.80	0.20	1.01			0.140	2760	0.229	0.354
1029.00	0.10	0.58			0.135	2750	0.227	0.476
1029.10	0.20	2.81			0.148	2720	0.049	0.749
1029.30	0.20	0.19			0.143	2720	0.083	0.766
1029.50	0.10	0.22			0.118	2740	0.050	0.857
1029.60	0.10	0.11			0.128	2720	0.113	0.742
1029.70	0.20	0.09			0.122	2750		0.886
1029.90	0.10	0.16			0.130	2740		0.910
1030.00	0.20	0.07			0.085	2760		0.798
1030.20	0.10	1.67			0.144	2720	0.095	0.606
1030.30	0.10	1.41			0.155	2720	0.102	0.570
1030.50	0.20	0.41			0.086	2760	0.155	0.433
1030.60	0.10	1.23			0.147	2720	0.144	0.631
1030.70	0.10	1.32			0.148	2720	0.138	0.546
1030.90	0.20	0.28			0.077	2780	0.171	0.477
1031.00	0.10	0.65			0.070	2800	0.089	0.693
1031.20	0.20	1.01			0.138	2730	0.082	0.651
1031.30	0.10	0.16			0.104	2760	0.075	0.800
1031.50	0.20	0.21			0.135	2720	0.047	0.720
1031.70	0.20	1.05			0.149	2720	0.054	0.728
1031.90	0.10	1.86			0.143	2710	0.080	0.652
1032.00	0.20	0.77			0.136	2720	0.095	0.652
1032.20	0.20	0.24			0.096	2770	0.053	0.558
1032.30	0.10	0.19			0.085	2760	0.049	0.726
1032.40	0.20	0.71			0.118	2740	0.072	0.724
1032.60	0.10	0.49			0.118	2720	0.102	0.637
1032.70	0.20	0.65			0.147	2710		0.721
1033.00	0.10	0.56			0.147	2720		0.767
1033.10	0.30	0.46			0.126	2770		0.928
1033.40	0.10	0.16			0.092	2770		0.829
1033.50	0.10	0.36			0.098	2750		0.799
1033.60	0.10	-0.01			0.074	2770		0.844
1033.70	0.10	0.08			0.097	2760		0.829
1033.80	0.10	-0.01			0.039	2870	0.152	0.636
1033.90	0.50	-0.01	-0.01	-0.01	0.010	2870		0.781
1034.50	0.10	-0.01			0.044	2720		0.845
1034.60	0.30	-0.01	-0.01	-0.01	0.034	2740		0.752
1034.90	0.20	0.12	0.11	-0.01	0.091	2720		0.778
1035.10	0.10	0.08			0.076	2770	0.055	0.734
1035.20	0.50	0.07	0.06	-0.01	0.075	2740		0.785
1035.60	0.10	0.19			0.106	2750	0.071	0.453
1035.80	0.30	-0.01	-0.01	-0.01	0.016	2780		0.679
1036.10	0.10	0.06			0.020	2760		0.726
1036.20	0.10	12.70			0.112	2710	0.120	0.416

1036.30	0.30	2.64	2.45	0.61	0.147	2710	0.105	0.670
1036.60	0.10	1.63			0.098	2740	0.115	0.582
1036.70	0.30	3.31	1.35	0.89	0.109	2710	0.125	0.386
1036.90	0.10	0.22			0.100	2710	0.073	0.611
1037.00	0.20	0.09	0.08	-0.01	0.079	2710	0.078	0.569
1037.30	0.20	0.28	0.14	0.24	0.095	2720	0.056	0.631
1037.50	0.10	0.08			0.033	2760	0.089	0.711
1037.60	0.20	0.59	0.1	2.59	0.103	2710		0.883
1037.80	0.10	0.07			0.082	2750		0.836
1037.90	0.30		0.1		0.102	2720		0.767
1038.20	0.20	0.28	0.23	0.19	0.104	2750		0.877
1038.30	0.10	0.16			0.105	2710		0.822
1038.50	0.30	1.59	1.53	1.57	0.140	2710		0.829
1038.70	0.10	0.30	0.3	0.19	0.112	2730	0.035	0.803
1038.90	0.10	0.26			0.133	2700	0.036	0.765
1039.00	0.30	0.39	0.38	0.35	0.128	2730	0.037	0.652
1039.30	0.70							
1040.00	0.20	3.85	2.78	1.73	0.146	2720	0.058	0.589
1040.20	0.10	13.50			0.177	2720	0.045	0.655
1040.20	0.20	35.70	6.37	2.18	0.157	2720	0.031	0.658
1040.40	0.20	4.46	3.52	1.22	0.153	2740	0.043	0.564
1040.60	0.10	0.31			0.121	2740	0.048	0.662
1040.70	0.20	3.08	2.79	1.83	0.150	2760		0.792
1040.90	0.10	5.94	3.38	0.62	0.147	2760	0.056	0.593
1041.10	0.10	6.44	4.65	3.6	0.166	2760	0.042	0.657
1041.20	0.10	0.46			0.116	2740	0.038	0.632
1041.30	0.20	12.00	11.3	8.11	0.152	2770	0.071	0.499
1041.50	0.20	21.90	18.7	6.05	0.147	2740	0.076	0.595
1041.60	0.20	4.52	3.39	0.83	0.104	2760	0.063	0.617
1041.80	0.10	18.90			0.110	2720	0.071	0.592
1041.90	0.10	0.38			0.125	2740	0.034	0.544
1042.00	0.10	0.09			0.036	2840		0.589
1042.20	0.20	0.96			0.084	2750	0.085	0.512
1042.30	0.10	0.11			0.051	2820		0.729
1042.40	0.10	0.21			0.085	2780		0.749
1042.50	0.10	1.49			0.101	2810	0.079	0.538
1042.60	0.20	0.15	0.07	0.04	0.062	2750	0.108	0.690
1042.80	0.20	0.55	0.37	0.2	0.094	2810		0.744
1043.00	0.10	0.44	0.22	0.52	0.103	2750	0.049	0.697
1043.10	0.20	2.39	0.22	0.81	0.094	2730		0.811
1043.30	0.20	0.70	0.64	0.31	0.130	2760	0.050	0.657
1043.50	0.10	0.37			0.100	2770	0.037	0.681
1043.50	0.10	0.93	0.75	0.21	0.098	2750		0.824
1043.70	0.20	0.14	0.12	0.07	0.085	2730	0.078	0.717
1043.90	0.20	5.31	1.89	1.93	0.127	2740	0.071	0.455
1044.10	0.10	0.52			0.105	2750	0.043	0.728
1044.20	0.20	9.10	8.5	1.17	0.149	2750	0.058	0.622
1044.40	0.20	29.50	24.5	2.79	0.174	2750		0.737
1044.60	0.20	30.70	29.4	4.6	0.178	2760	0.127	0.361
1044.70	0.10	45.40			0.189	2740	0.061	0.606
1044.80	0.20	63.20	39.1	67.5	0.187	2750	0.095	0.478
1045.00	0.10	7.77	5.95	3.73	0.160	2760	0.076	0.515

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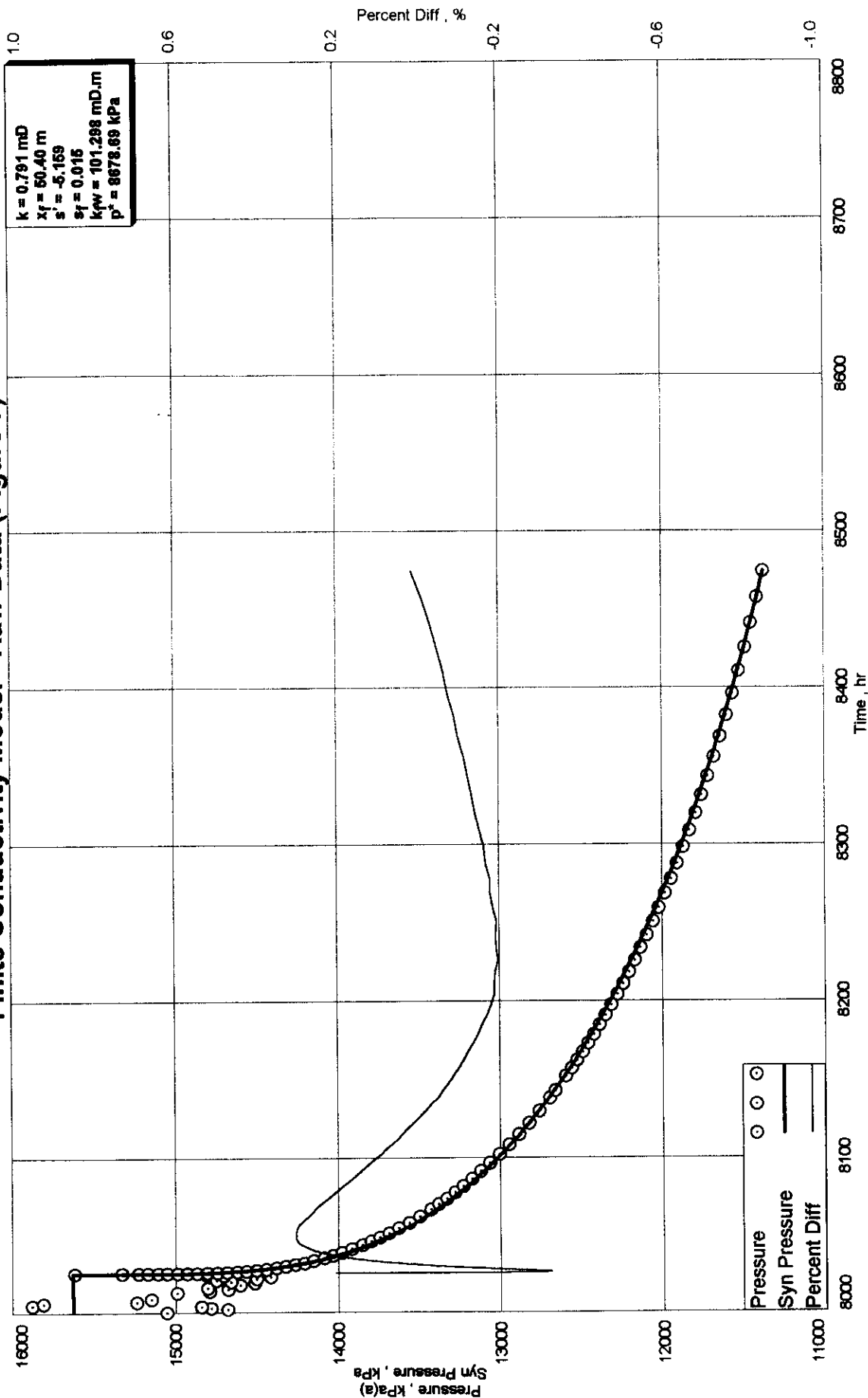


1045.10	0.10	258.00			0.211	2730	0.112	0.450
1045.20	0.20	24.50	17.2	4.09	0.157	2770	0.074	0.553
1045.40	0.10	1.49	0.7	0.42	0.106	2790		0.746
1045.50	0.20	8.69	8.69	0.71	0.137	2790	0.069	0.754
1045.80	0.10							
1045.90	0.10	0.33			0.148	2840	0.126	0.533
1046.00	0.20	1.64	1.01	0.06	0.060	2840	0.091	0.583
1046.20	0.20	0.87	0.77	0.12	0.105	2850		0.783
1046.30	0.10	0.33			0.083	2840	0.040	0.741
1046.40	0.20	2.11	1.42	0.56	0.152	2840		0.802
1046.70	0.20	5.54	0.07	0.86	0.073	2810	0.067	0.672
1046.90	0.10	0.18			0.083	2770		0.765
1047.00	0.10	12.60			0.114	2730	0.126	0.515
1047.10	0.30	7.89	6.79	1.53	0.108	2740	0.148	0.302
1047.30	0.10	0.27			0.074	2730	0.114	0.433
1047.50	0.20	17.40	15	4.54	0.133	2720	0.096	0.495
1047.70	0.20	29.30	12.9	0.77	0.134	2730	0.056	0.797
1047.90	0.10	52.20			0.146	2710	0.118	0.503
1048.00	0.20	30.00	25.4	7.5	0.147	2720	0.111	0.526
1048.20	0.20	747.00	32.8	1260	0.166	2730	0.091	0.490
1048.40	0.20	121.00			0.191	2700	0.116	0.452
1048.50	0.20	55.40	42	15	0.138	2740	0.104	0.521
1048.70	0.10	2810.00			0.198	2710	0.120	0.445
1048.80	0.10	200.00	173	17.6	0.217	2720	0.127	0.457
1049.00	0.10	116.00			0.195	2710	0.106	0.591
1049.10	0.20	319.00	161	19.3	0.206	2730	0.098	0.286
1049.20	0.10	222.00	110	16.4	0.257	2760	0.101	0.474
1049.30	0.20	76.20	66.1	12.4	0.219	2750	0.101	0.449
1049.50	0.20	310.00	213	196	0.228	2720	0.100	0.479
1049.70	0.10	553.00			0.183	2700	0.142	0.509
1049.80	0.20	50.30			0.222	2720	0.059	0.561
1050.00	0.10	144.00	114	51.8	0.225	2730	0.067	0.538
1050.10	0.20	64.40	36.7	15.6	0.188	2720	0.049	0.485
1050.30	0.20	43.60	10.1	22.7	0.195	2720	0.085	0.461
1050.50	0.10	0.81			0.166	2730		0.703
1050.70	0.20	47.60	25.7	16.3	0.115	2740	0.059	0.591
1050.80	0.20	1.29	1.18	0.58	0.141	2770		0.725
1051.00	0.20	0.78			0.126	2710	0.069	0.691
1051.20	0.10	196.00			0.163	2740	0.072	0.720
1051.30	0.10	3.91			0.139	2720		0.798
1051.50	0.20	0.29	0.29	0.16	0.088	2790		0.725
1051.70	0.10	0.12			0.071	2770		0.852
1051.80	0.10	0.90			0.091	2840		0.827
1051.90	0.20							
1052.10	5.90							

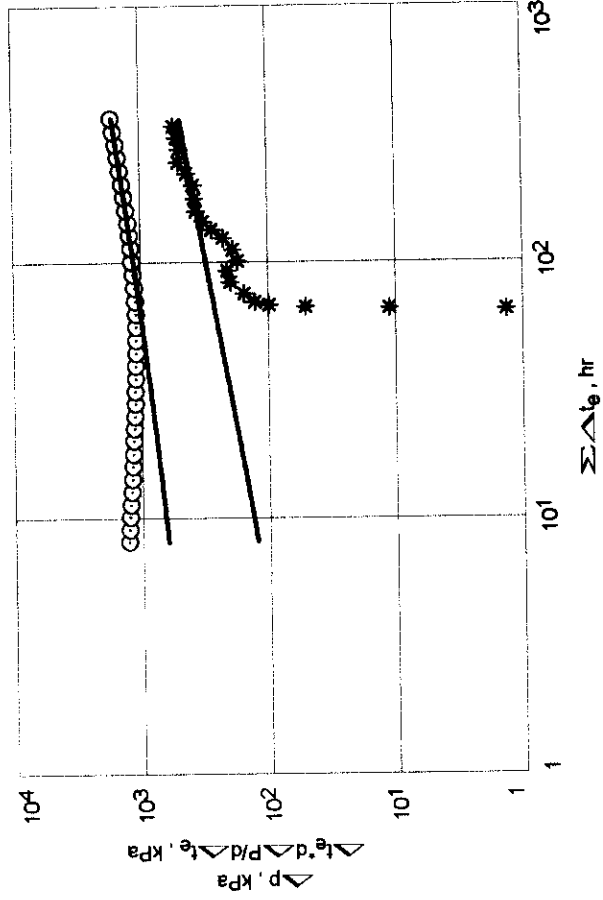
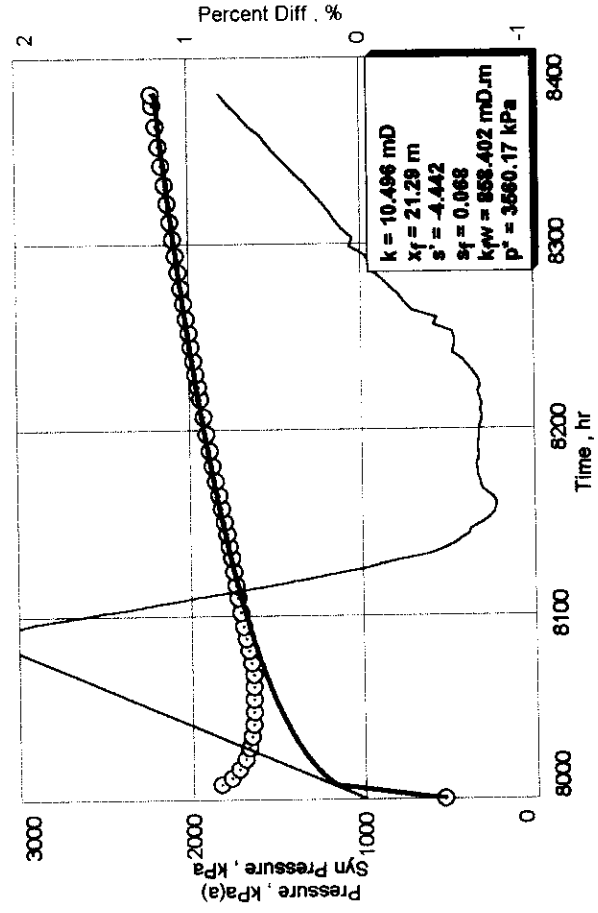
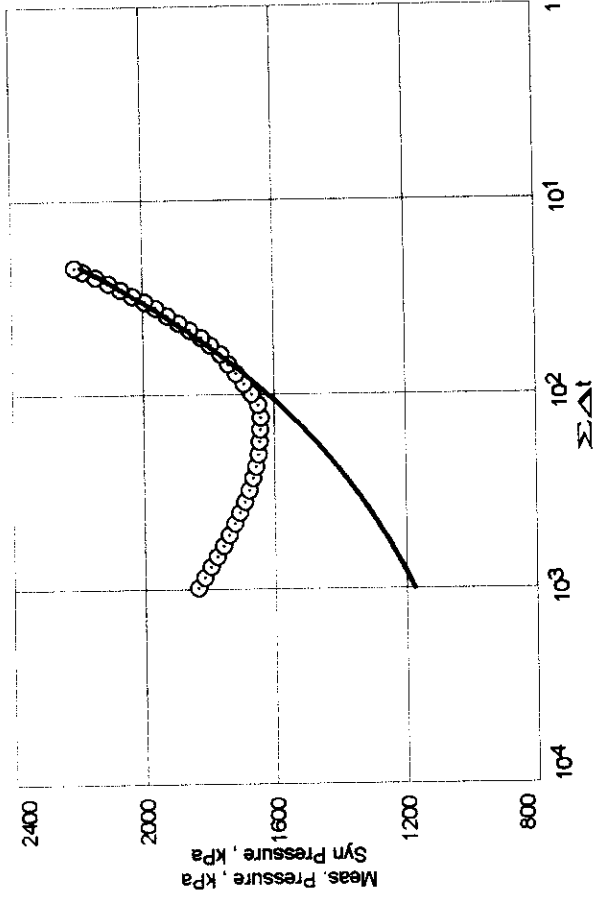
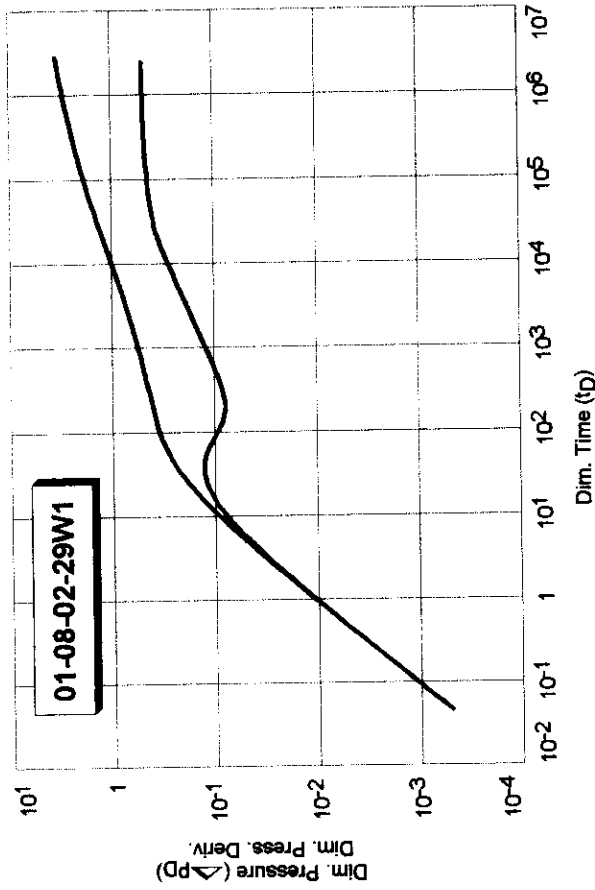
## **Appendix 2**

Home Pierson 16-05-02-29W1  
 Spearfish (1023.5-28.5, 1029-34)  
 Fall-off Test  
 Dec. 10 - 29, 1999

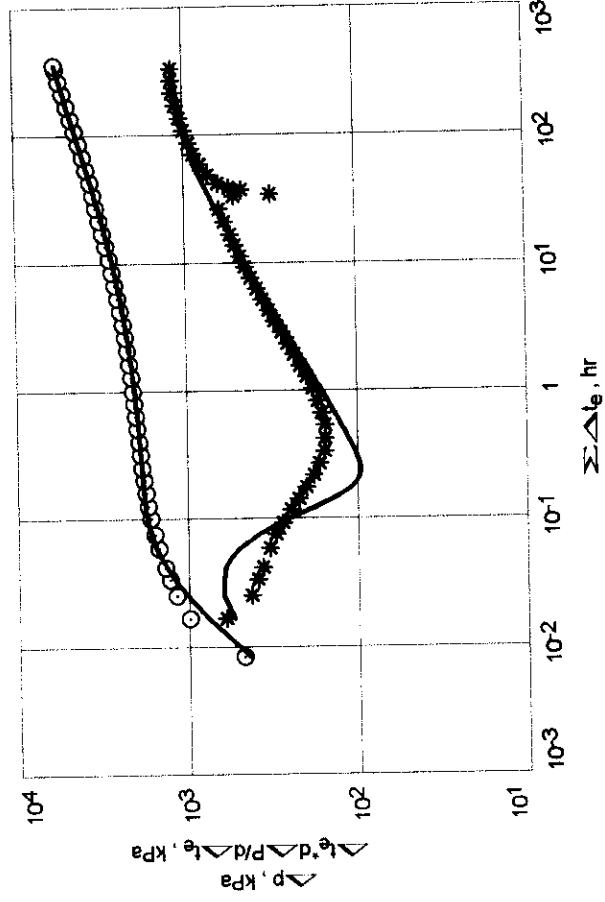
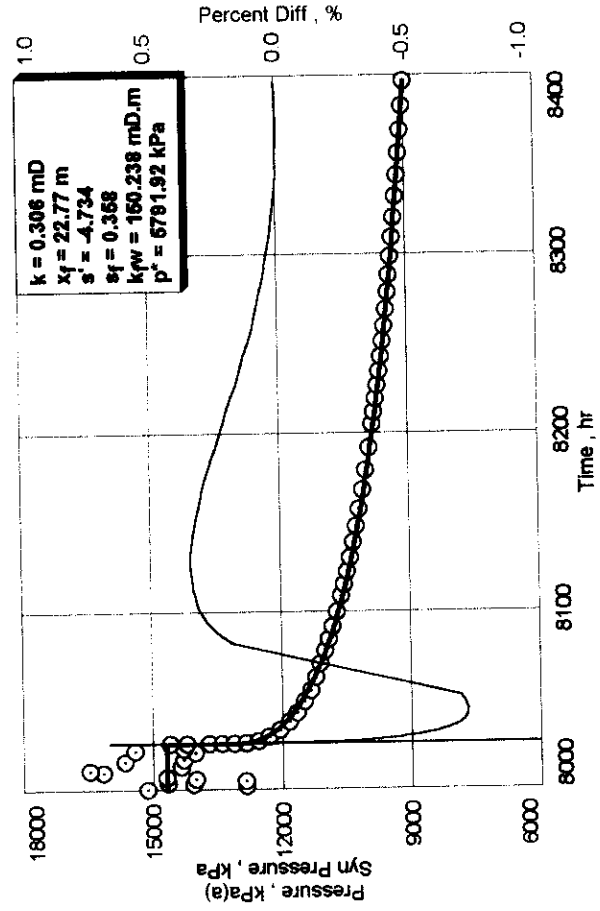
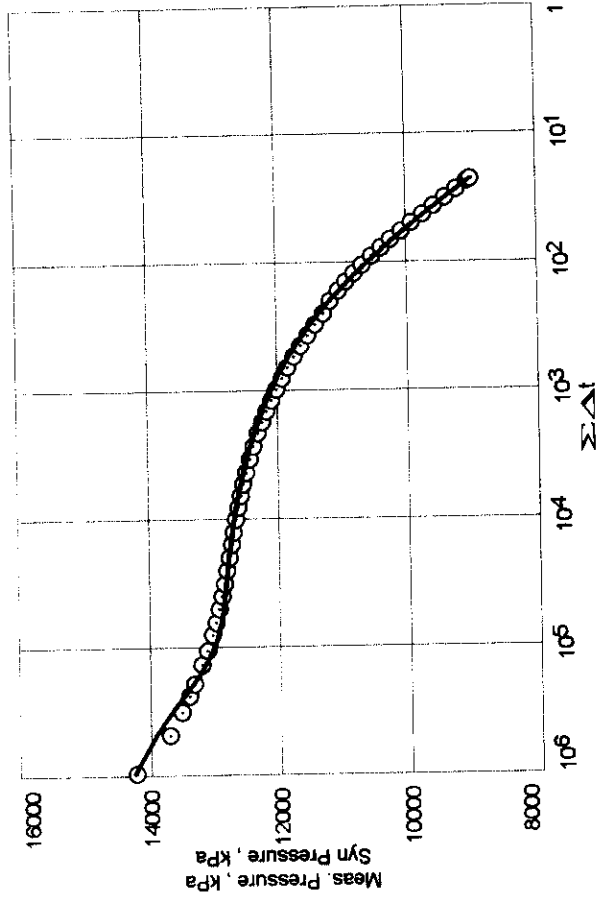
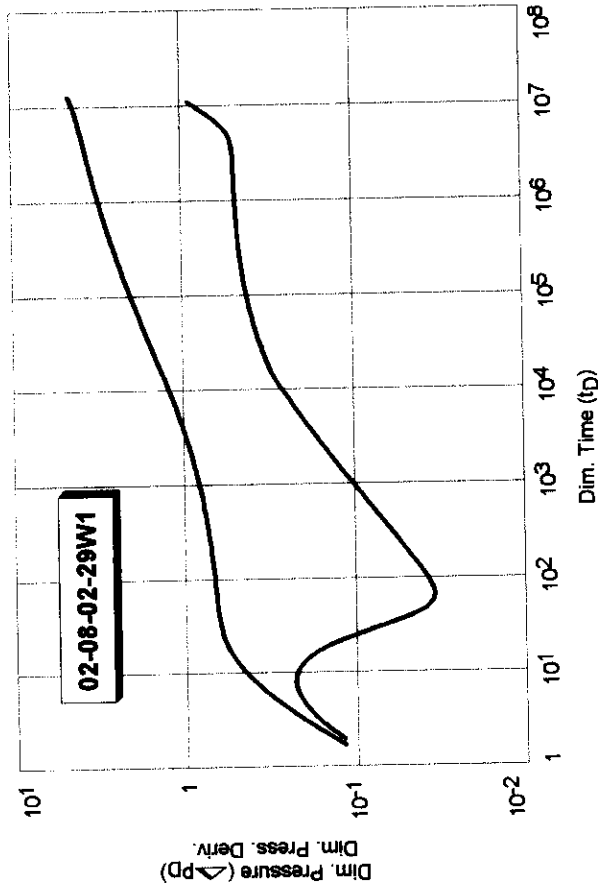
Finite Conductivity Model - Raw Data (Figure 7)



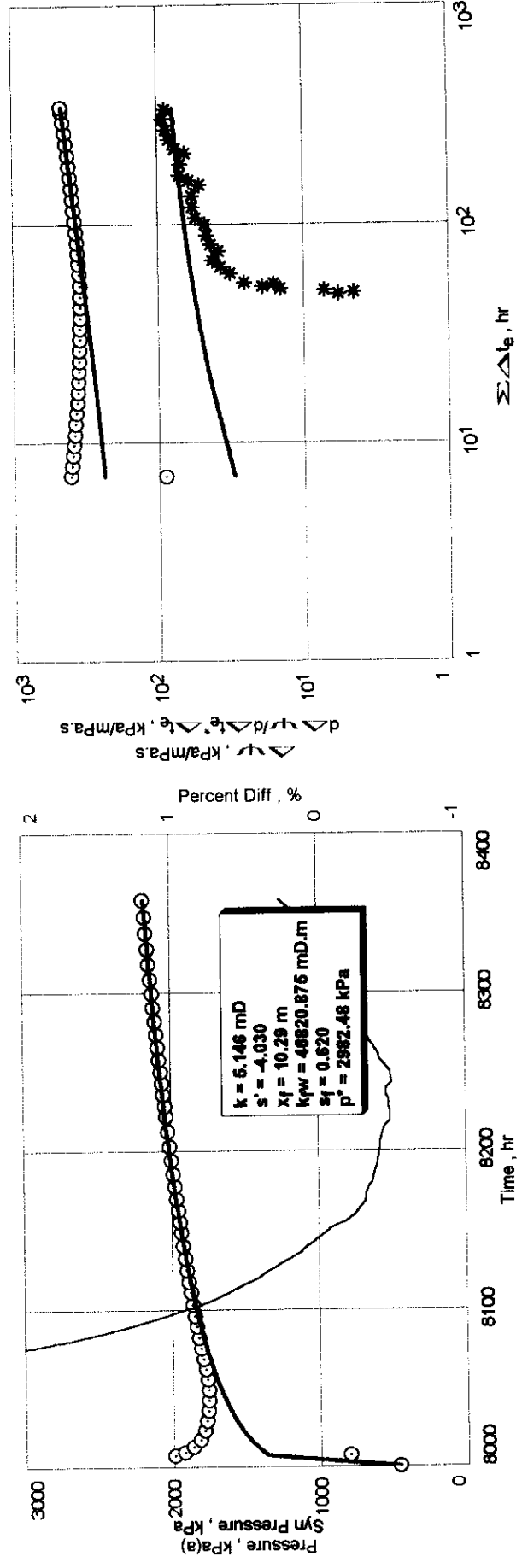
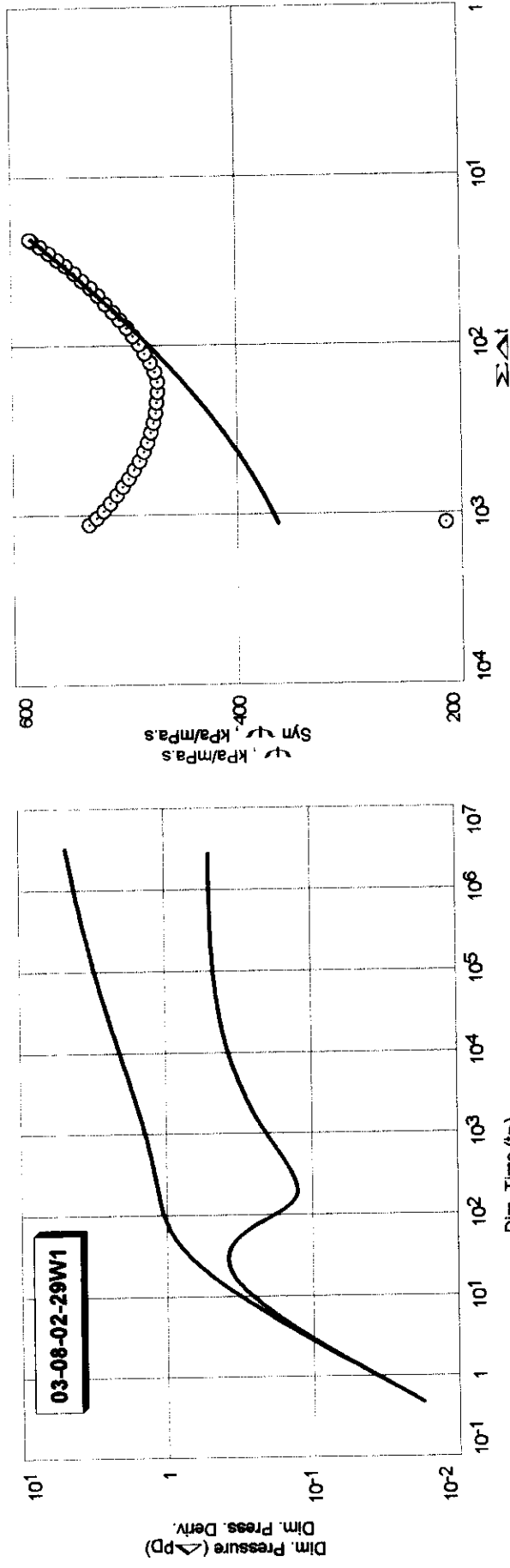
# Finite Conductivity Fracture #1



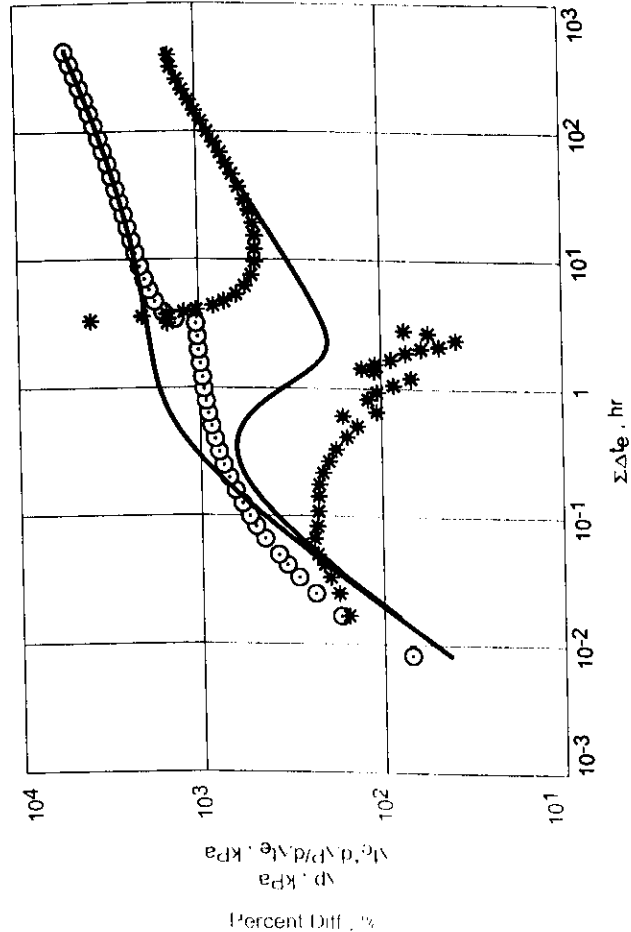
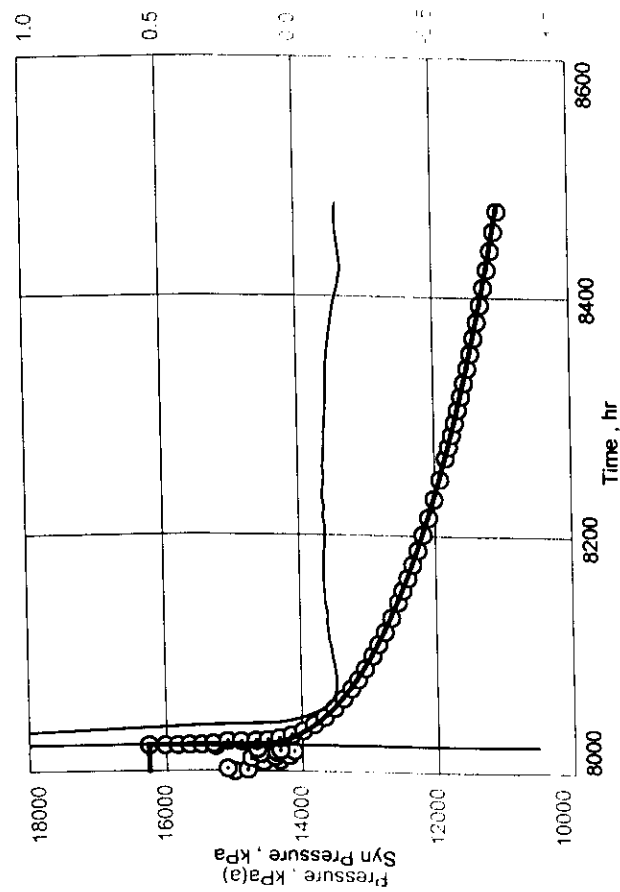
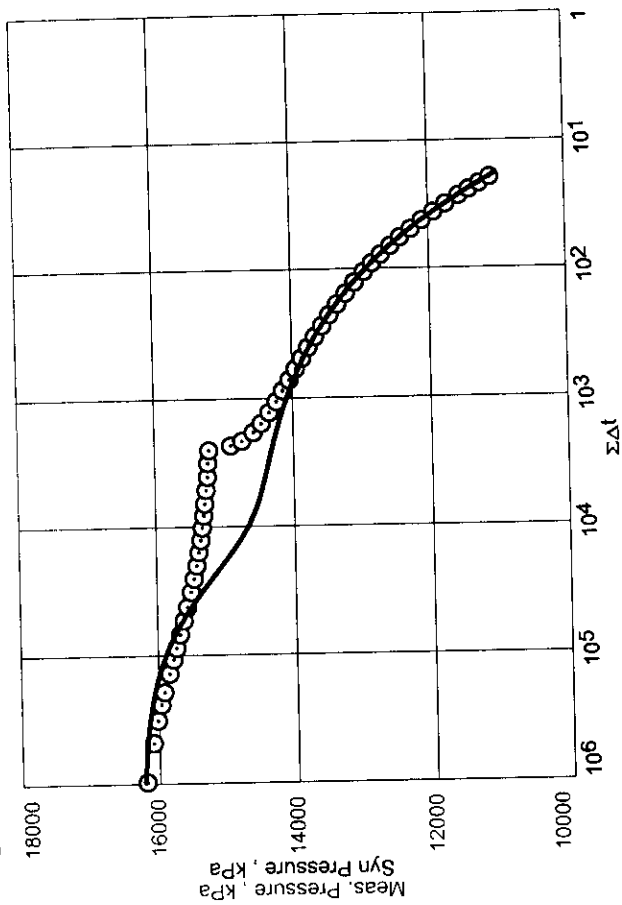
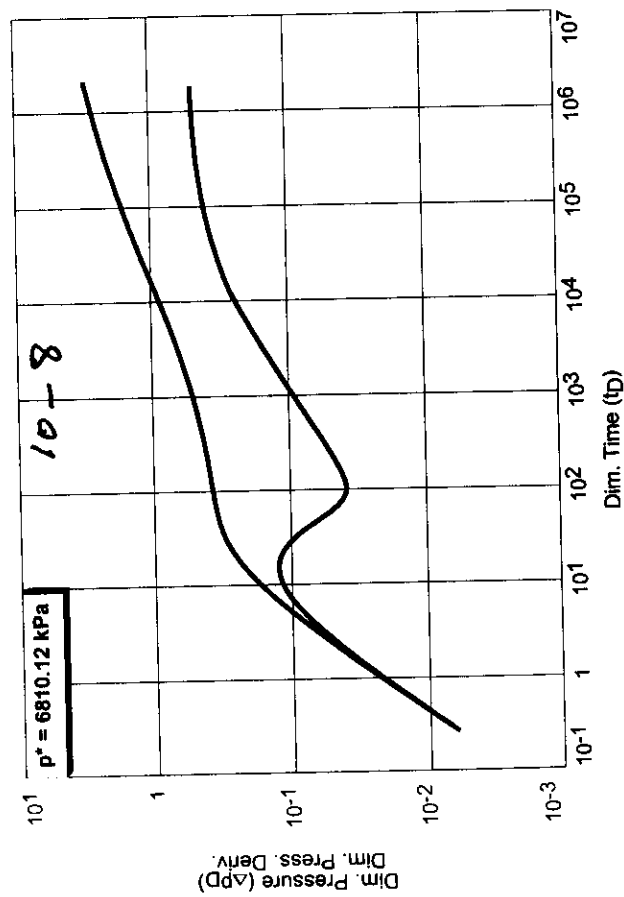
# Finite Conductivity Fracture #1



# Finite Conductivity Fracture #1

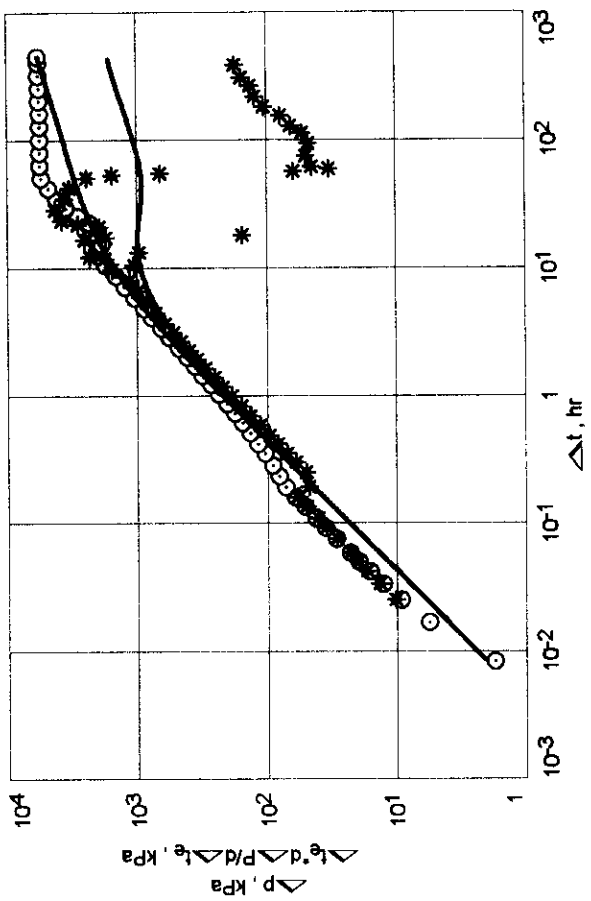
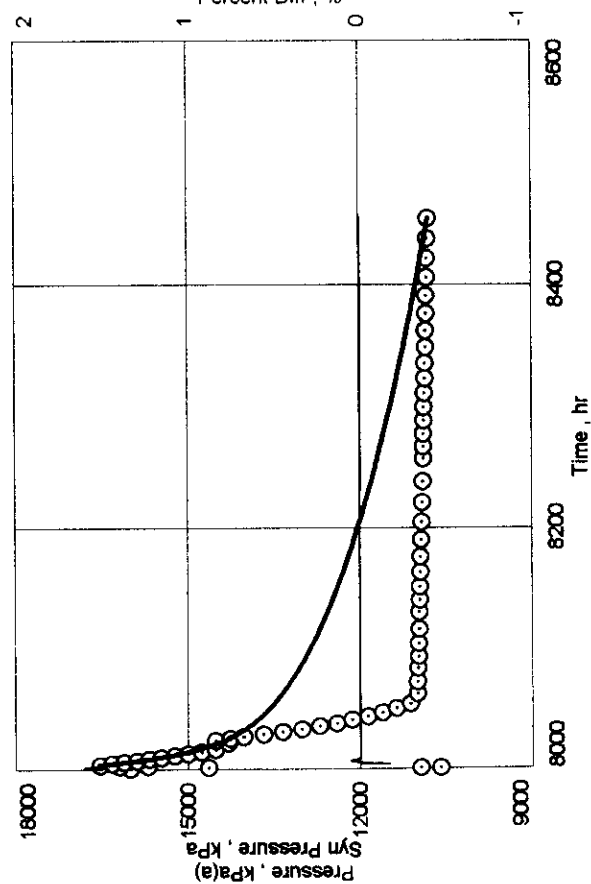
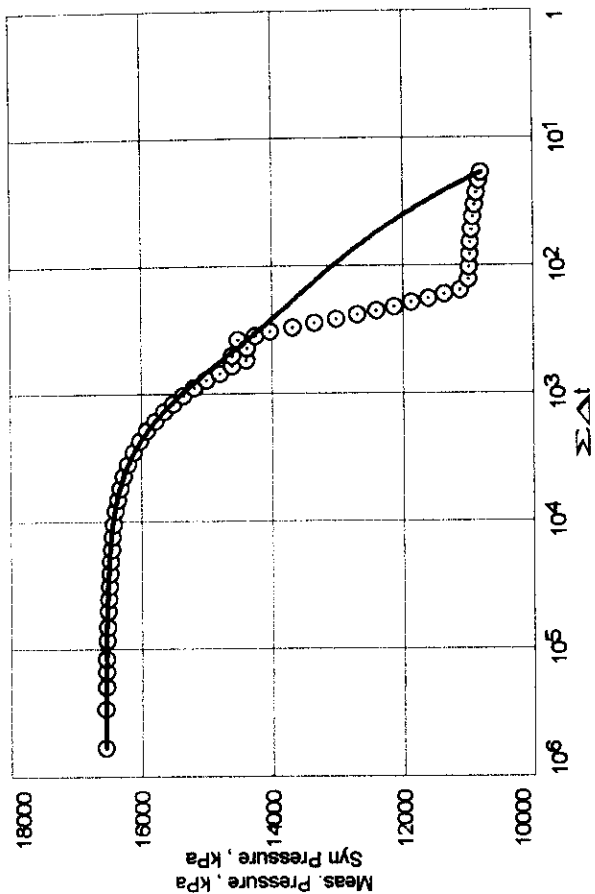
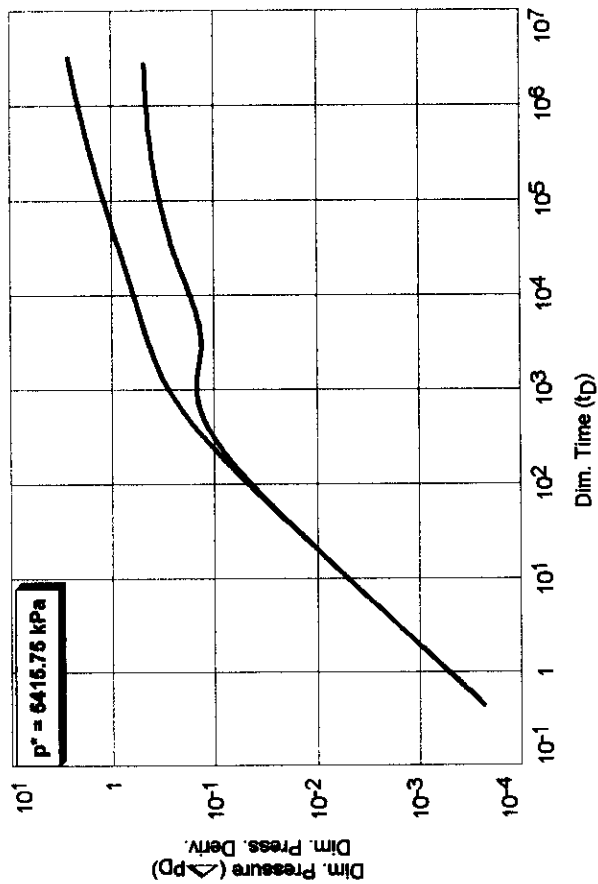


# Finite Conductivity Fracture #1



# Finite Conductivity Fracture #1

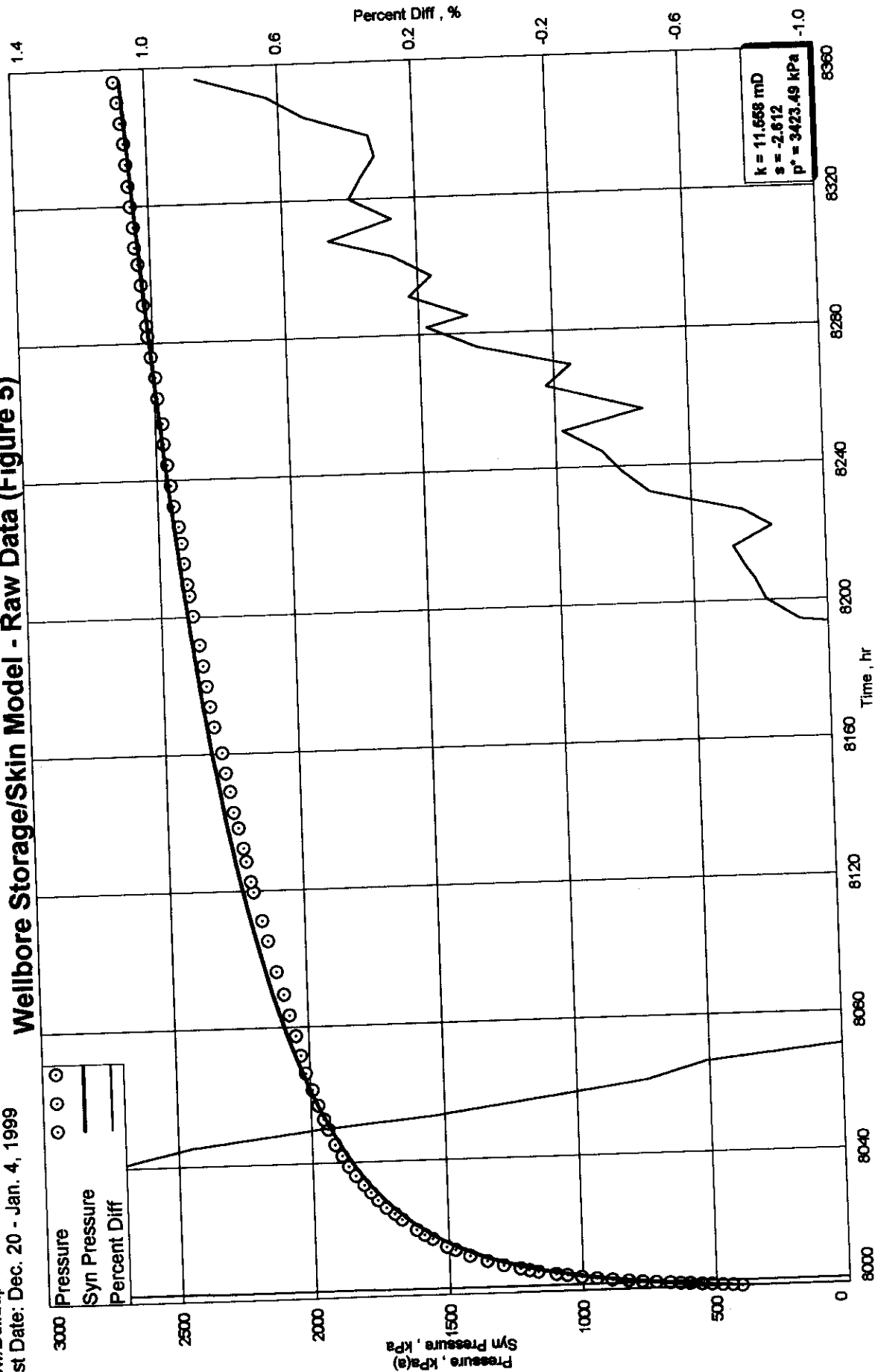
2-9



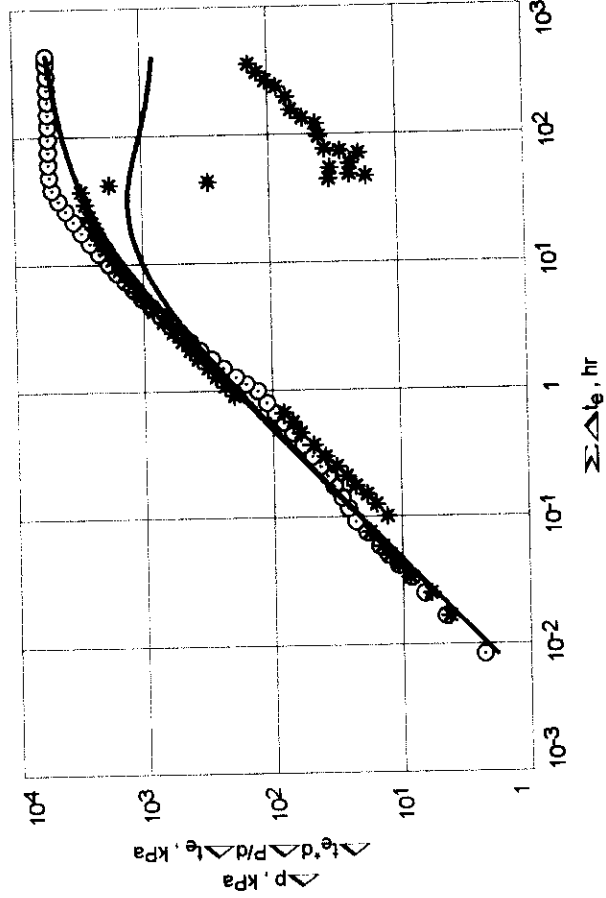
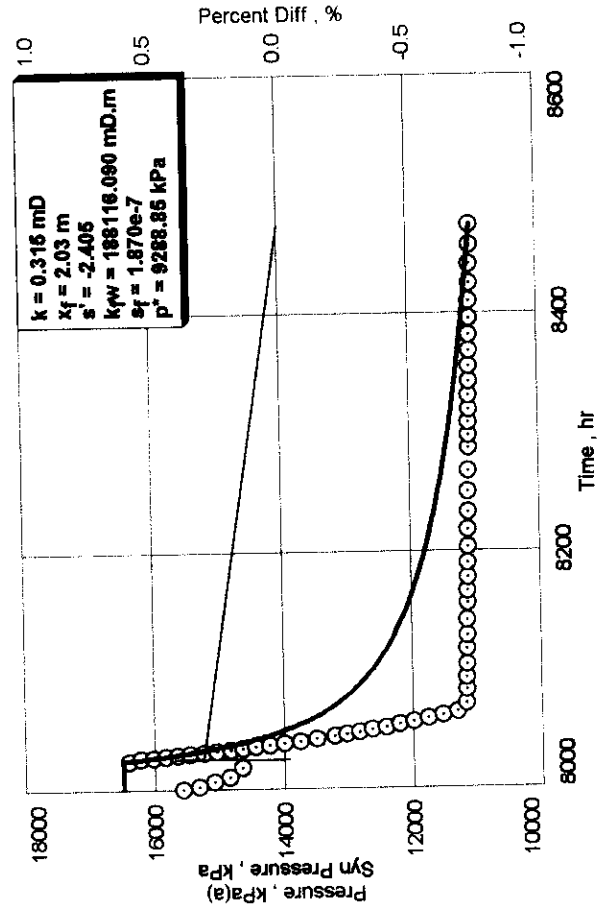
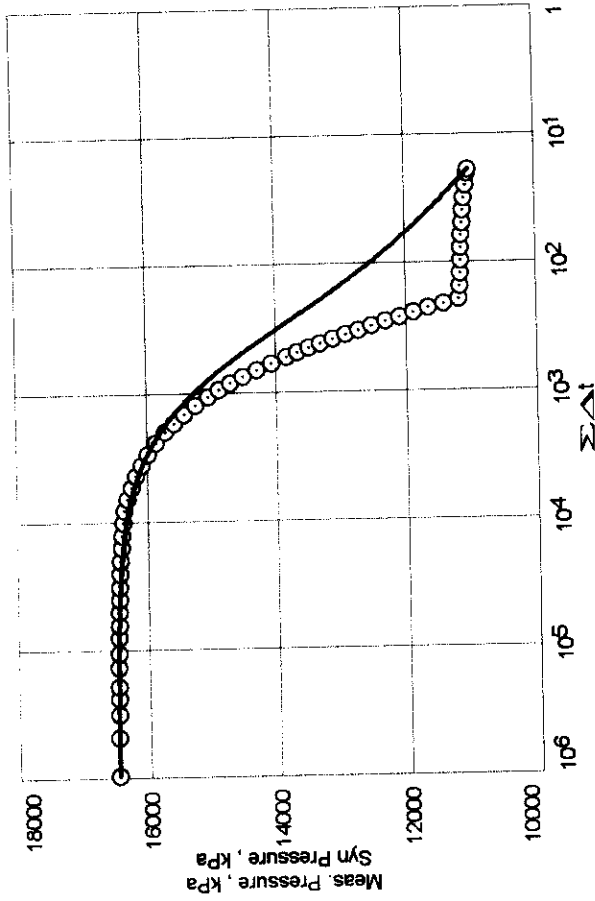
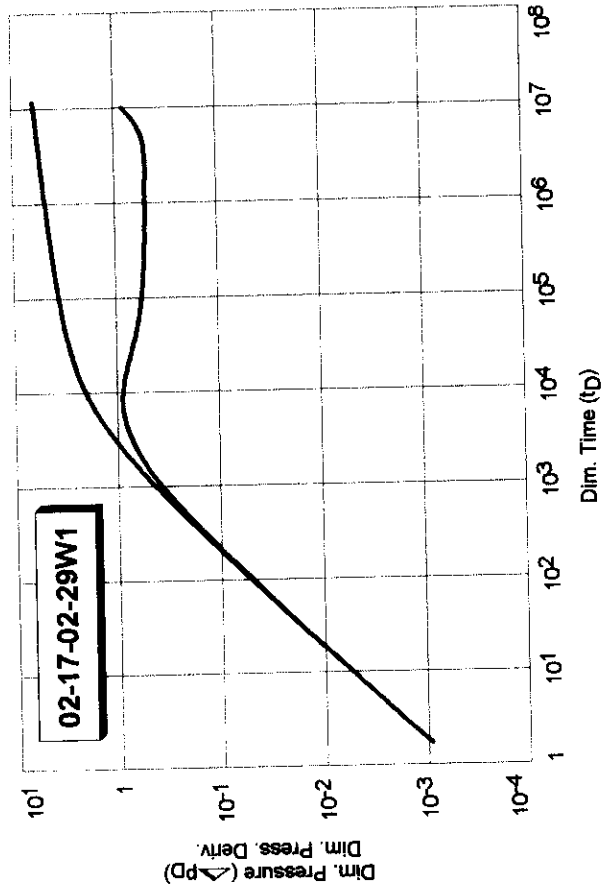


Home Pierson 15-09-02-29W1  
 Spearfish (1020 - 1025 mKB)  
 Flow/Buildup Test  
 Test Date: Dec. 20 - Jan. 4, 1999

Wellbore Storage/Skin Model - Raw Data (Figure 5)

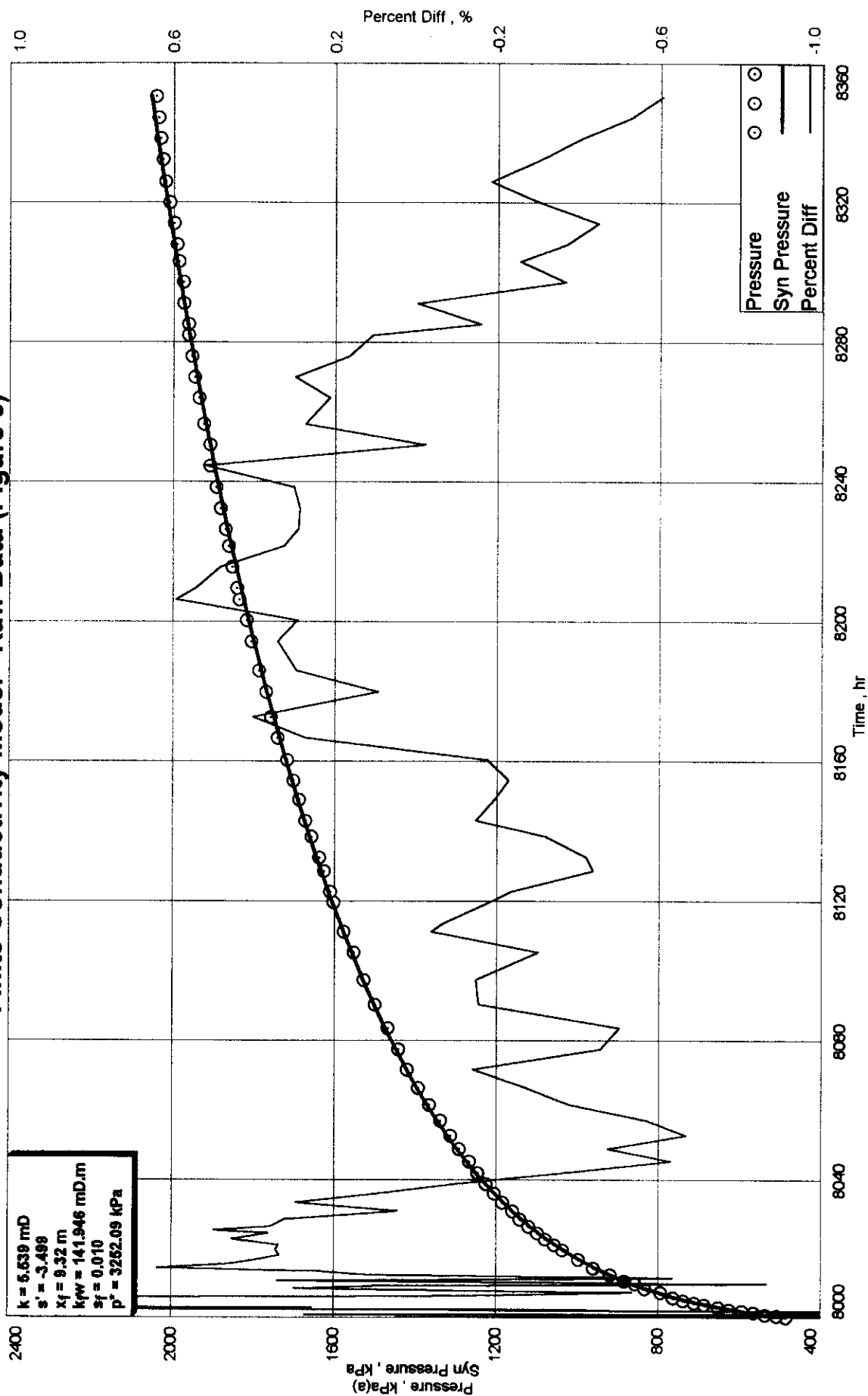


# Finite Conductivity Fracture #1



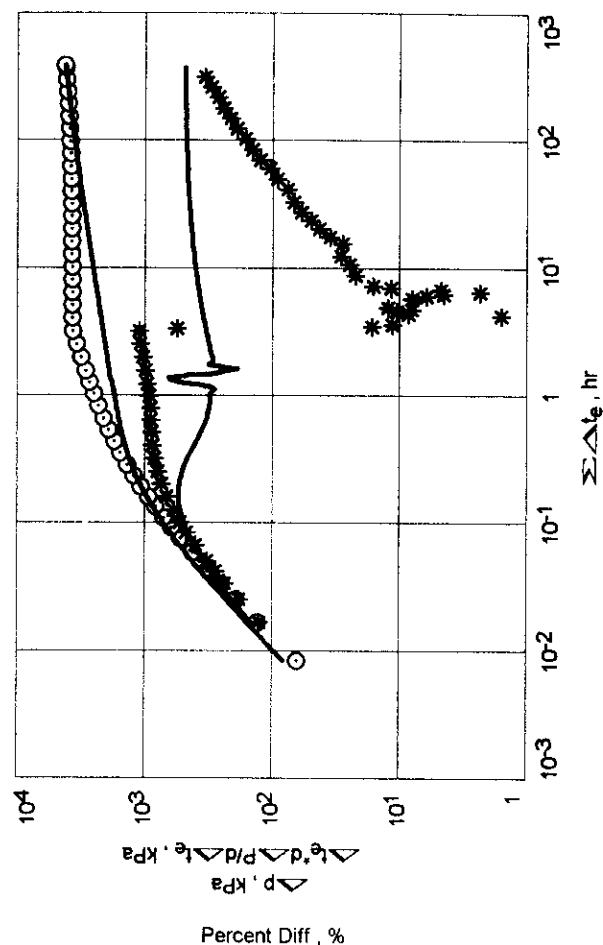
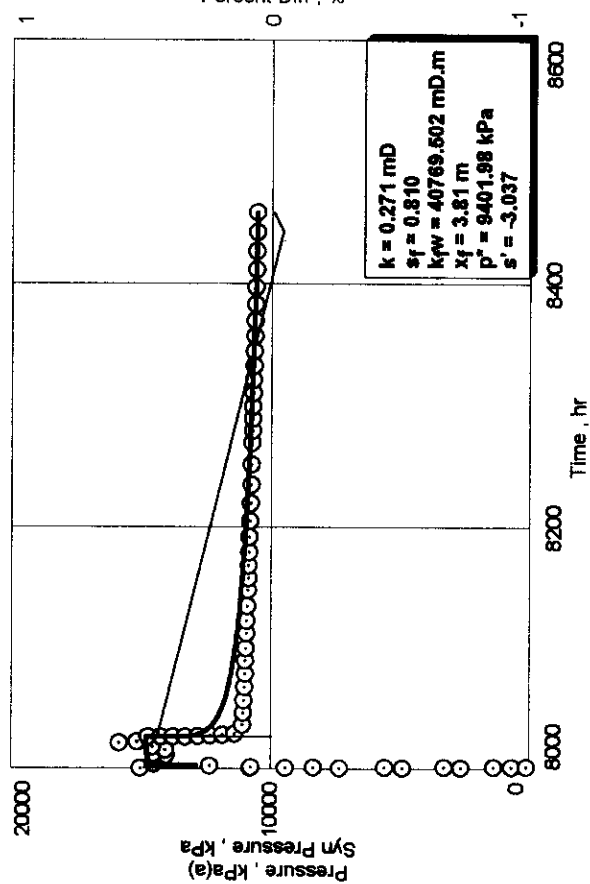
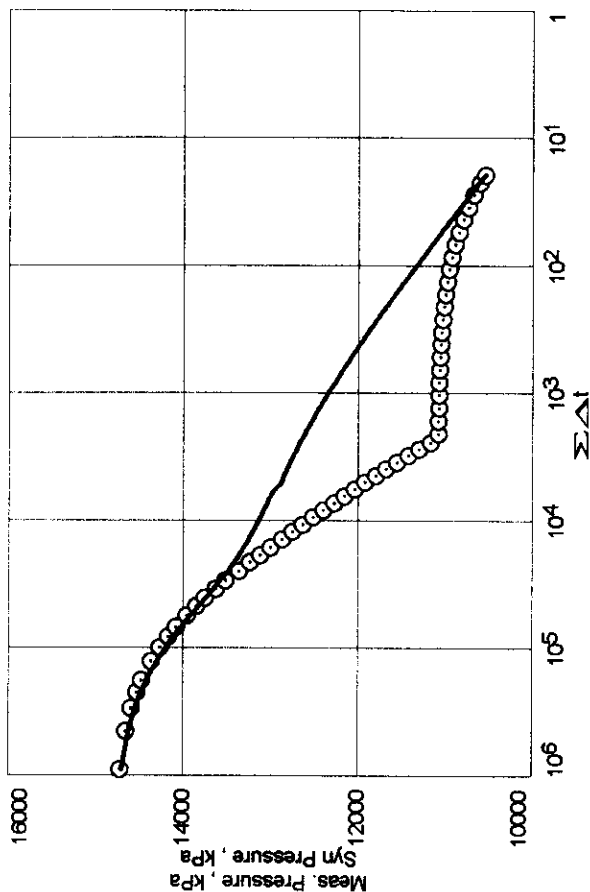
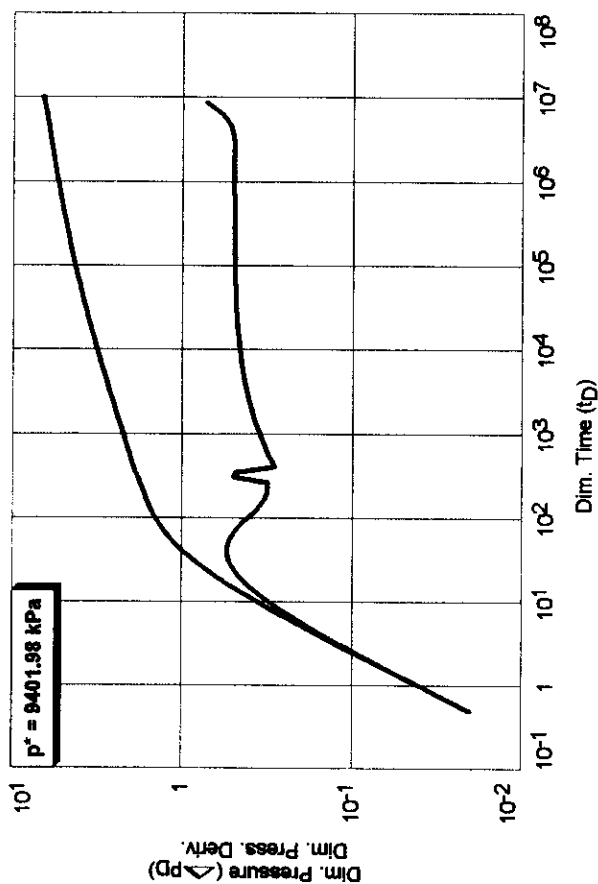
Home Pierson 07-16-02-29W1  
 Spearfish (1015 - 1021 mKB)  
 Flow/Buildup Test  
 Test Date: Dec. 20 - Jan. 4, 2000

Finite Conductivity Model - Raw Data (Figure 6)



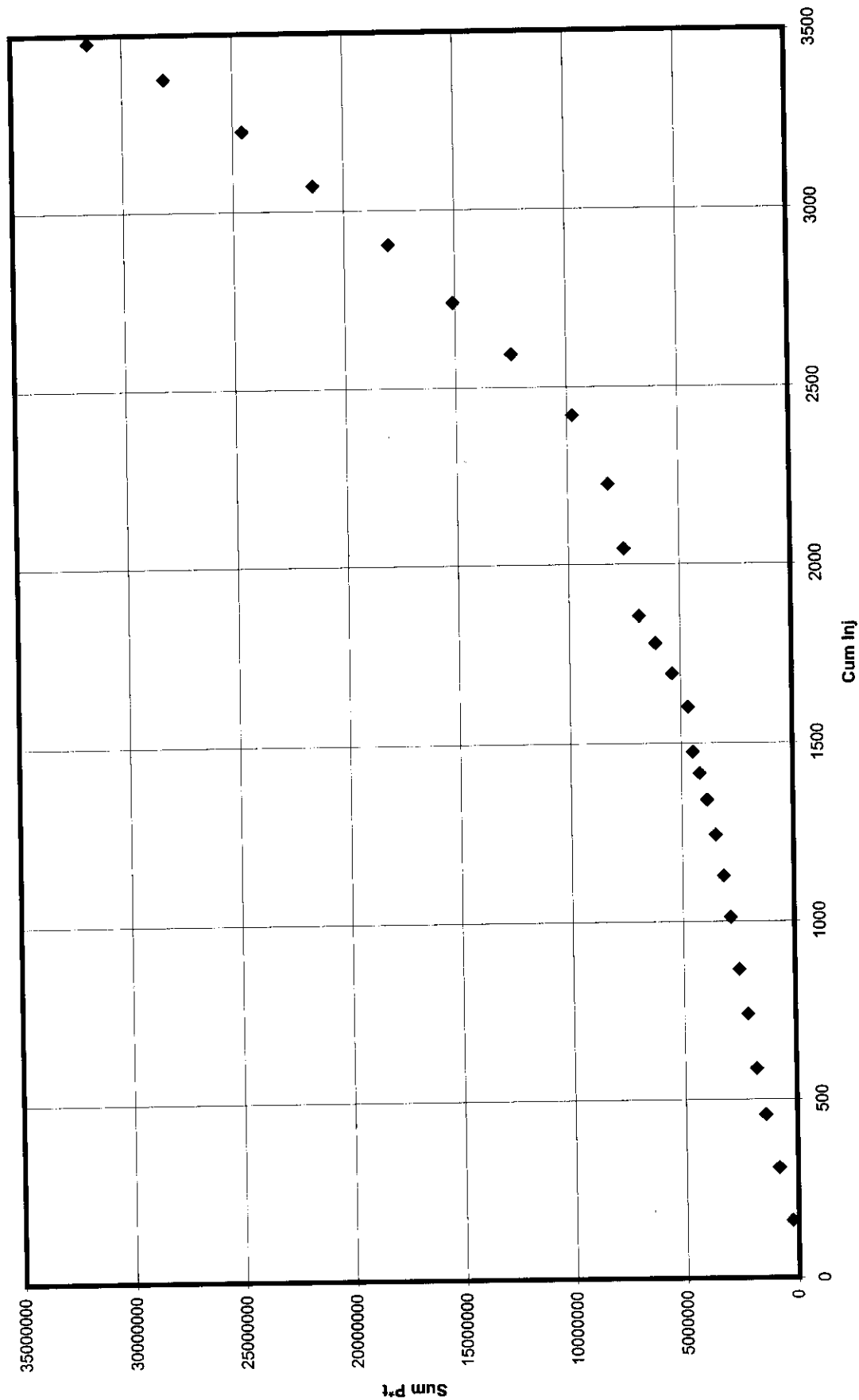
4-17

# Finite Conductivity Fracture #1

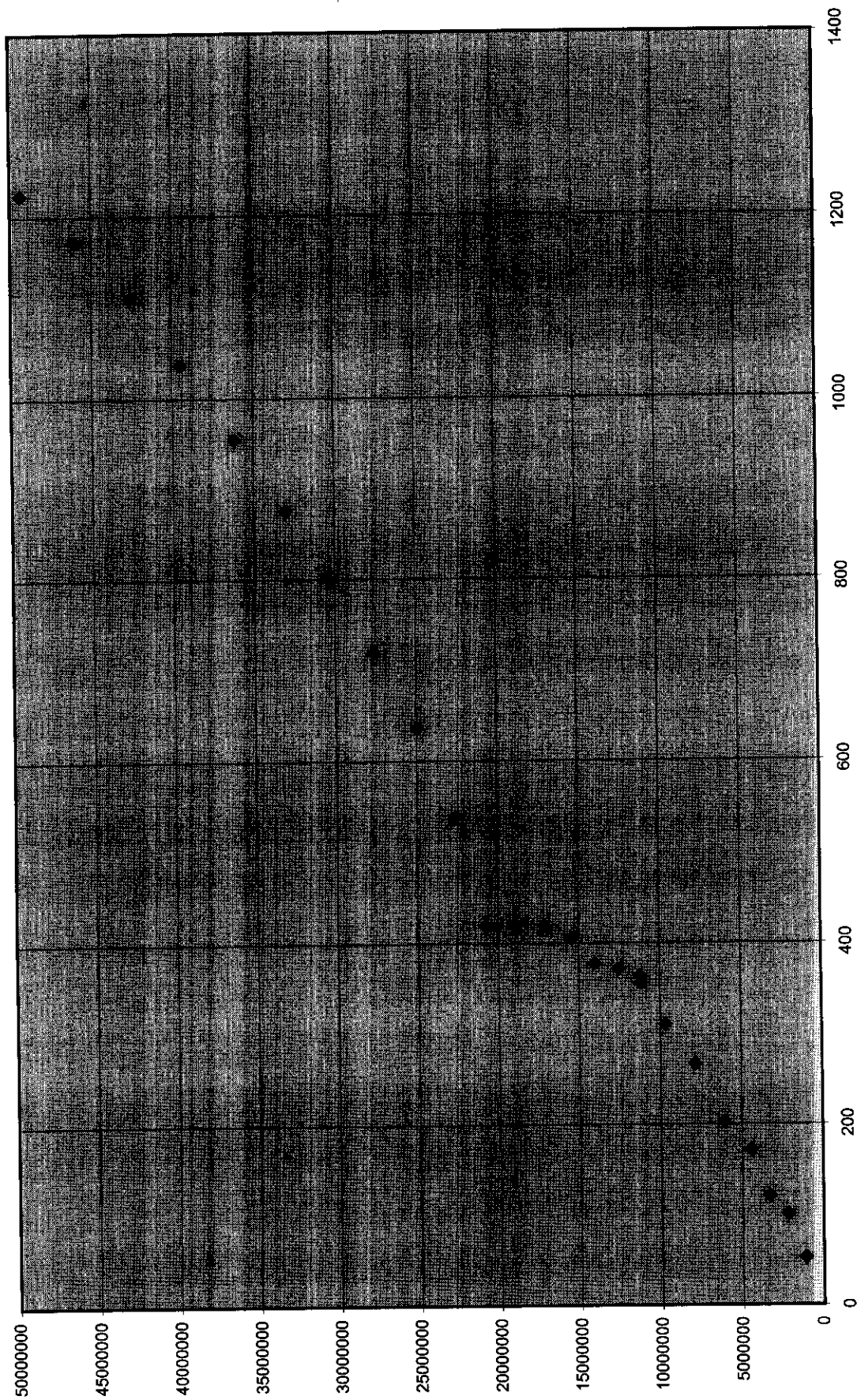


## **Appendix 3**

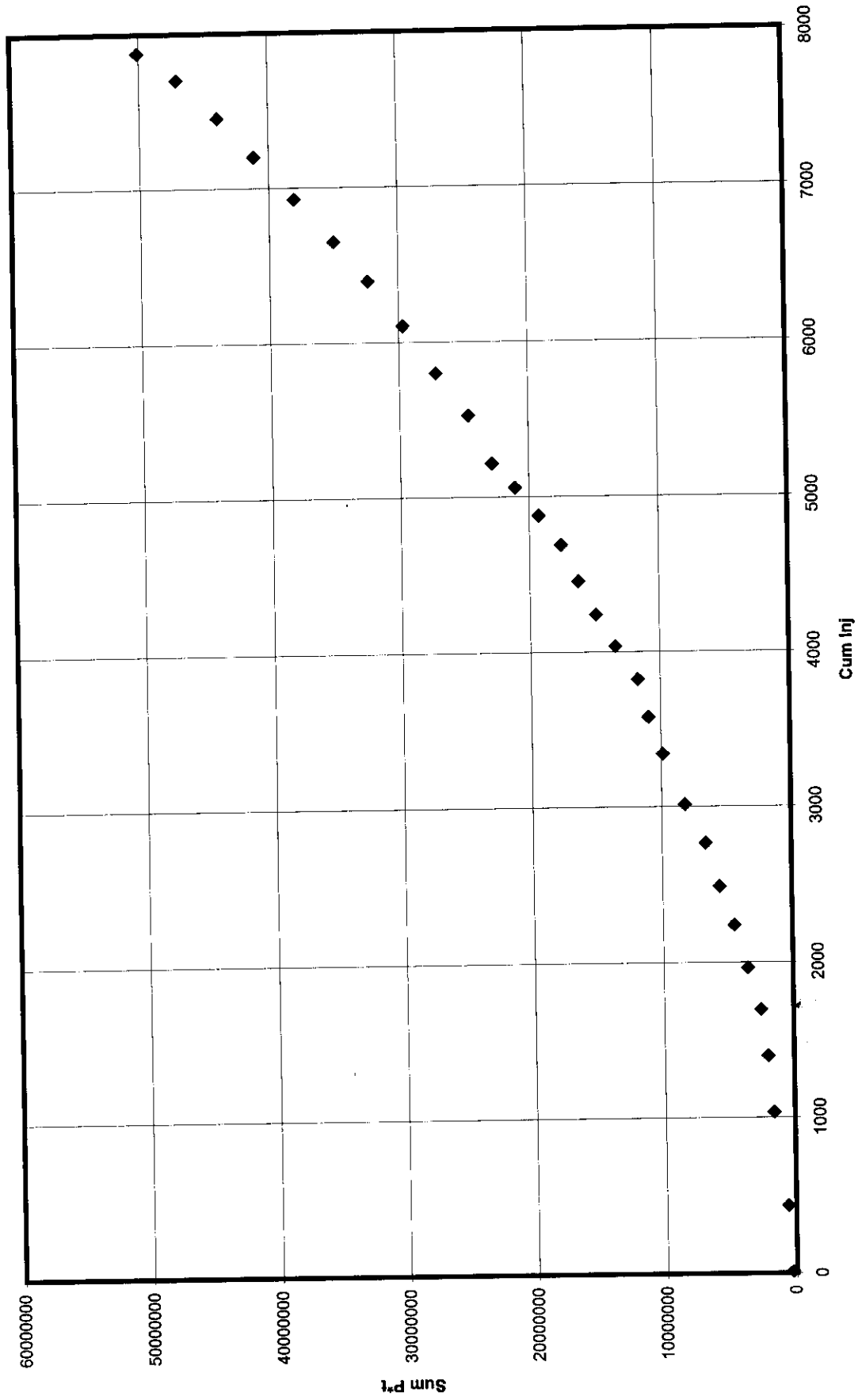
14-4 Hall Plot



16-4 Hall Plot

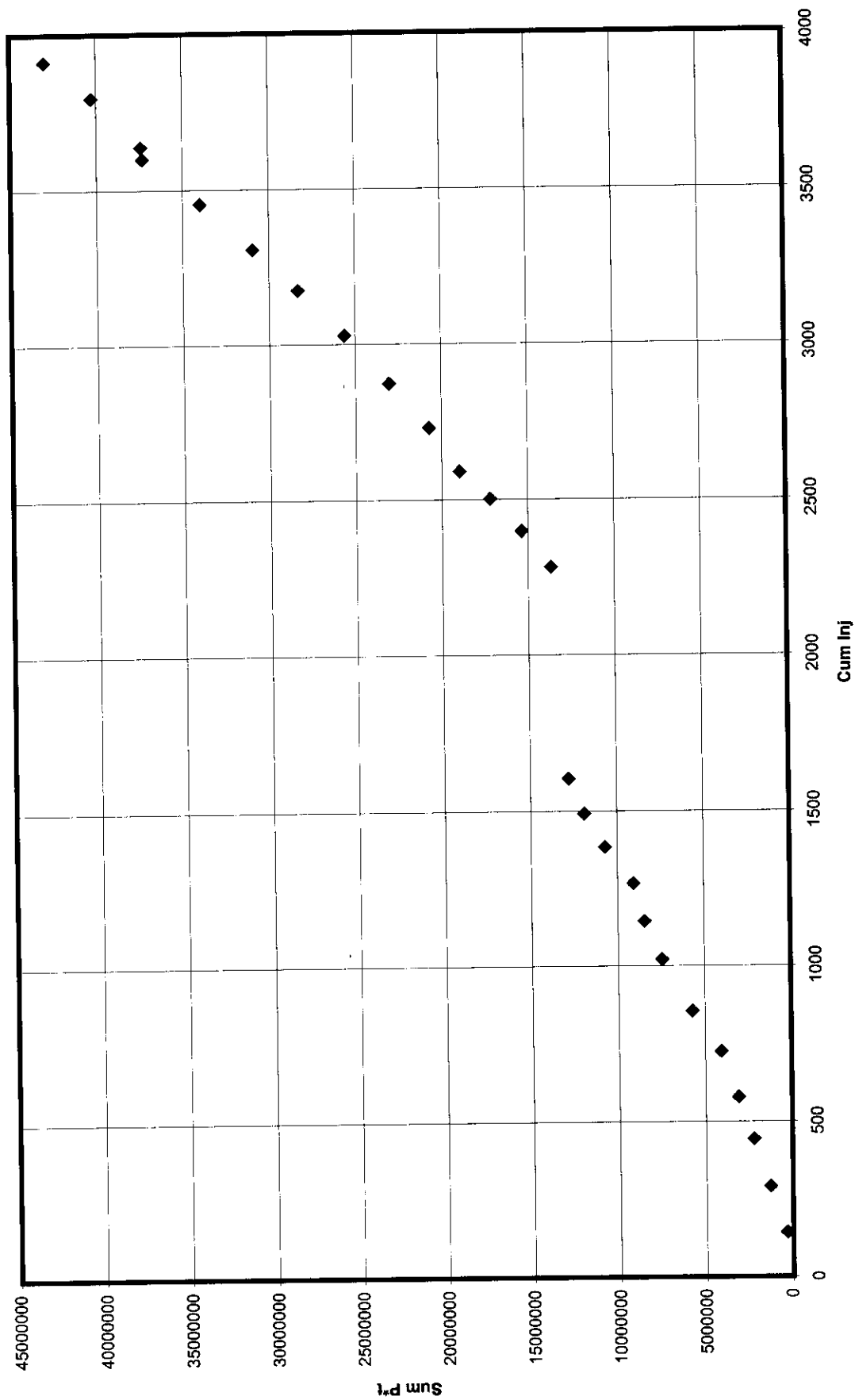


16-5 Hall Plot

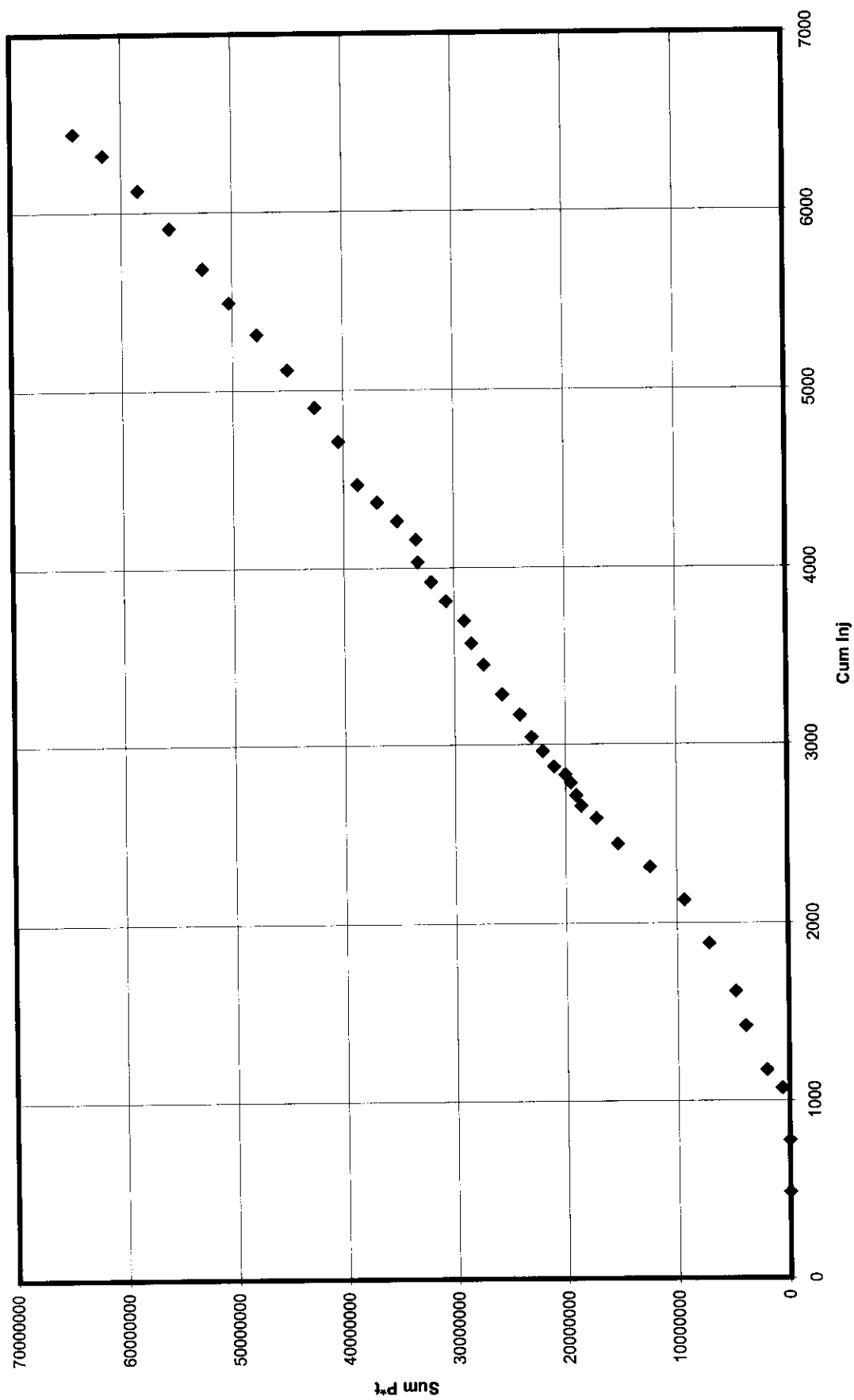




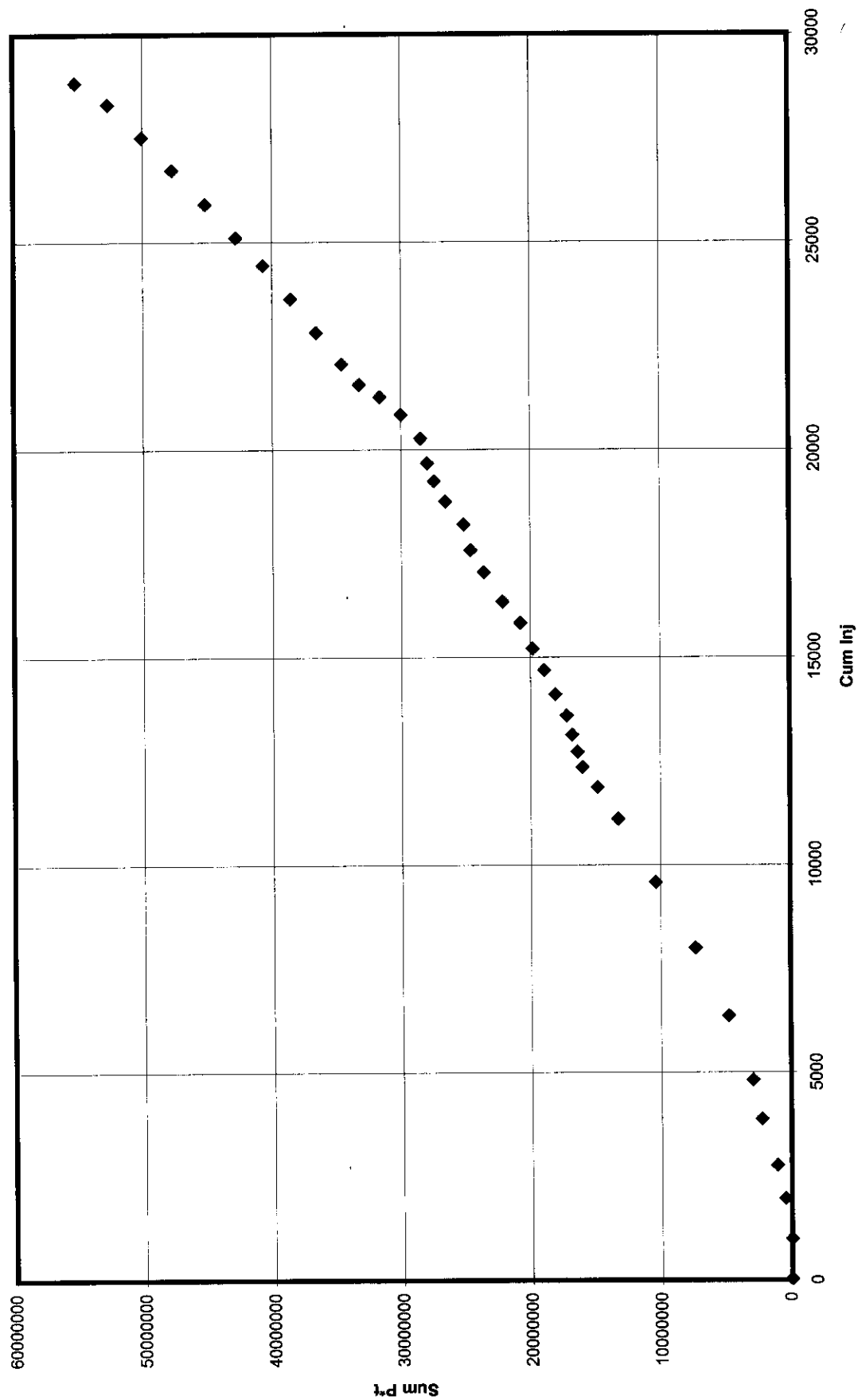
2-8 Hall Plot



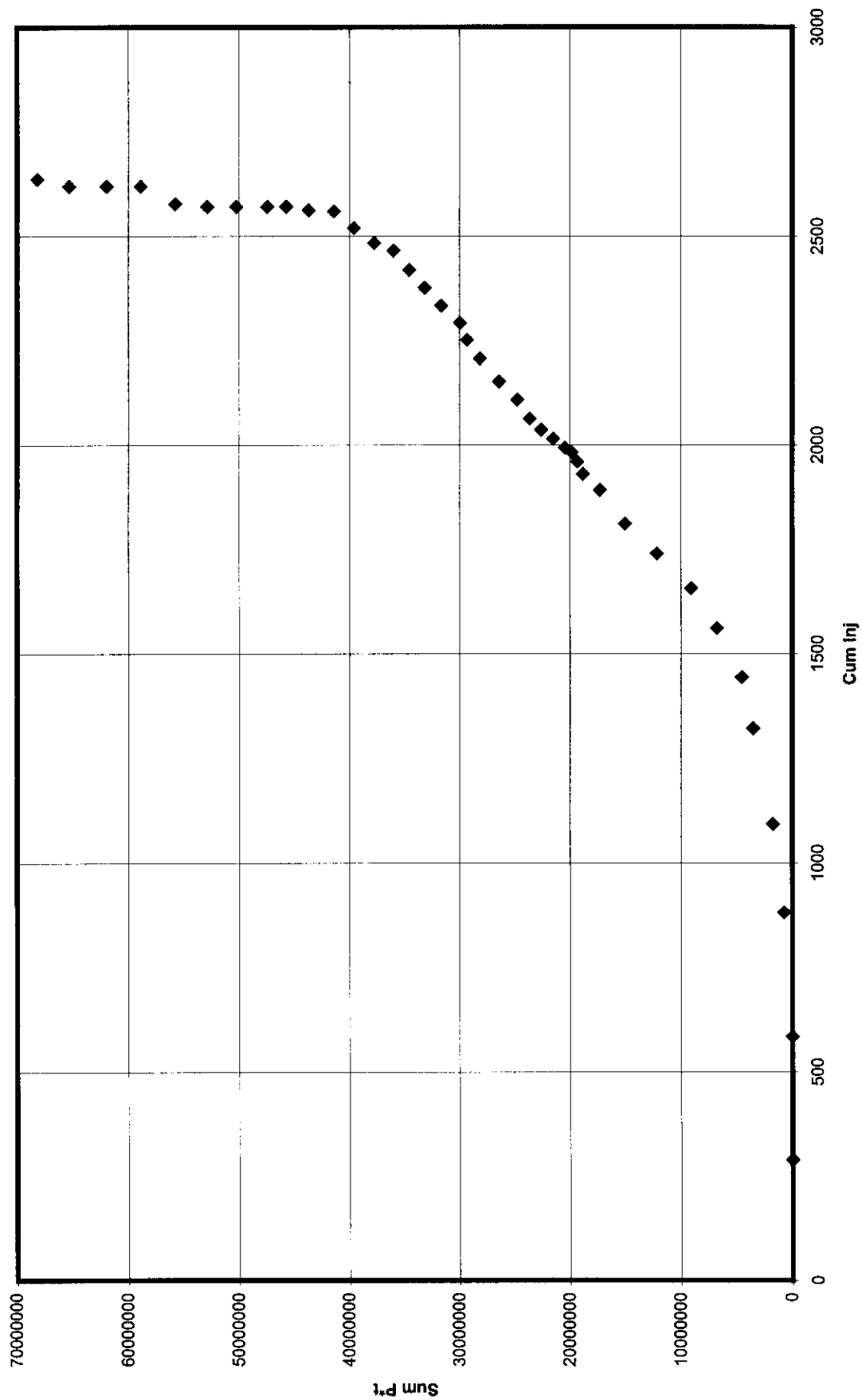
6-8 Hall Plot



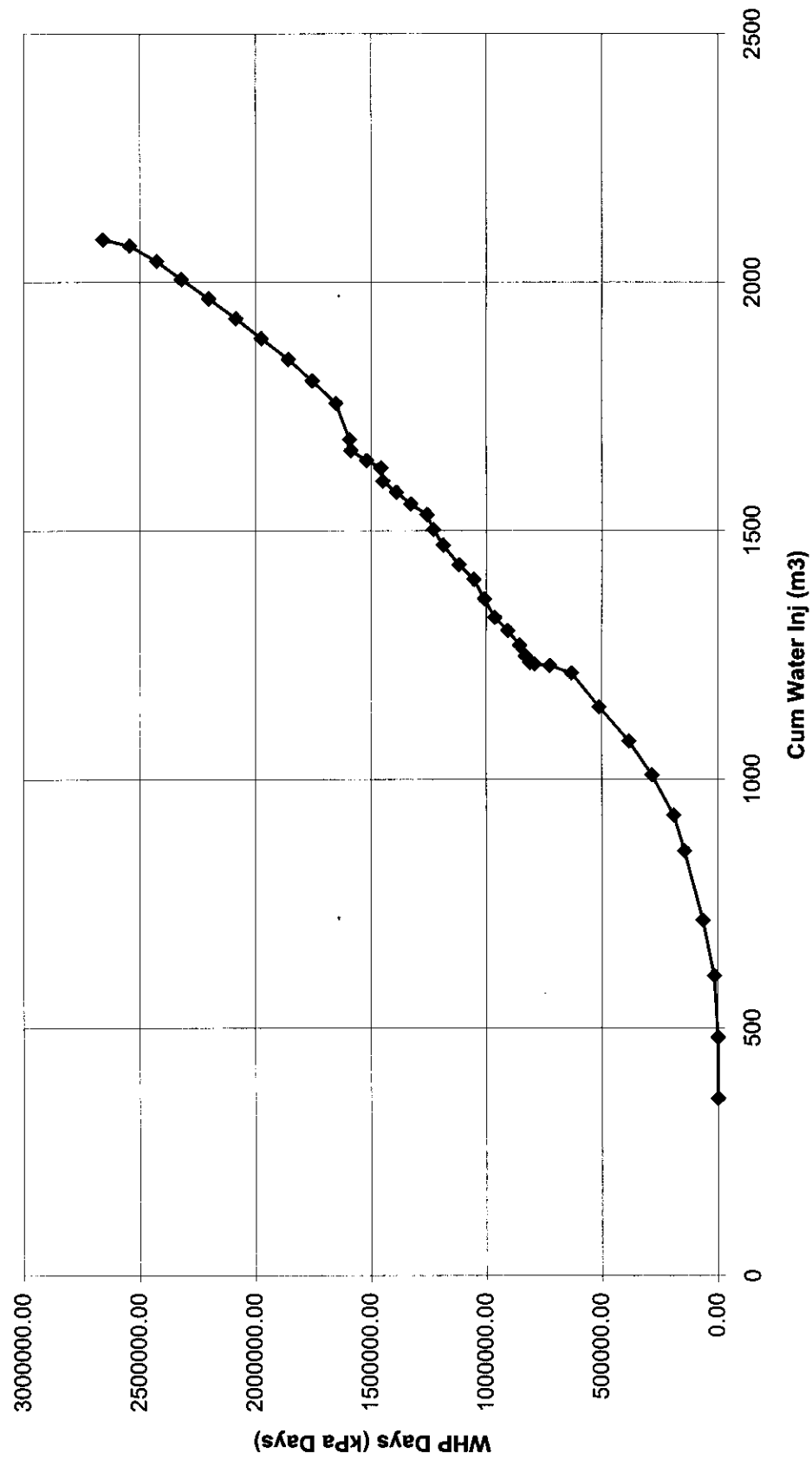
8-8 Hall Plot



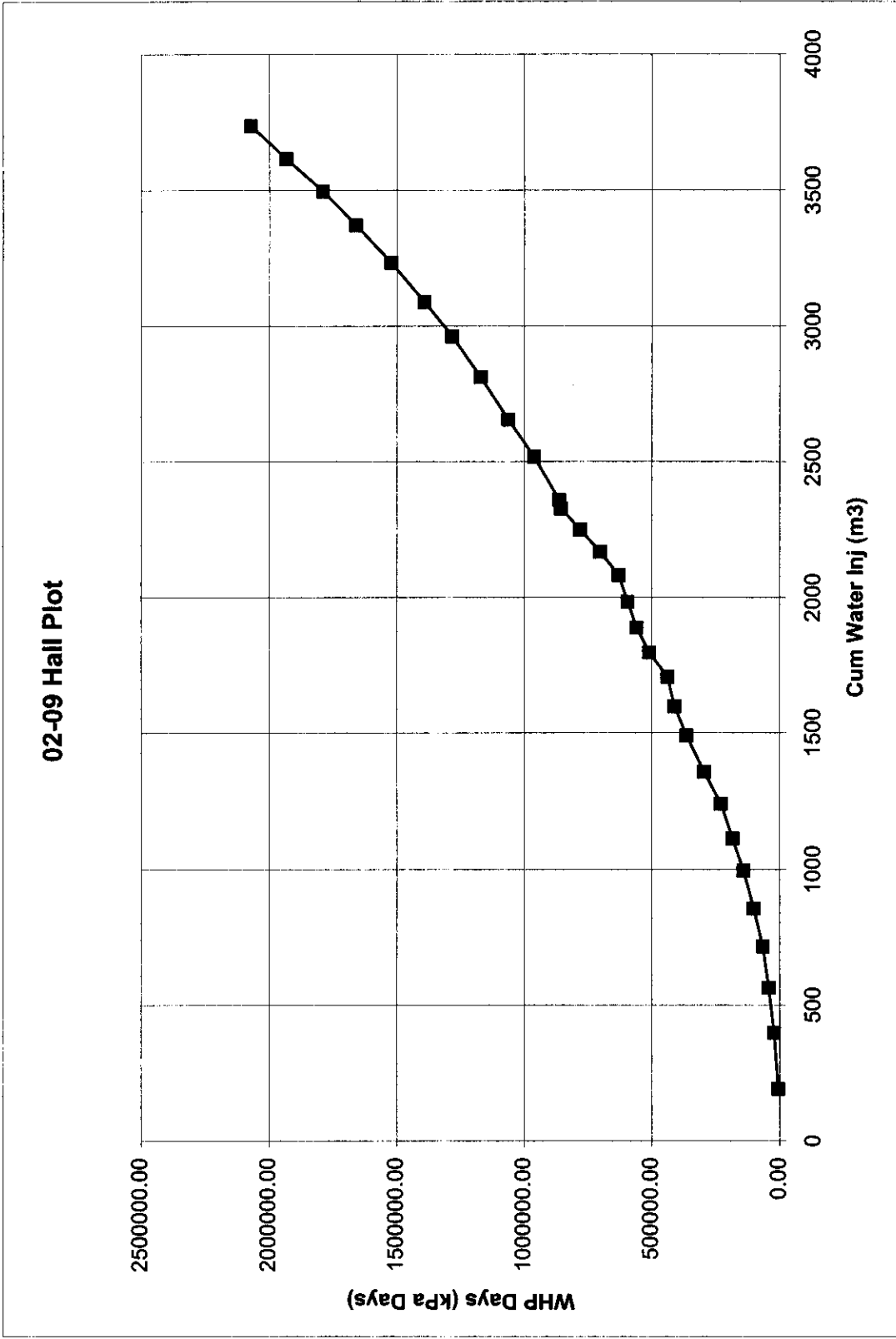
12-8 Hall Plot



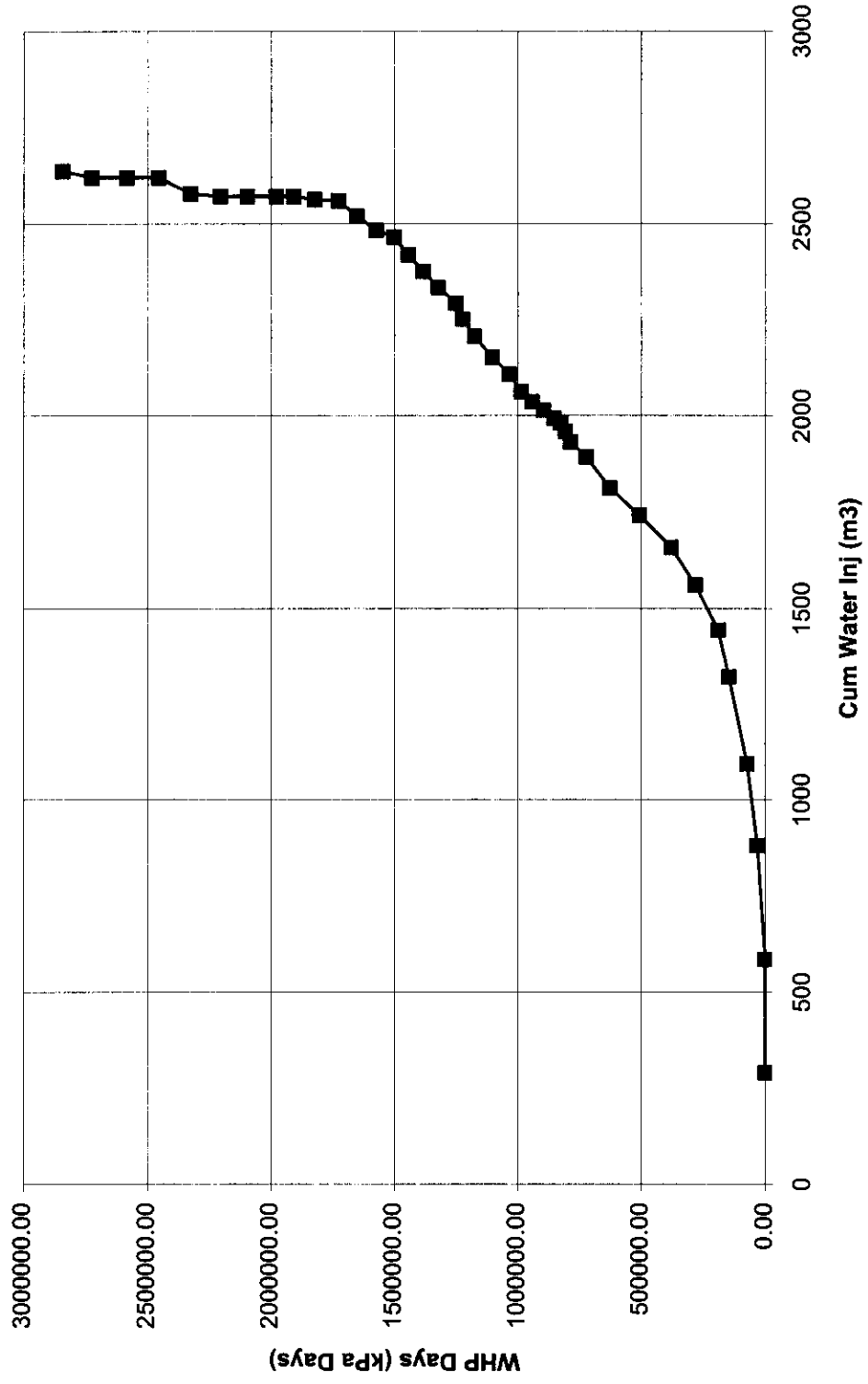
# 14-08 Hall Plot



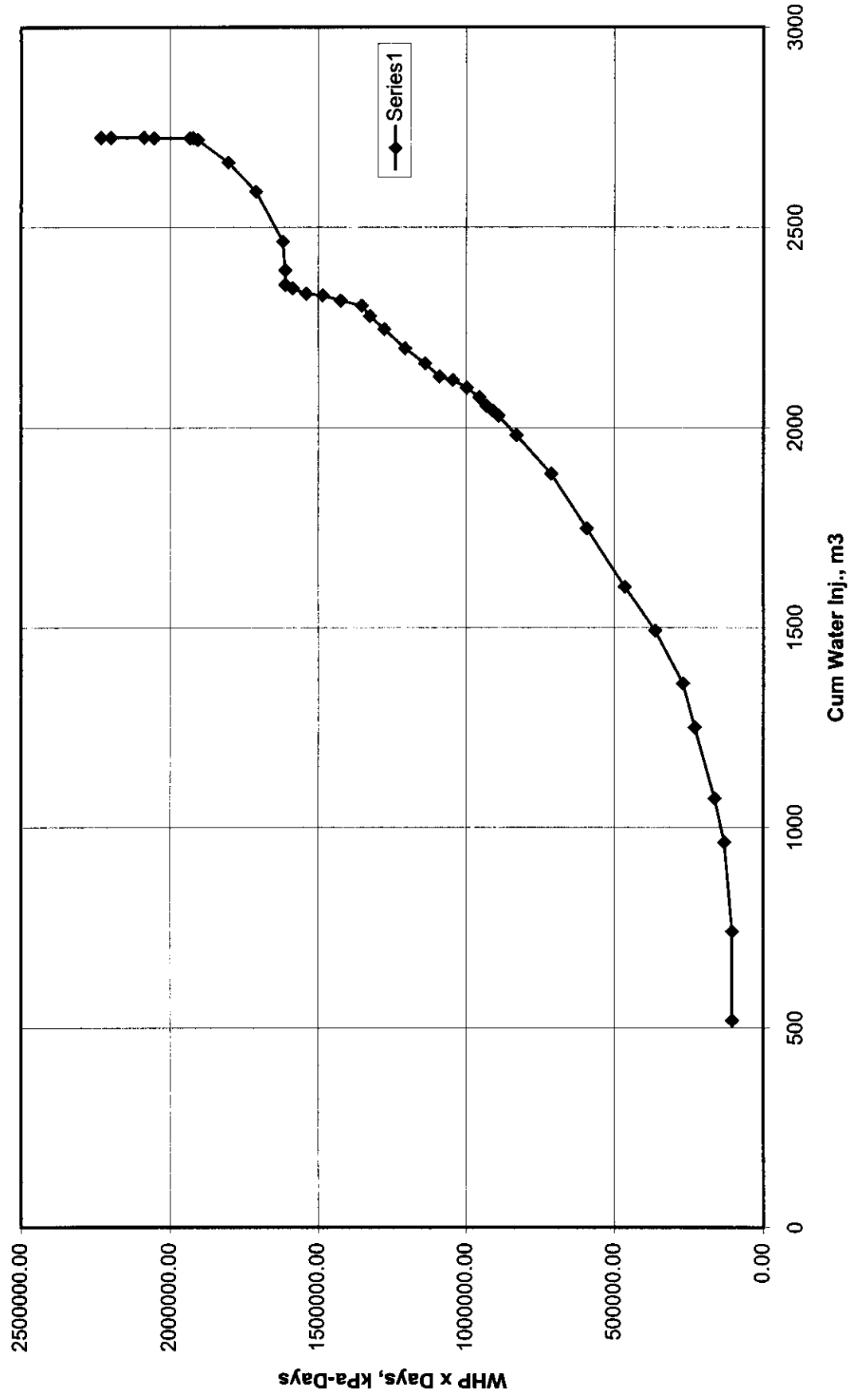
0.6



# 12-08 Hall Plot

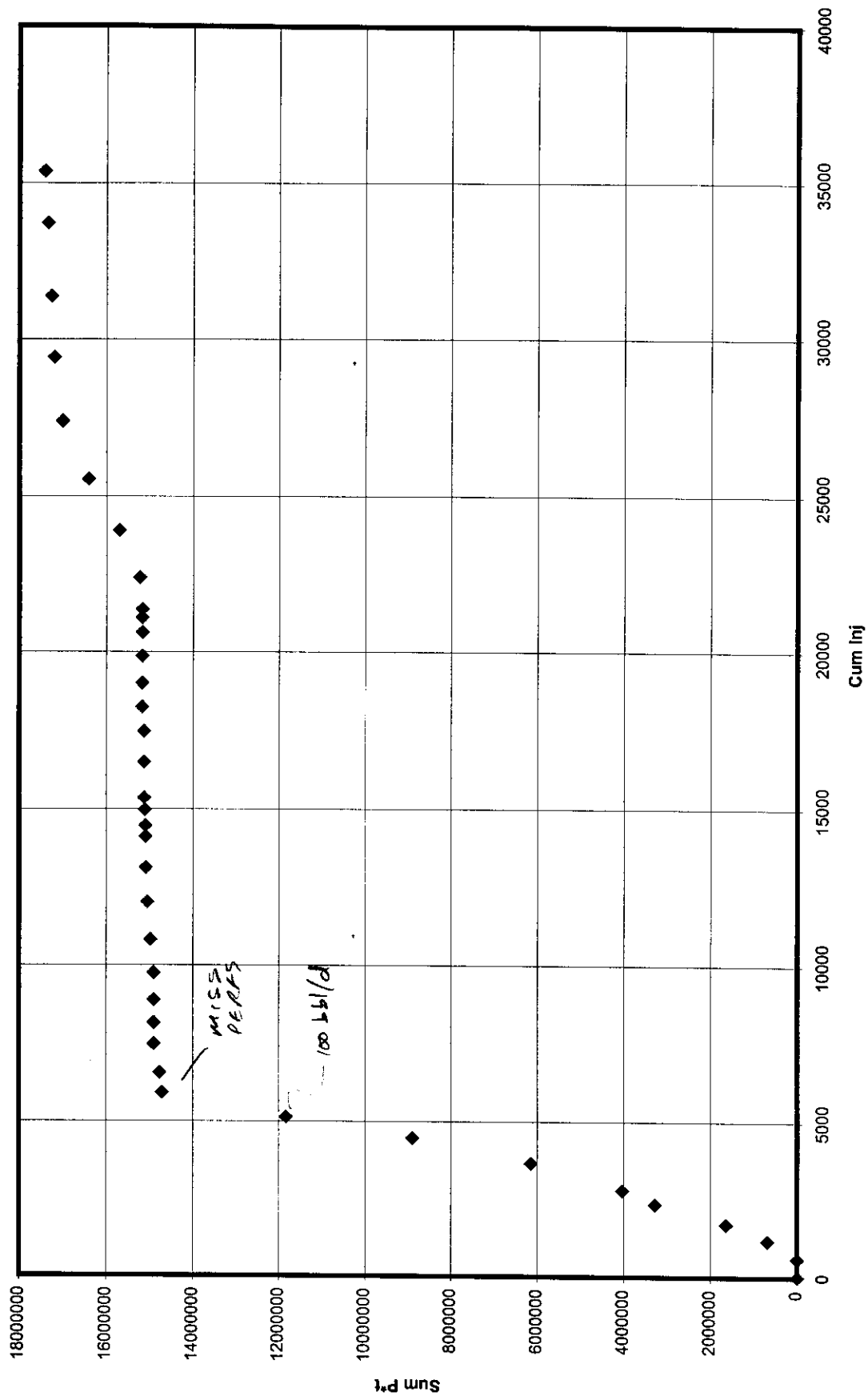


# 10-08-2-29W1 Hall Plot

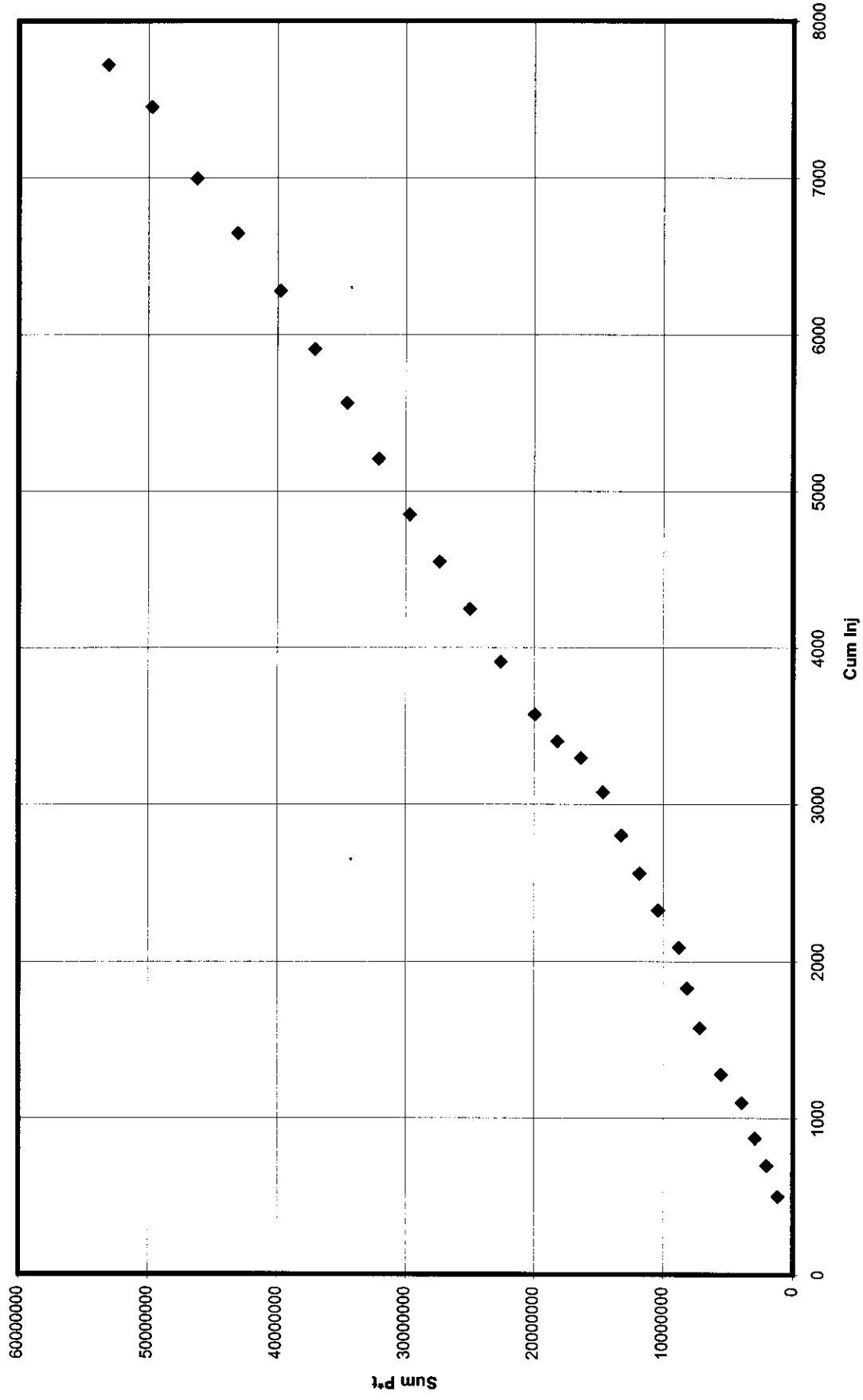




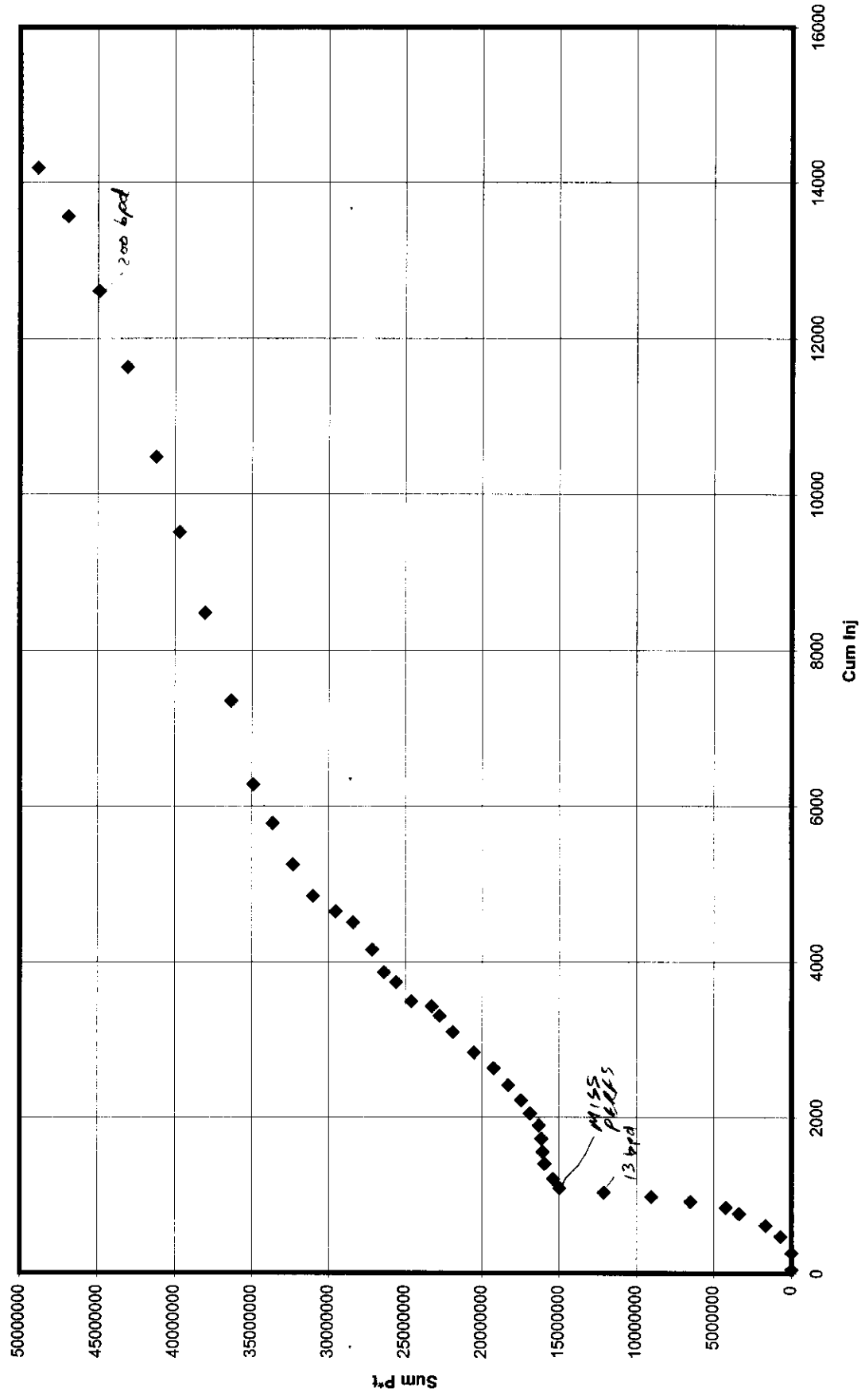
4-9 Hall Plot



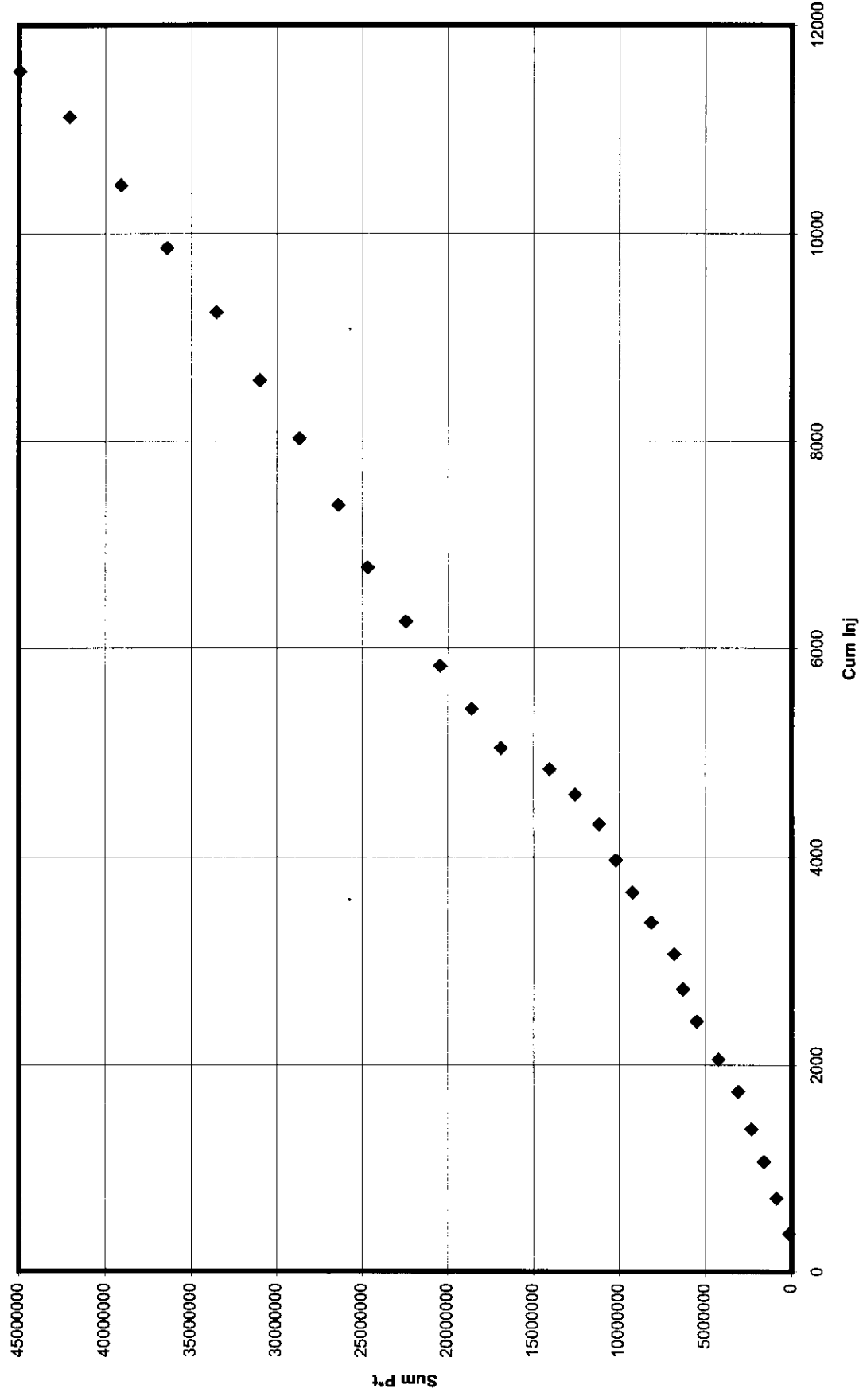
6-9 Hall Plot



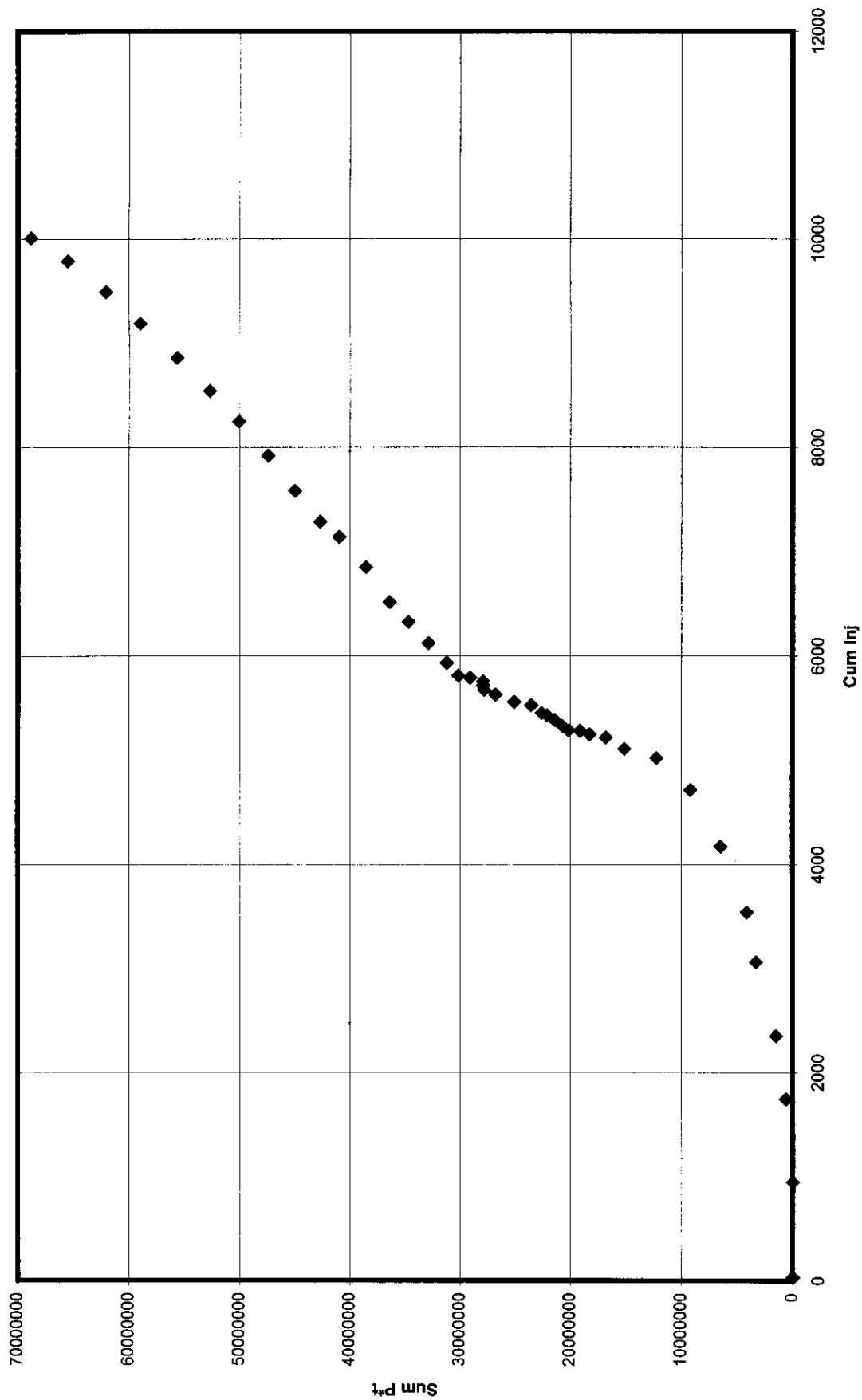
8-9 Hall Plot



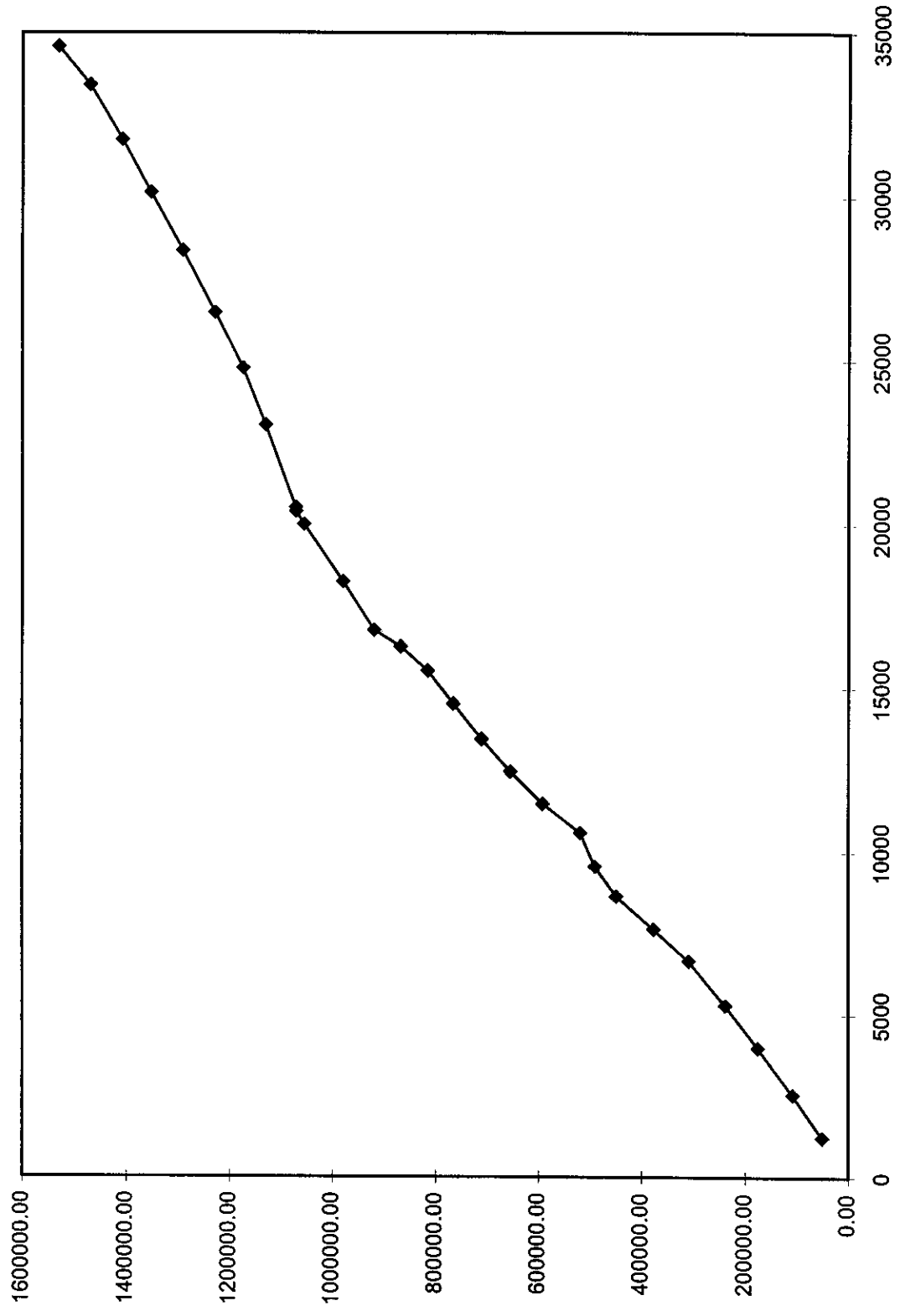
10-9 Hall Plot



12-9 Hall Plot

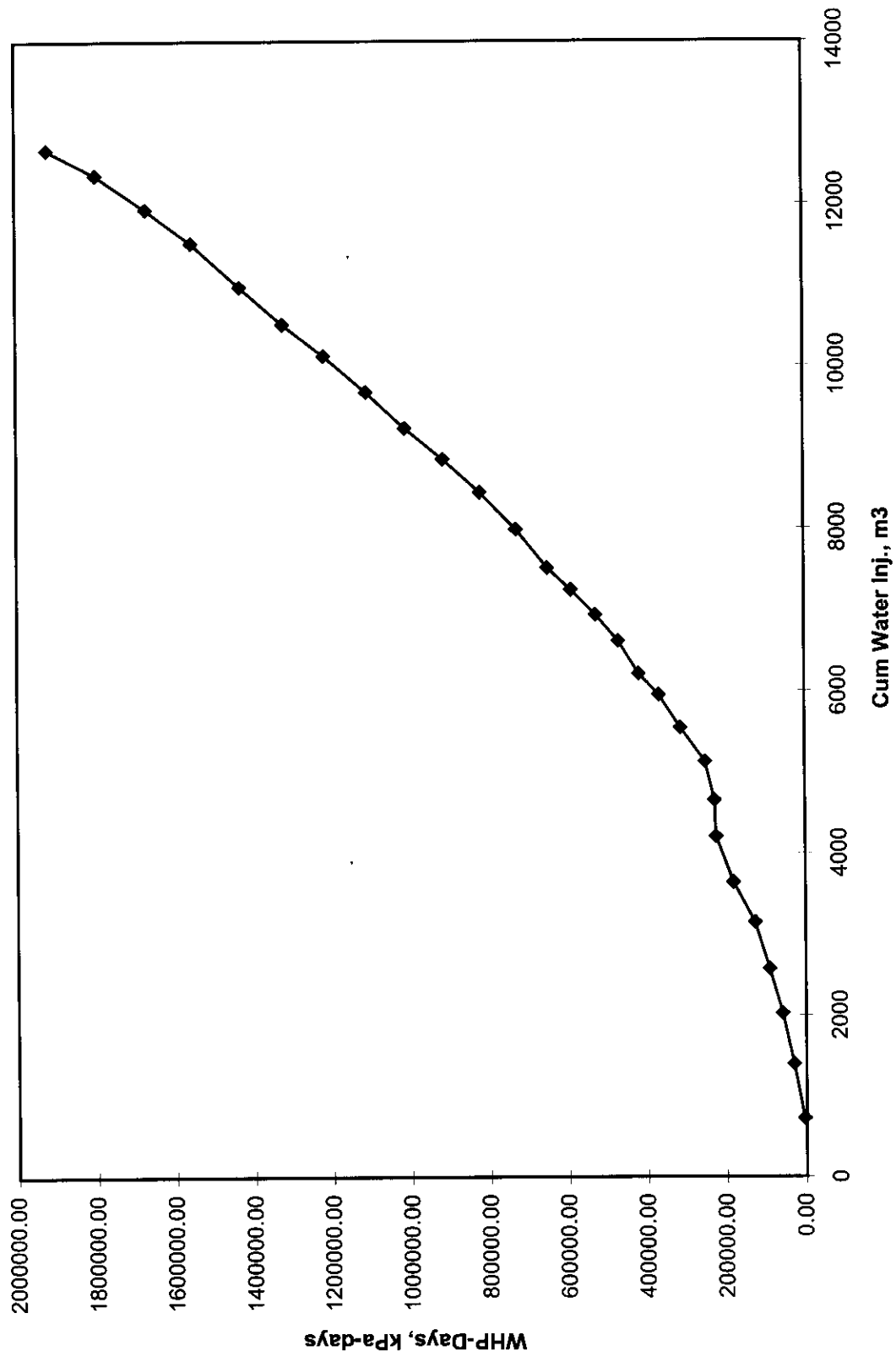


14-09 Hall Plot

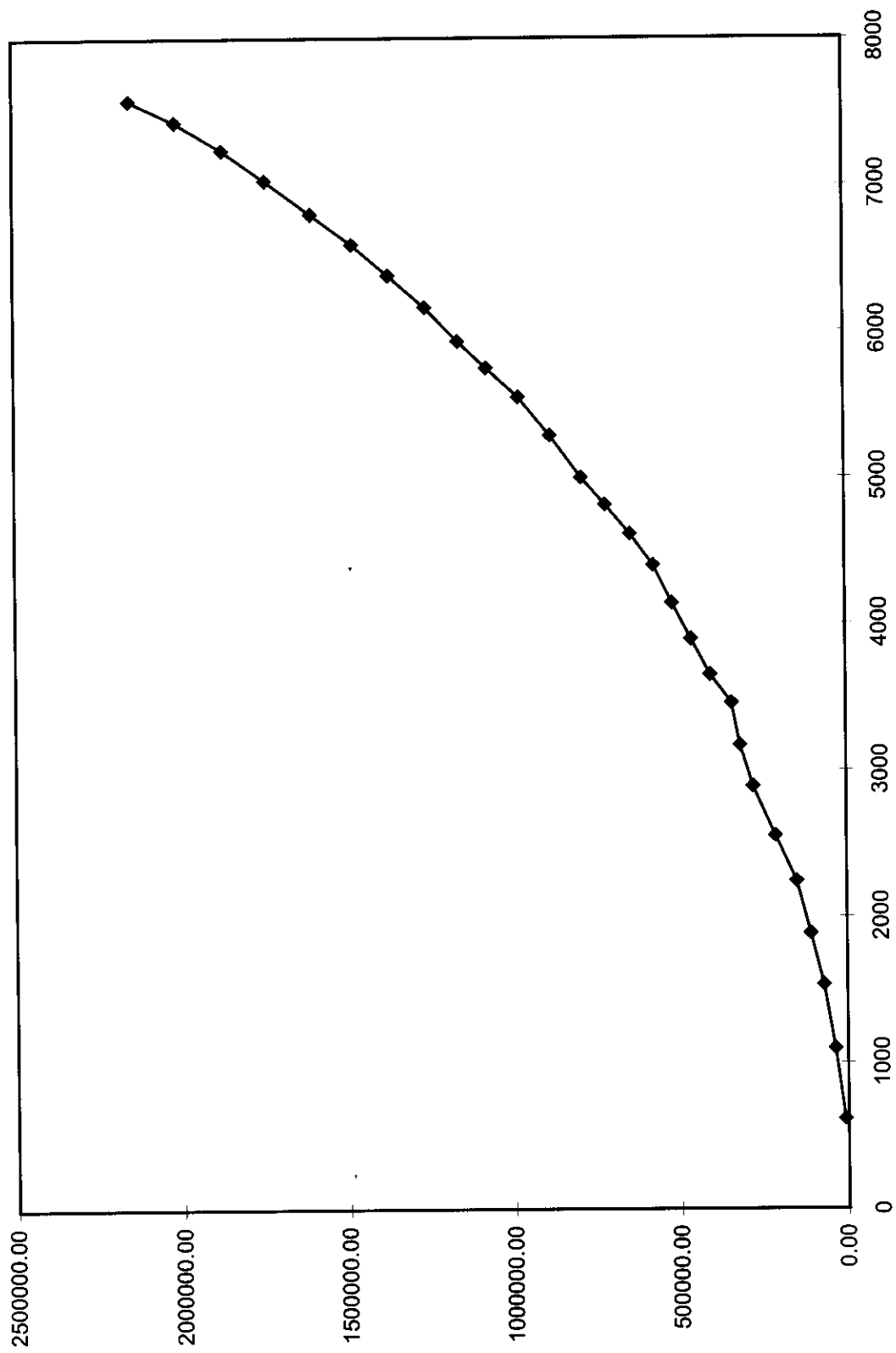


10-09

### 16-09 Hall Plot

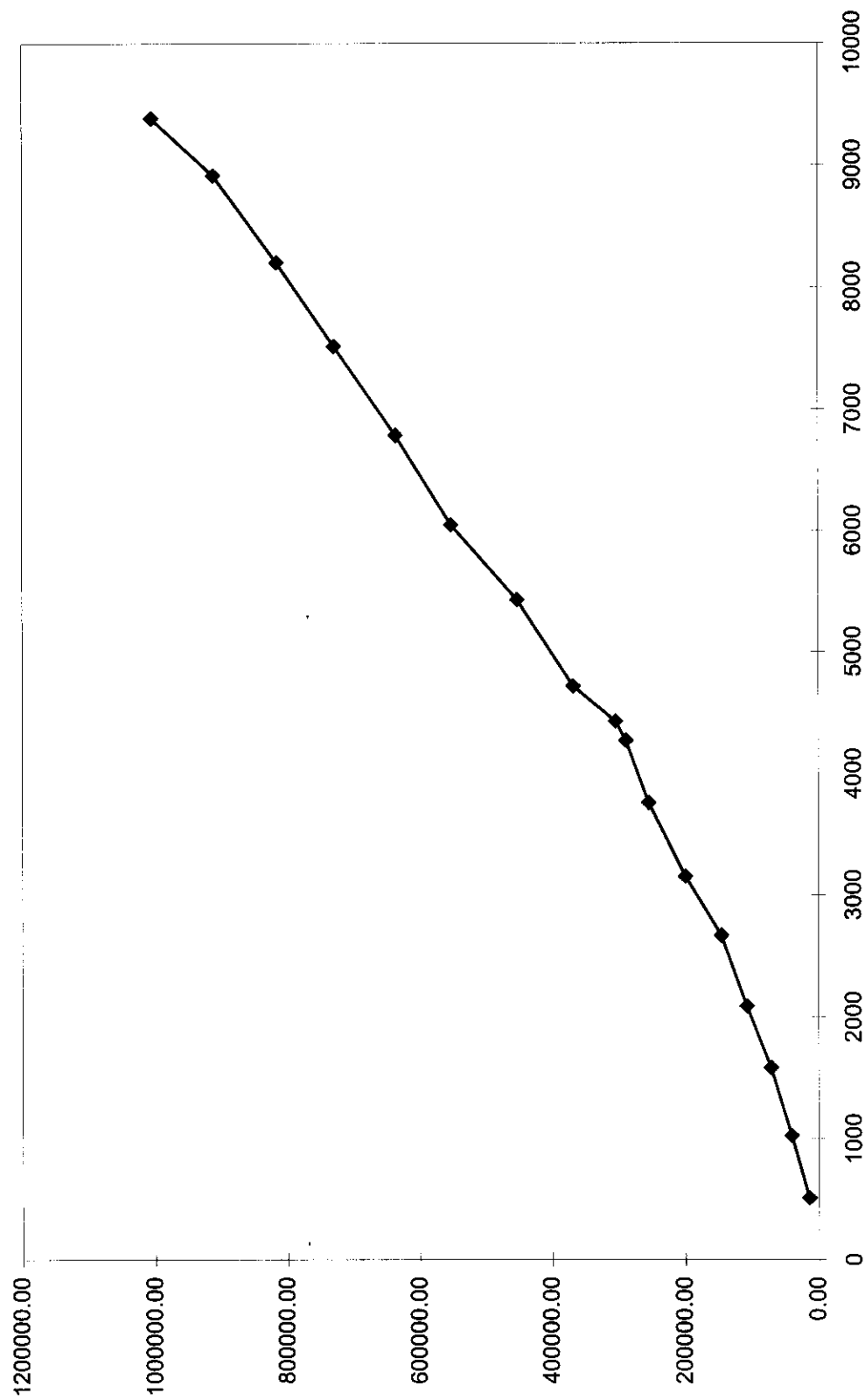


# 04-15 Hall Plot

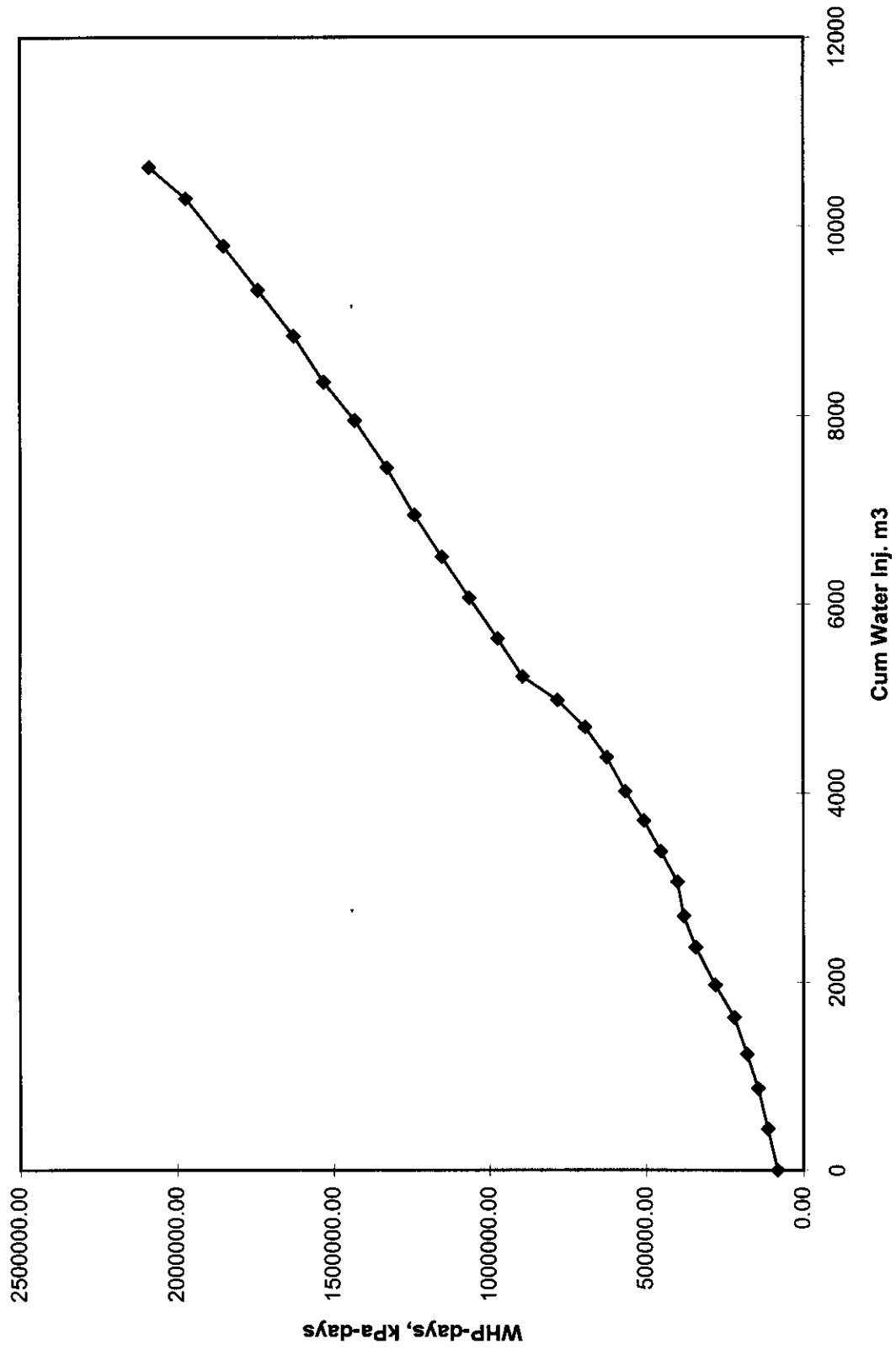




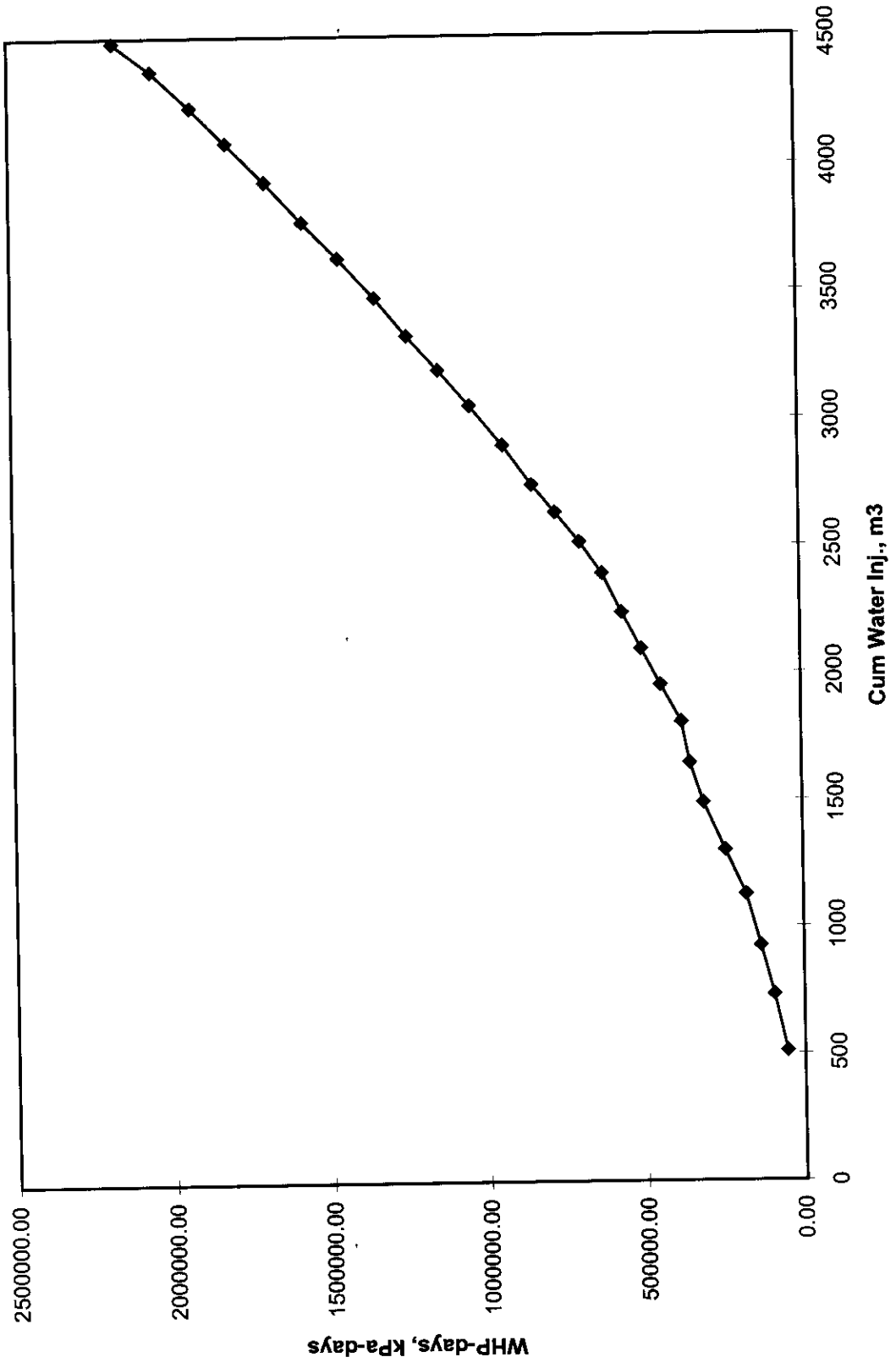
## 2-16 Hall Plot



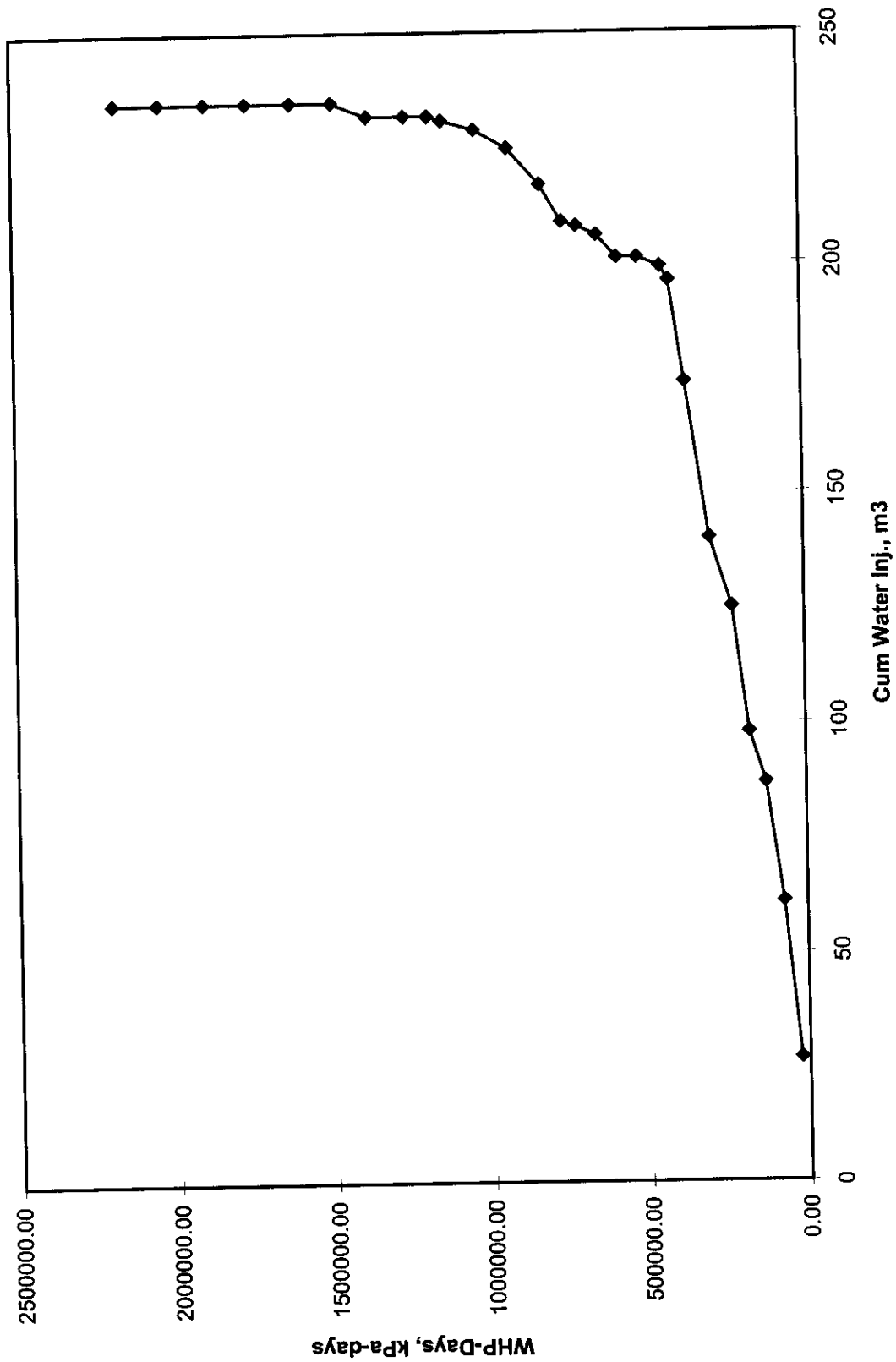
# 04-16 Hall Plot



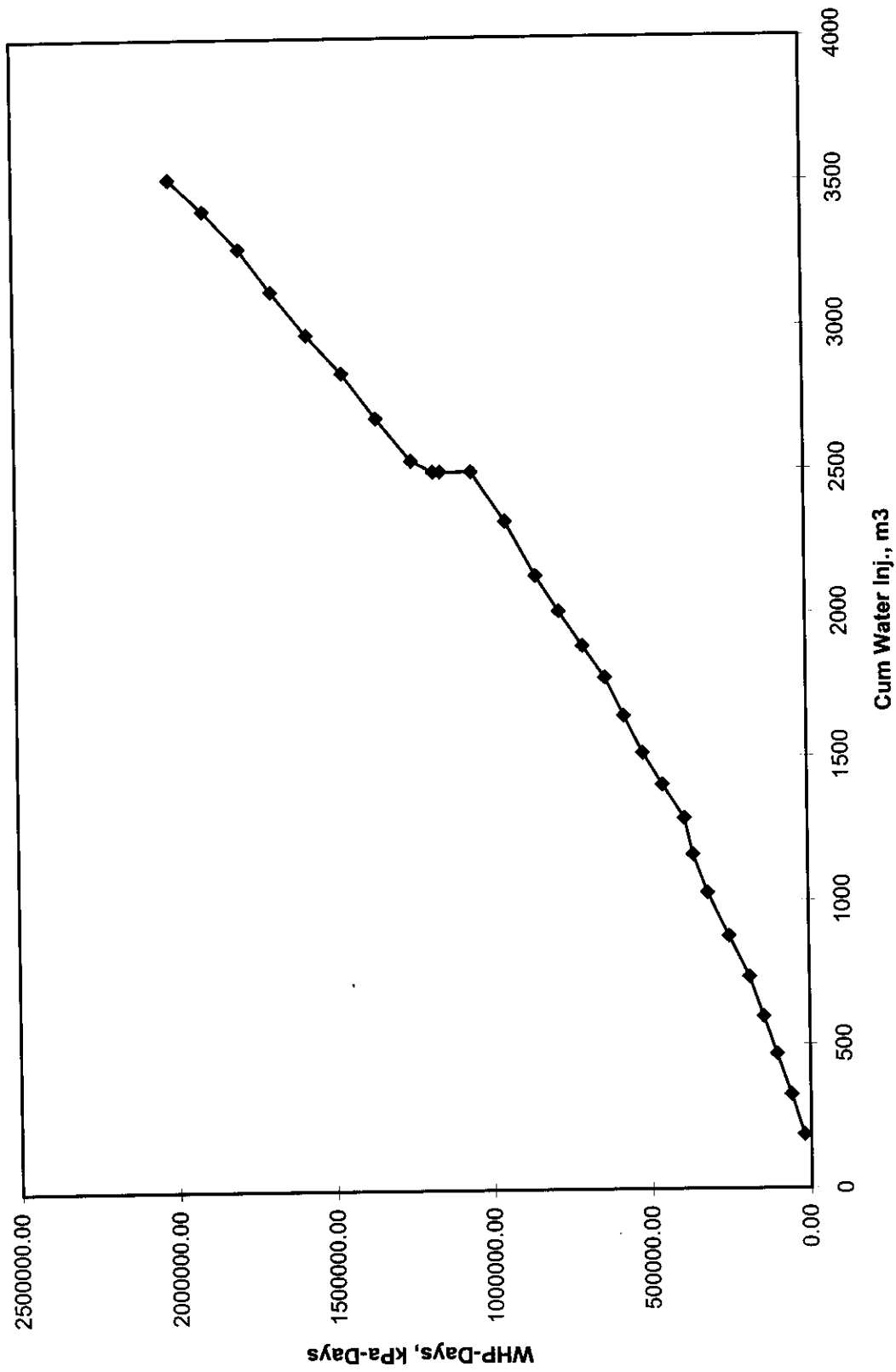
# 06-16 Hall Plot



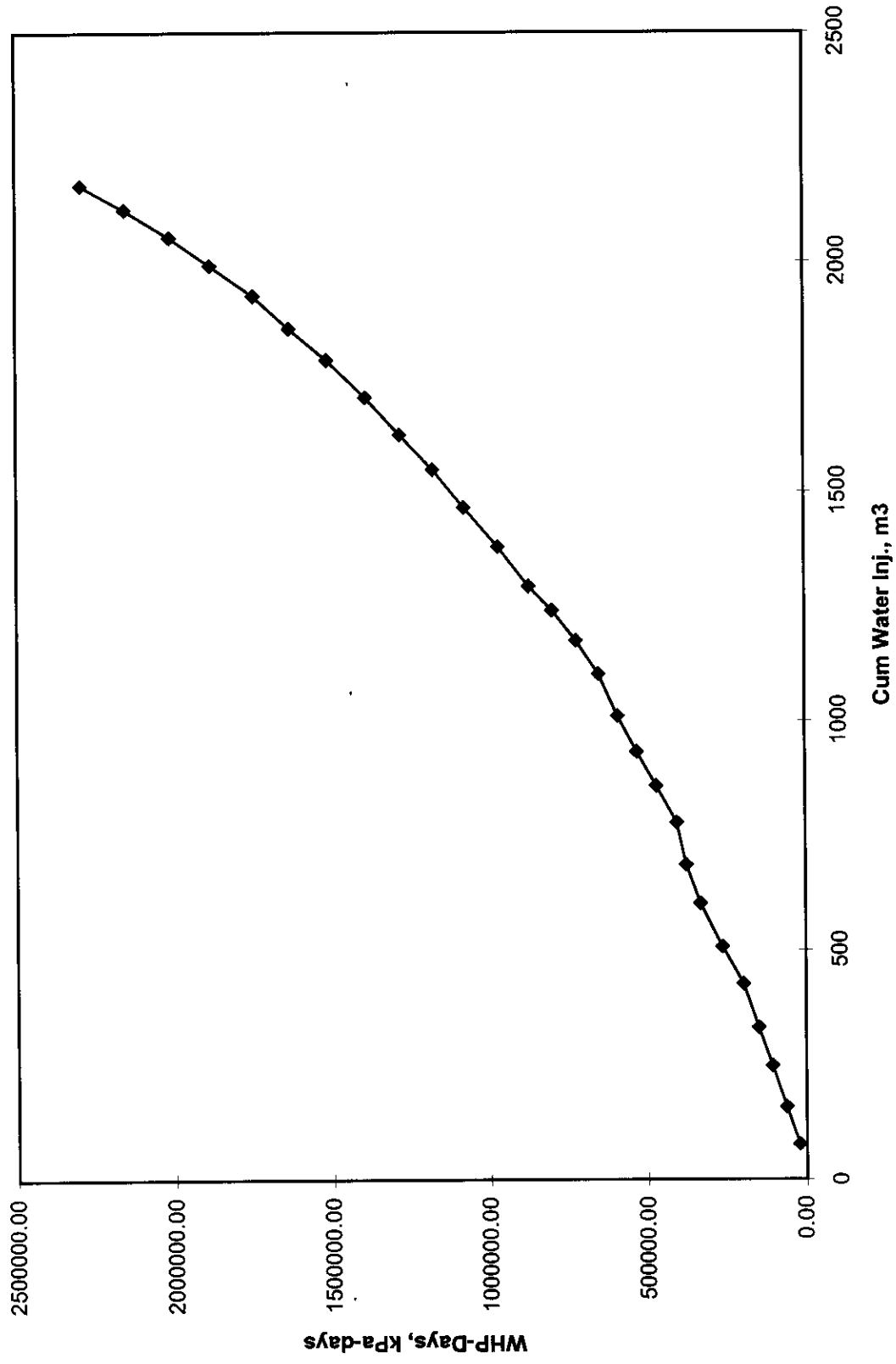
# 08-16 Hall Plot



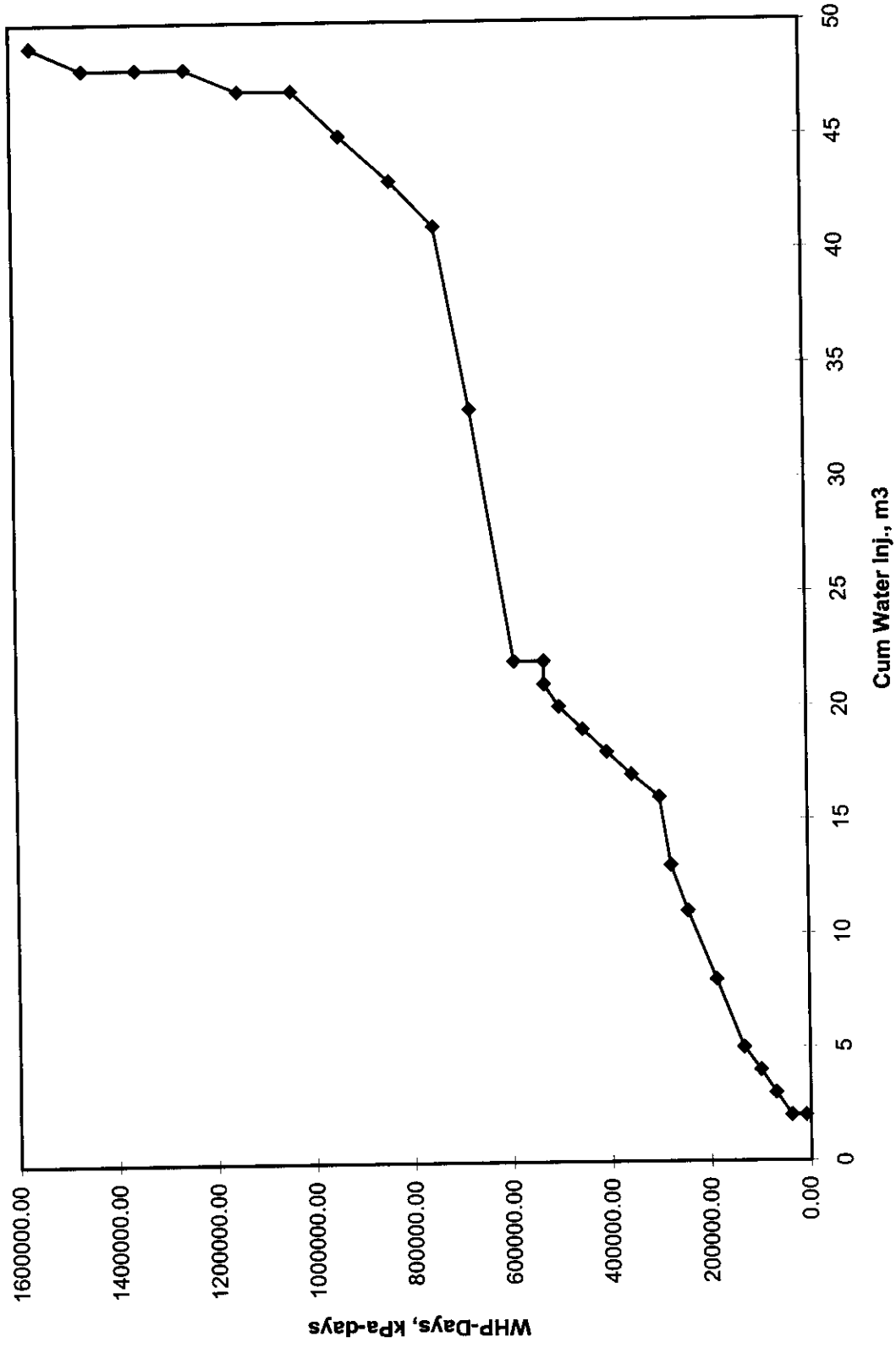
# 10-16 Hall Plot



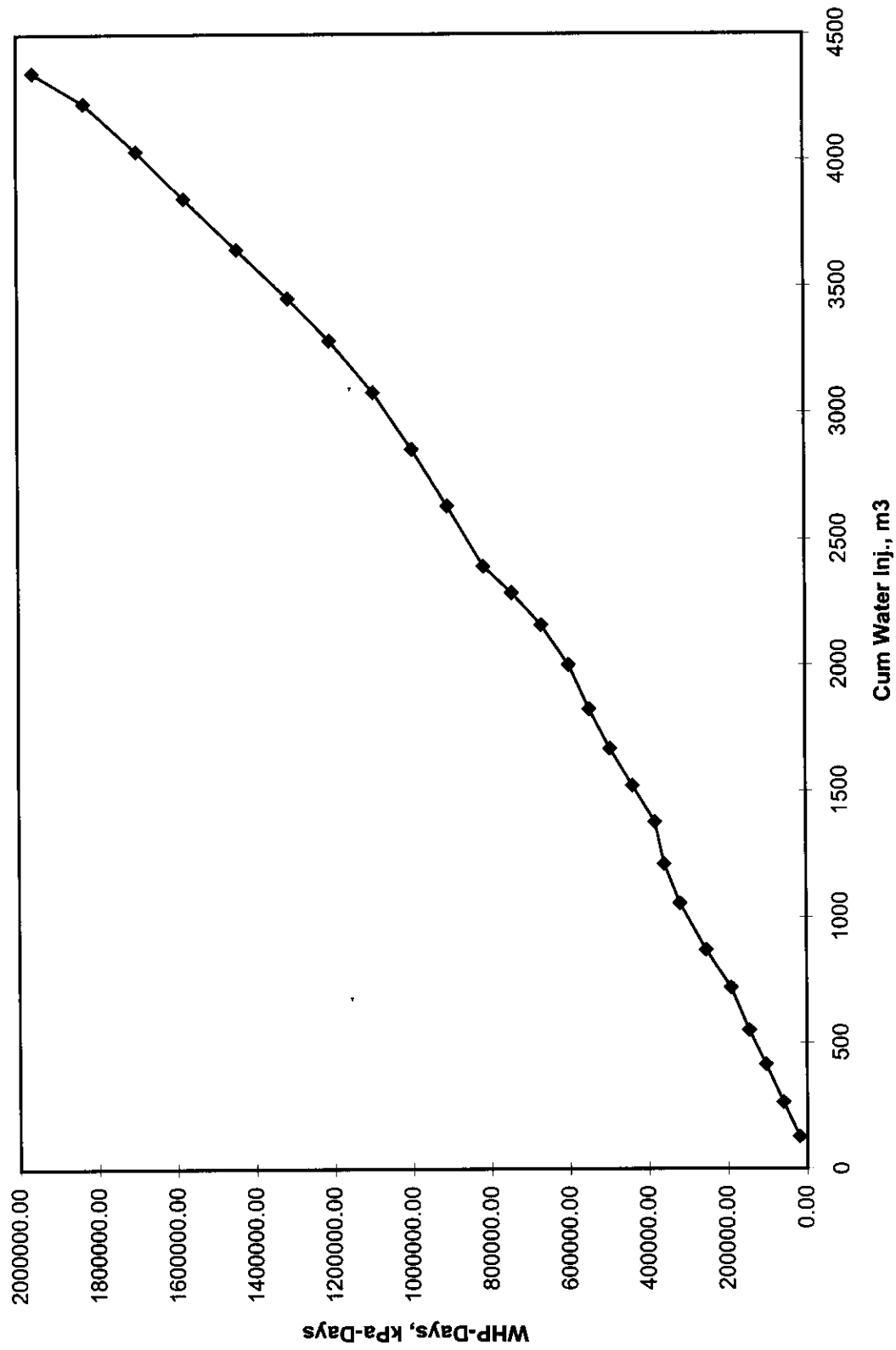
# 12-16 Hall Plot



# 02-17 Hall Plot

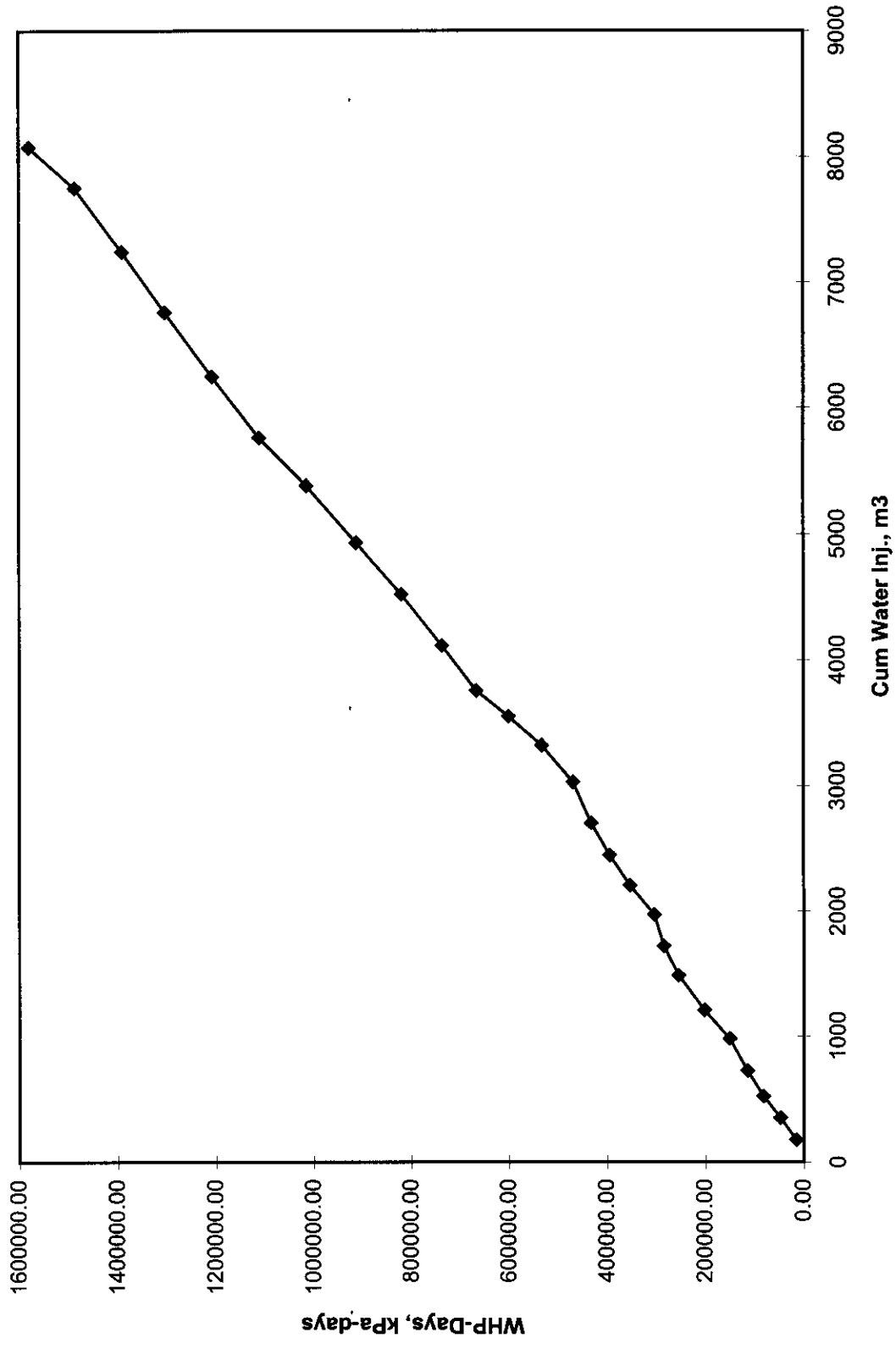


# 04-17 Hall Plot

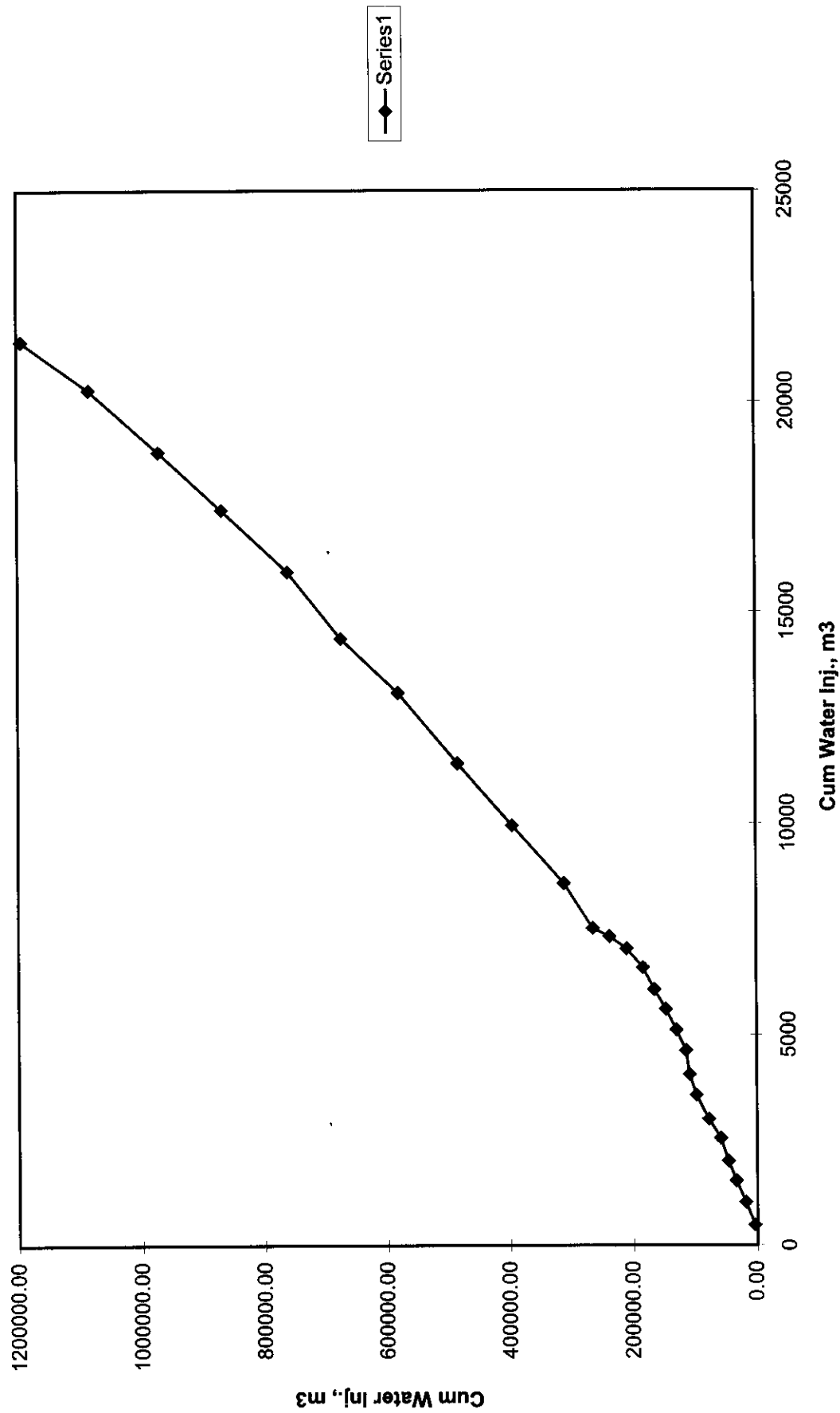




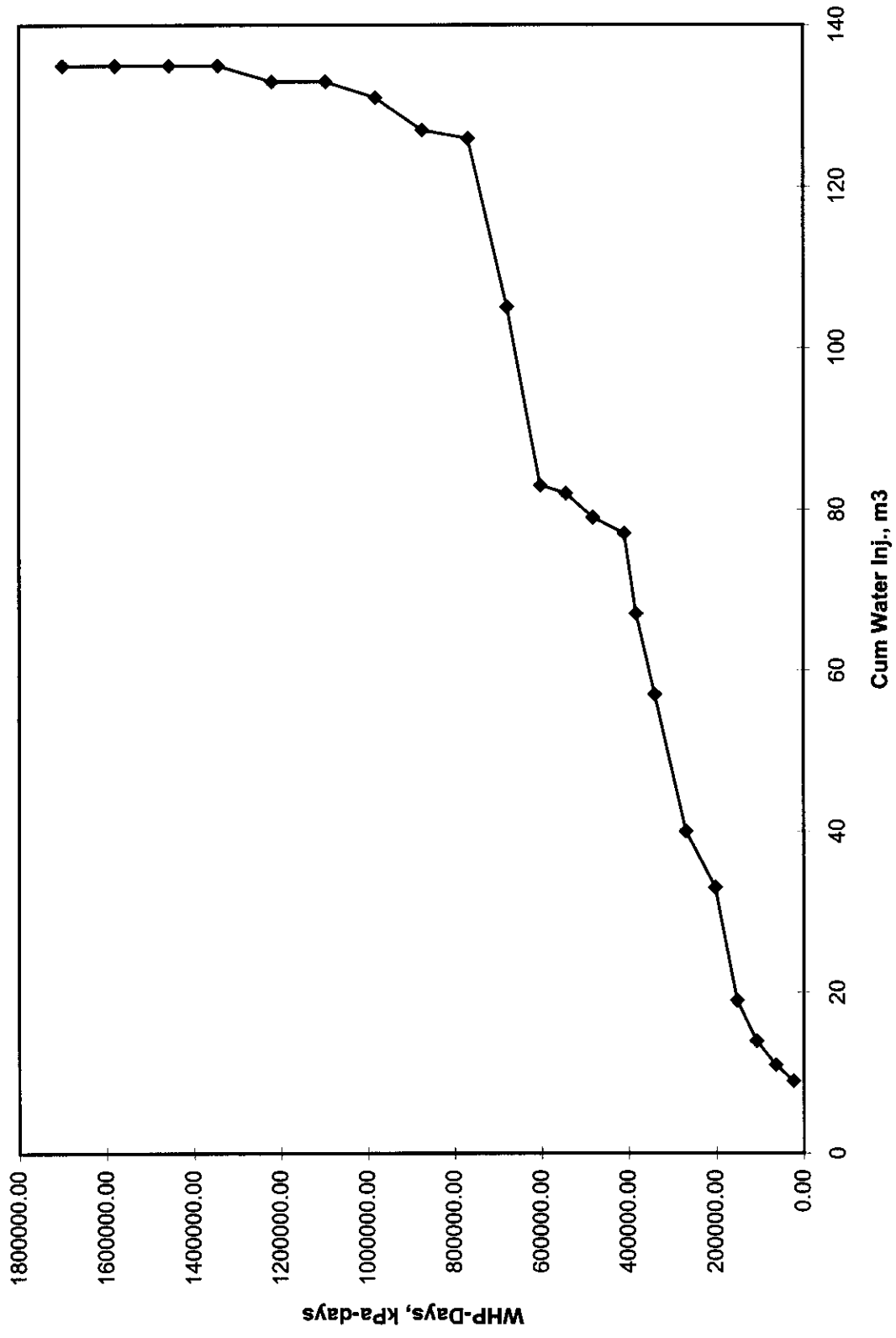
## 06-17 Hall Plot



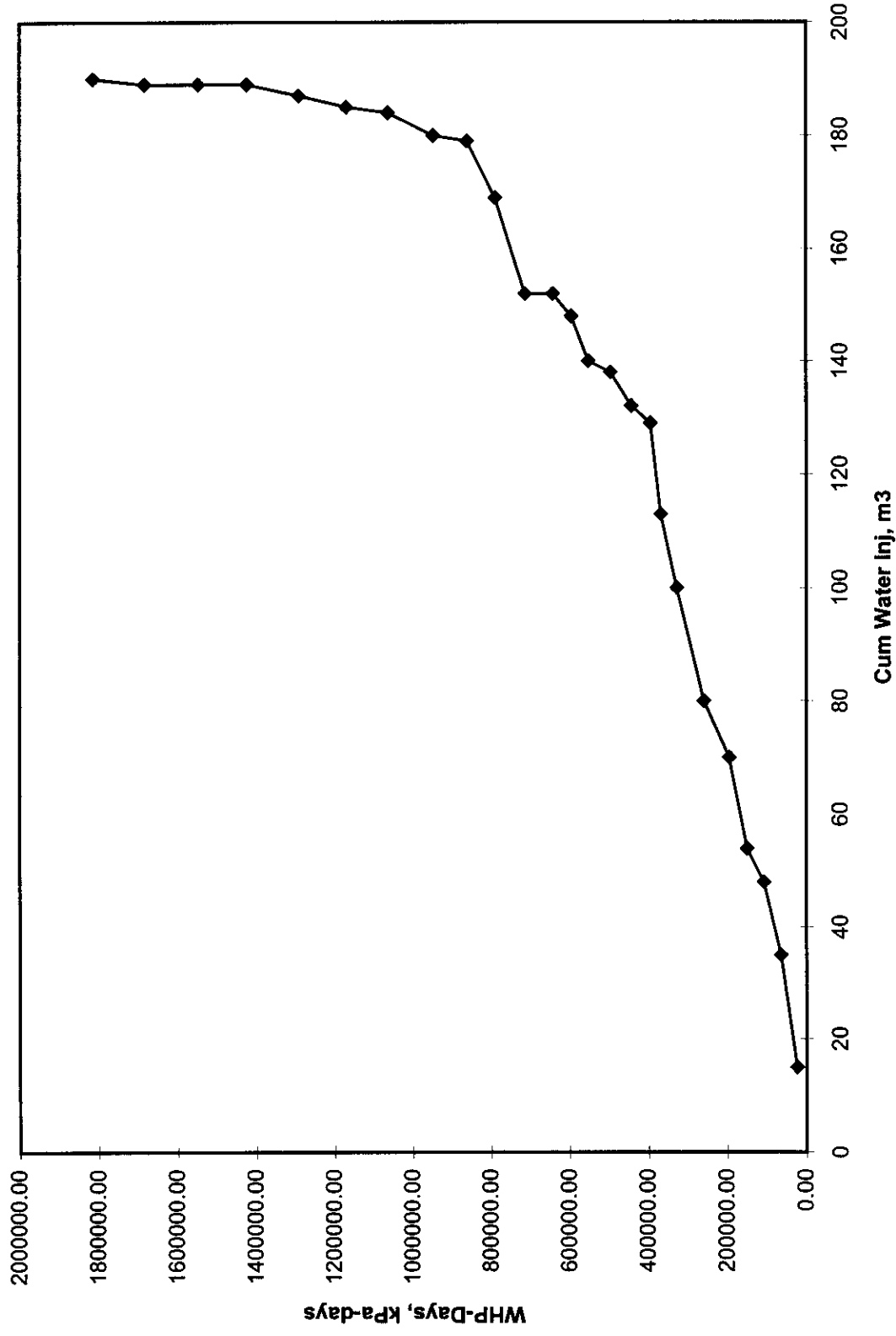
# 08-17 Hall Plot



# 12-17 Hall Plot



# 08-18 Hall Plot

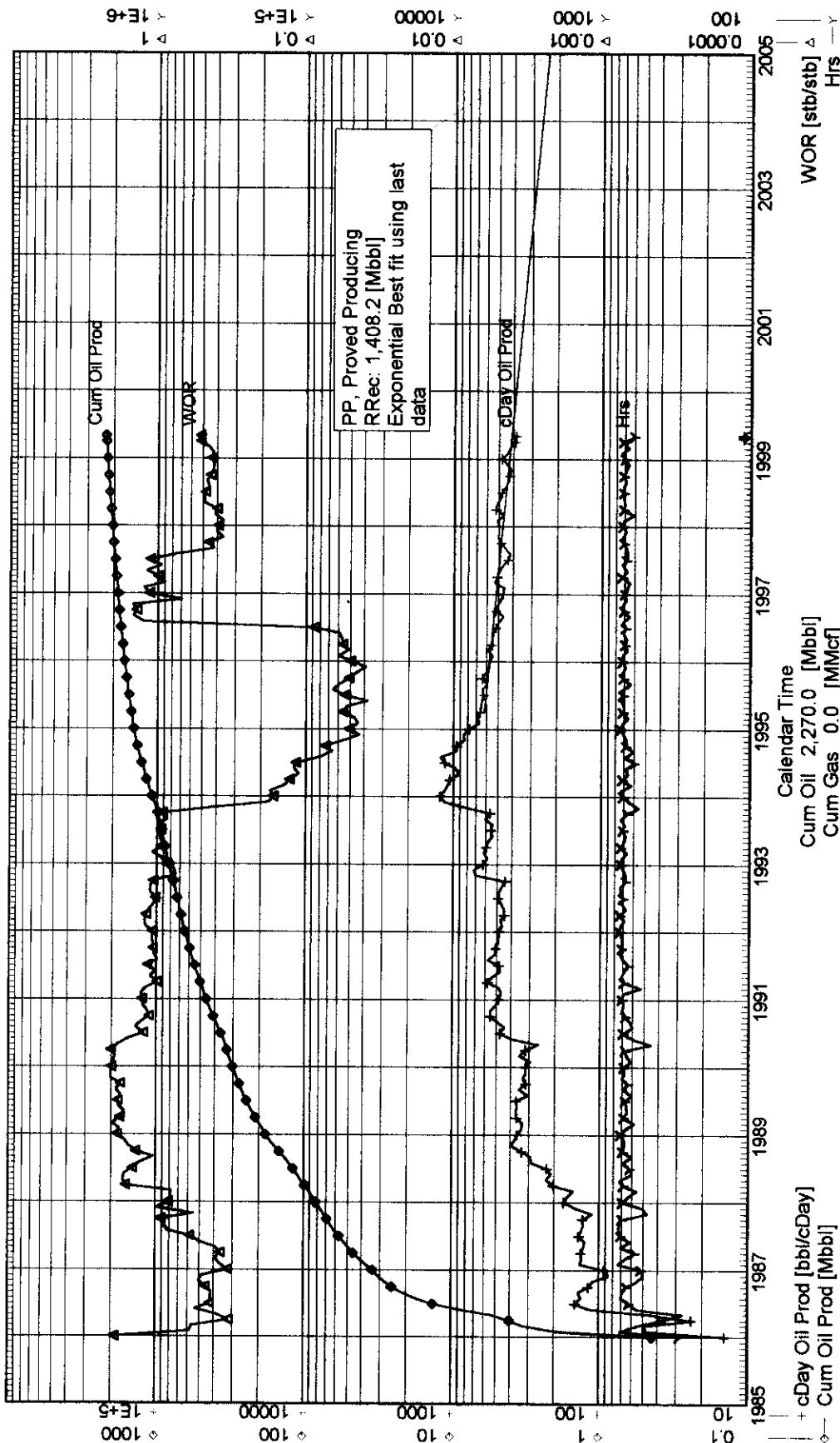


## **Appendix 4**

Group: South Pierson Unit  
Total Wells: 67

Primary: OIL  
Last On: Apr-1999

Field:  
Pool:  
Unit:  
Oper:  
Source Date: n/a



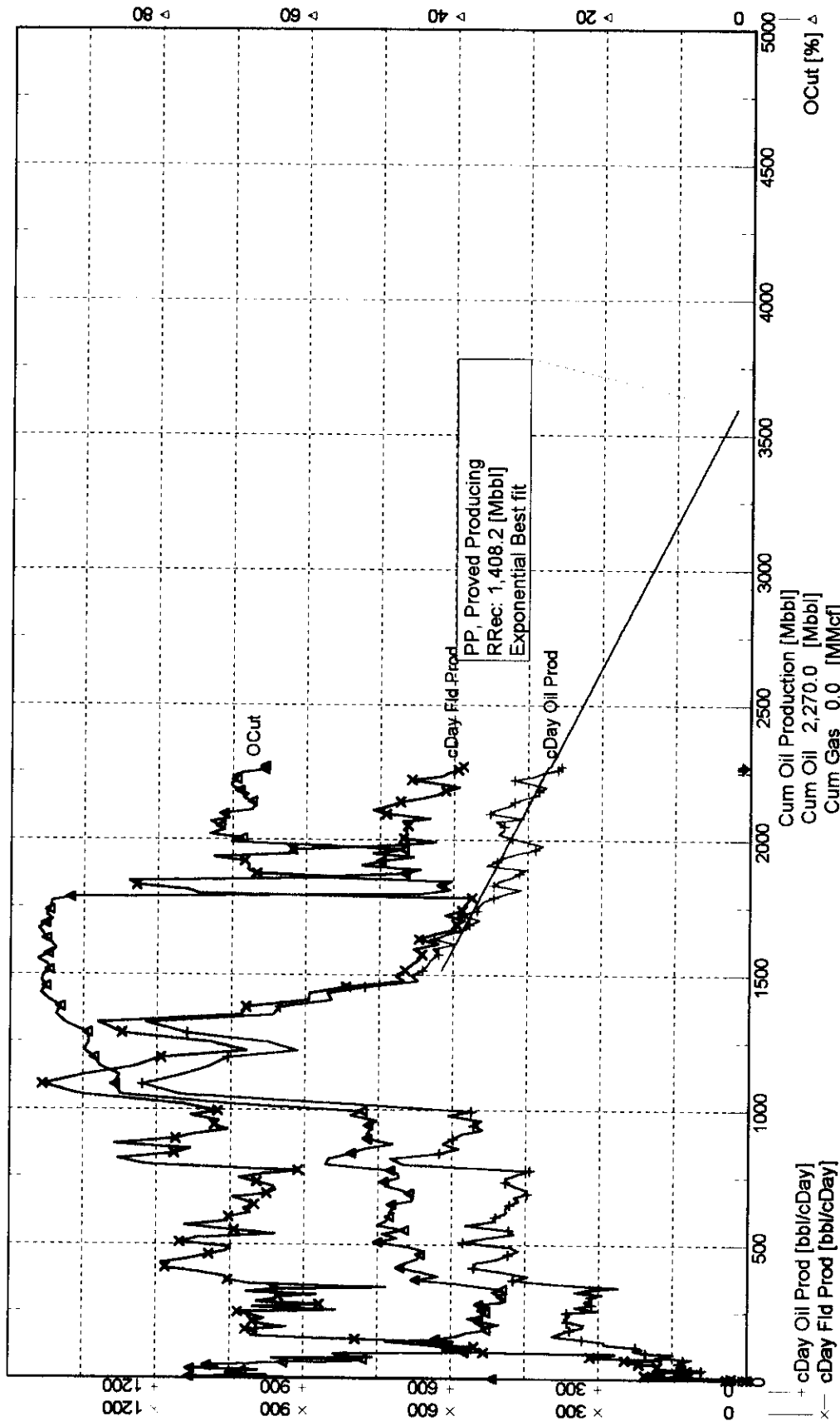
Qi 408.6 [bbl/cDay]  
Rem Rec 1,408.2 [Mbbbl] (1999/04)

Serv 100.0%  
Exp 9.422%/Yr

Group: **South Pierson Unit**  
Total Wells: 67

Primary: OIL  
Last On: Apr-1999

Field:  
Pool:  
Unit:  
Oper:  
Source Date: n/a



Qi 401.3 [bbl/cDay]  
Rem Rec 1,408.2 [Mbbl] (1999/04)

Qf 30.0 [bbl/cDay]  
Ult Rec 3,678.2 [Mbbl] (PP)

Serv 100.0%  
Exp 9.806%/Yr

Group: **South Pierson Unit**

Total Wells: 67

Primary: OIL

Last On: Apr-1999

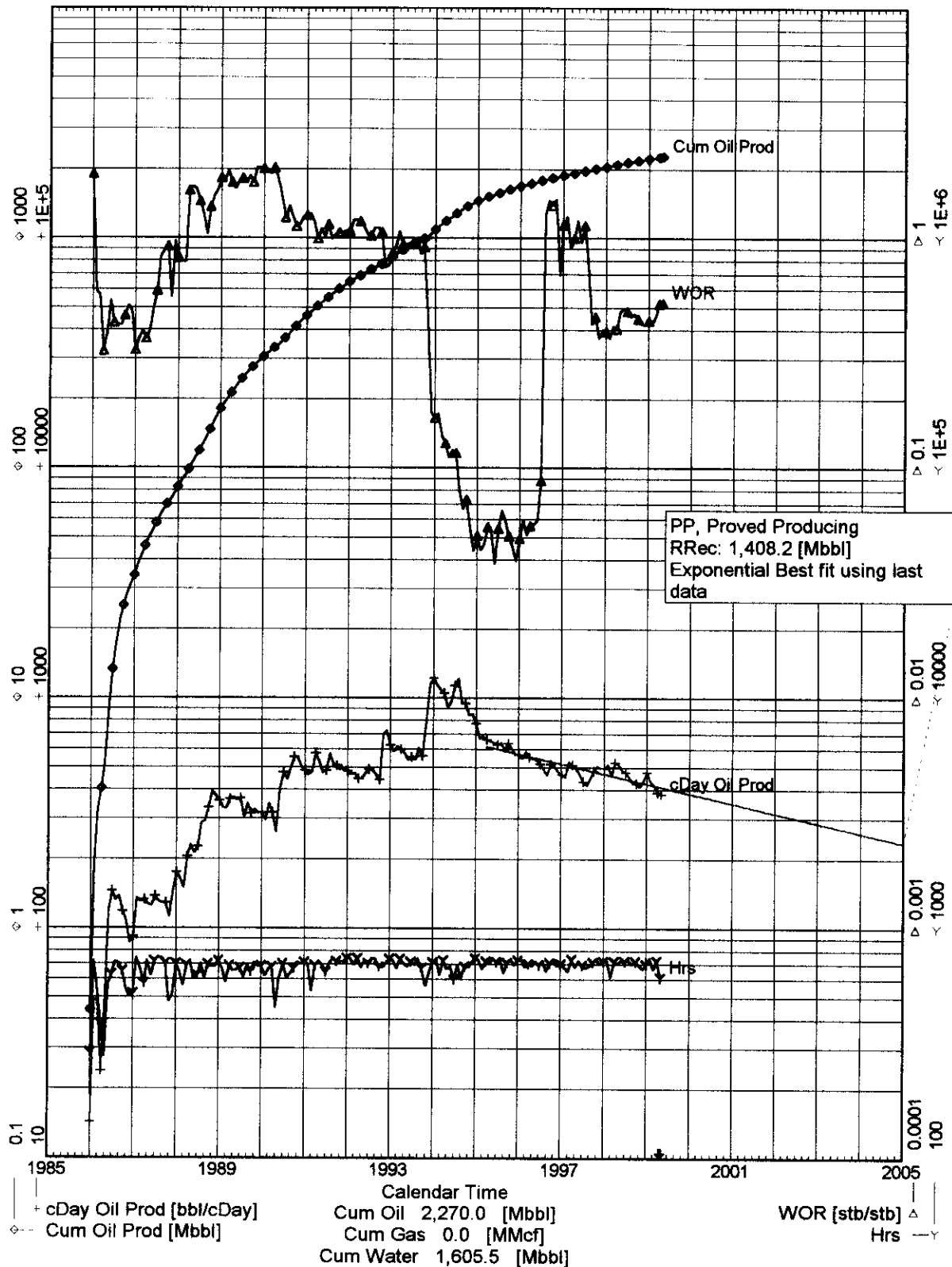
Field:

Pool:

Unit:

Oper:

Source Date: n/a



Qi 408.6 [bbl/cDay] Qf 30.0 [bbl/cDay]  
Rem Rec 1,408.2 [Mbbl] (1999/04) Ult Rec 3,678.2 [Mbbl] (PP)

Serv 100.0%  
Exp 9.422%/Yr



Group: **South Pierson Unit**

Total Wells: 67

Primary: OIL

Last On: Apr-1999

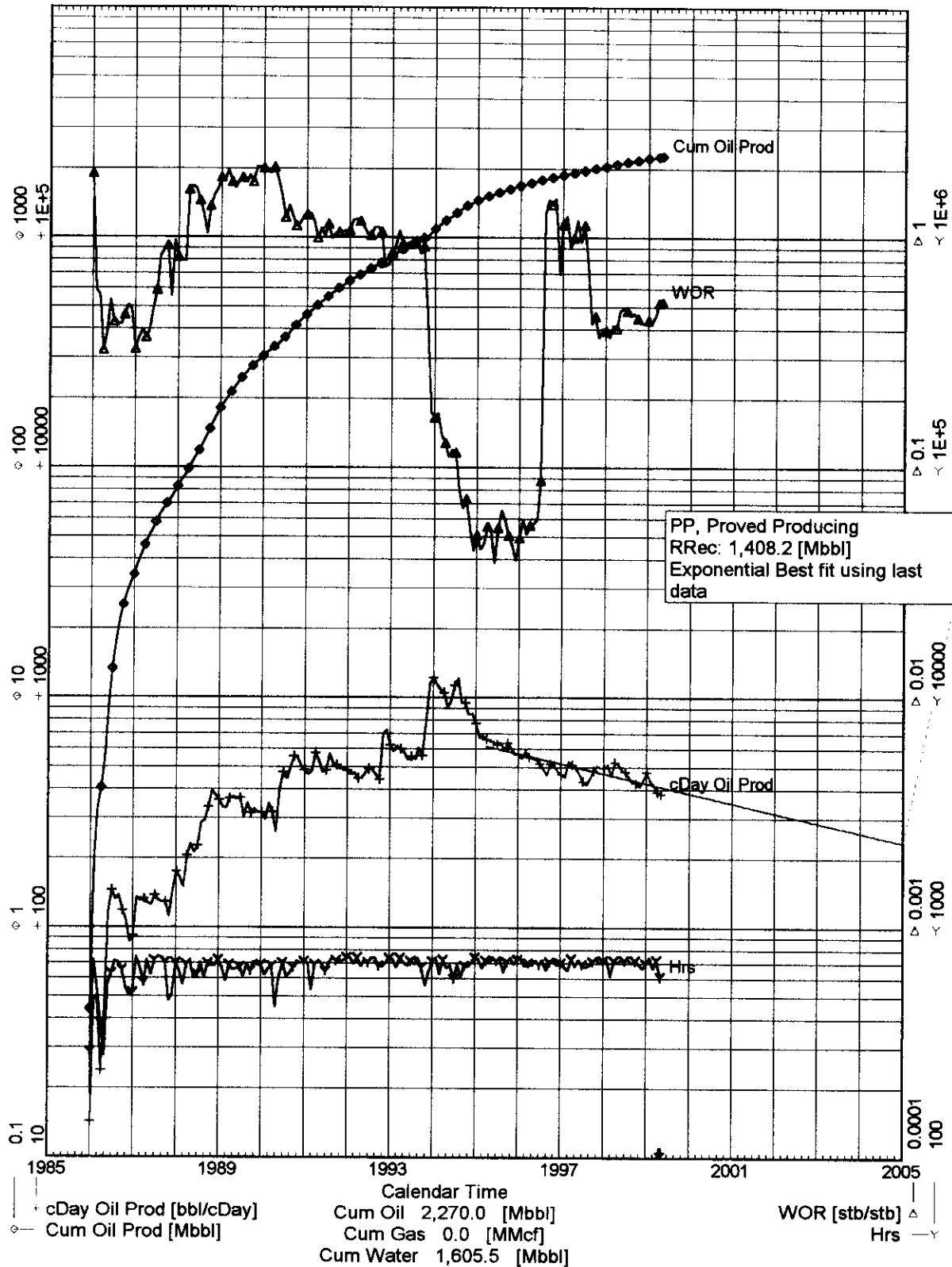
Field:

Pool:

Unit:

Oper:

Source Date: n/a



# FORECAST SUMMARY

## South Pierson Unit (67 wells)

1. forecast (Exp,Time,cDay Oil Prod) - PP
  - a) Correlation Coefficient (r) = -0.8613
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 622.3 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 8.247E-03 [1/t]
  - e) Effective Decline Rate (De) = 9.422 [%/Yr]
  - f) Forecast Start Rate (Qo) = 412.0 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit (Ql) = 30.0 [bbl/cDay] (2025/Oct)
  - j) Ultimate Recoverable (Np) = 3,678.2 [Mbbbl]
  - k) Remaining Recoverable = 1,408.2 [Mbbbl] (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

## Footnote(s):

- (1) forecast (Exp,Time,cDay Oil Prod)

Range: Start of Curve Fit to Economic Limit

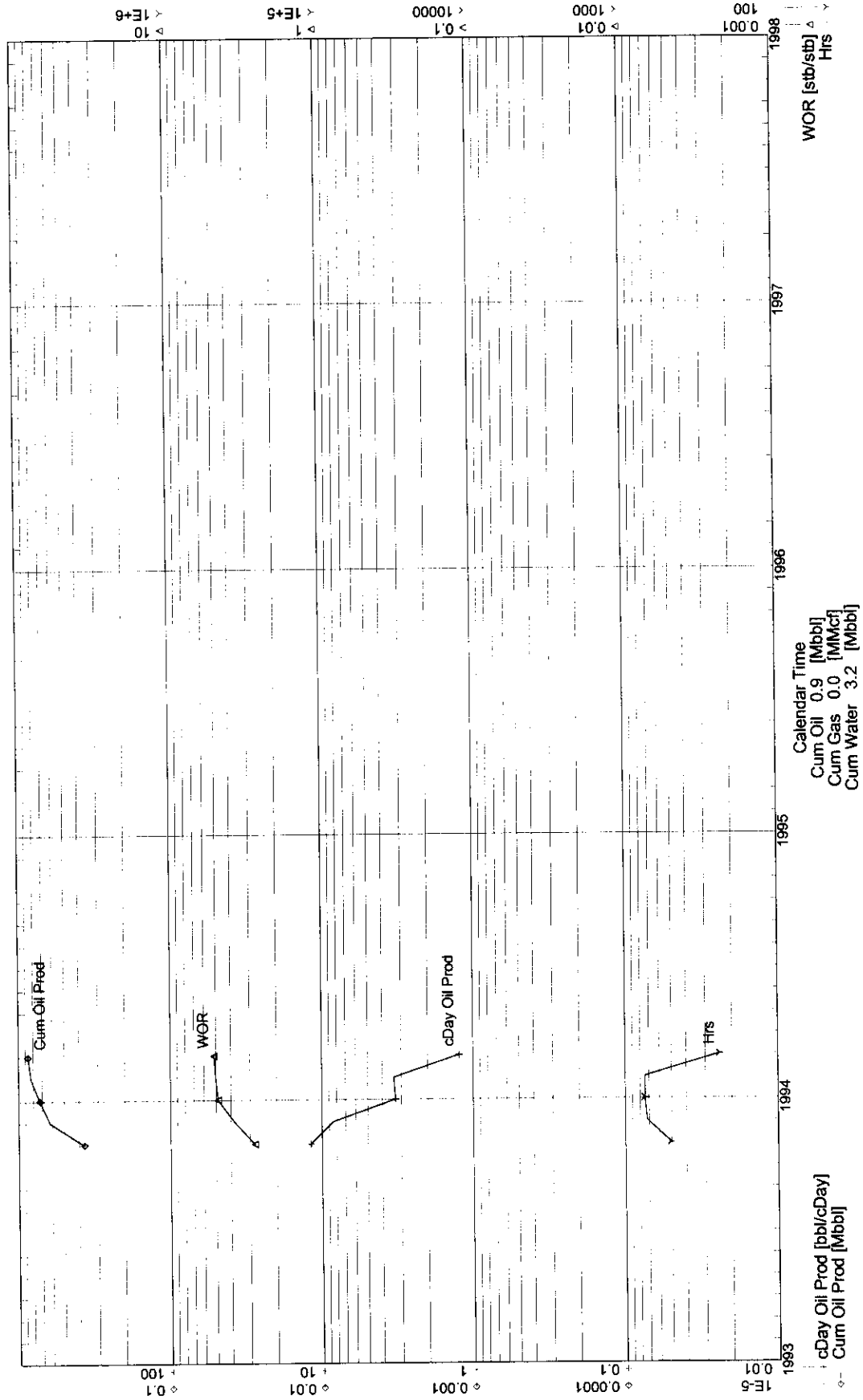
Date	ACTUALS		FORECASTS					Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	cDay Oil Prod (1) [bbl/cDay]	Cum [Mbbbl]	Remaining Reserves [Mbbbl]					
1995	350.0	621.7	1,685.8	594.9			9.422				
1996	379.2	519.0	1,875.0	543.3			9.422				
1997	343.1	479.8	2,050.0	492.1			9.422				
1998	335.8	468.7	2,221.1	445.8			9.422				
1999/04	408.3	407.5	2,270.0	412.0	2,270.0	1,408.2	9.422				
1999				397.1	2,367.0	1,311.2	9.422				
2000				365.7	2,500.9	1,177.3	9.422				
2001				331.3	2,622.3	1,055.9	9.422				
2002				300.1	2,732.2	946.0	9.422				
2003				271.8	2,831.7	846.4	9.422				
2004				246.2	2,921.9	756.3	9.422				
2005				223.0	3,003.6	674.6	9.422				
2006				202.0	3,077.6	600.6	9.422				
2007				182.9	3,144.6	533.6	9.422				
2008				165.7	3,205.3	472.9	9.422				
2009				150.1	3,260.3	417.9	9.422				
2010				135.9	3,310.1	368.1	9.422				
2011				123.1	3,355.2	323.0	9.422				
2012				111.5	3,396.0	282.2	9.422				
2013				101.0	3,433.0	245.2	9.422				
2014				91.5	3,466.5	211.6	9.422				
2015				82.9	3,496.9	181.3	9.422				
2016				75.1	3,524.4	153.8	9.422				
2017				68.0	3,549.3	128.9	9.422				
2018				61.6	3,571.9	106.3	9.422				
2019				55.8	3,592.3	85.9	9.422				

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS							
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	cDay Oil Prod (1) [bbl/cDay]	Cum [Mbbbl]	Remaining Reserves [Mbbbl]	Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
2020				50.5	3,610.8	67.4	9.422			
2021				45.8	3,627.6	50.6	9.422			
2022				41.5	3,642.8	35.4	9.422			
2023				37.6	3,656.5	21.6	9.422			
2024				34.0	3,669.0	9.2	n/a			
2025				31.1	3,678.5	-0.3	n/a			

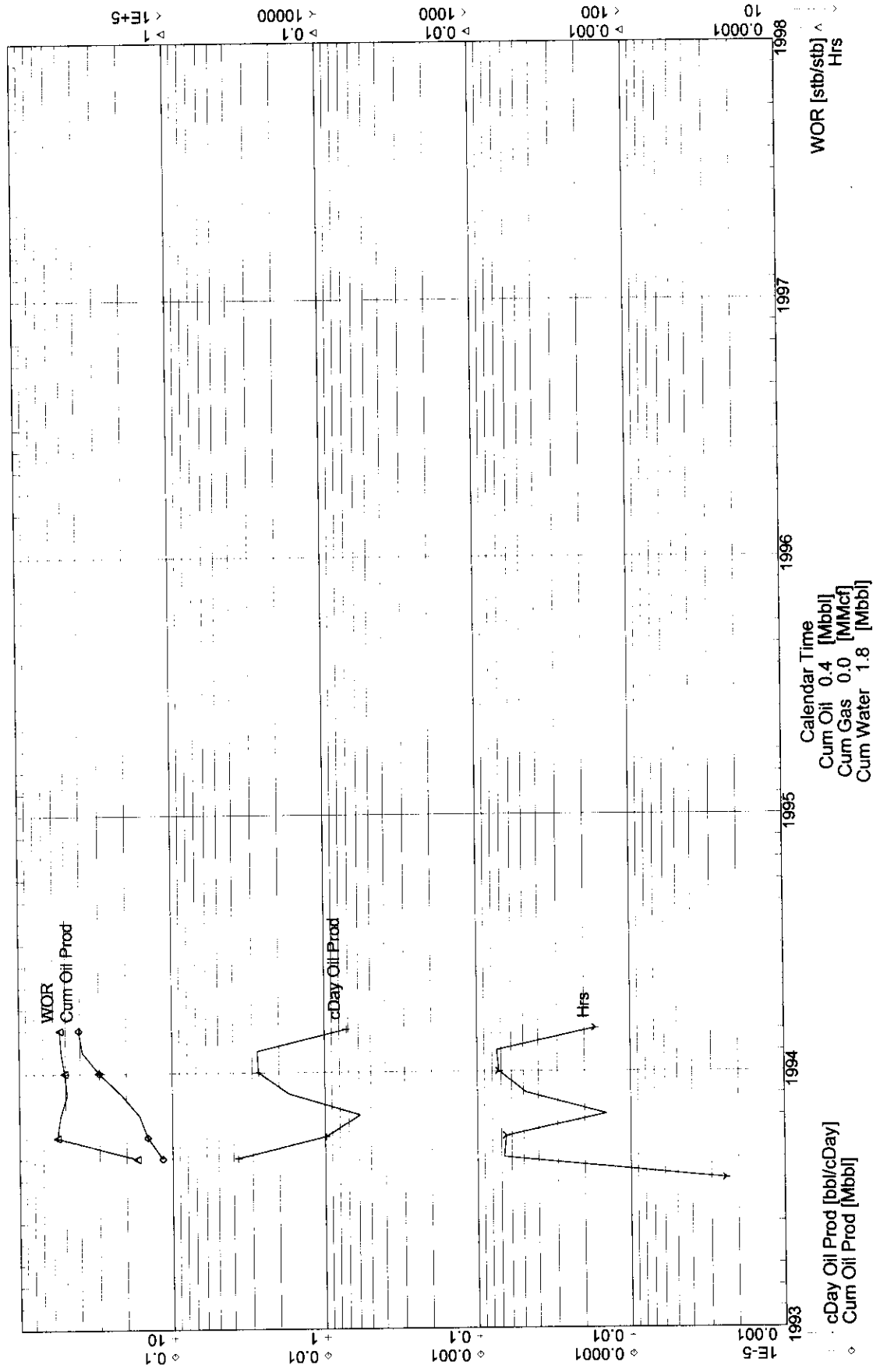
Group: **South Pierson Unit**  
 Well: **00/10-04-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 10-4-2-29  
 Primary: OTHER Status:  
 Last On: Feb-1994

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



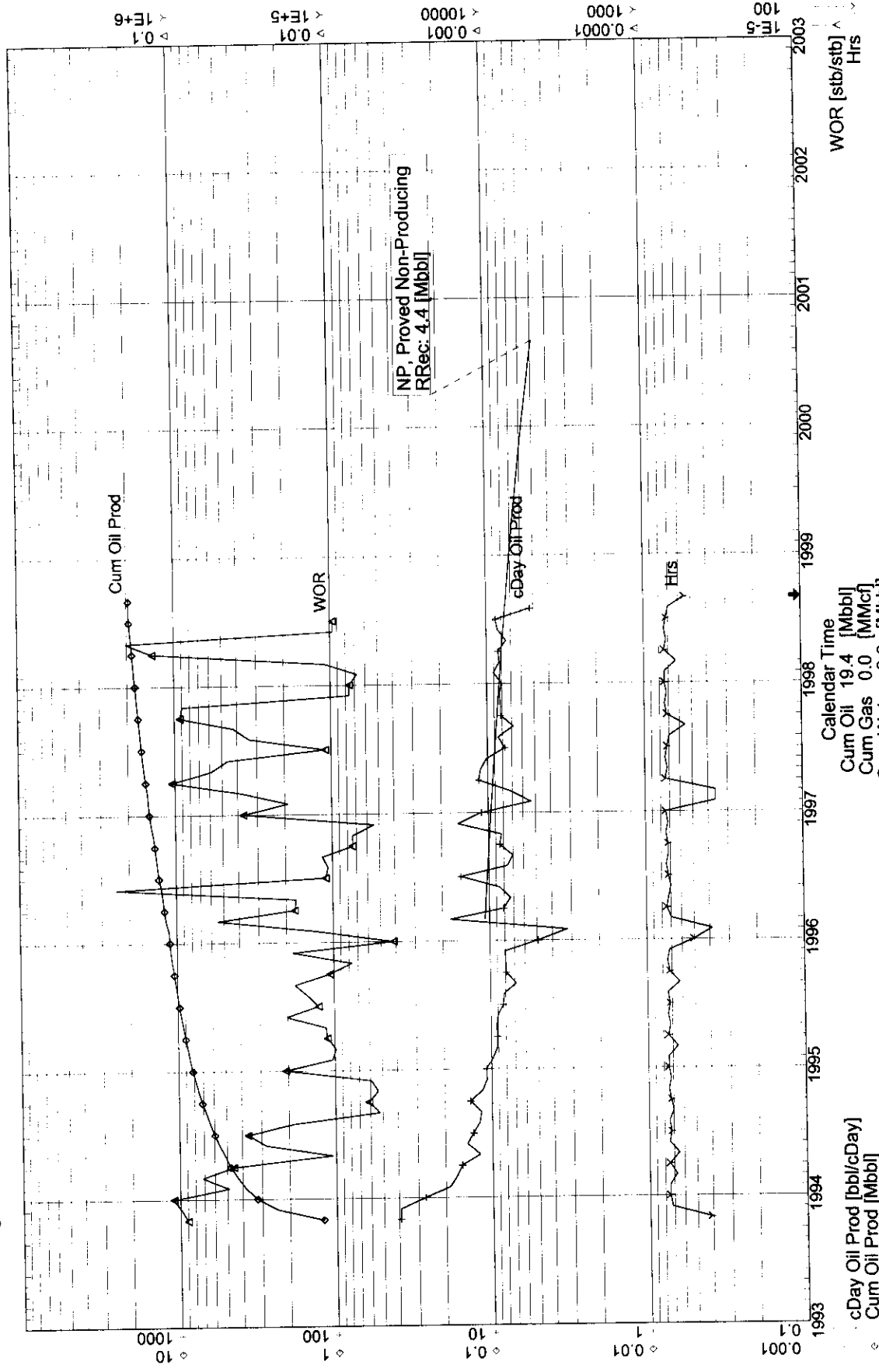
Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/12-04-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO1 12-4-2-29  
 Primary: OTHER Status:  
 Last On: Feb-1994



Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/13-04-002-29W1/0  
 Name: HOME S PIERSON UNIT 1 PROV 13-4-2-29  
 Primary: OTHER Status:  
 Last On: Aug-1998



Qi 7.4 [bbl/cDay]  
 Rqm Rec 4.4 [Mbbbl] (1998-08)  
 DECPRO v3.10  
 Petro-Soft Systems Ltd  
 Cum Oil 19.4 [Mbbbl]  
 Cum Gas 0.0 [MMcf]  
 Cum Water 2.0 [Mbbbl]  
 Qf 5.0 [bbl/cDay]  
 Utl Rec 23.8 [Mbbbl] (NP)  
 Hyp 17.4 [Mbbbl] (NP)  
 Serv 100.0%  
 c data decline under scenario for Pierson.dpd  
 01-Nov-99 16:30 [person]

# FORECAST SUMMARY

00/13-04-002-29W1/0

1. Temp3 (Hyp,Time,cDay Oil Prod) - NP
  - a) Correlation Coefficient (r) = -0.3286
  - b) Decline Exponent (n) = -1.000
  - c) Initial Decline Rate (Qi) = 10.8 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 9.909E-03 [1/t]
  - e) Effective Decline Rate (Dei) = 11.891 [%/Yr]
  - f) Forecast Start Rate (Qo) = 7.7 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1998/Jun
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2000/Aug)
  - j) Ultimate Recoverable (Np) = 23.8 [Mbbbl]
  - k) Remaining Recoverable = 4.4 [Mbbbl] (at 1998/08)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

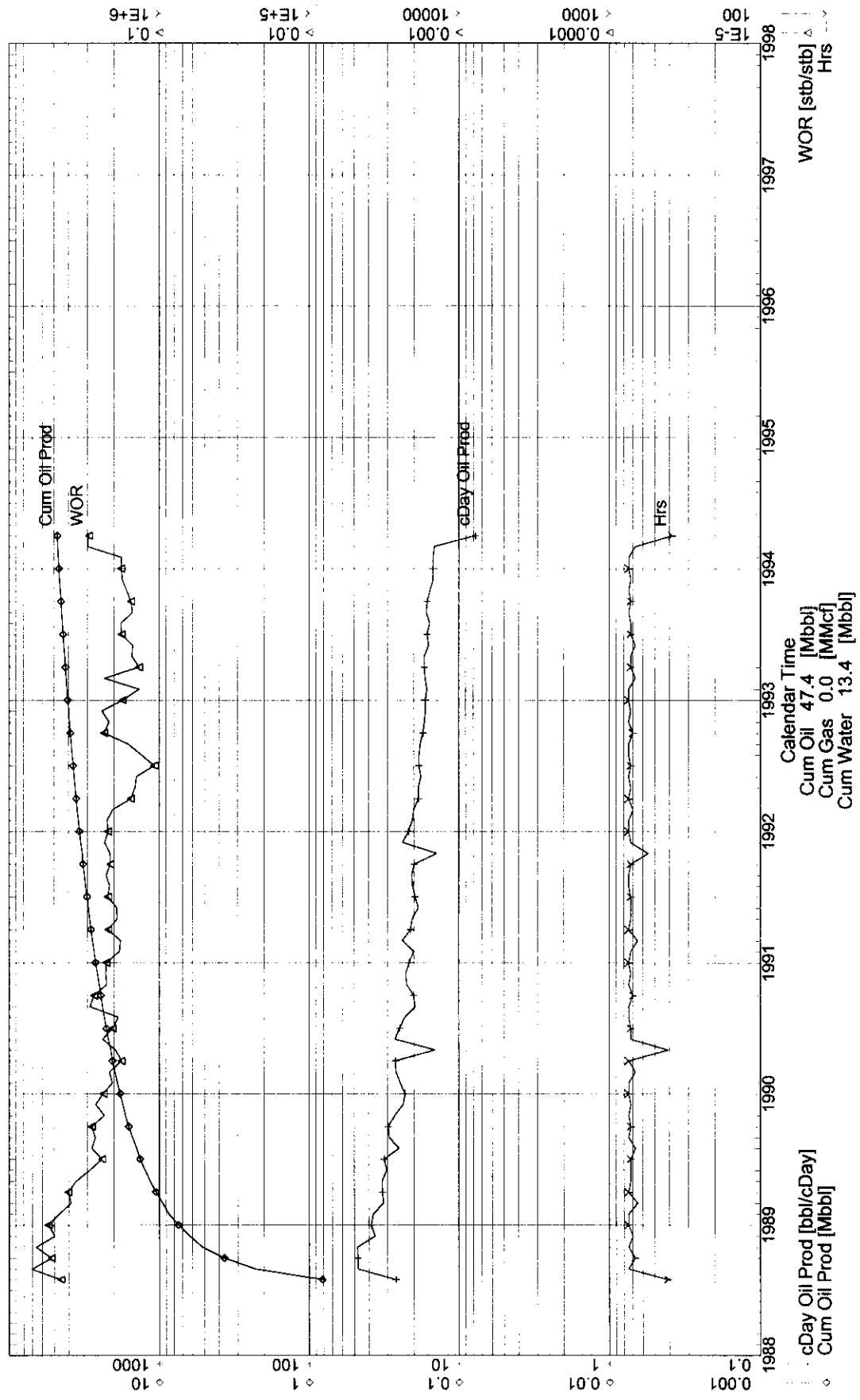
Footnote(s):

(1) Temp3 (Hyp,Time,cDay Oil Prod)

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS				
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	(1) cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Remaining Reserves [Mbbbl]	Effective Decline [%/Yr]
1996 Q1	720.0	12.9	11.9	10.6			12.132
1996 Q2	712.0	10.3	12.9	10.3			12.511
1996 Q3	728.0	7.7	13.6	10.0			12.915
1996 Q4	736.0	11.6	14.7	9.7			13.346
1996 Average	724.4	10.4	14.7	10.1			13.346
1997 Q1	488.0	8.0	15.4	9.4			13.807
1997 Q2	728.0	9.6	16.3	9.1			14.300
1997 Q3	656.0	7.8	17.0	8.7			14.830
1997 Q4	736.0	8.2	17.7	8.4			15.401
1997 Average	652.0	8.4	17.7	8.9			15.401
1998 Q1	704.0	8.6	18.5	8.1			16.018
1998 Q2	728.0	8.2	19.2	7.8			16.686
1998 Q2	624.0	2.6					
1998 Average	693.0	6.9	19.4	7.5	19.4	4.4	17.164
1998 Q3				7.4	19.6	4.1	17.413
1998 Q4				7.1	20.3	3.5	18.205
1998 Average				7.2			18.205
1999 Q1				6.8	20.9	2.9	19.074
1999 Q2				6.5	21.5	2.3	20.029
1999 Q3				6.2	22.1	1.7	n/a
1999 Q4				5.9	22.6	1.2	n/a
1999 Average				6.3	22.6	1.2	n/a
2000 Q1				5.5	23.1	0.6	n/a
2000 Q2				5.2	23.6	0.2	n/a
2000 Q3				5.0	23.9	-0.1	n/a
2000 Average				5.3	23.9	-0.1	n/a

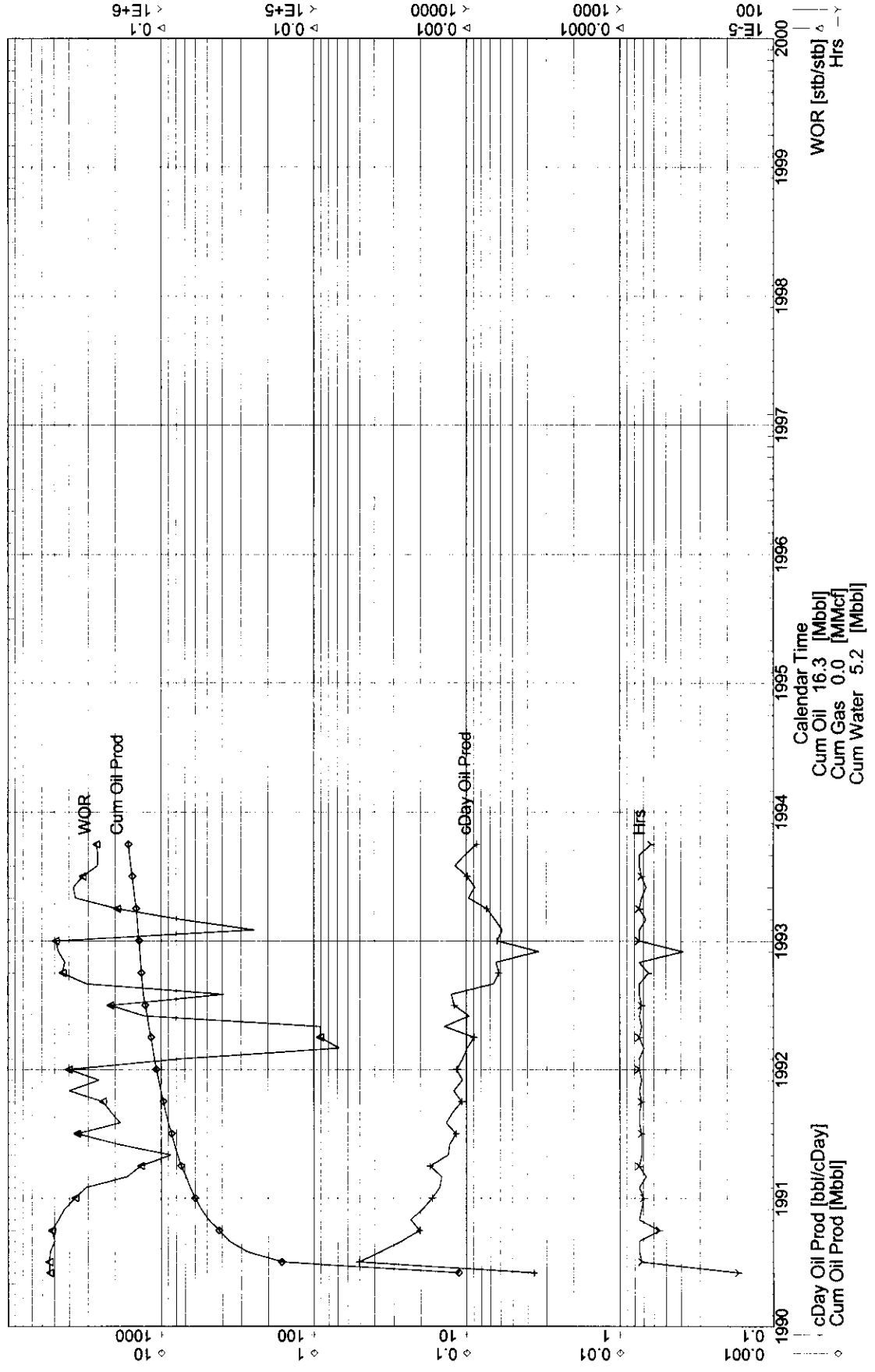
Group: **South Pierson Unit**  
 Well: **00/14-04-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO.1 14-4-2-29  
 Primary: OTHER Status:  
 Last On: Mar-1994  
 Field: S PIERSO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



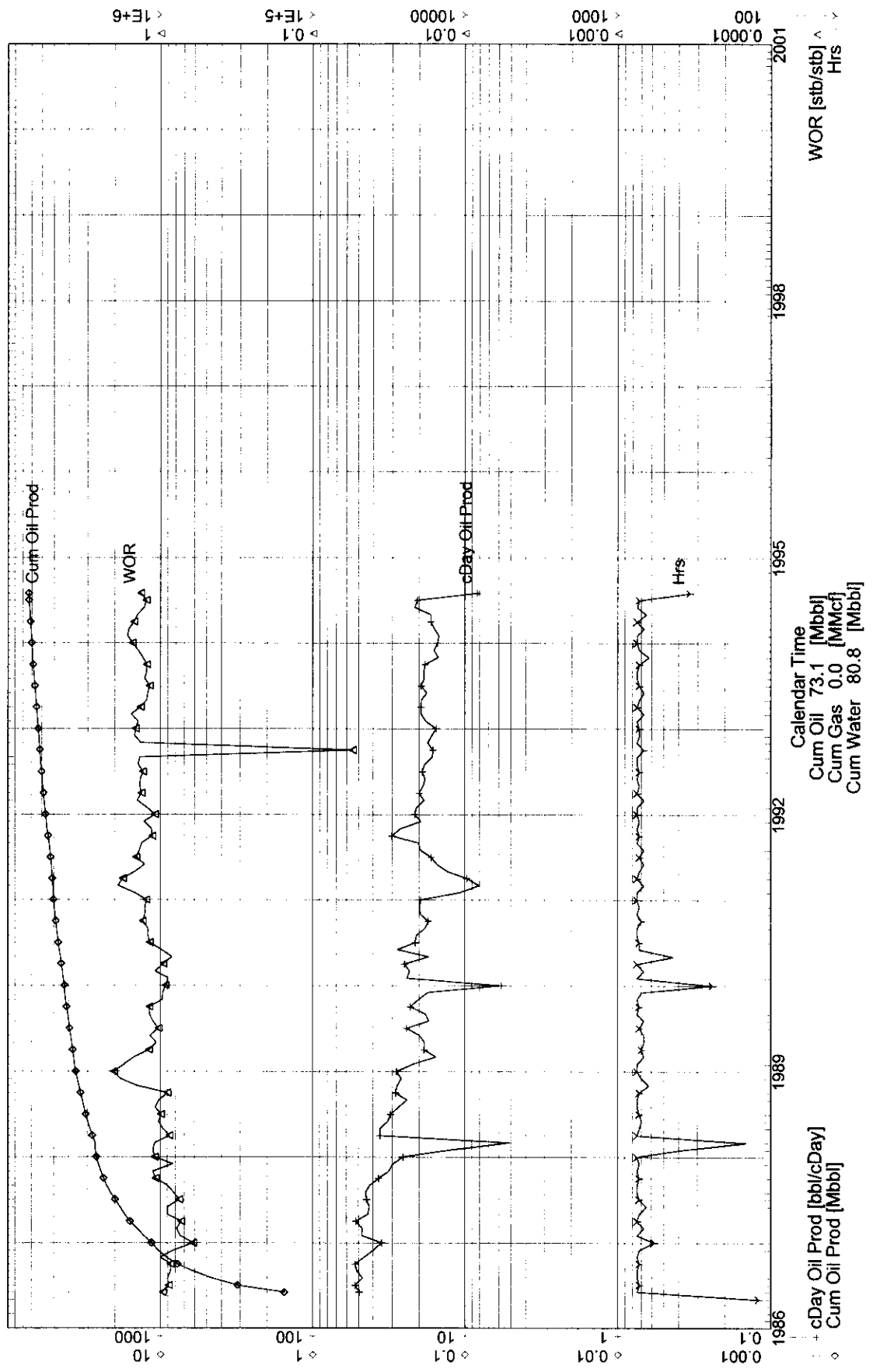


Group: **South Pierson Unit**  
 Well: **00/16-04-002-29W1/0**  
 Name: HOME S. PIERSON UNIT N01 16-4-2-29  
 Primary: OTHER Status:  
 Last On: Sep-1993

Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

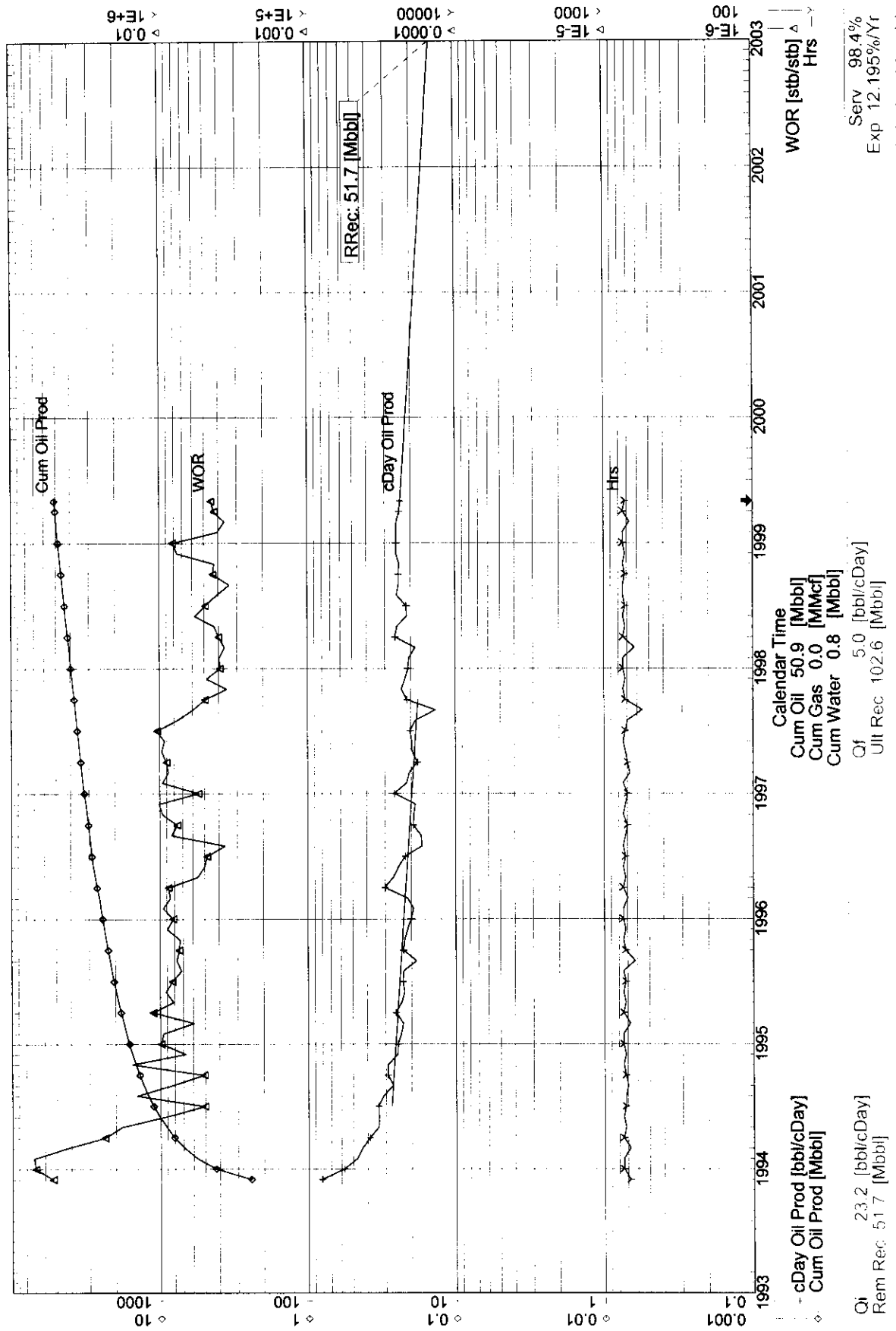


Group: **South Pierson Unit**  
 Well: **00/16-05-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 16-5-2-29  
 Primary: OTHER Status:  
 Last On: Jul-1994  
 Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



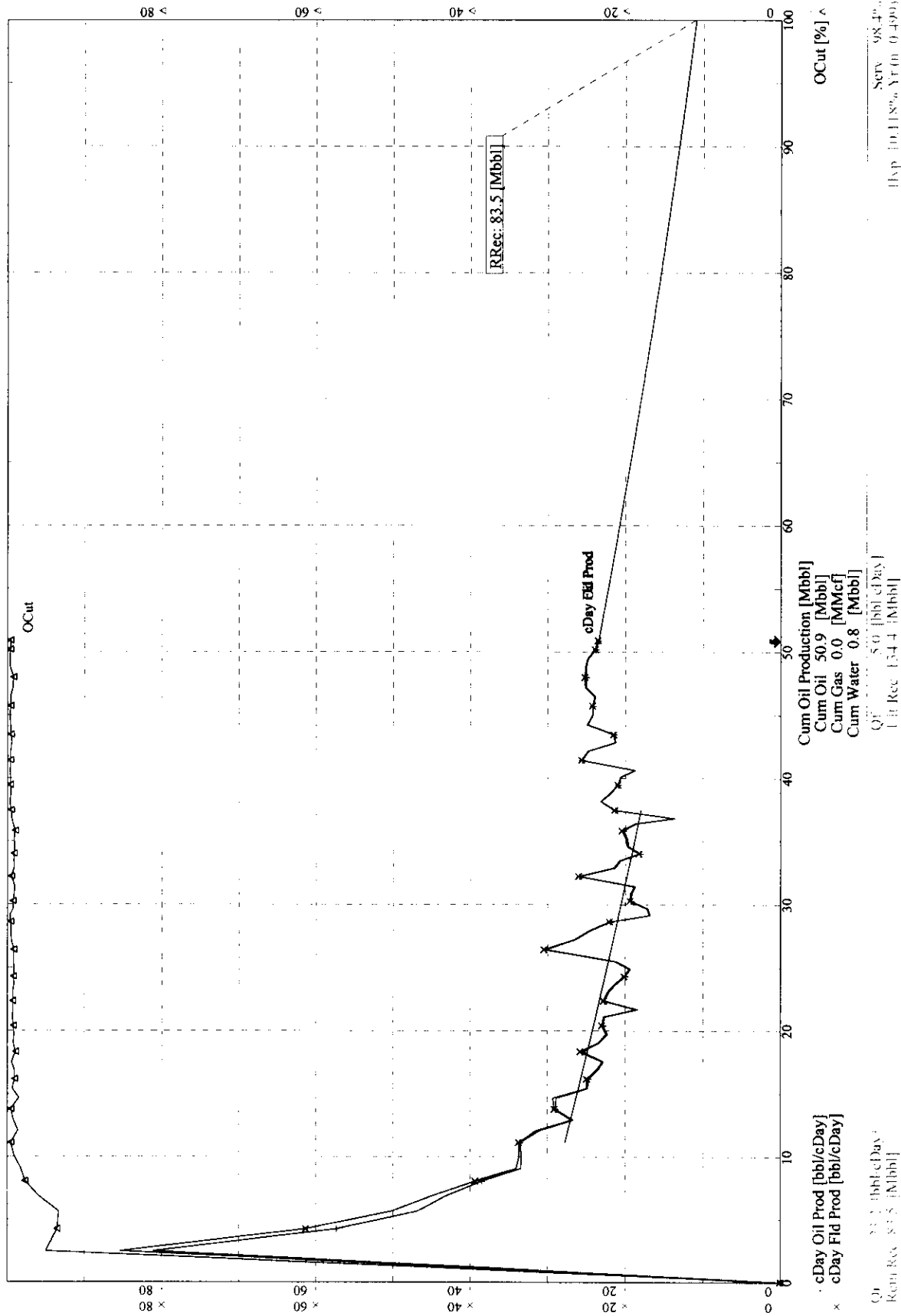
Group: **South Pierson Unit**  
 Well: **00/01-08-002-29W1/0**  
 Name: S. PIERSON UNIT NO. 1 PROV. 1-8-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: S PIERSO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Group: **South Pierson Unit**  
 Well: **00/01-08-002-29W1/0**  
 Name: **S. PIERSON UNIT NO. 1 PROV. 1-8-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Apr-1999**

Field: **S PIERSON SOUTH PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**



# FORECAST SUMMARY

00/01-08-002-29W1/0

1. Temp1 (Hyp,Time,cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.6919
  - b) Decline Exponent (n) = -0.264
  - c) Initial Decline Rate (Qi) = 27.6 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 1.027E-02 [1/t]
  - e) Effective Decline Rate (Dei) = 11.772 [%/Yr]
  - f) Forecast Start Rate (Qo) = 23.4 [bbl/cDay] (from: Last Data)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 98.4 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2007/Dec)
  - j) Ultimate Recoverable (Np) = 90.4 [Mbbbl]
  - k) Remaining Recoverable = 39.6 [Mbbbl] (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS Operating Hours	FORECASTS								
		cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Temp1 cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Remaining Reserves [Mbb]	Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
1994	723.4	28.4	16.2	43.5			11.989			
1995	720.0	22.3	24.3	39.4			12.381			
1996	724.0	21.7	32.2	34.6			12.799			
1997	706.0	19.9	39.5	30.2			13.246			
1998	726.0	23.2	48.0	26.3			13.725			
1999/04	720.0	24.3	50.9	23.4	50.9	39.6	13.893			
1999				22.2	56.3	34.1	14.241			
2000				19.6	63.5	27.0	14.796			
2001				16.7	69.6	20.8	15.397			
2002				14.2	74.8	15.6	16.048			
2003				12.0	79.2	11.2	16.757			
2004				10.0	82.9	7.5	17.530			
2005				8.3	85.9	4.5	18.379			
2006				6.8	88.4	2.0	19.313			
2007				5.5	90.5	0.0	n/a			

# FORECAST SUMMARY

00/01-08-002-29W1/0

1. Temp2 (2pt,Time,cDay Oil Prod) - PP
  - a) Correlation Coefficient (r) = 0.0000
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 26.0 [bbl/cDay]
  - d) Nominal Decline Rate (D) = 1.992E-02 [1/t]
  - e) Effective Decline Rate (De) = 21.264 [%/Yr]
  - f) Forecast Start Rate (Qo) = 23.4 [bbl/cDay]
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 98.4 [%]
  - i) Economic Limit (Qf) = 1.0 [bbl/cDay] (2012/Jul)
  - j) Ultimate Recoverable (Np) = 85.1 [Mbb]
  - k) Remaining Recoverable = 34.2 [Mbb] (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Footnote(s):

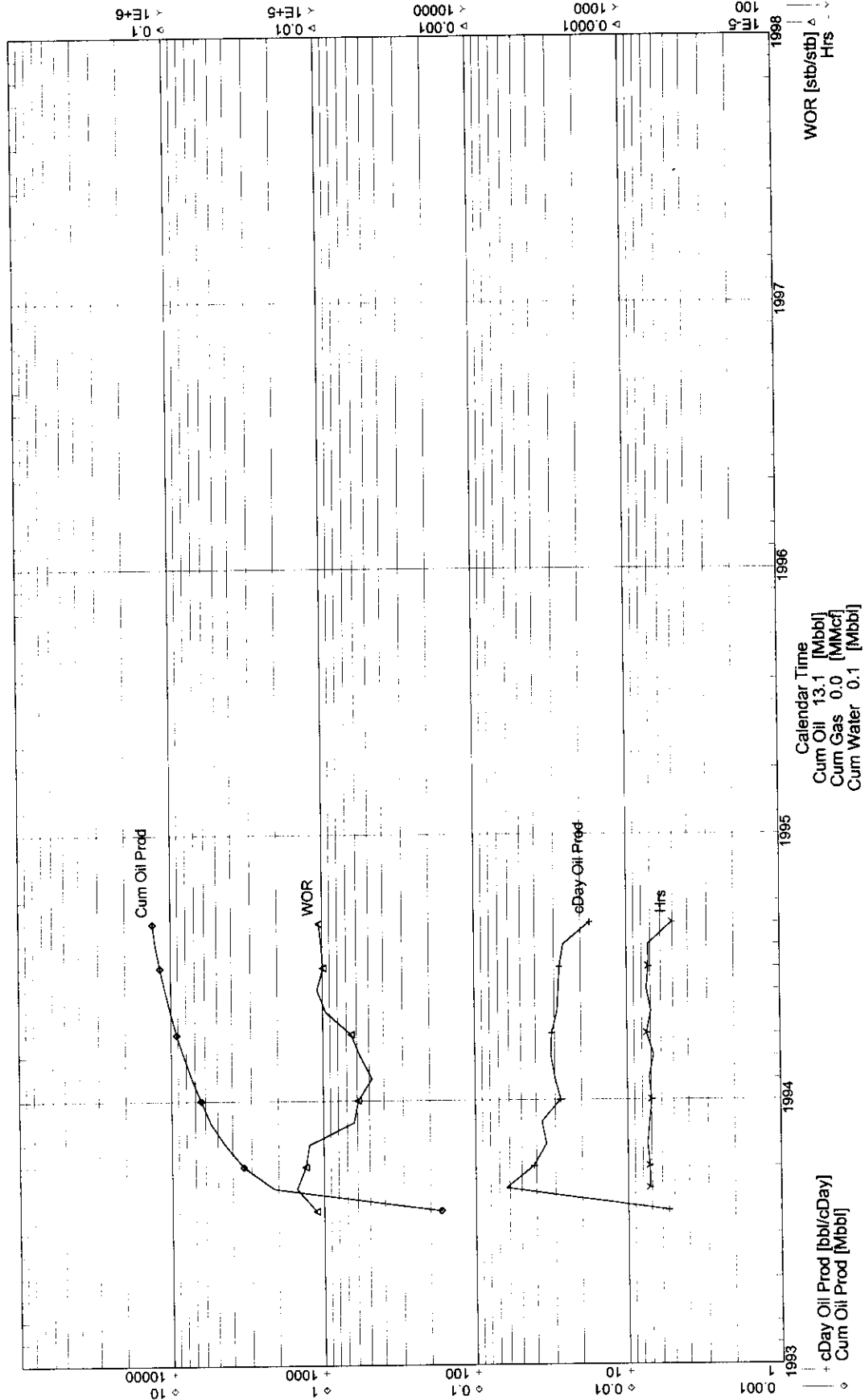
- (1) Temp2 (2pt,Time,cDay Oil Prod)

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS Operating Hours	FORECASTS					Effective Decline [%/Yr]	Remaining Reserves [Mbb]	[Fluid]	[Liq-Liq]	[GOR]
		cDay Oil Prod [bbl/cDay]	Cum [Mbb]	cDay Oil Prod (1) [bbl/cDay]	Cum [Mbb]	Oil Prod [bbl/cDay]					
1996	724.8	22.0	32.2	44.8	44.8	44.8	21.264				
1997	706.0	19.9	39.5	36.0	36.0	36.0	21.264				
1998	726.0	23.2	48.0	28.4	28.4	28.4	21.264				
1999/04	720.0	24.3	50.9	23.4	50.9	50.9	21.264	34.2			
1999				21.4	56.1	56.1	21.264	29.0			
2000				17.6	62.6	62.6	21.264	22.5			
2001				13.9	67.7	67.7	21.264	17.4			
2002				10.9	71.7	71.7	21.264	13.4			
2003				8.6	74.9	74.9	21.264	10.2			
2004				6.8	77.4	77.4	21.264	7.7			
2005				5.3	79.4	79.4	21.264	5.7			
2006				4.2	80.9	80.9	21.264	4.2			
2007				3.3	82.1	82.1	21.264	3.0			
2008				2.6	83.1	83.1	21.264	2.0			
2009				2.0	83.8	83.8	21.264	1.3			
2010				1.6	84.4	84.4	21.264	0.7			
2011				1.3	84.9	84.9	n/a	0.2			
2012				1.0	85.1	85.1	n/a	0.0			

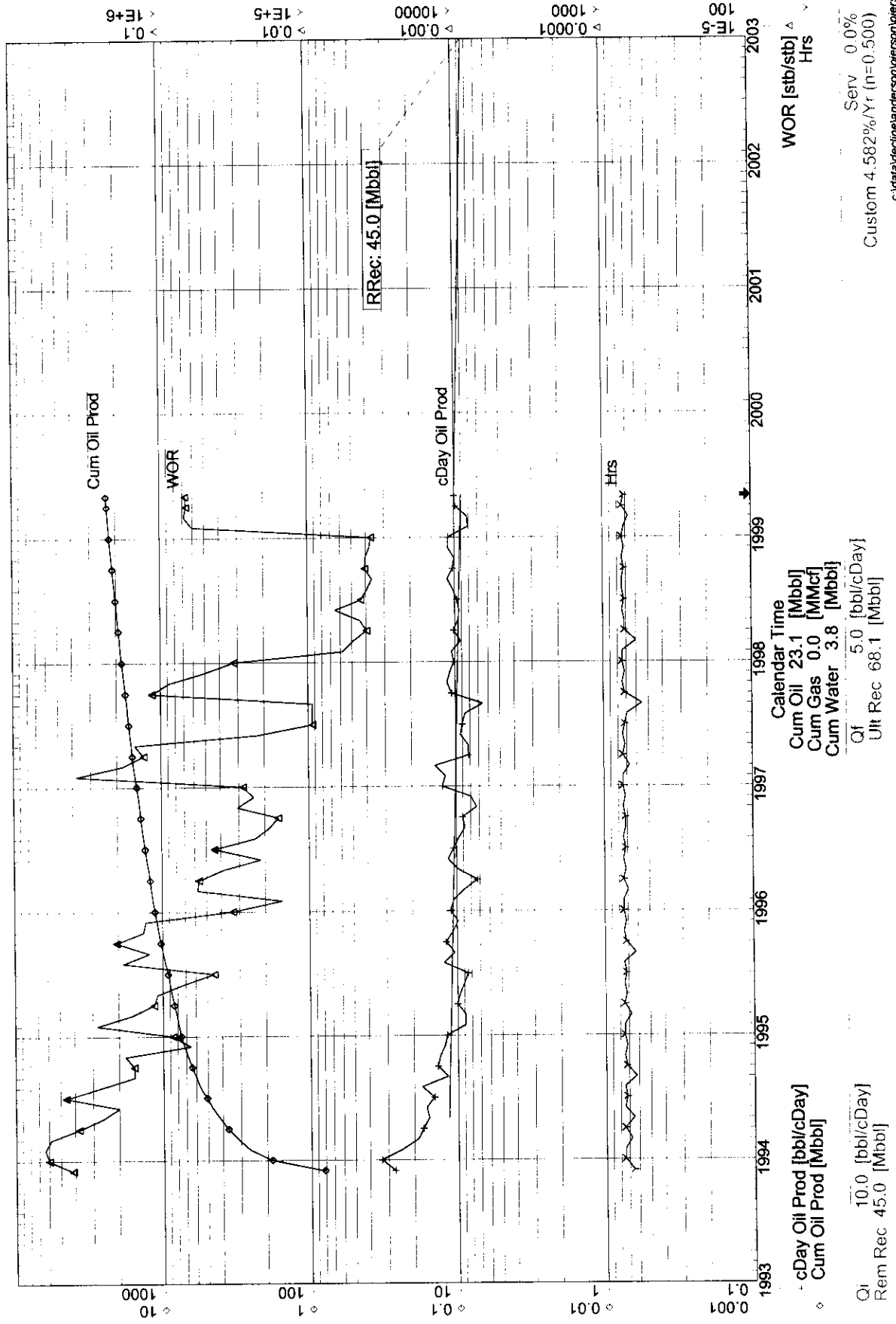
Group: **South Pierson Unit**  
 Well: **00/02-08-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 2-8-2-29  
 Primary: OTHER Status:  
 Last On: Aug-1994

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



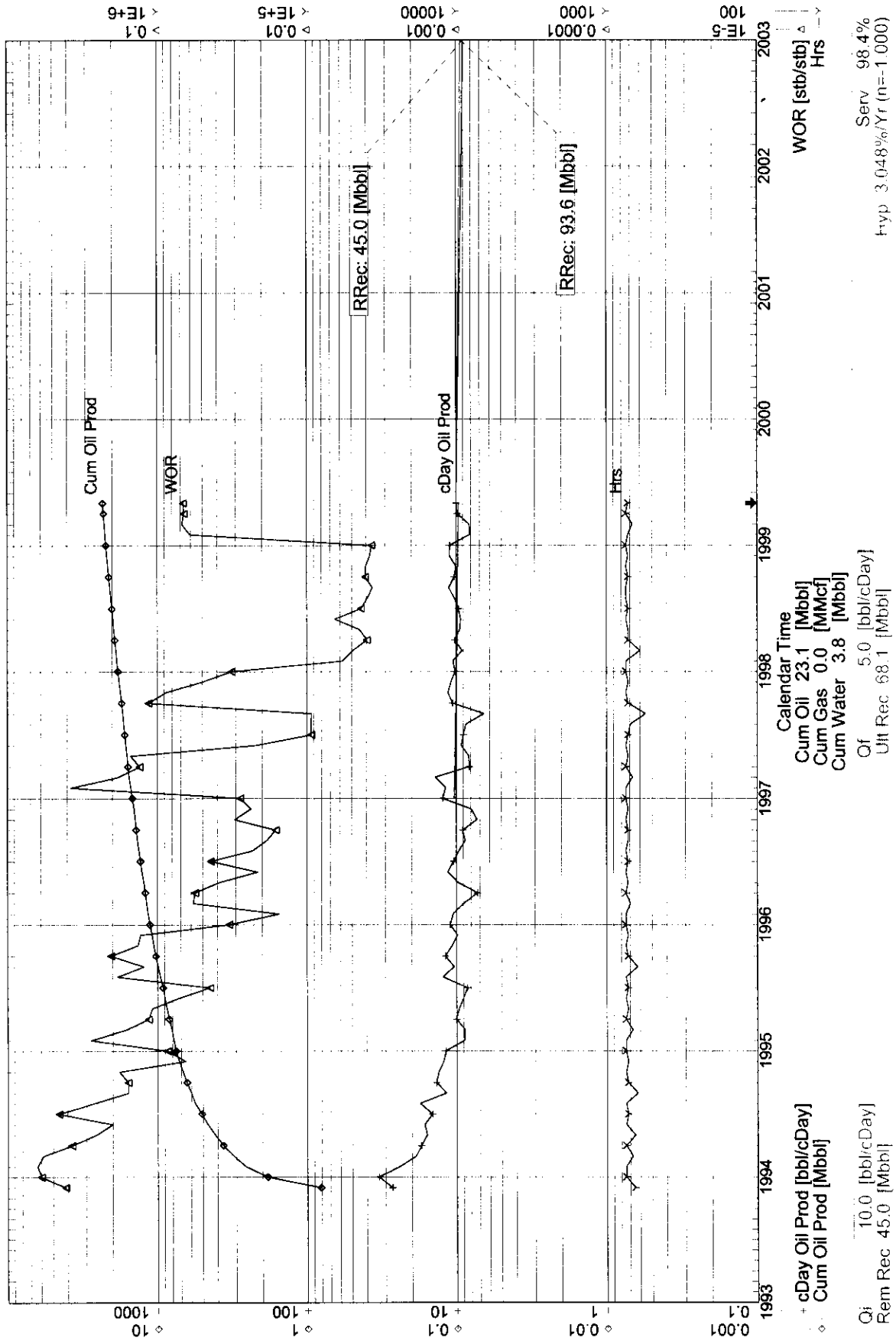
Group: **South Pierson Unit**  
 Well: **00/03-08-002-29W1/0**  
 Name: **S. PIERSON UNIT NO. 1 PROV. 3-8-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Apr-1999**

Field: **S PIERSO SOUTH PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**





Group: **South Pierson Unit**  
 Well: **00/03-08-002-29W1/0**  
 Name: **S. PIERSON UNIT NO. 1 PROV. 3-8-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Apr-1999**  
 Field: **S PIERSON SOUTH PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**



# ORECAST SUMMARY

00/03-08-002-29W1/0

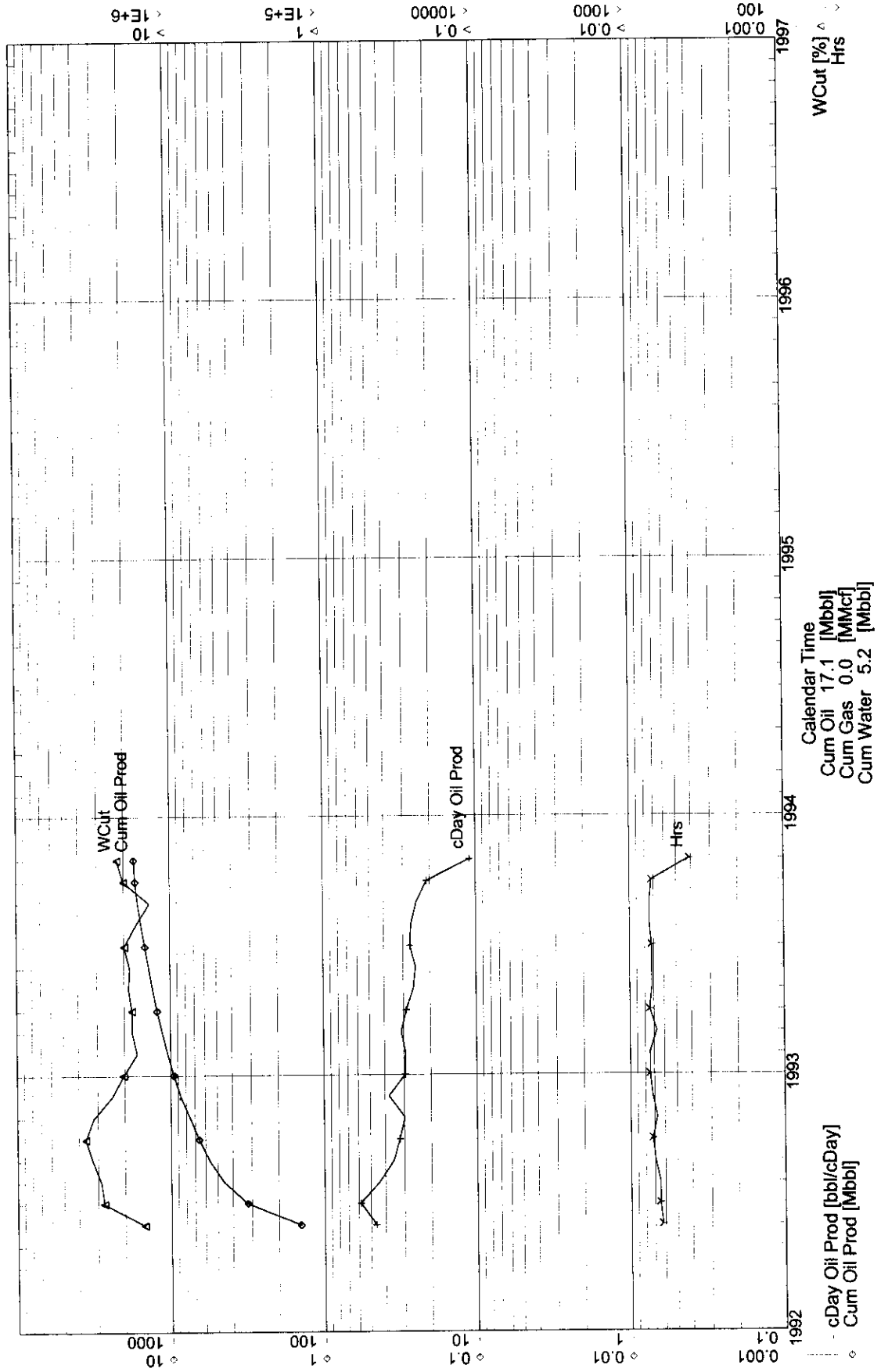
1. Temp5 (Custom, Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.3921
  - b) Decline Exponent (n) = 0.500
  - c) Initial Decline Rate (Qi) = 11.6 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 4.508E-03 [1/t]
  - e) Effective Decline Rate (Dei) = 5.198 [%/Yr]
  - f) Forecast Start Rate (Qo) = 10.0 [bbl/cDay] (from: Last Data)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 0 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2016/Oct)
  - j) Ultimate Recoverable (Np) = 68.1 [Mbb]
  - k) Remaining Recoverable = 45.0 [Mbb] (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS Operating Hours	FORECASTS Temp5					Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
		cDay Oil Prod [bbl/cDay]	Cum [Mbb]	cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Temp5 cDay Oil Prod [bbl/cDay]				
1994	712.0	14.1	7.5	12.7			5.098			
1995	720.0	10.1	11.2	12.1			4.972			
1996	730.0	9.4	14.7	11.5			4.851			
1997	710.0	9.9	18.3	10.9			4.736			
1998	722.0	10.2	22.0	10.4			4.627			
1999/04	714.0	9.0	23.1	10.0	23.1		4.591	45.0		
1999										
2000				9.8	25.5		4.522	42.6		
				9.5	28.9		4.422	39.1		
2001				9.0	32.2		4.326	35.8		
2002				8.6	35.4		4.235	32.7		
2003				8.3	38.4		4.147	29.7		
2004				7.9	41.3		4.063	26.8		
2005				7.6	44.1		3.982	24.0		
2006				7.3	46.7		3.904	21.3		
2007				7.0	49.3		3.829	18.8		
2008				6.7	51.8		3.757	16.3		
2009				6.5	54.1		3.688	13.9		
2010				6.2	56.4		3.621	11.7		
2011				6.0	58.6		3.557	9.5		
2012				5.8	60.7		3.495	7.3		
2013				5.6	62.8		3.435	5.3		
2014				5.4	64.7		3.377	3.3		
2015				5.2	66.6		n/a	1.4		
2016				5.1	68.2		n/a	-0.1		

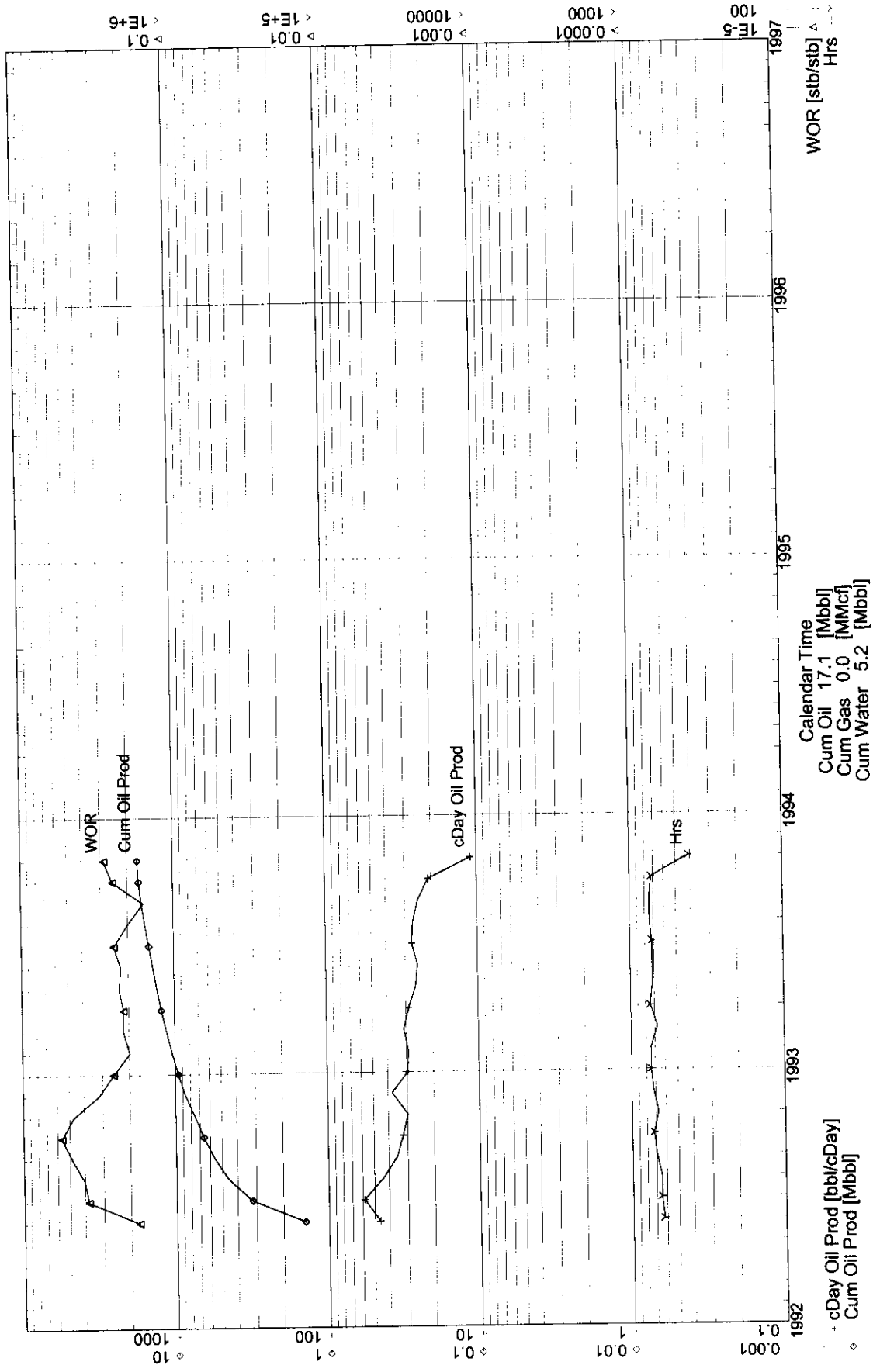
Group: **South Pierson Unit**  
 Well: **00/06-08-002-29W1/0**  
 Name: **HOME S. PIERSON W1W 6-8-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Oct-1993**

Field: **PIERSON PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**



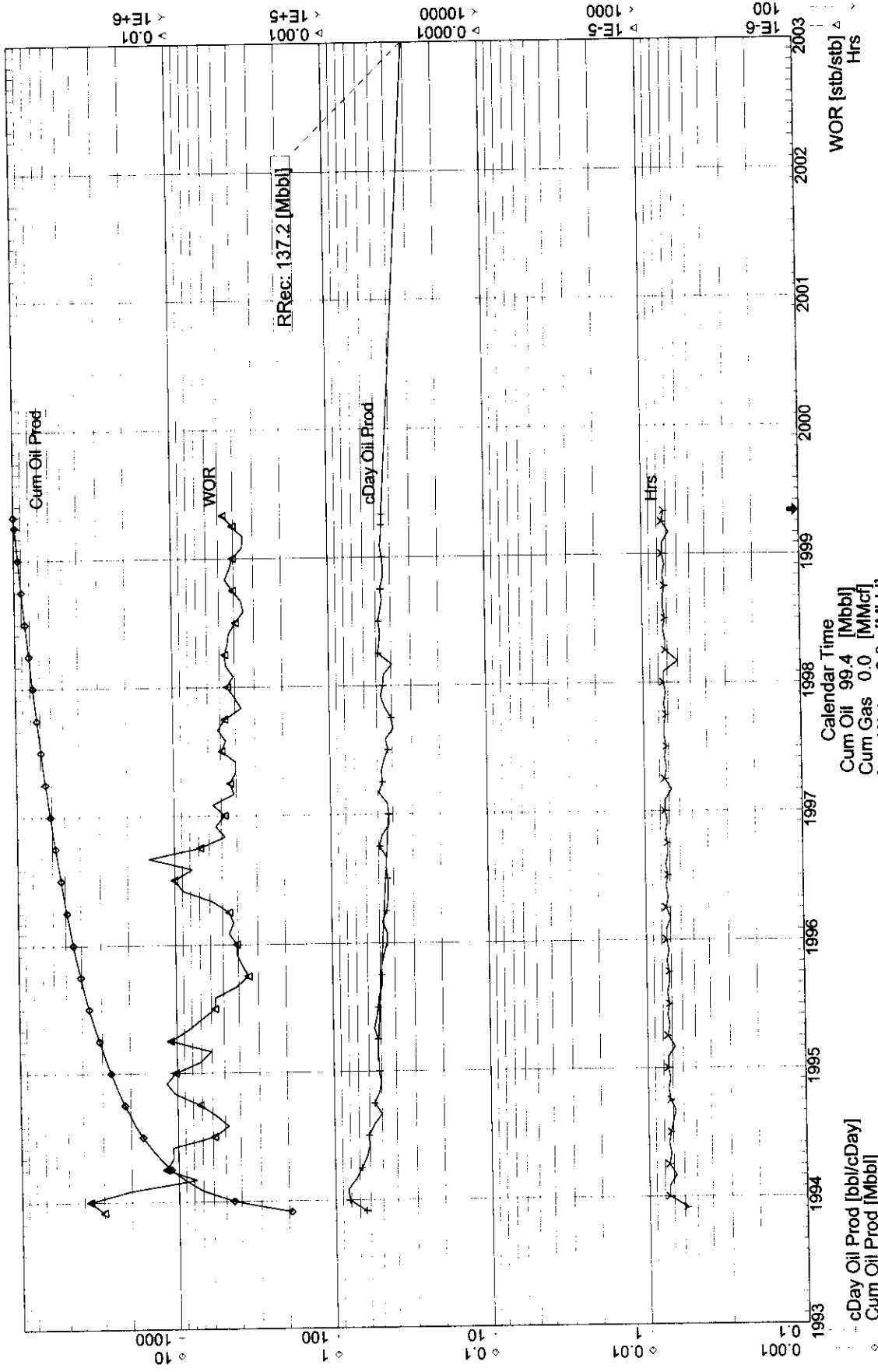
Group: **South Pierson Unit**  
 Well: **00/06-08-002-29W1/0**  
 Name: HOME S. PIERSON WIW 6-8-2-29  
 Primary: OTHER Status:  
 Last On: Oct-1993

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/07-08-002-29W1/0  
 Name: HOME PIERSON UNIT NO.1 PROV 7-8-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999



Calendar Time  
 Cum Oil 99.4 [Mbb]  
 Cum Gas 0.0 [MMcf]  
 Cum Water 0.8 [Mbb]  
 Qf 5.0 [bbl/cDay]  
 Ult Rec 235.6 [Mbb]

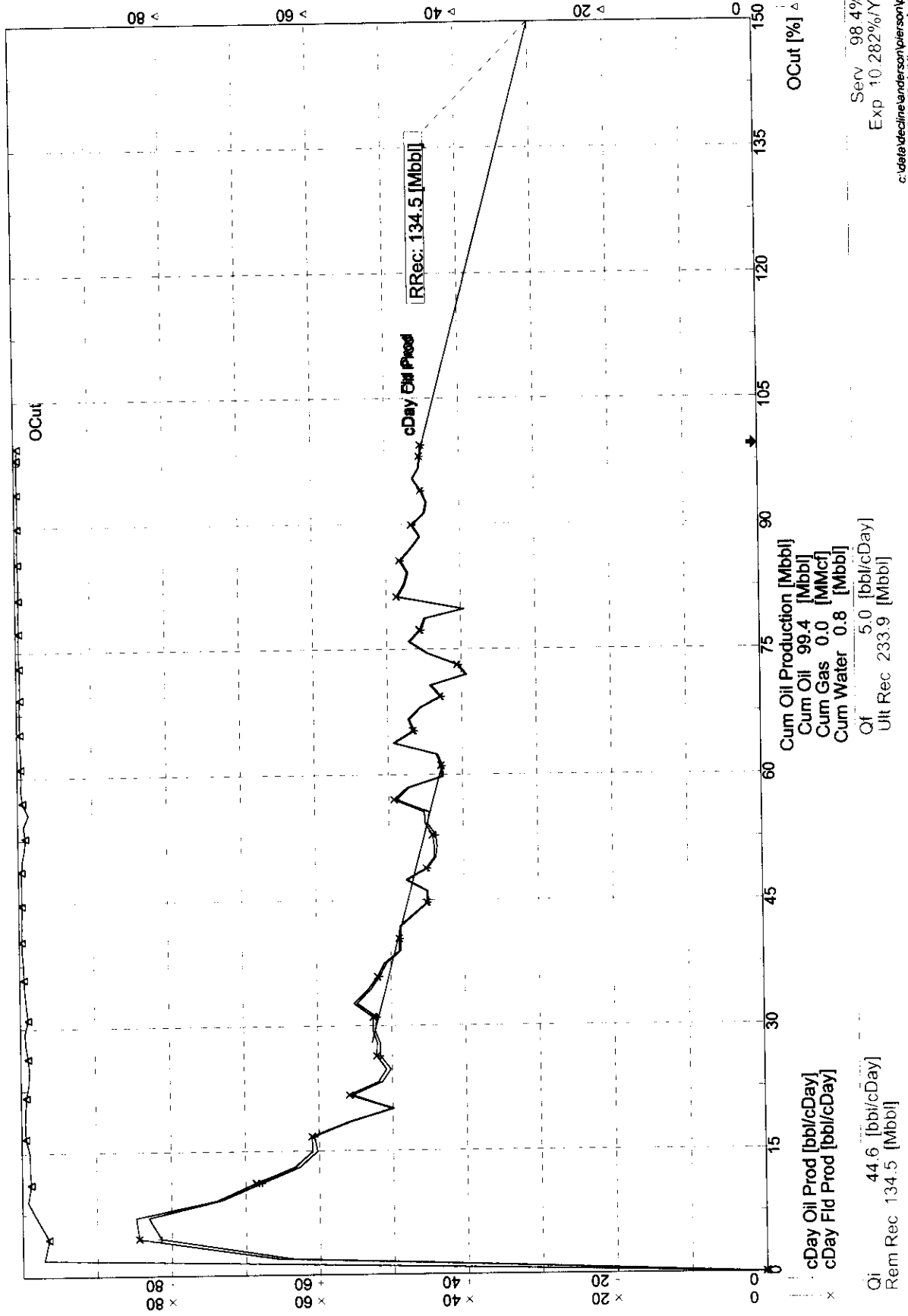
Qi 44.6 [bbl/cDay]  
 Rer Rec 137.2 [Mbb]  
 DECPRO v3.11 Evaluation  
 Petro-Soft Systems Ltd

Serv 98.4%  
 Exp 10.091%  
 c\data\data\end\end\pierson\pierson.dpd  
 08-Nov-99 15:56 (pierson)

**Group: South Pierson Unit**

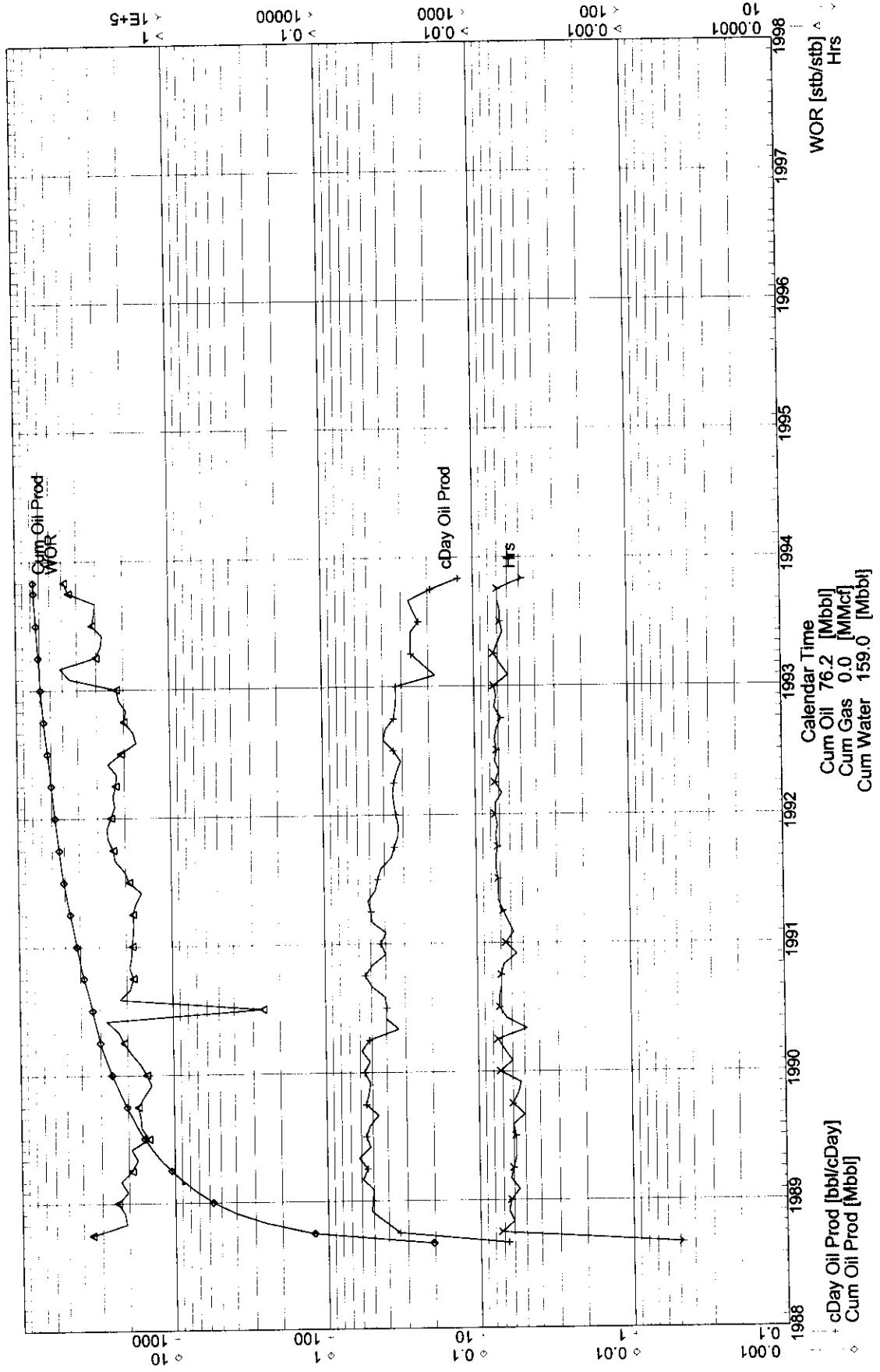
Well: 00/07-08-002-29W1/0  
 Name: HOME PIERSON UNIT NO.1 PROV 7-8-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



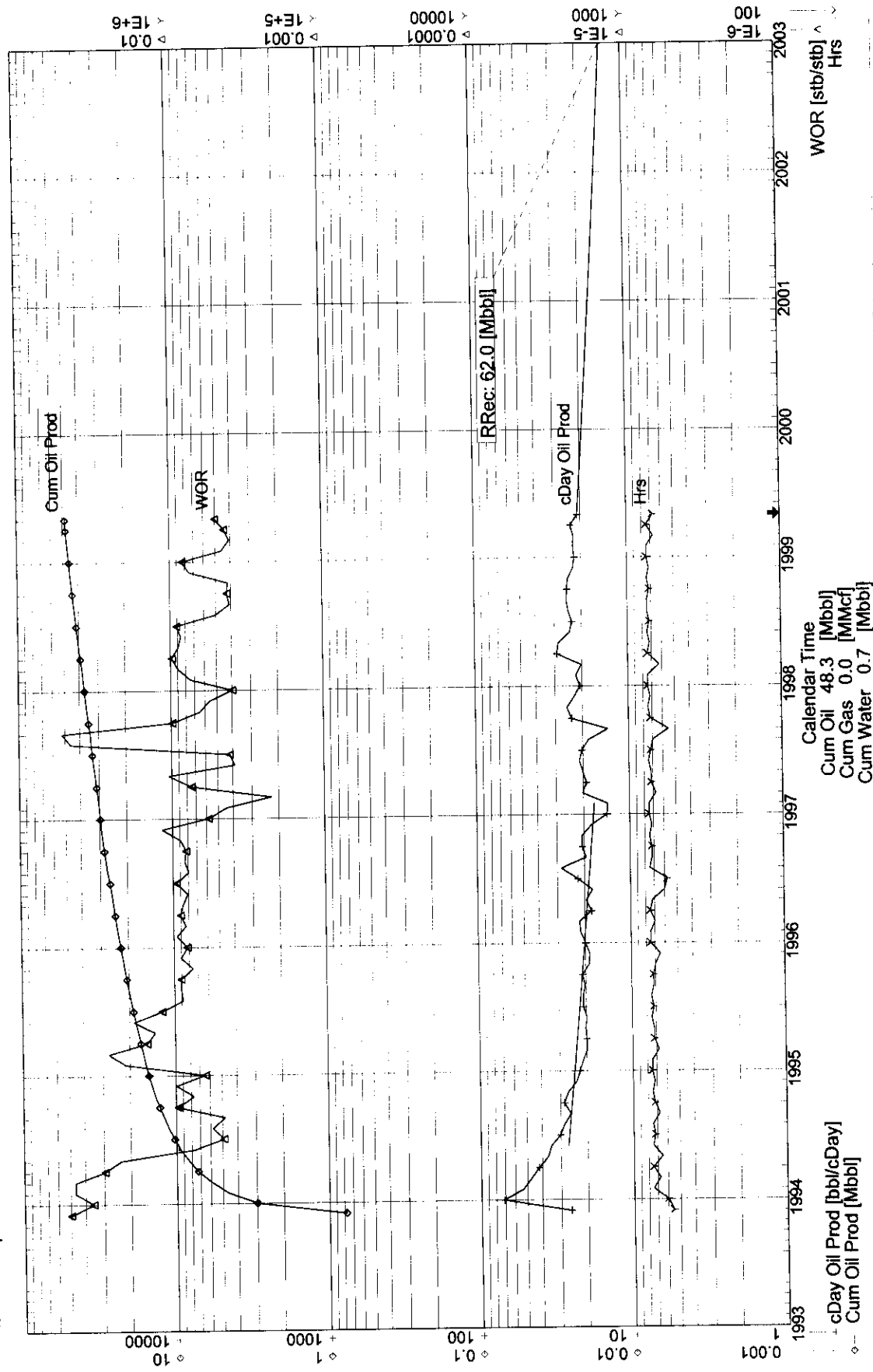
Group: **South Pierson Unit**  
 Well: **00/08-08-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO 1 WIW 8-8-2-  
 Primary: OTHER Status:  
 Last On: Oct-1993

Field: SPIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Group: **South Pierson Unit**  
 Well: **00/09-08-002-29W1/0**  
 Name: HOME PIERSON UNIT NO. 1 1-9-8-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Calendar Time  
 Cum Oil 48.3 [Mbb]  
 Cum Gas 0.0 [MMcf]  
 Cum Water 0.7 [Mbb]  
 Of 5.0 [bbl/cDay]  
 Ult Rec 110.3 [Mbb]

Qi 20.6 [bbl/cDay]  
 Rem Rec 62.0 [Mbb]

Serv 100.0%  
 Hyp 11.574%/Yr (n=0.533)  
 c:\data\decline\anderson\pierson\pierson.dod  
 00-Nov-99 20:07 [pierson]



# ORECAST SUMMARY

00/09-08-002-29W1/0

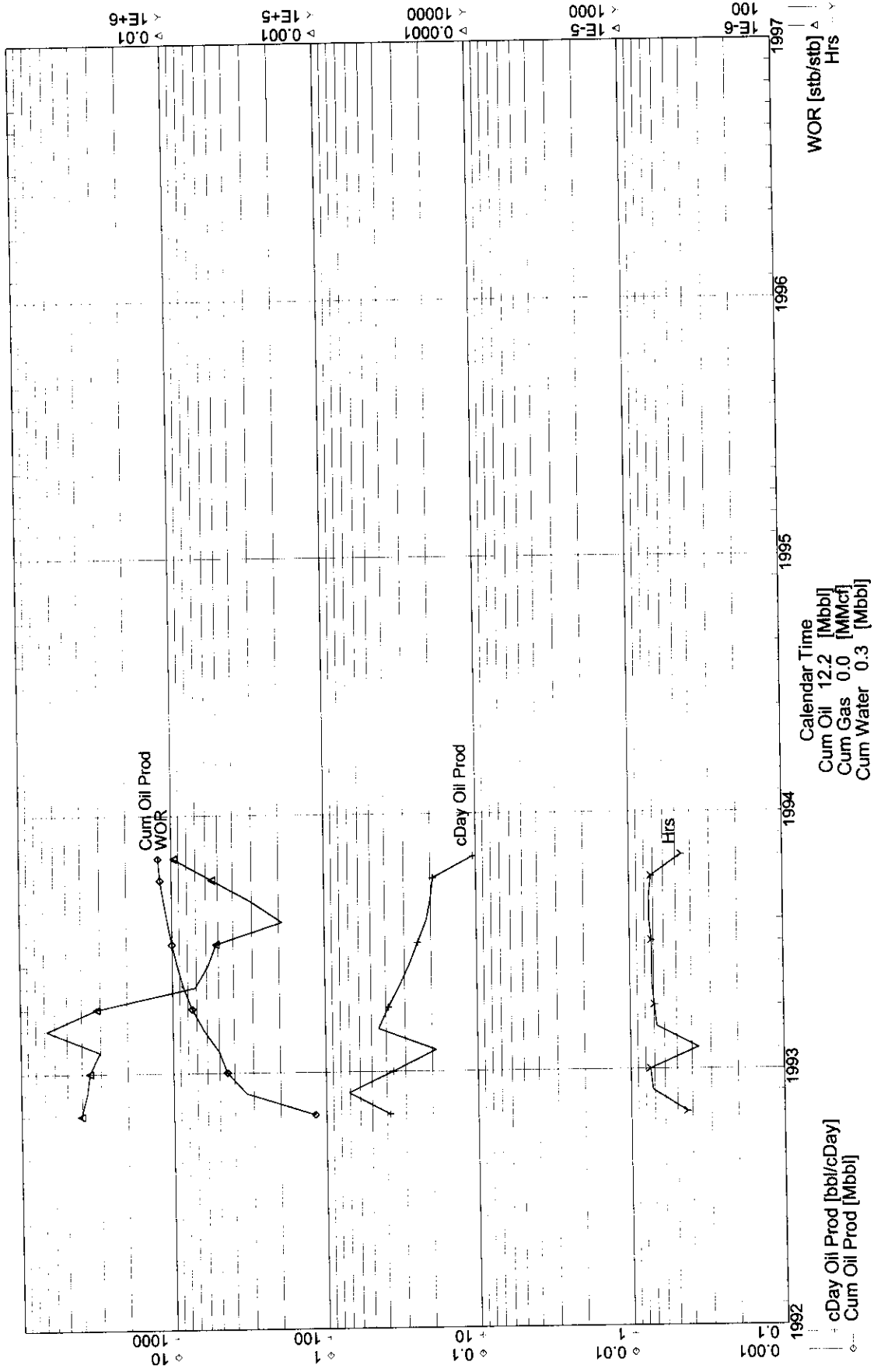
1. Temp6 (Hyp.Time.cDay Oil Prod)
  - a) Correlation Coefficient ( $r$ ) = -0.7083
  - b) Decline Exponent ( $n$ ) = 0.533
  - c) Initial Decline Rate ( $Q_i$ ) = 27.2 [bbl/cDay]
  - d) Nominal Decline Rate ( $D_i$ ) = 1.617E-02 [1/t]
  - e) Effective Decline Rate ( $Dei$ ) = 16.857 [%/Yr]
  - f) Forecast Start Rate ( $Q_o$ ) = 20.9 [bbl/cDay] (from: Last Data)
  - g) Forecast Start Date ( $t_o$ ) = 1999/Apr
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit ( $Q_f$ ) = 5.0 [bbl/cDay] (2016/Jan)
  - j) Ultimate Recoverable ( $N_p$ ) = 110.3 [Mbbl]
  - k) Remaining Recoverable = 62.0 [Mbbl] (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS						Effective Decline [%/Yr]	Remaining Reserves [Mbbl]	[Fluid]	[Liq-Liq]	[GOR]
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbl]	Temp6 cDay Oil Prod [bbl/cDay]	Cum [Mbbl]	Temp6 cDay Oil Prod [bbl/cDay]	Cum [Mbbl]	Temp6 cDay Oil Prod [bbl/cDay]					
1994	726.0	27.3	15.0	42.5	15.0	42.5	15.0	42.5	15.905				
1995	716.0	20.0	22.3	36.6	22.3	36.6	22.3	36.6	14.663				
1996	706.0	20.0	29.6	31.0	29.6	31.0	29.6	31.0	13.601				
1997	708.0	19.8	36.9	26.7	36.9	26.7	36.9	26.7	12.682				
1998	726.0	24.1	45.7	23.2	45.7	23.2	45.7	23.2	11.879				
1999/04	708.0	22.1	48.3	20.9	48.3	20.9	48.3	20.9	11.634	62.0			
1999				19.9	53.2	19.9	53.2	19.9	11.172	57.2			
2000				18.0	59.8	18.0	59.8	18.0	10.544	50.6			
2001				16.0	65.7	16.0	65.7	16.0	9.983	44.7			
2002				14.4	70.9	14.4	70.9	14.4	9.478	39.4			
2003				13.0	75.7	13.0	75.7	13.0	9.022	34.6			
2004				11.8	80.0	11.8	80.0	11.8	8.608	30.3			
2005				10.8	84.0	10.8	84.0	10.8	8.231	26.4			
2006				9.9	87.6	9.9	87.6	9.9	7.885	22.8			
2007				9.1	90.9	9.1	90.9	9.1	7.567	19.5			
2008				8.4	93.9	8.4	93.9	8.4	7.273	16.4			
2009				7.7	96.8	7.7	96.8	7.7	7.002	13.6			
2010				7.2	99.4	7.2	99.4	7.2	6.749	10.9			
2011				6.7	101.9	6.7	101.9	6.7	6.515	8.5			
2012				6.3	104.2	6.3	104.2	6.3	6.296	6.2			
2013				5.9	106.3	5.9	106.3	5.9	6.092	4.0			
2014				5.5	108.3	5.5	108.3	5.5	5.900	2.0			
2015				5.2	110.2	5.2	110.2	5.2	n/a	0.1			
2016				5.0	110.3	5.0	110.3	5.0	n/a	0.0			

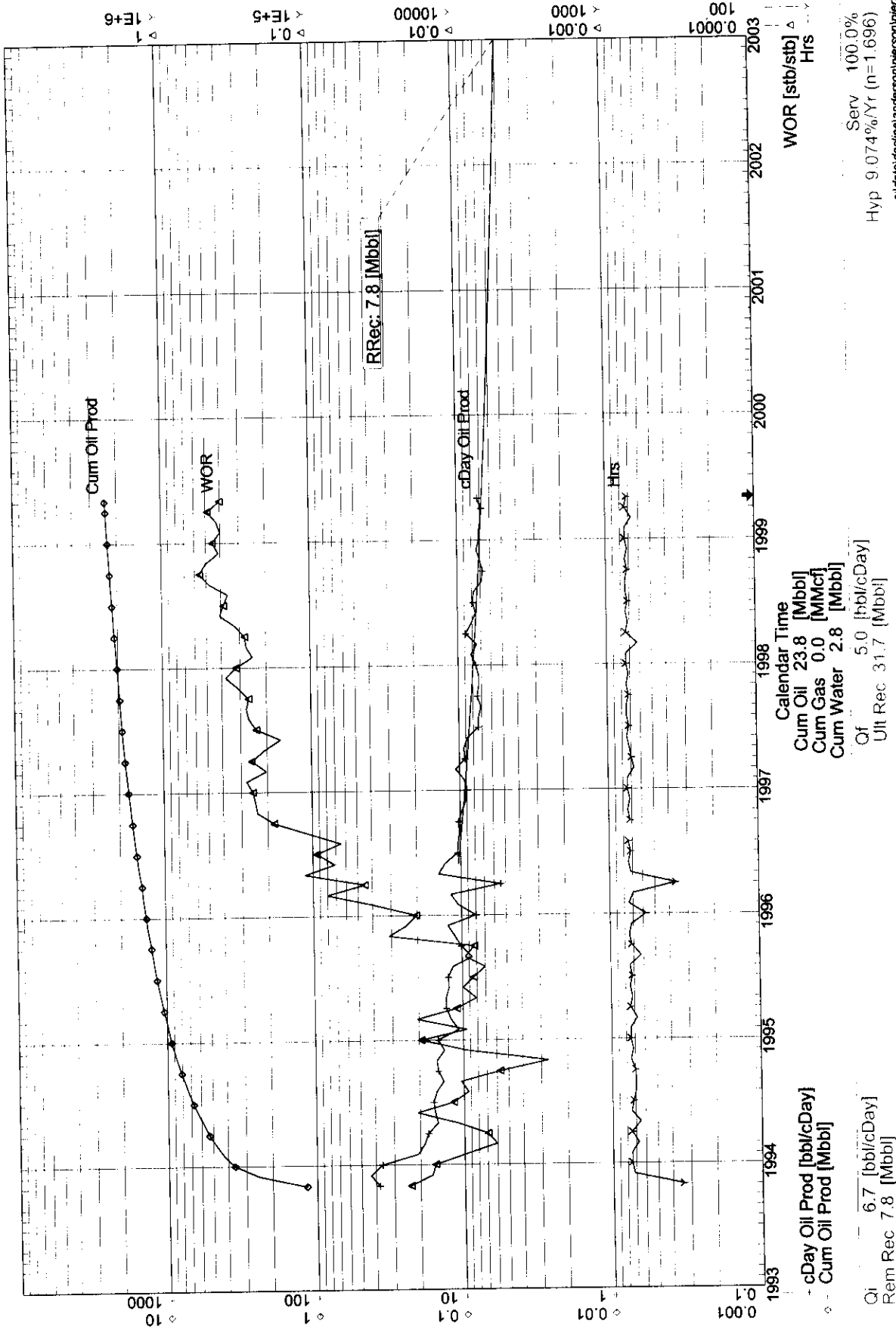
Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/10-08-002-29W1/0  
 Name: HOME S. PIERSON UNIT 1 WW 10-8-2-29  
 Primary: OTHER Status:  
 Last On: Oct-1993



Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: **South Pierson Unit**  
 Well: **02/11-08-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO. 1 A11-8-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

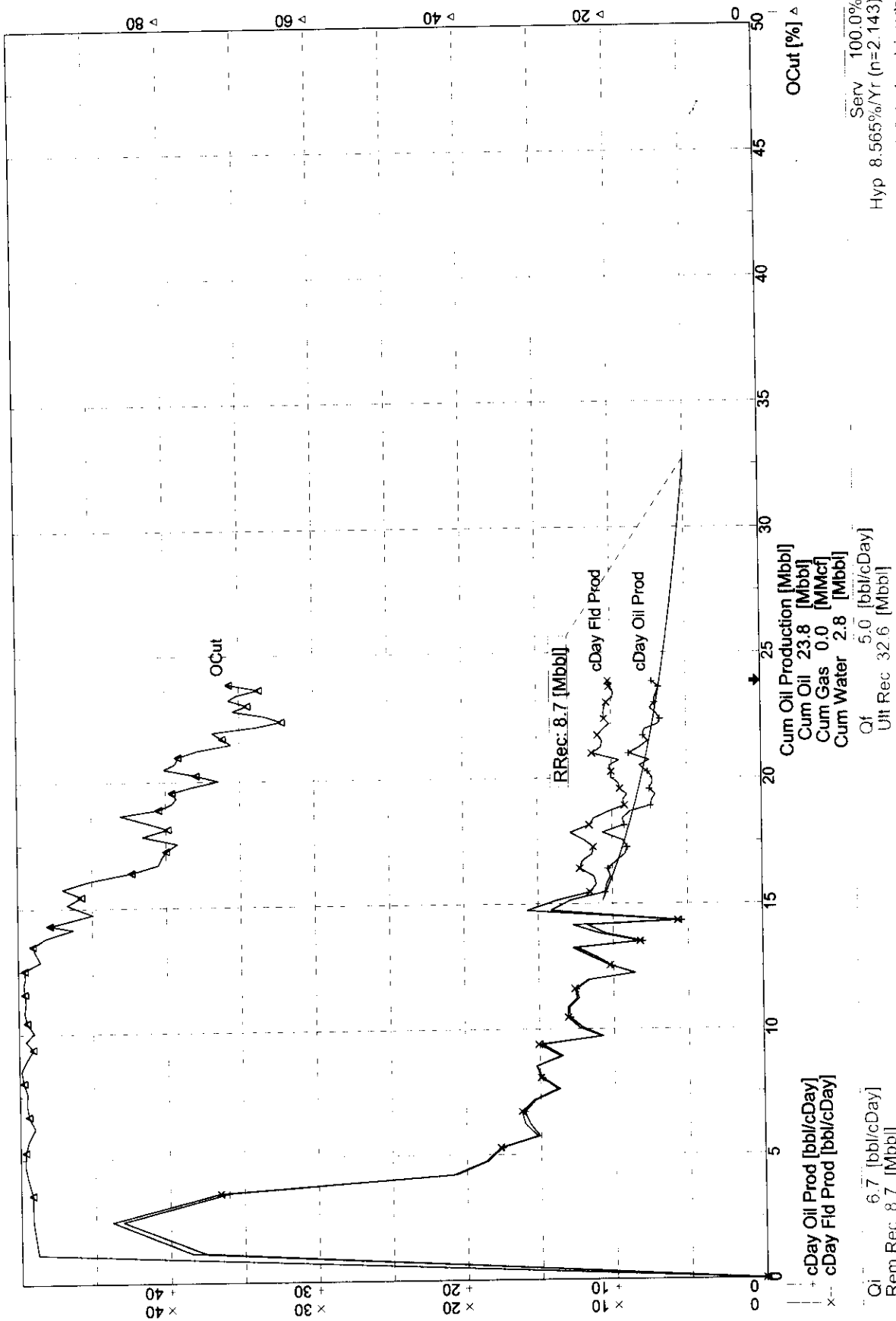


Well: 02/11-08-002-29W1/0  
Name: HOFES PIERSON UNIT NO. 1 A11-8-2-29

Primary: OTHER Status:

Last On: Apr-1999

Field: S PIERO SOUTH PIERSON  
Pool: M0000000 UNDEFINED  
Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
Oper:  
Source Date: Apr-1999



# FORECAST SUMMARY

02/11-08-002-29W1/0

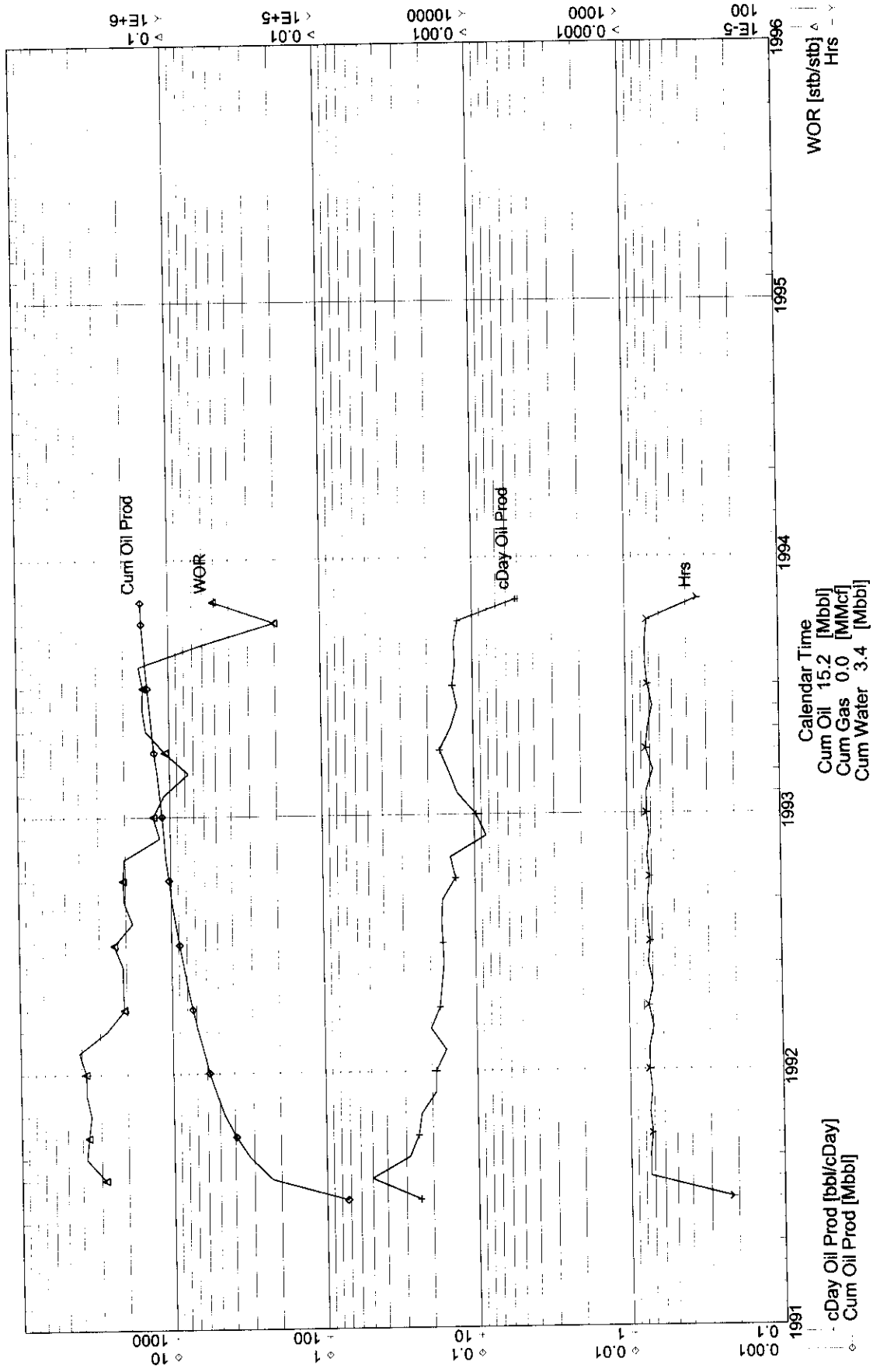
1. Temp1 (Hyp Time cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.8514
  - b) Decline Exponent (n) = 1.696
  - c) Initial Decline Rate (Qi) = 10.6 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 1.870E-02 [1/t]
  - e) Effective Decline Rate (Dei) = 17.315 [%/Yr]
  - f) Forecast Start Rate (Qo) = 6.7 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2003/Jan)
  - j) Ultimate Recoverable (Np) = 31.7 [Mbb]l
  - k) Remaining Recoverable = 7.8 [Mbb]l (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS					[Fluid]	[Liq-Liq]	[GOR]
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbb]l	Temp1 cDay Oil Prod [bbl/cDay]	Cum [Mbb]l	Remaining Reserves [Mbb]l	Effective Decline [%/Yr]			
1996	651.0	10.3	17.2	9.8			14.469			
1997	726.0	8.2	20.2	8.5			11.611			
1998	726.0	7.6	23.0	7.4			9.697			
1999/04	720.0	7.0	23.8	6.7	23.8	7.8	9.192			
1999				6.5	25.4	6.2	8.326			
2000				6.0	27.6	4.0	7.295			
2001				5.6	29.7	2.0	6.491			
2002				5.2	31.6	0.1	n/a			
2003				5.0	31.7	-0.1	n/a			

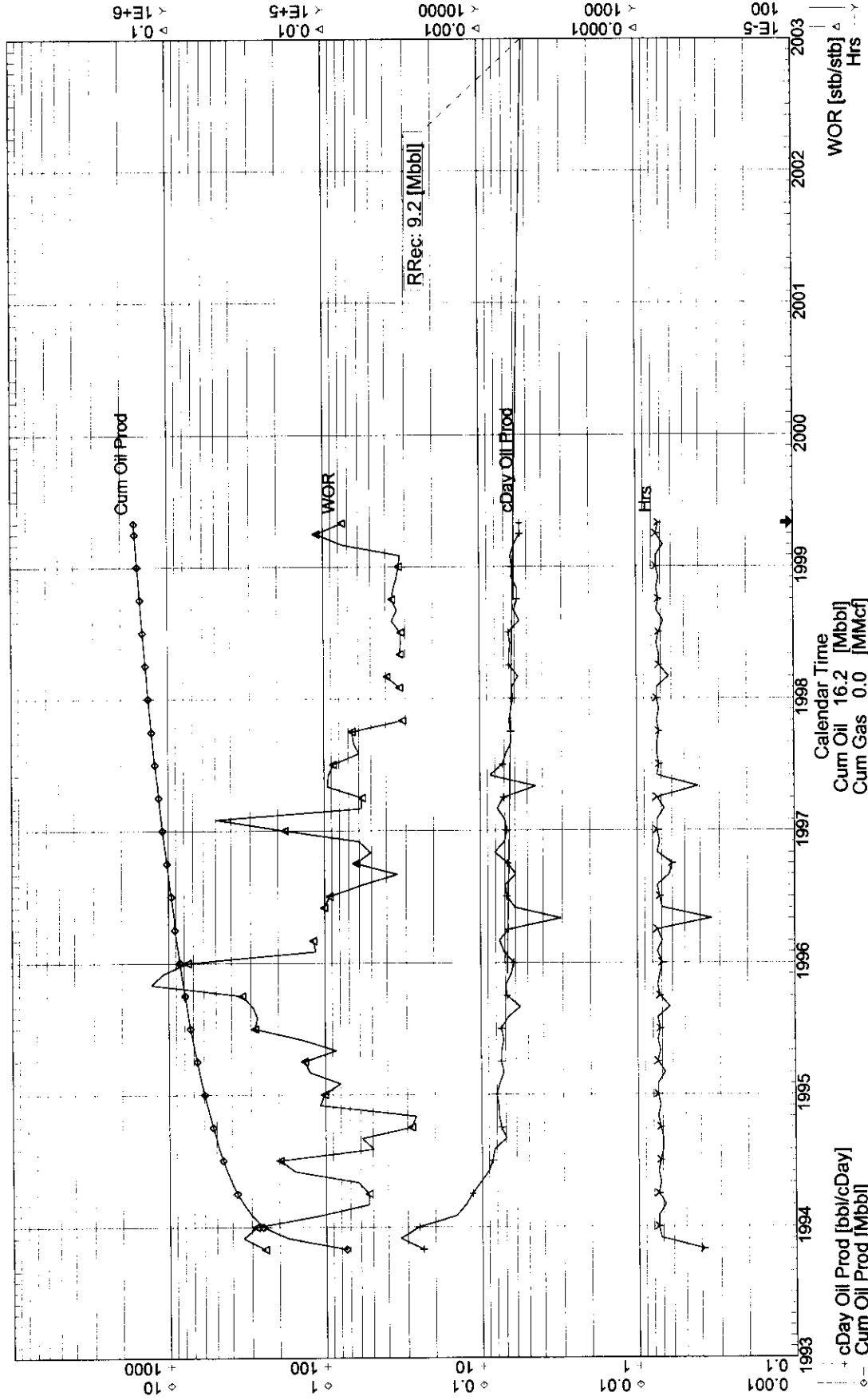
Group: **South Pierson Unit**  
 Well: **00/12-08-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO.1 WIW 12-8-2  
 Primary: OTHER Status:  
 Last On: Oct-1993

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Group: **South Pierson Unit**  
 Well: **00/13-08-002-29W1/0**  
 Name: **HOME S PIERSON UNIT 1** 13-8-2-29  
 Primary: **OTHER** Status:  
 Last On: **Apr-1999**

Field: **PIERSON PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**



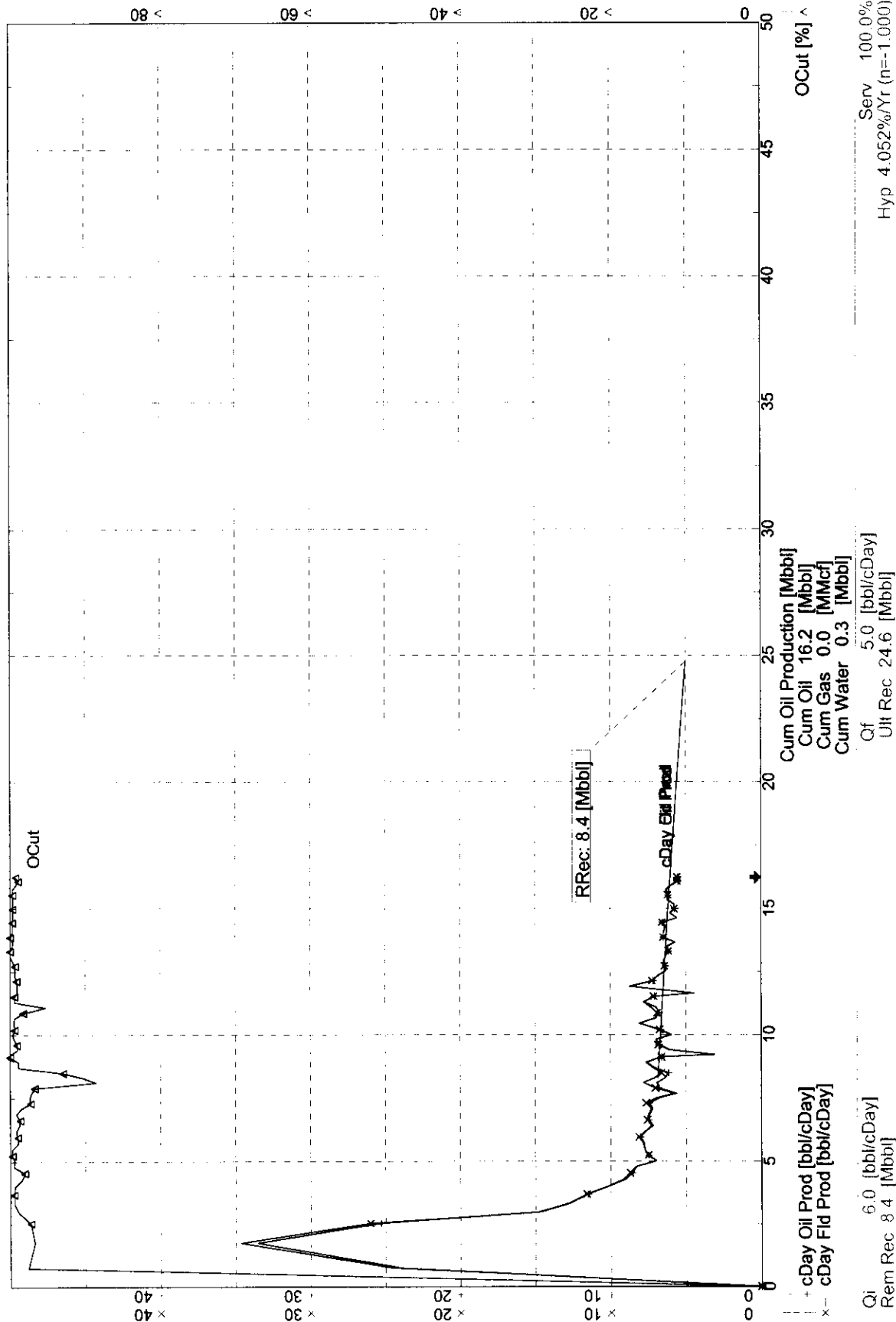
Calendar Time  
 Cum Oil 16.2 [Mbb]l  
 Cum Gas 0.0 [MMcf]  
 Cum Water 0.3 [Mbb]l  
 Qf 5.0 [bbl/cDay]  
 Ult Rec 25.4 [Mbb]l

Oil 6.0 [bbl/cDay]  
 Rem Rec 9.2 [Mbb]l

Hyp 3.664%/Yr (n=-1.000)  
 Serv 100.0%

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/13-08-002-29W1/0  
 Name: HOME S PIERSON UNIT 1 13-8-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999



c:\data\decline\anderson\pierson\pierson.dpd  
 05-Nov-99 15:06 [oil linear rate-cum (cday)]



# ORECAST SUMMARY

00/13-08-002-29W1/0

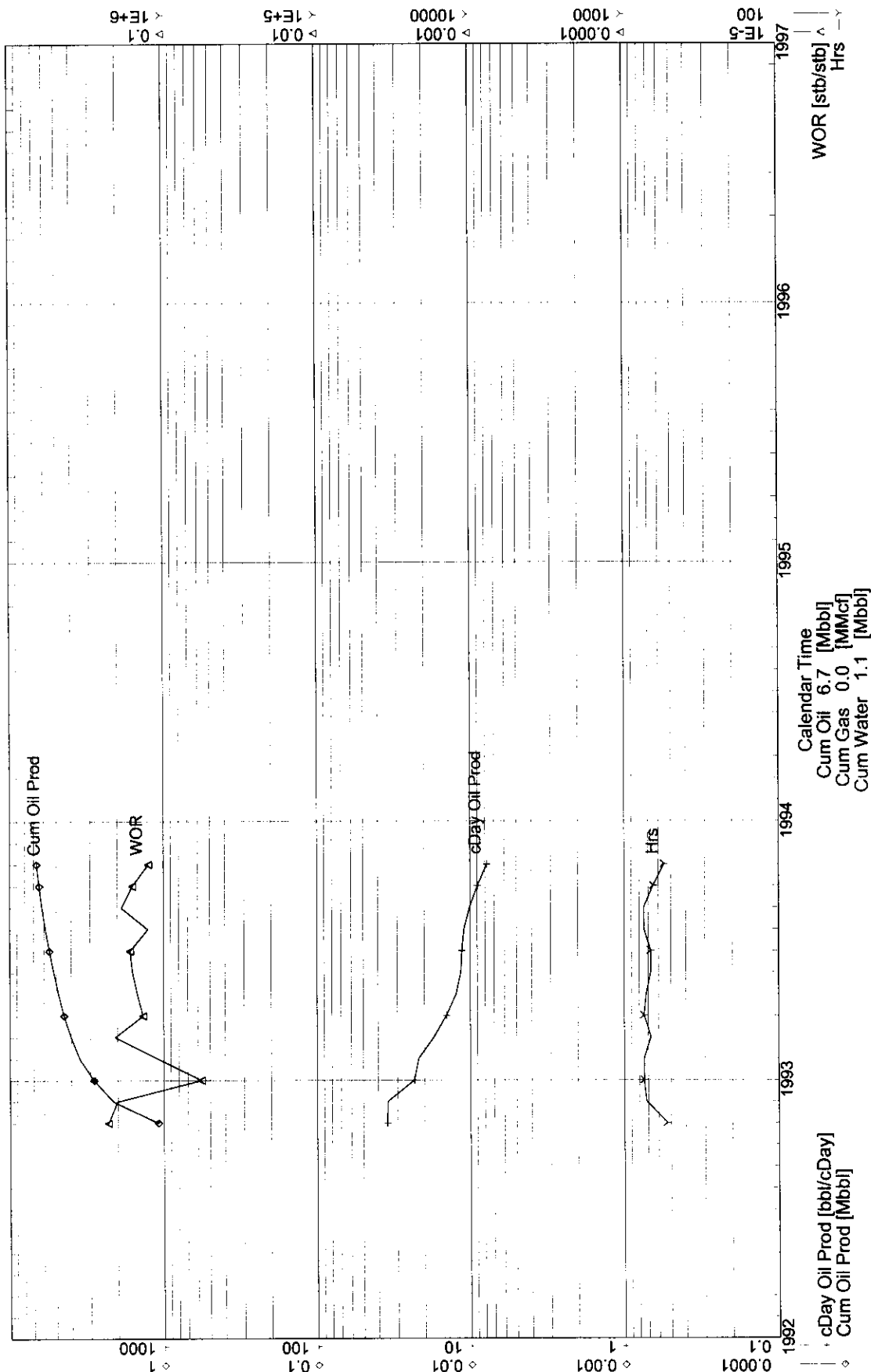
1. Temp2 (Hyp, Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.2467
  - b) Decline Exponent (n) = -1.000
  - c) Initial Decline Rate (Qi) = 6.8 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 2.699E-03 [1/t]
  - e) Effective Decline Rate (Dei) = 3.239 [%/Yr]
  - f) Forecast Start Rate (Qo) = 6.0 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2003/Nov)
  - j) Ultimate Recoverable (Np) = 25.4 [Mbb]l
  - k) Remaining Recoverable = 9.2 [Mbb]l (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS Operating Hours	FORECASTS Temp2					Effective Decline [%/Yr]	Remaining Reserves [Mbb]l	[Fluid] [Liq-Liq]	[GOR]
		cDay Oil Prod [bbl/cDay]	Cum [Mbb]l	cDay Oil Prod [bbl/cDay]	Cum [Mbb]l	Temp2 cDay Oil Prod [bbl/cDay]				
1995	708.0	6.3	8.5	6.7			3.256			
1996	676.0	6.5	10.9	6.6			3.366			
1997	704.0	6.7	13.3	6.4			3.483			
1998	718.0	6.1	15.5	6.2			3.609			
1999/04	720.0	5.8	16.2	6.0	16.2		3.653	9.2		
1999				5.9	17.7		3.744	7.8		
2000				5.7	19.8		3.890	5.7		
2001				5.5	21.8		4.047	3.6		
2002				5.3	23.7		n/a	1.7		
2003				5.1	25.4		n/a	0.0		

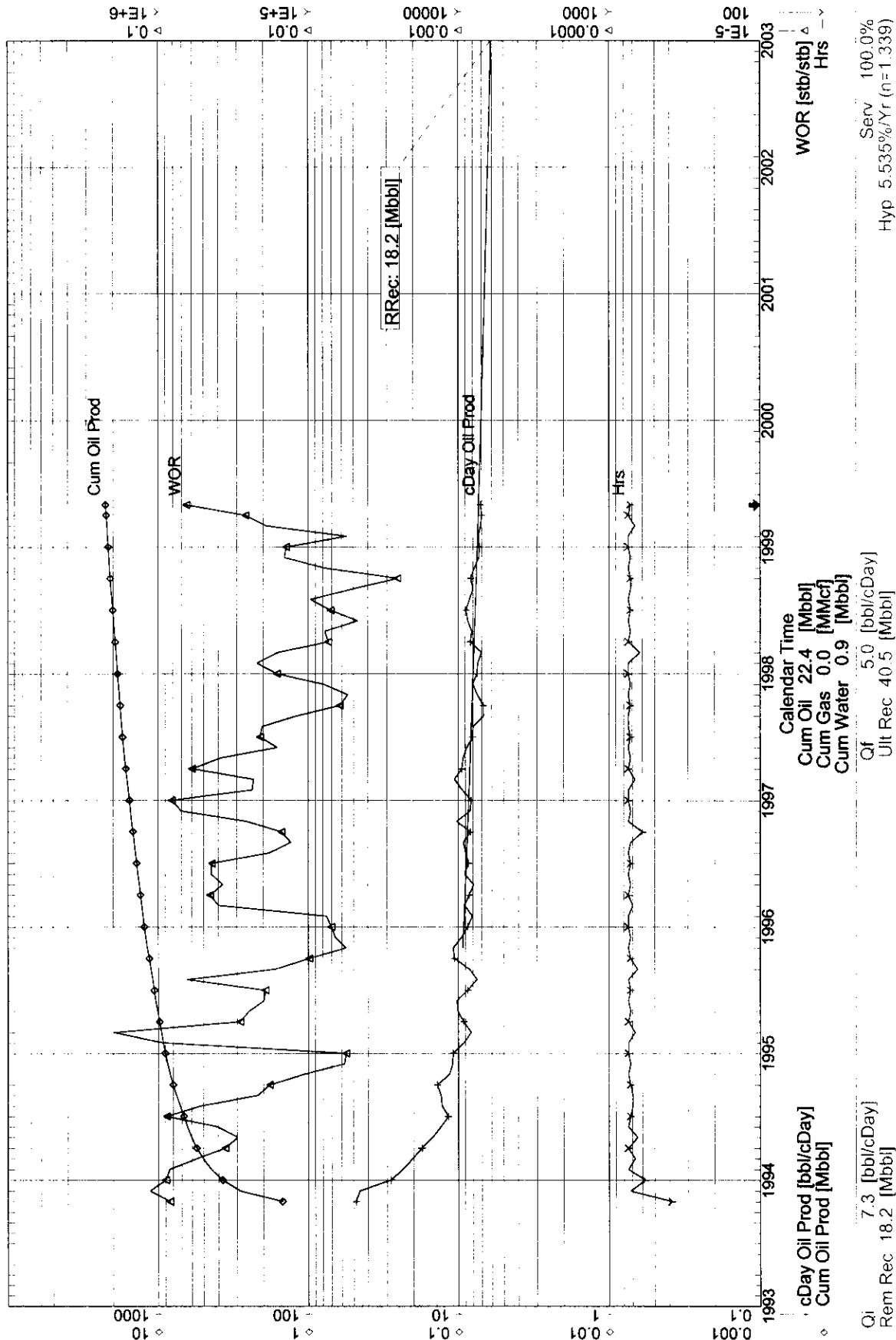
Group: **South Pierson Unit**  
 Well: **00/14-08-002-29W1/0**  
 Name: HOME S. PIERSON UNIT 1 WIW 14-8-2-29  
 Primary: OTHER Status:  
 Last On: Oct-1993

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: **South Pierson Unit**  
 Well: **00/15-08-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO.1 15-8-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999



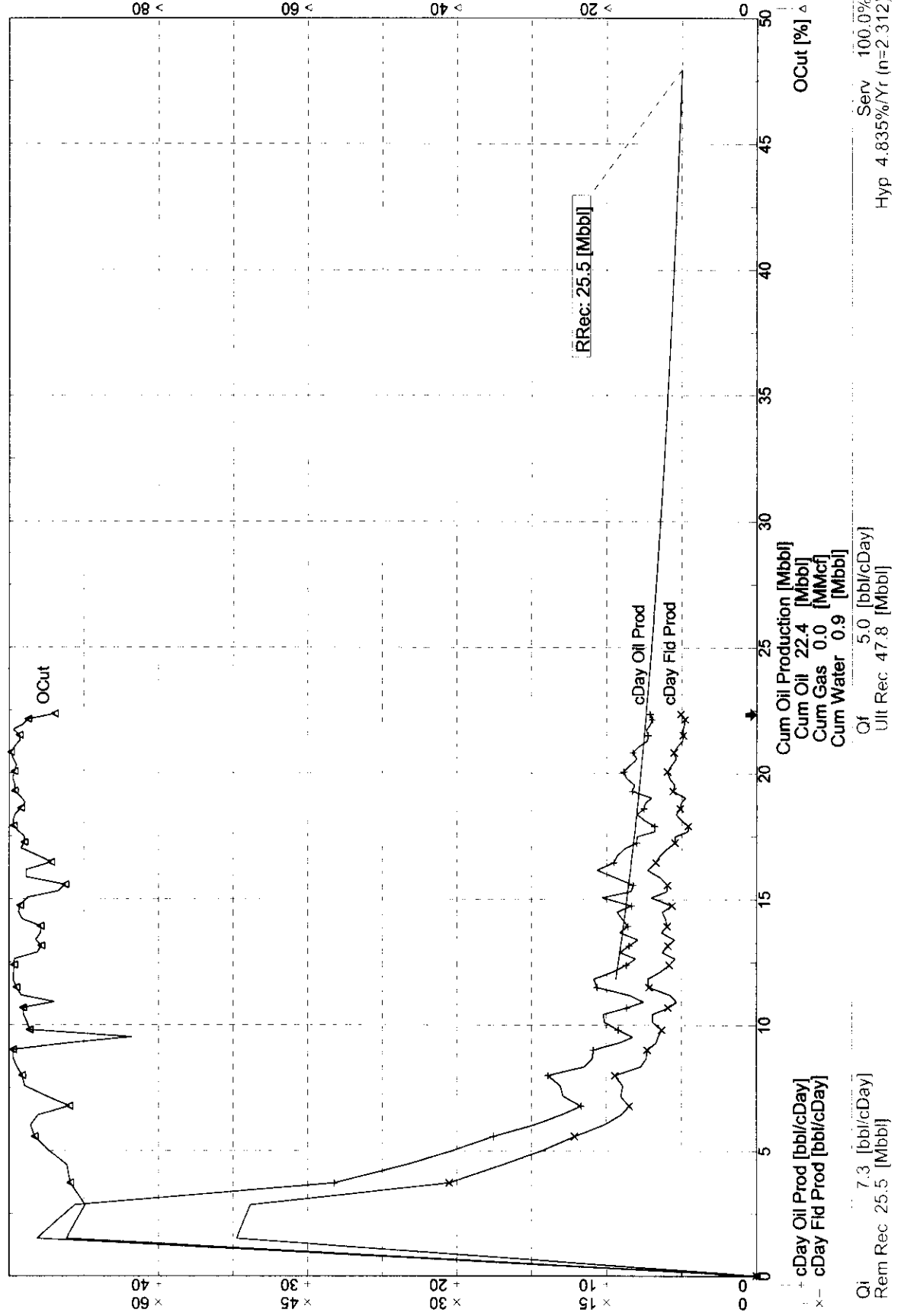
Group: **South Pierson Unit**  
 Well: **00/15-08-002-29W1/0**

Name: HOME S. PIERSON UNIT NO.1 15-8-2-29

Primary: OTHER Status:

Last On: Apr-1999

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



# ORECAST SUMMARY

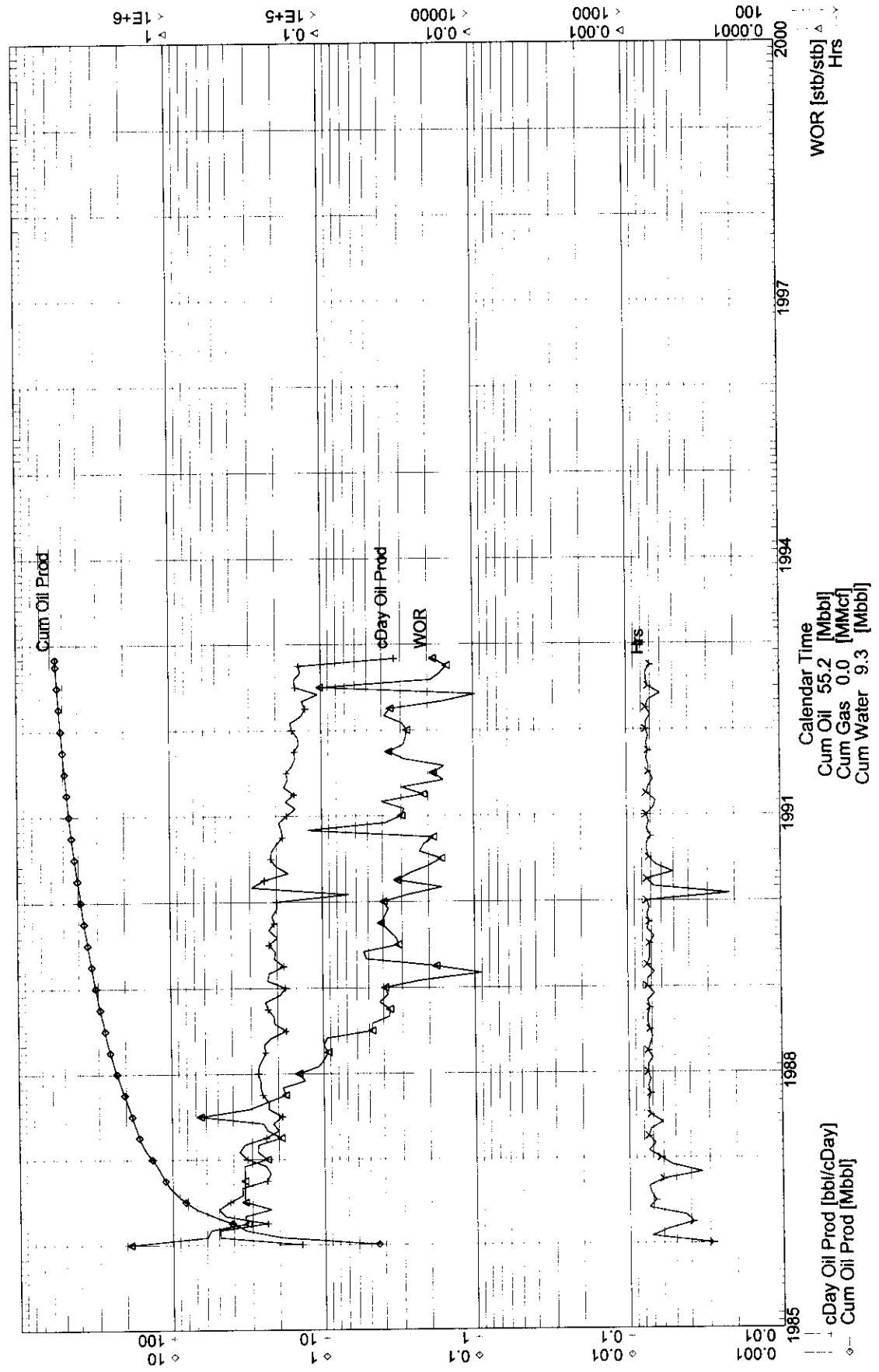
00/15-08-002-29W1/0

1. Temp1 (Hyp. Time cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.6297
  - b) Decline Exponent (n) = 1.339
  - c) Initial Decline Rate (Qi) = 9.4 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 6.950E-03 [1/t]
  - e) Effective Decline Rate (Dei) = 7.601 [%/Yr]
  - f) Forecast Start Rate (Qo) = 7.3 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2007/Aug)
  - j) Ultimate Recoverable (Np) = 40.5 [Mbb]l
  - k) Remaining Recoverable = 18.2 [Mbb]l (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

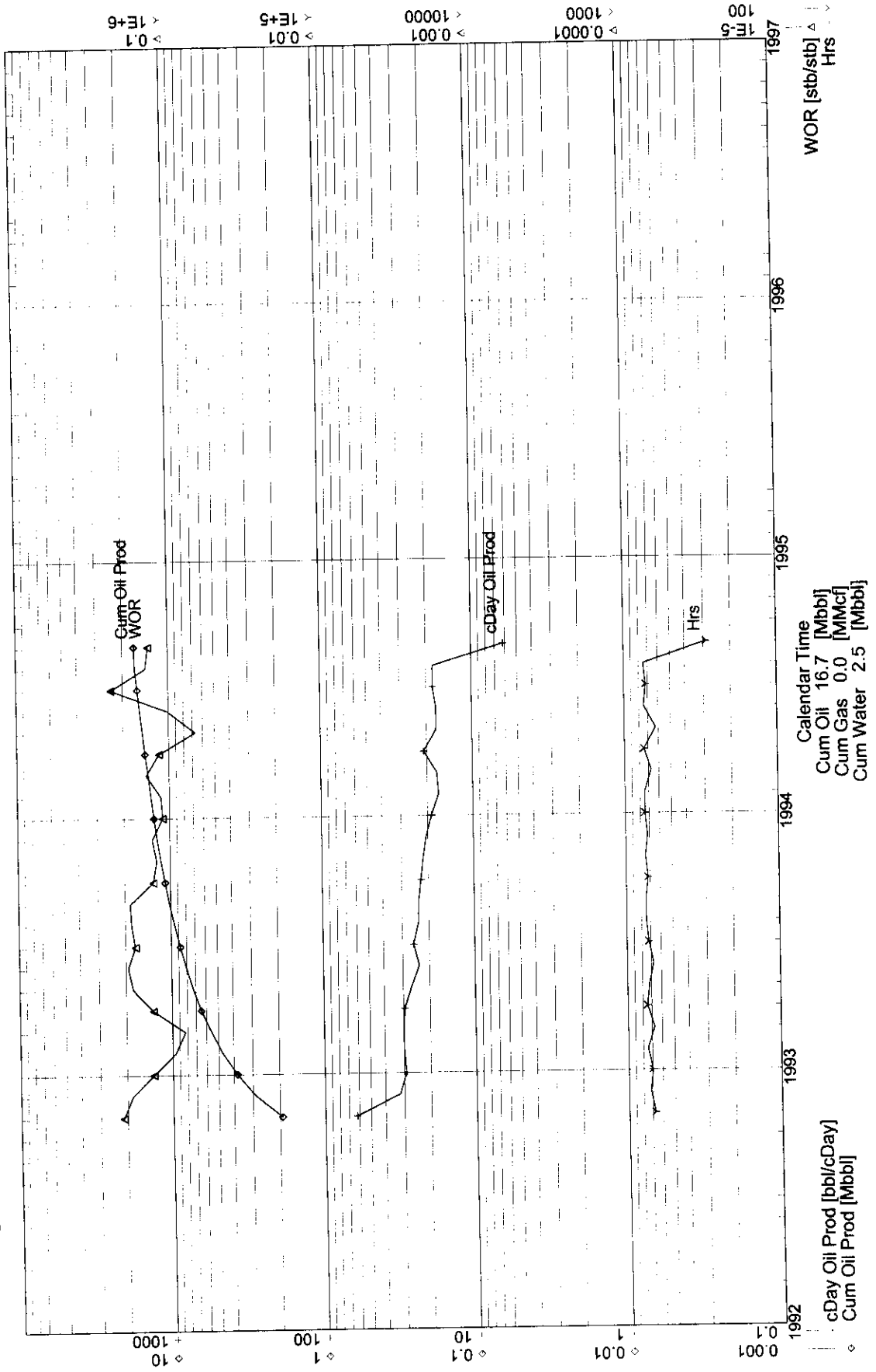
Date	ACTUALS Operating Hours	FORECASTS					Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
		cDay Oil Prod [bbl/cDay]	Cum [Mbb]l	Temp1 cDay Oil Prod [bbl/cDay]	Cum [Mbb]l	Remaining Reserves [Mbb]l				
1995	736.0	9.7	12.4	9.3			7.413			
1996	720.0	8.7	15.6	8.8			6.743			
1997	730.0	8.3	18.6	8.2			6.184			
1998	724.0	7.9	21.5	7.7			5.711			
1999/04	720.0	7.1	22.4	7.3	22.4	18.2	5.569			
1999										
2000				7.2	24.1	16.4	5.305			
				6.8	26.6	13.9	4.954			
2001				6.5	29.0	11.6	4.645			
2002				6.2	31.2	9.3	4.373			
2003				5.9	33.4	7.1	4.131			
2004				5.6	35.4	5.1	3.915			
2005				5.4	37.4	3.1	3.720			
2006				5.2	39.3	1.2	n/a			
2007				5.1	40.6	0.0	n/a			

Group: **South Pierson Unit**  
 Well: **00/16-08-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 WIW 16-8-2-  
 Primary: OTHER Status:  
 Last On: Oct-1992  
 Field: S PIERSO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



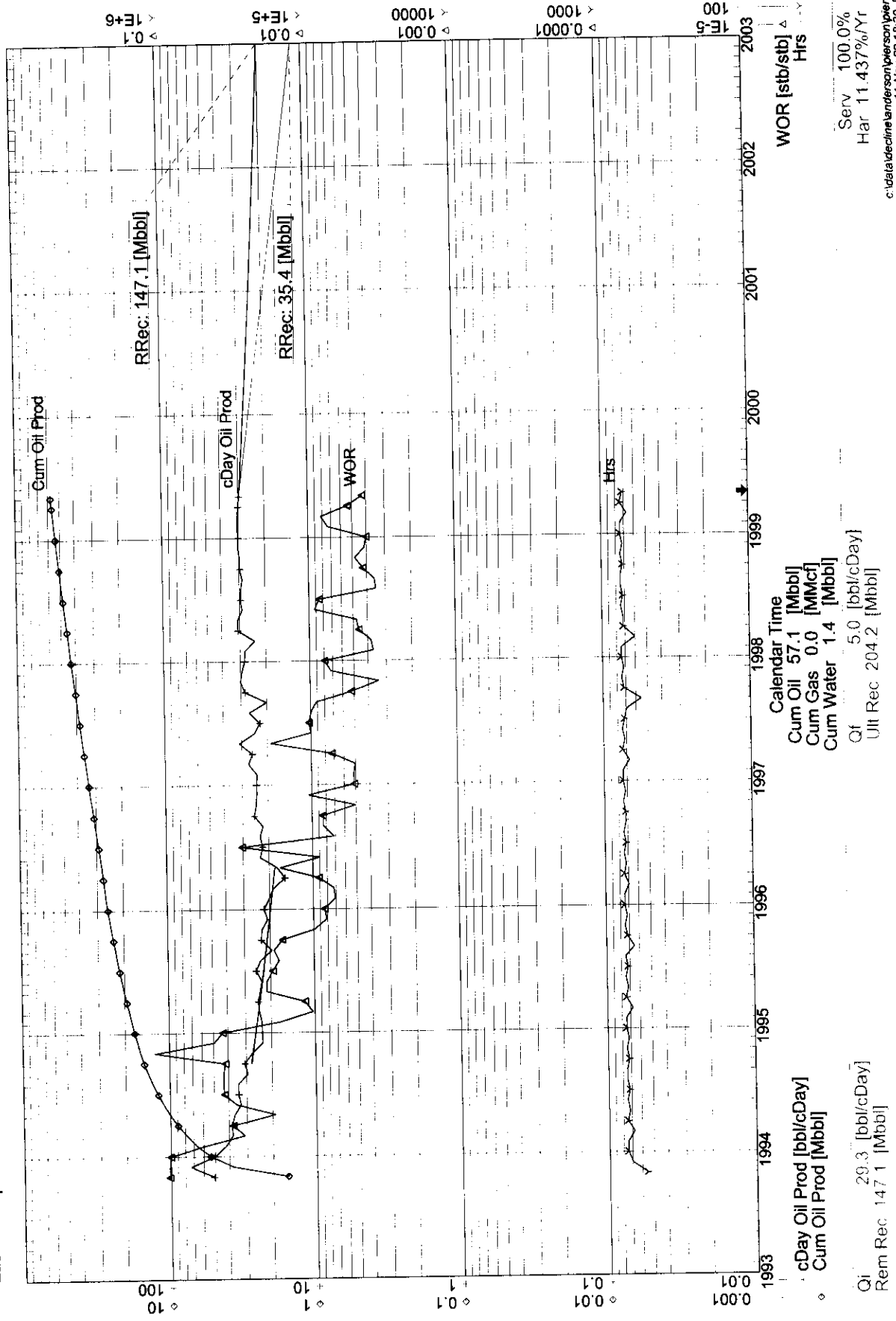
Group: **South Pierson Unit**  
 Well: **00/02-09-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 2-9-2-29  
 Primary: OTHER Status:  
 Last On: Aug-1994

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: **South Pierson Unit**  
 Well: **00/03-09-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO 1 3-9-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

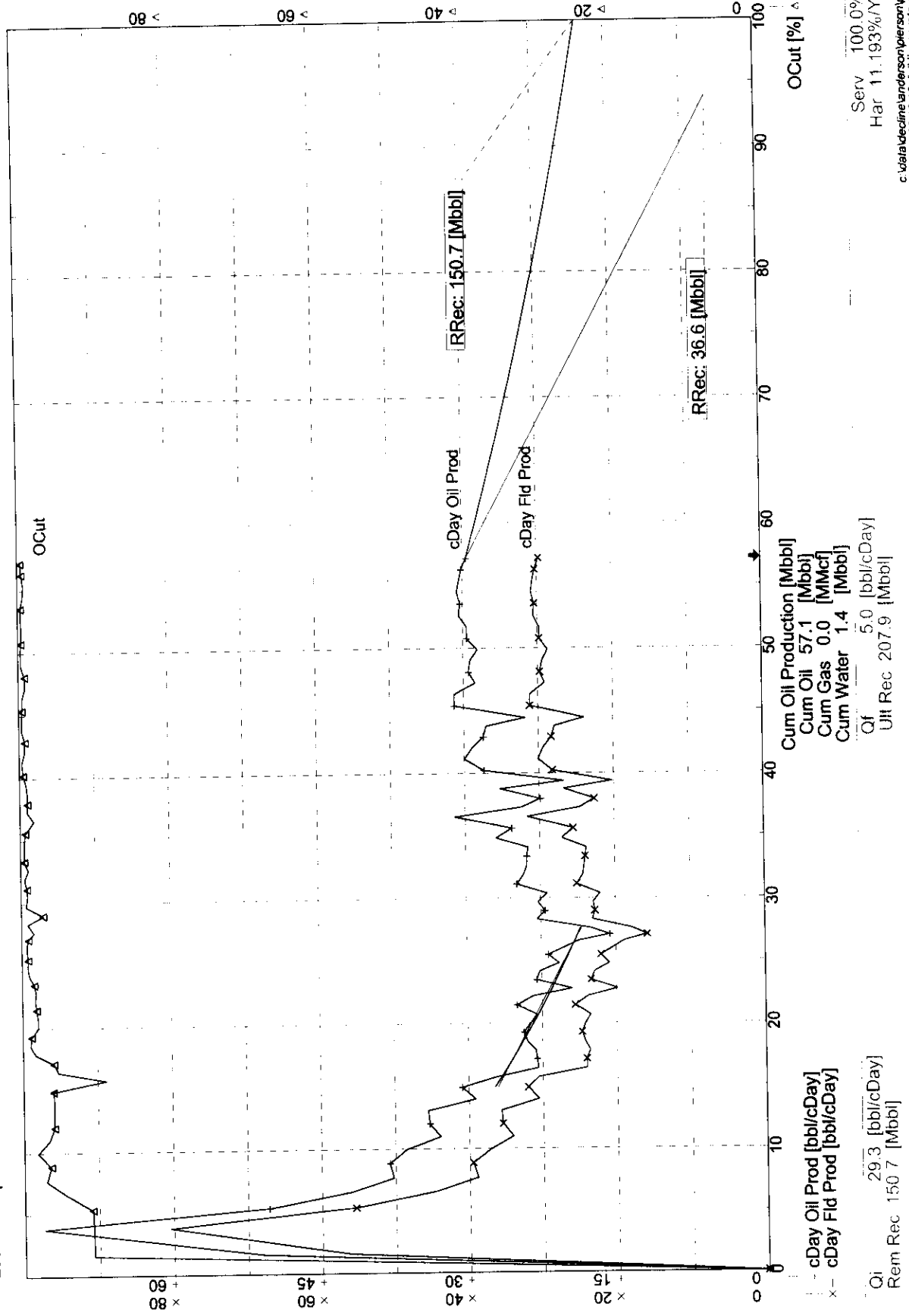


Serv 100.0%  
 Har 11.437%/Yr  
 c:\data\decline\anderson\pierson\pierson.dpd  
 11-Nov-99 18:20 [pierson]



Group: **South Pierson Unit**  
 Well: **00/03-09-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO 1 3-9-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



# ORECAST SUMMARY

00/03-09-002-29W1/0

1. Temp7 (Har, Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = 0.8177
  - b) Decline Exponent (n) = 1.000
  - c) Initial Decline Rate (Qi) = 28.4 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 2.784E-02 [1/t]
  - e) Effective Decline Rate (Dei) = 25.040 [%/Yr]
  - f) Forecast Start Rate (Qo) = 29.6 [bbl/cDay] (from: Last Data)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2037/Jan)
  - j) Ultimate Recoverable (Np) = 204.2 [Mbbbl]
  - k) Remaining Recoverable = 147.1 [Mbbbl] (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

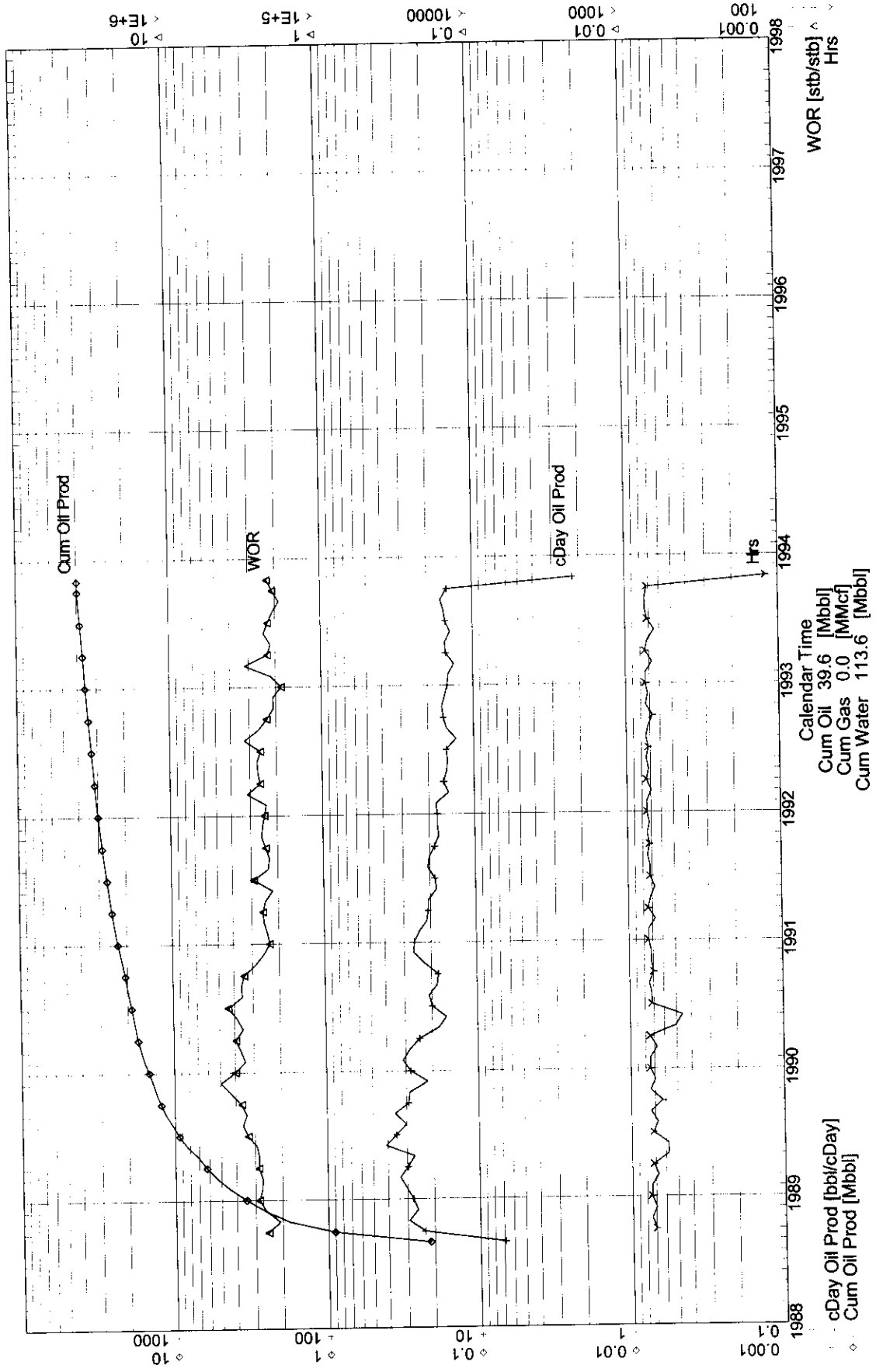
Date	ACTUALS		FORECASTS							
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Temp7 cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Remaining Reserves [Mbbbl]	Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
1994	732.0	25.9	17.1	70.9			23.111			
1995	722.0	22.8	25.5	58.9			18.772			
1996	730.0	21.5	33.3	46.7			15.805			
1997	710.0	26.3	42.9	38.7			13.648			
1998	722.0	29.1	53.5	33.1			12.009			
1999/04	720.0	30.1	57.1	29.6	57.1	147.1	11.547			
1999				28.2	64.0	140.2	10.722			
2000				25.6	73.4	130.8	9.683			
2001				23.0	81.8	122.4	8.828			
2002				20.9	89.5	114.7	8.112			
2003				19.1	96.5	107.7	7.504			
2004				17.6	102.9	101.3	6.980			
2005				16.4	108.9	95.3	6.524			
2006				15.3	114.5	89.7	6.125			
2007				14.3	119.7	84.5	5.771			
2008				13.4	124.7	79.6	5.456			
2009				12.7	129.3	74.9	5.174			
2010				12.0	133.7	70.5	4.920			
2011				11.4	137.9	66.4	4.689			
2012				10.9	141.8	62.4	4.479			
2013				10.4	145.6	58.6	4.287			
2014				9.9	149.2	55.0	4.111			
2015				9.5	152.7	51.5	3.948			
2016				9.1	156.0	48.2	3.798			

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS		RemaininEffective	
	Operating Hours	cDay Oil ProdCum [Mbbbl]	cDay Oil ProdCum [Mbbbl]	Tempo7 [bbl/cDay]	Reserves Declin [Mbbbl]	Declin(Liq-Liq [GOR] [%/Yr]
2017		8.8	159.3	8.4	45.0	3.659
2018		8.4	162.3	8.1	41.9	3.530
2019		8.1	165.3	7.9	38.9	3.410
2020		7.9	168.2		36.0	3.297
2021		7.6	171.0		33.3	3.192
2022		7.3	173.6		30.6	3.093
2023		7.1	176.2		28.0	3.001
2024		6.9	178.8		25.5	2.913
2025		6.7	181.2		23.0	2.831
2026		6.5	183.6		20.6	2.753
2027		6.3	185.9		18.3	2.679
2028		6.1	188.1		16.1	2.609
2029		6.0	190.3		13.9	2.543
2030		5.8	192.4		11.8	2.480
2031		5.7	194.5		9.7	2.420
2032		5.5	196.5		7.7	2.363
2033		5.4	198.5		5.7	2.308
2034		5.3	200.5		3.8	2.256
2035		5.2	202.3		1.9	2.206
2036		5.1	204.2		0.0	n/a
2037		5.0	204.3		-0.1	n/a

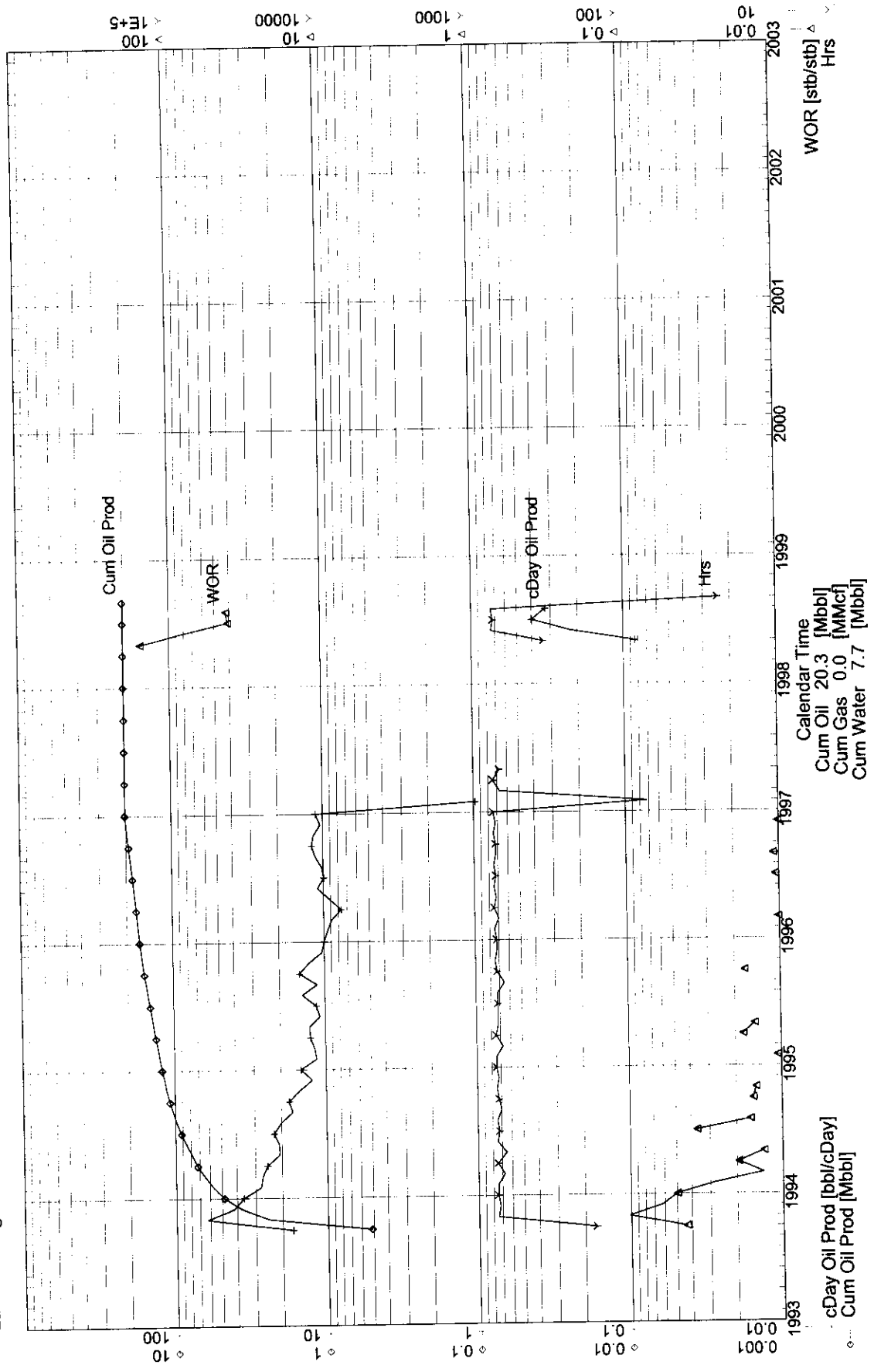
Group: **South Pierson Unit**  
 Well: **00/04-09-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 4-9-2-29  
 Primary: OTHER Status:  
 Last On: Oct-1993

Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



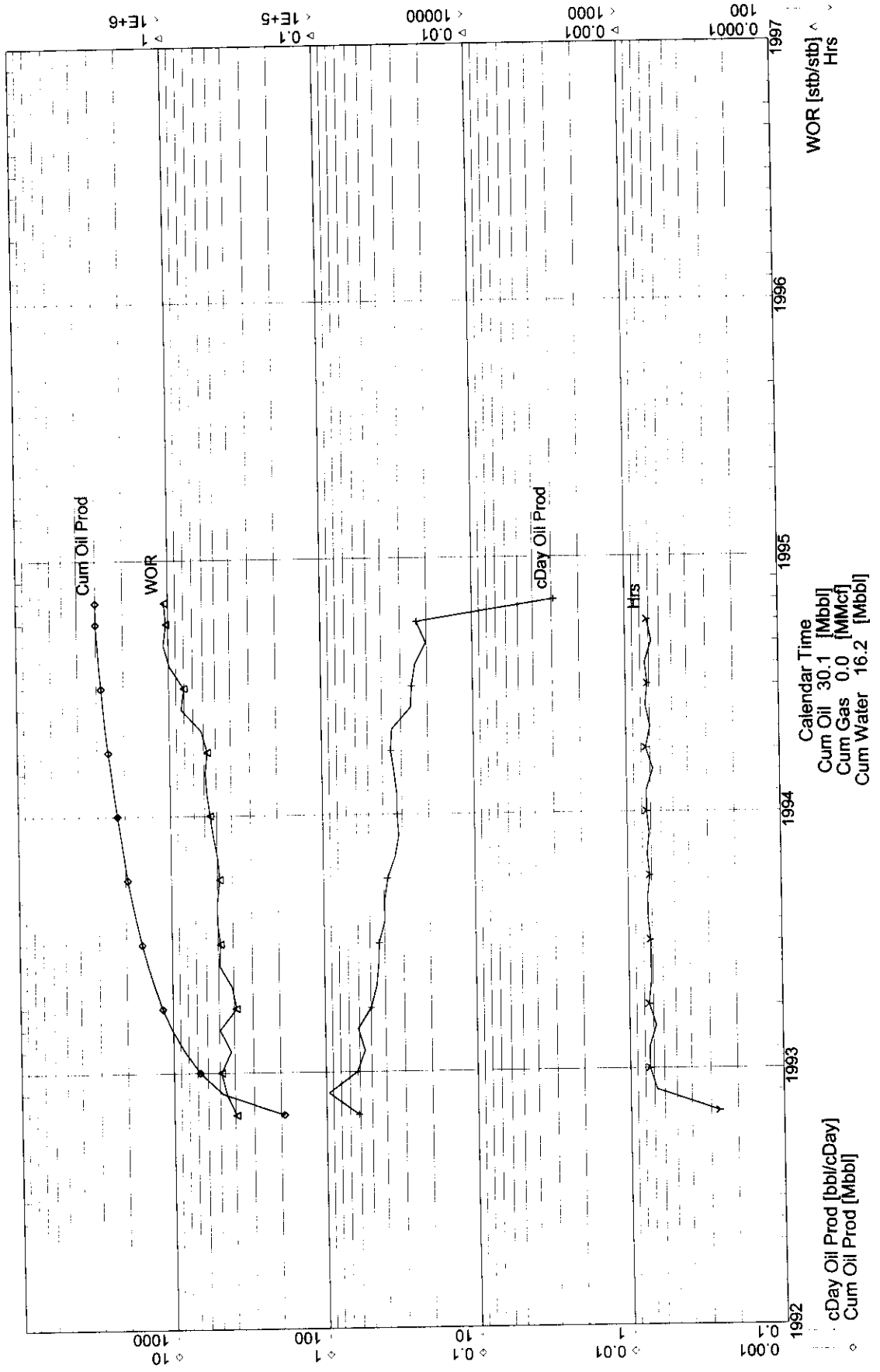
Group: **South Pierson Unit**  
 Well: **00/05-09-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO. 1 5-9-2-29  
 Primary: OTHER Status:  
 Last On: Aug-1998

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



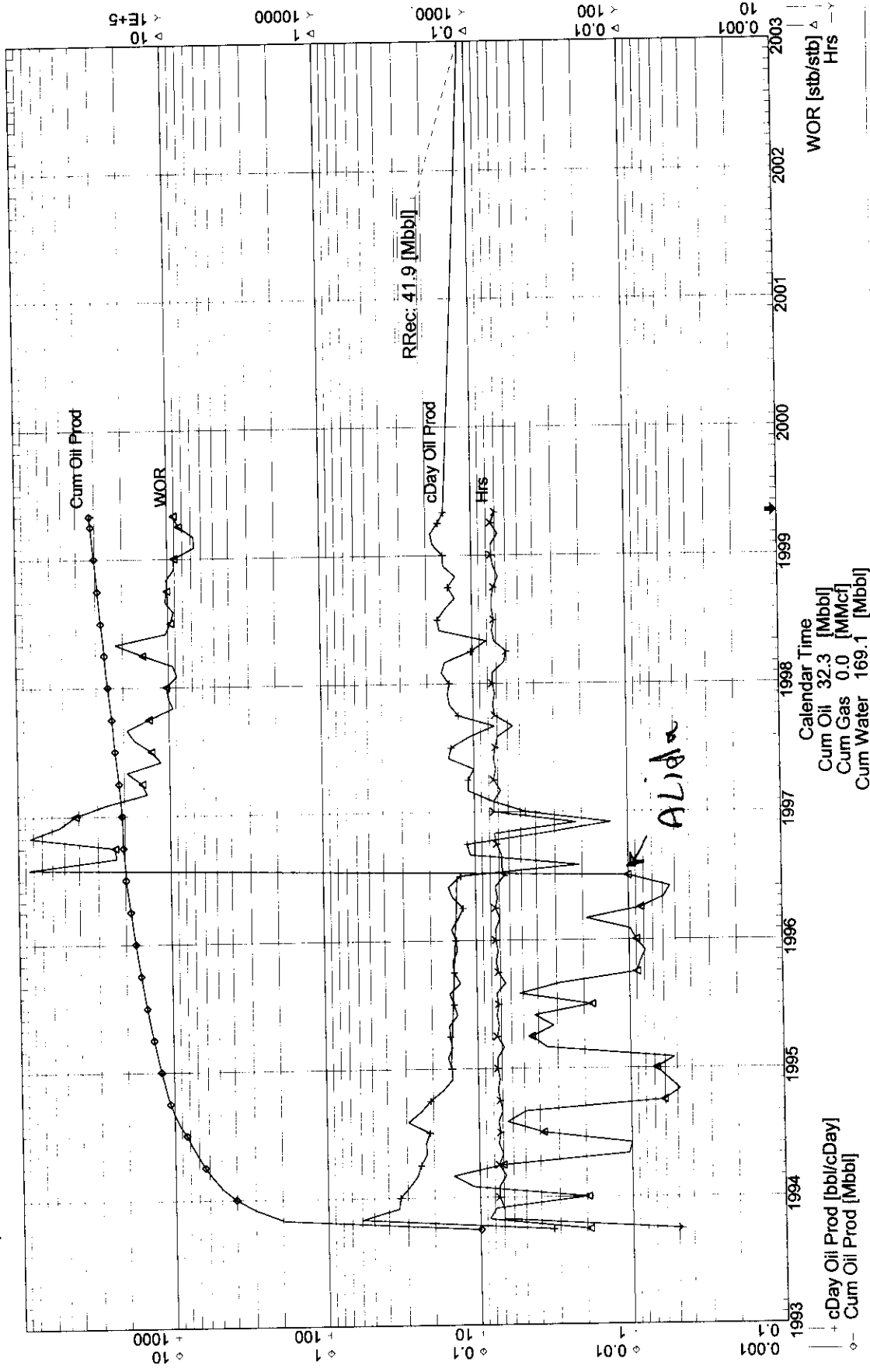
Group: **South Pierson Unit**  
 Well: **00/06-09-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 6-9-2-29  
 Primary: OTHER Status:  
 Last On: Oct-1994

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/07-09-002-29W1/0  
 Name: HOME S PIERSON UNIT NO. 1 7-9-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999



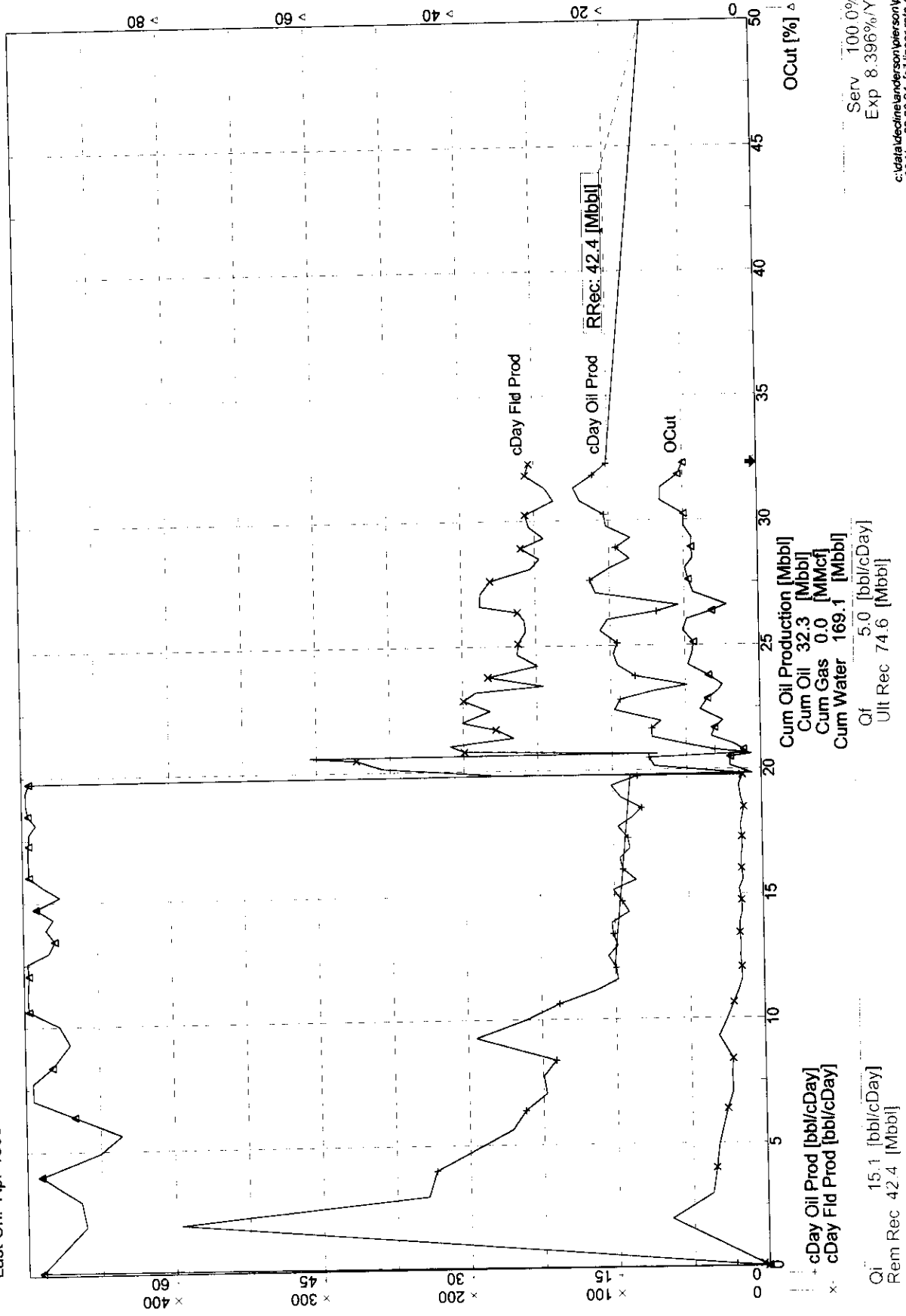
Calendar Time  
 Cum Oil 32.3 [Mbbbl]  
 Cum Gas 0.0 [MMcf]  
 Cum Water 169.1 [Mbbbl]  
 Qf 5.0 [bbl/cDay]  
 Ult Rec 74.2 [Mbbbl]

Qf 15.1 [bbl/cDay]  
 Rem Rec 41.9 [Mbbbl]

WOR [stb/stb] Δ  
 Hrs  
 Serv 100.0%  
 Exp 8.485%/Yr  
 c:\data\decline\anderson\pierson\pierson.dpd  
 06-Nov-99 20:24 [pierson]

Group: **South Pierson Unit**  
 Well: **00/07-09-002-29W1/0**  
 Name: **HOME S PIERSON UNIT NO. 1** 7-9-2-29  
 Primary: **OTHER** Status:  
 Last On: **Apr-1999**

Field: **PIERSON PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**





# ORECAST SUMMARY

00/07-09-002-29W1/0

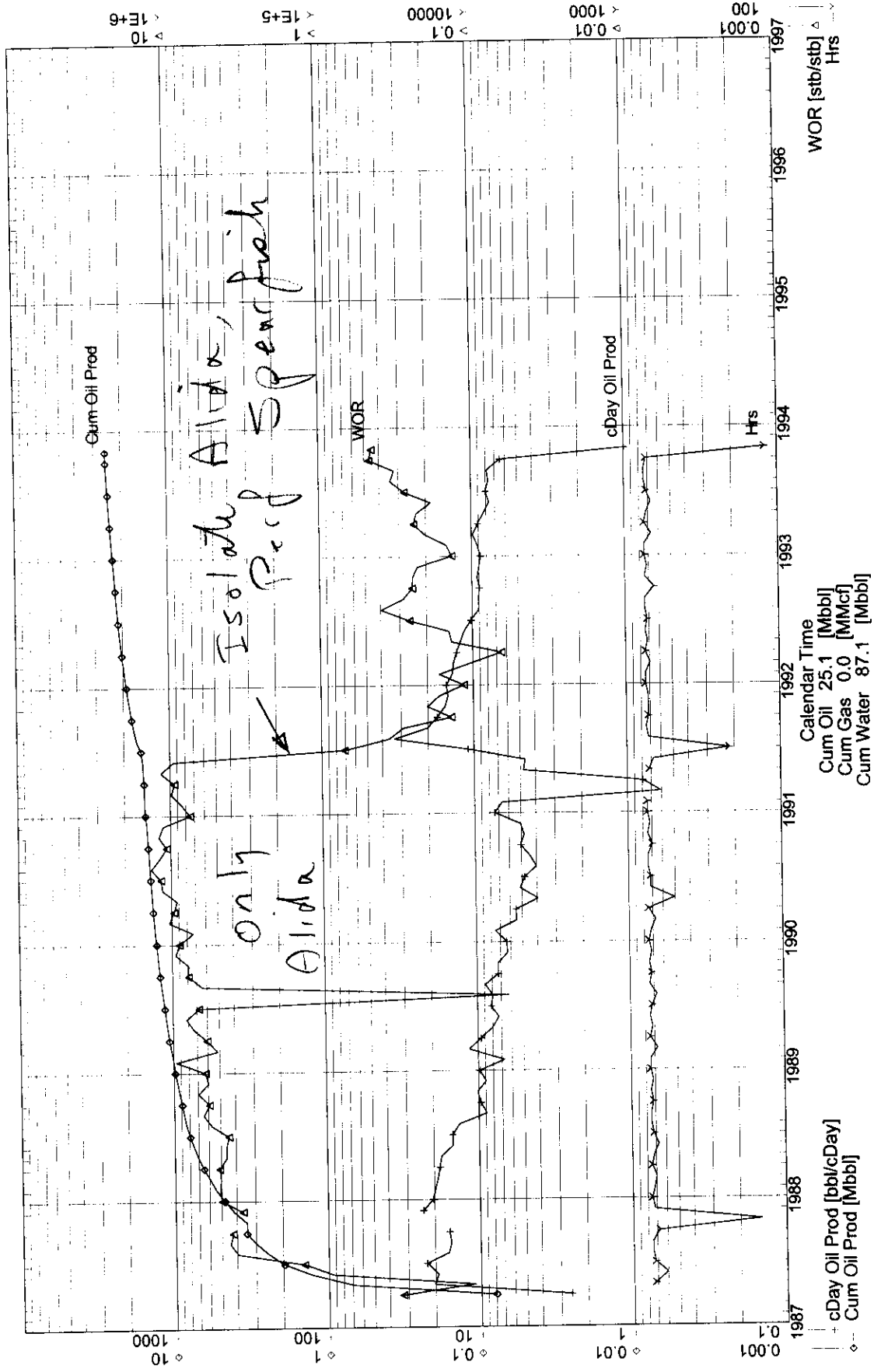
1. Temp2 (Exp, Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.5554
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 15.2 [bbl/cDay]
  - d) Nominal Decline Rate (D) = 7.389E-03 [1/t]
  - e) Effective Decline Rate (De) = 8.485 [%/Yr]
  - f) Forecast Start Rate (Qo) = 15.2 [bbl/cDay] (from: Last Data)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2011/Nov)
  - j) Ultimate Recoverable (Np) = 74.2 [Mbbbl]
  - k) Remaining Recoverable = 41.9 [Mbbbl] (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS					Effective Decline [%/Yr]	Remaining Reserves [Mbbbl]	[Fluid]	[Liq-Liq]	[GOR]
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Temp2 cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Temp2 cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]					
1994	744.0	14.9	12.1	22.3	12.1	22.3	12.1	8.485				
1995	722.0	14.3	17.3	21.3	17.3	21.3	17.3	8.485				
1996	672.0	9.6	20.8	19.5	20.8	19.5	20.8	8.485				
1997	710.0	11.8	25.1	17.8	25.1	17.8	25.1	8.485				
1998	708.0	14.1	30.2	16.3	30.2	16.3	30.2	8.485				
1999/04	714.0	17.0	32.3	15.2	32.3	15.2	32.3	8.485	41.9			
1999				14.7	35.9	14.7	35.9	8.485	38.3			
2000				13.6	40.9	13.6	40.9	8.485	33.3			
2001				12.5	45.4	12.5	45.4	8.485	28.8			
2002				11.4	49.6	11.4	49.6	8.485	24.6			
2003				10.5	53.4	10.5	53.4	8.485	20.7			
2004				9.6	56.9	9.6	56.9	8.485	17.2			
2005				8.8	60.2	8.8	60.2	8.485	14.0			
2006				8.0	63.1	8.0	63.1	8.485	11.1			
2007				7.3	65.8	7.3	65.8	8.485	8.4			
2008				6.7	68.2	6.7	68.2	8.485	5.9			
2009				6.1	70.5	6.1	70.5	8.485	3.7			
2010				5.6	72.5	5.6	72.5	n/a	1.6			
2011				5.2	74.3	5.2	74.3	n/a	-0.1			

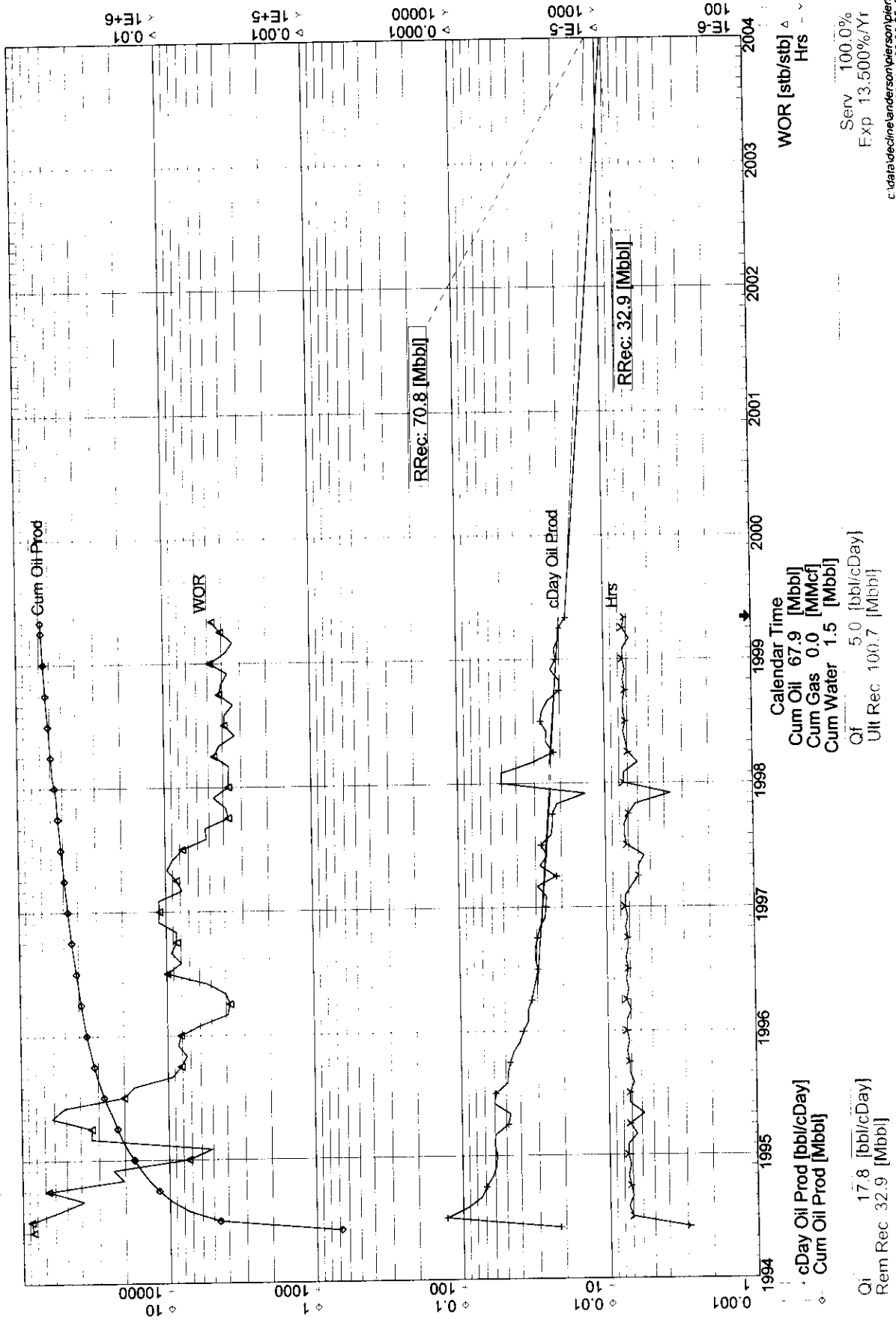
Group: **South Pierson Unit**  
 Well: **00/08-09-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 WIW 8-9-2-2  
 Primary: OTHER Status:  
 Last On: Oct-1993

Field: SPIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



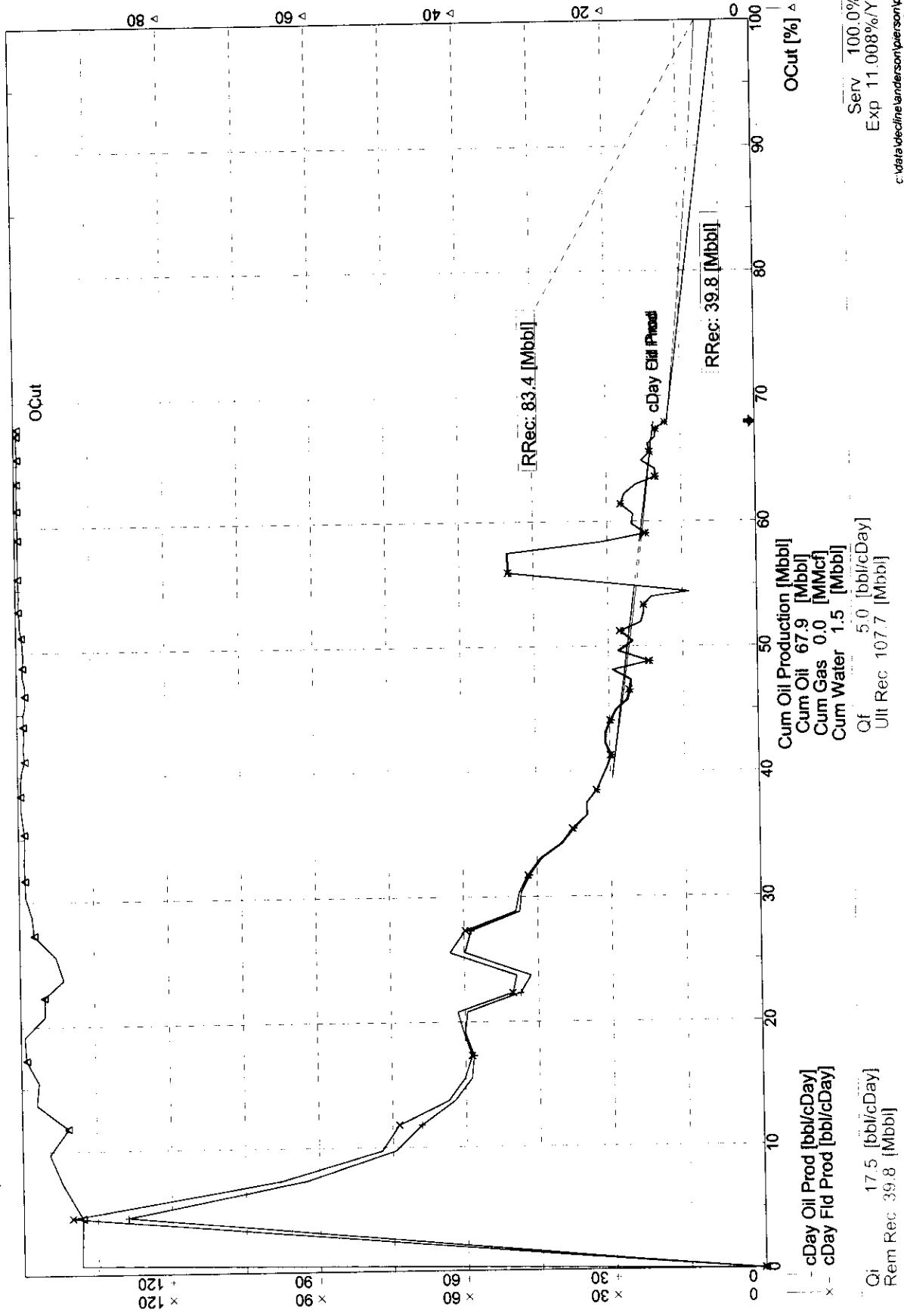
Group: **South Pierson Unit**  
 Well: **00/09-09-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO. 1 9-9-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: SPIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

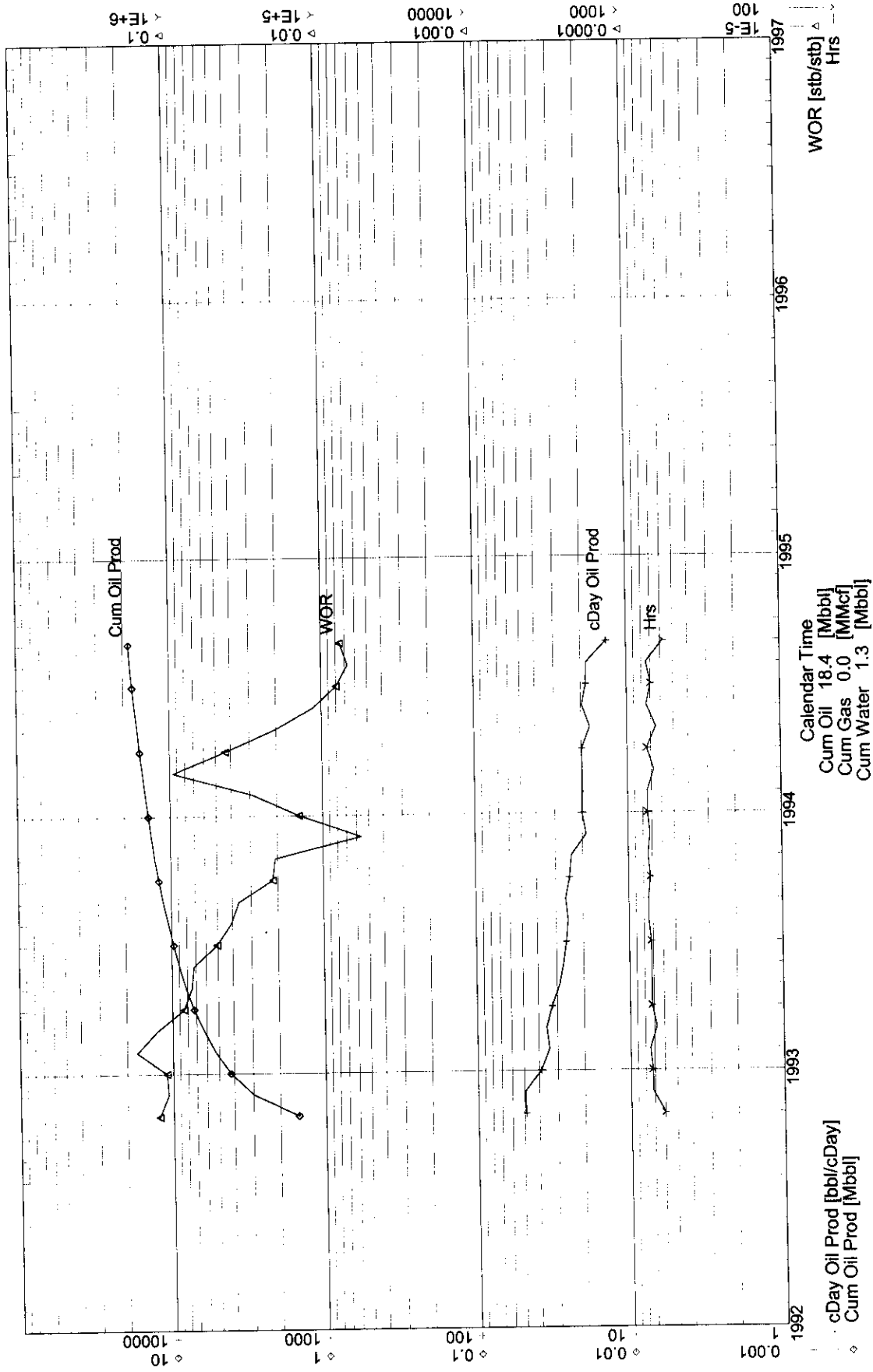
Group: **South Pierson Unit**  
 Well: **00/09-09-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO. 1 9-9-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999



Exp 100.0%  
 Exp 11.008%/Yr  
 c:\data\declines\pierson\pierson.dpd  
 08-Nov-99 20:34 [oil linear rate cum (cday)]

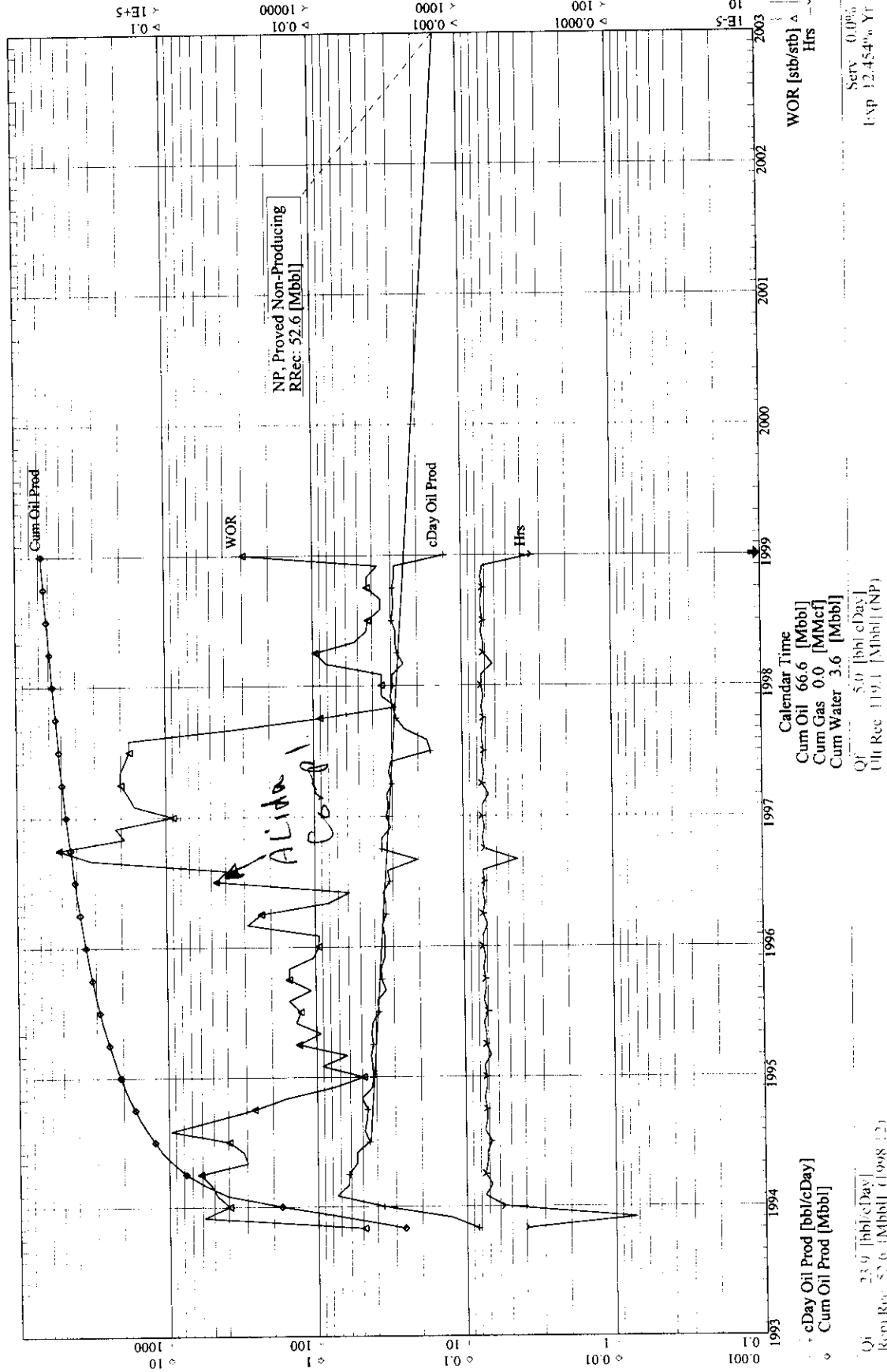
Group: **South Pierson Unit**  
 Well: **00/10-09-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 10-9-2-29  
 Primary: OTHER Status:  
 Last On: Aug-1994

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Group: **South Pierson Unit**  
 Well: **00/11-09-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO. 1 11-9-2-29  
 Primary: OTHER Status:  
 Last On: Dec-1998

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



# PRECAST SUMMARY

00/11-09-002-29W1/0

1. Temp4 (Exp,Time,cDay Oil Prod) - NP
  - a) Correlation Coefficient (r) = -0.7638
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 44.4 [bbl/cDay]
  - d) Nominal Decline Rate (D) = 1.108E-02 [1/t]
  - e) Effective Decline Rate (De) = 12.454 [%/Yr]
  - f) Forecast Start Rate (Qo) = 24.4 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1998/Nov
  - h) Forecast Service Factor = 0 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2010/Nov)
  - j) Ultimate Recoverable (Np) = 119.1 [Mbb]
  - k) Remaining Recoverable = 52.6 [Mbb] (at 1998/12)
  - l) Tolerance = 80
  - m) Smoothing Factor = 1

Footnote(s):

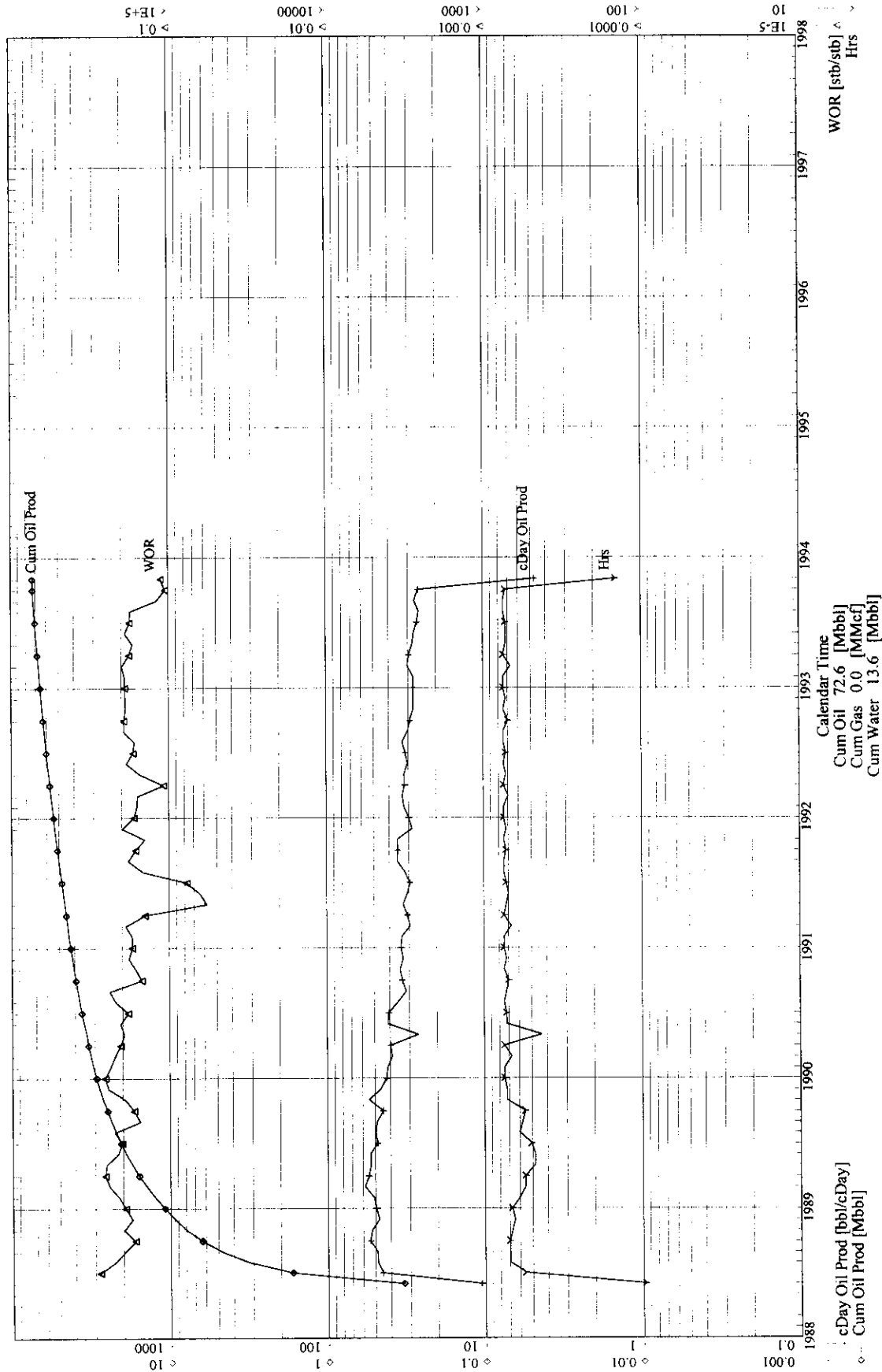
- (1) Temp4 (Exp,Time,cDay Oil Prod)

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS					Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbb]	cDay Oil Prod [bbl/cDay]	(1)	Cum [Mbb]	Remaining Reserves [Mbb]				
1994	720.0	45.7	20.8	42.5				12.454			
1995	724.0	38.5	34.9	38.3				12.454			
1996	706.0	32.5	46.7	33.5				12.454			
1997	730.0	27.6	56.7	29.4				12.454			
1998	690.0	27.0	66.6	25.7				12.454			
1999				22.5	74.8		44.3	12.454			
2000				19.7	82.1		37.1	12.454			
2001				17.2	88.4		30.7	12.454			
2002				15.1	93.9		25.2	12.454			
2003				13.2	98.8		20.4	12.454			
2004				11.6	103.0		16.1	12.454			
2005				10.1	106.7		12.4	12.454			
2006				8.9	110.0		9.2	12.454			
2007				7.8	112.8		6.3	12.454			
2008				6.8	115.3		3.8	12.454			
2009				5.9	117.5		1.6	n/a			
2010				5.2	119.3		-0.1	n/a			

Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

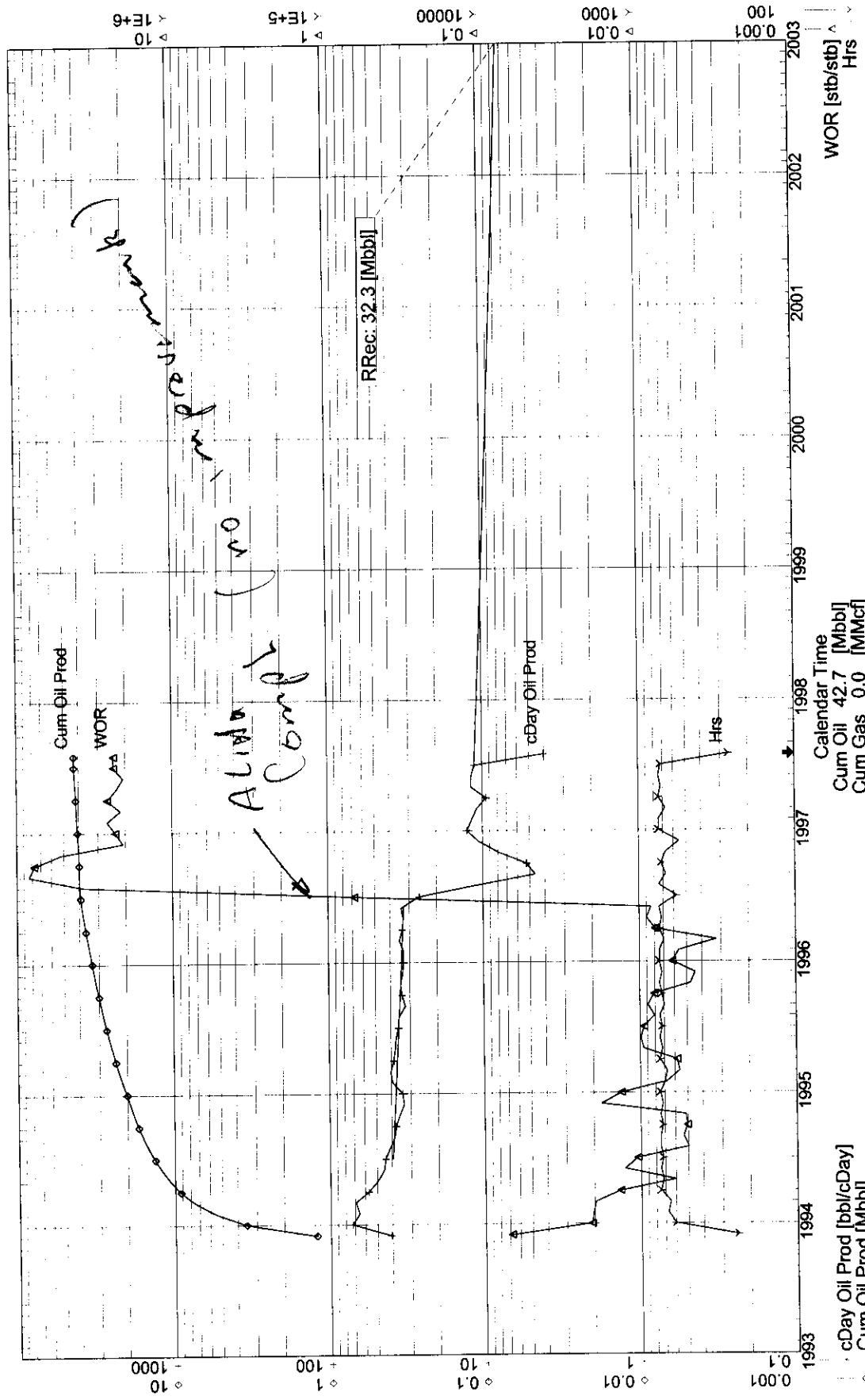
Group: South Pierson Unit  
 Well: 00/12-09-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO1 12-9-2-29  
 Primary: OTHER Status:  
 Last On: Oct-1993





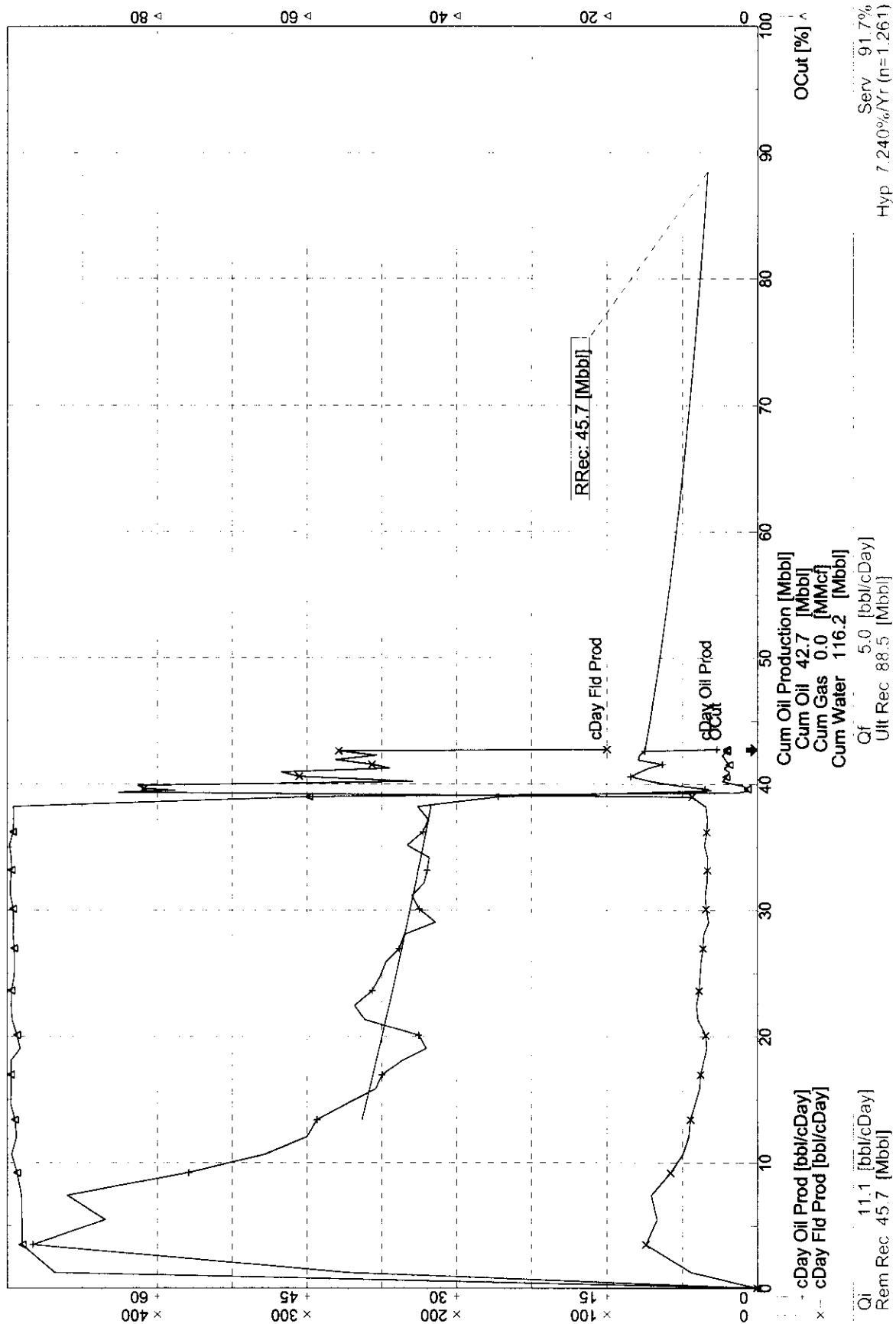
Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/13-09-002-29W1/0  
 Name: HOME S PIERSON UNIT NO. 1 13-9-2-29  
 Primary: OTHER Status:  
 Last On: Jul-1997



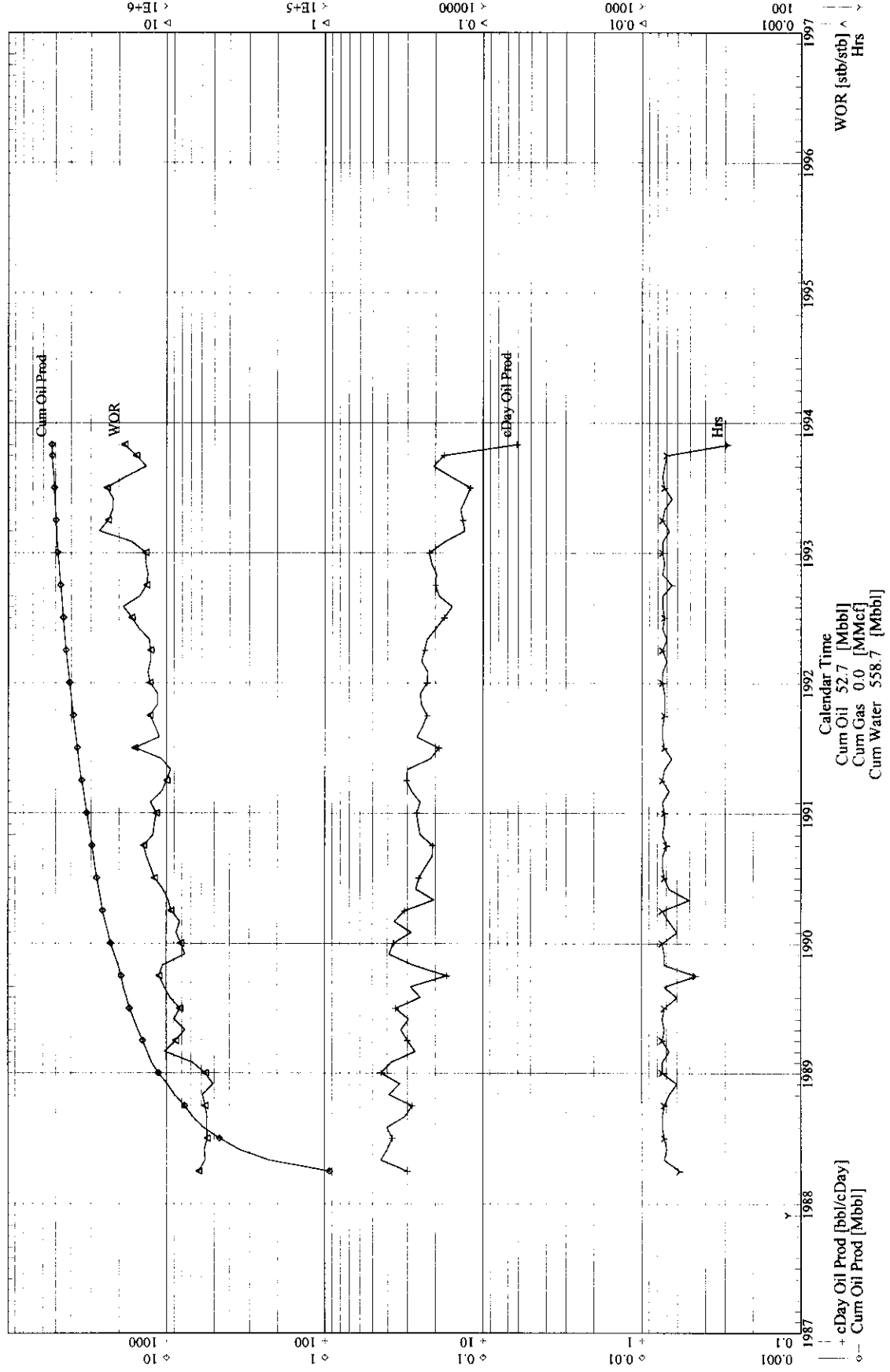
Calendar Time  
 Cum Oil 42.7 [Mbbl]  
 Cum Gas 0.0 [MMcf]  
 Cum Water 116.2 [Mbbl]  
 Qr 5.0 [bbl/cDay]  
 Ult Rec 75.0 [Mbbl]  
 Qr 11.1 [bbl/cDay]  
 Rem Rec 32.3 [Mbbl]  
 Serv 91.7%  
 Hyp 8.128%/Yr (n=0.631)  
 c:\data\decline\anderson\pierson\pierson.dpd  
 08-Nov-99 20:46 [pierson]

Group: **South Pierson Unit**  
 Well: **00/13-09-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO. 1 13-9-2-29  
 Primary: OTHER Status:  
 Last On: Jul-1997  
 Field: S PIERSO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Group: **South Pierson Unit**  
 Well: **00/14-09-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 WTW 14-9-2-  
 Primary: OTHER Status:  
 Last On: Oct-1993

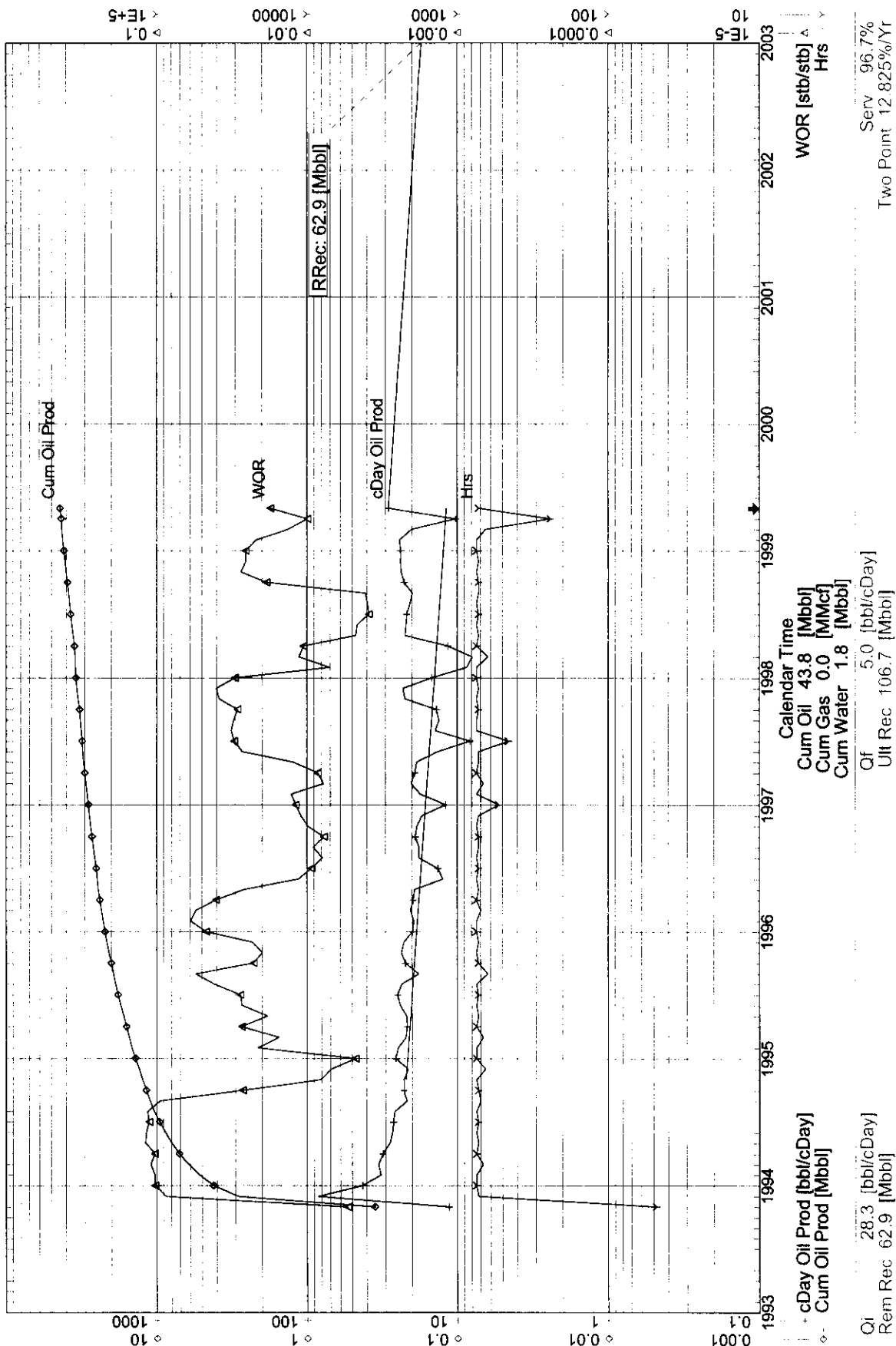
Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



# Group: **South Pierson Unit**

Well: **00/15-09-002-29W1/0**  
 Name: **HOME S PIERSON UNIT NO.1 15-9-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Apr-1999**

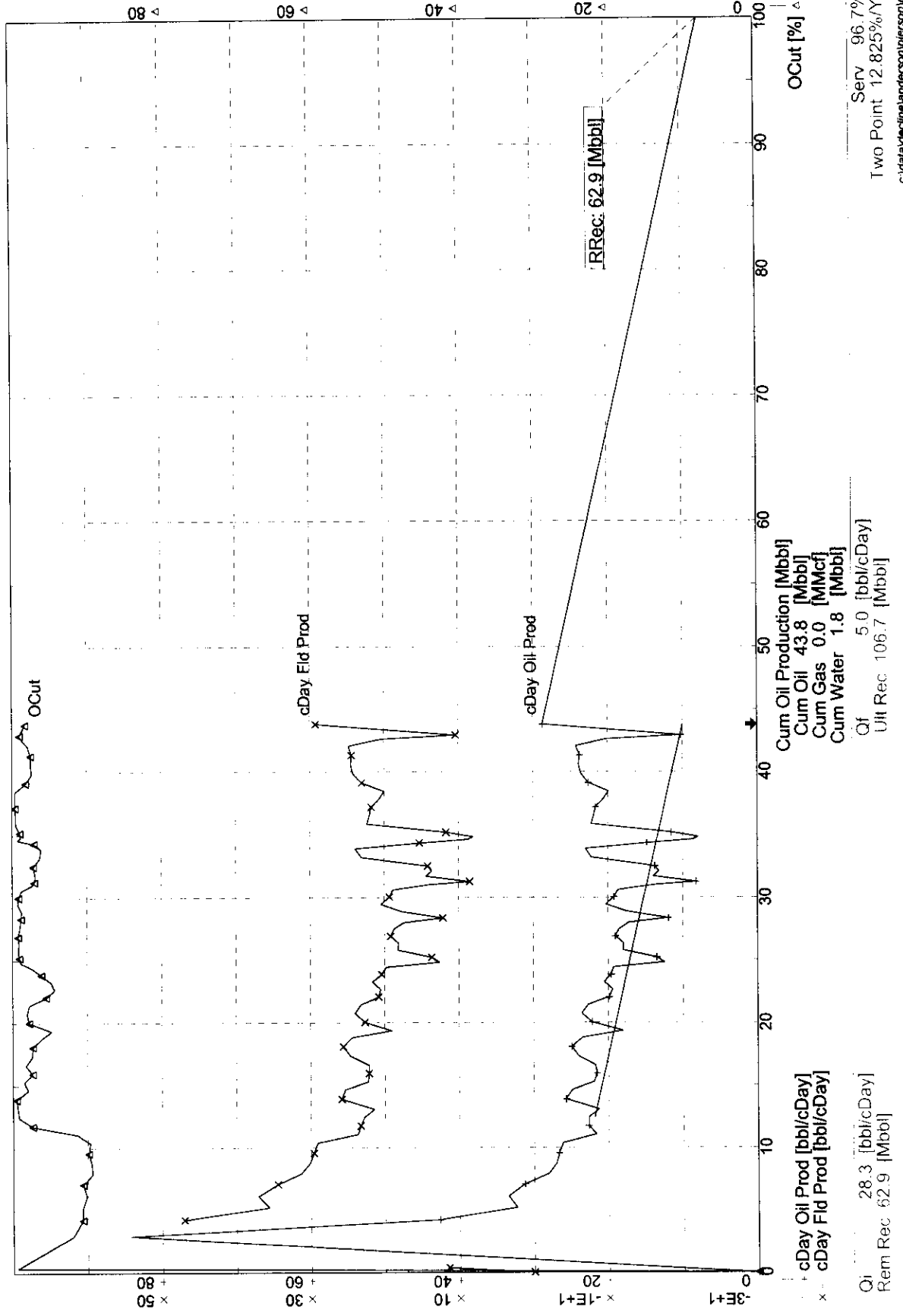
Field: **PIERSON PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**



Serv 96.7%  
 Two Point 12.825%/Yr  
 c:\data\decline\anderson\pierson\pierson.dpd  
 08-Nov-99 20:55 [pierson]

Group: **South Pierson Unit**  
 Well: **00/15-09-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO.1 15-9-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

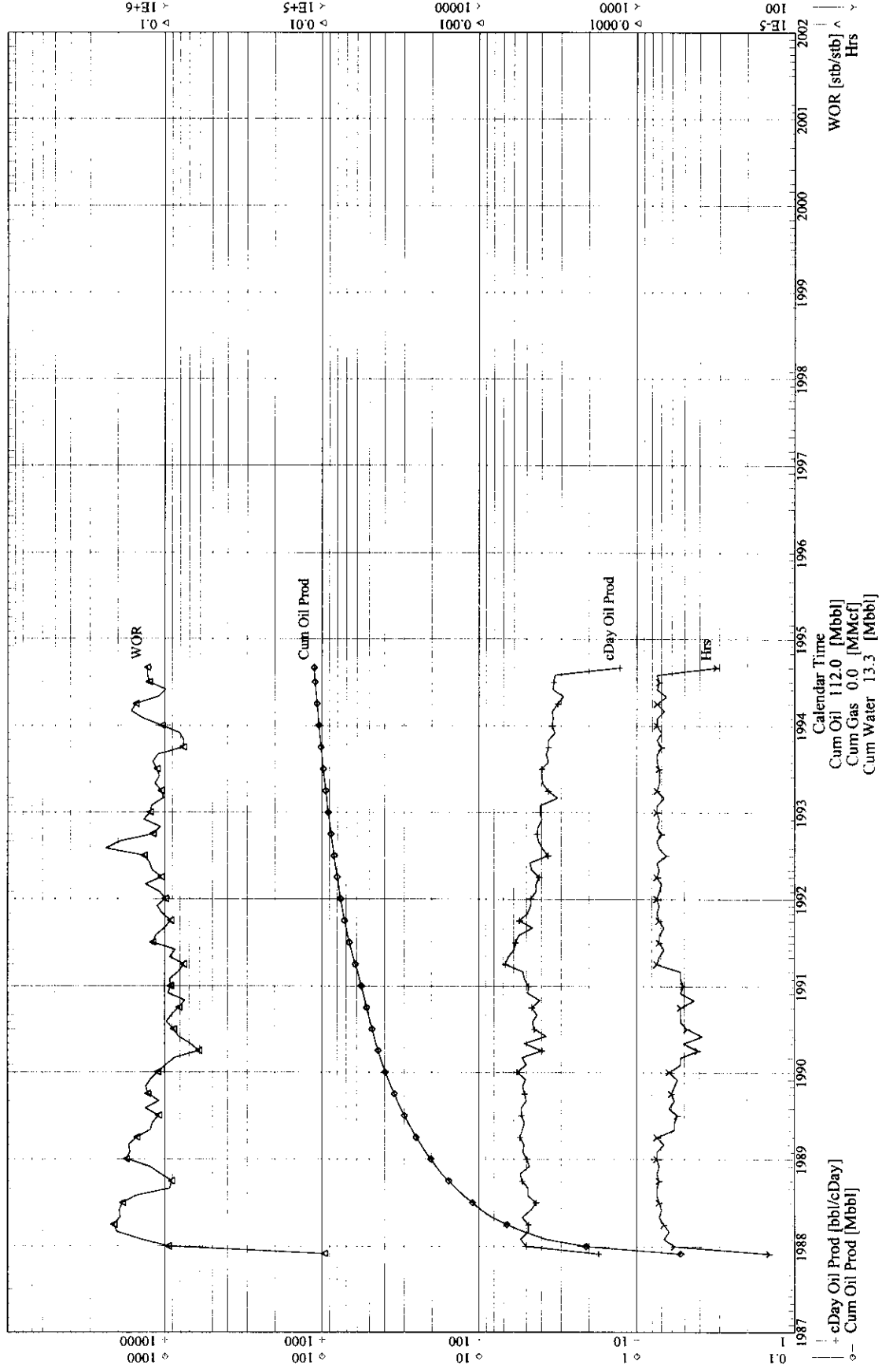
Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



# Group: **South Pierson Unit**

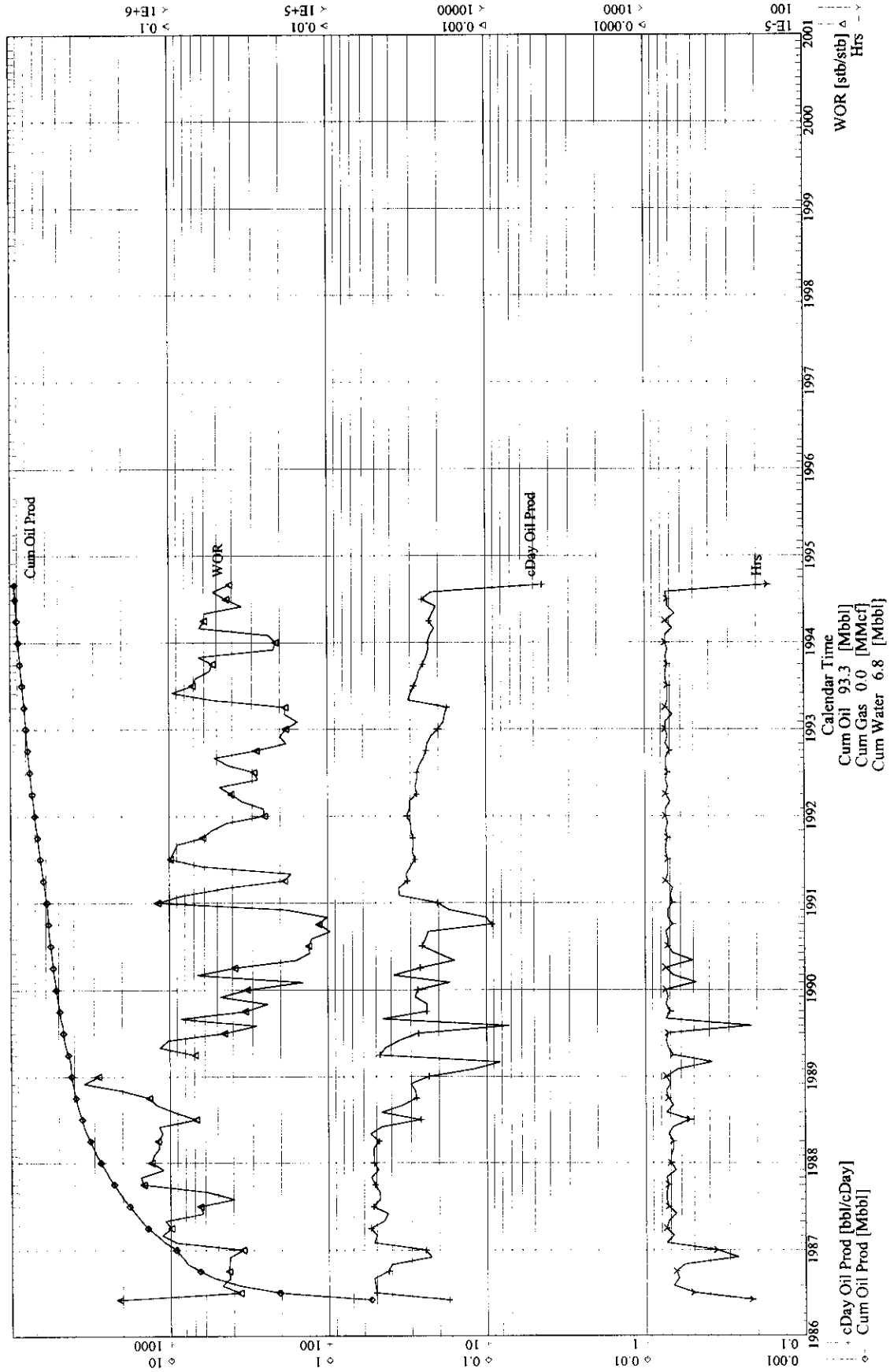
Well: **00/16-09-002-29W1/0**  
 Name: HOME S-PIERSON UNIT NO1 16-9-2-29  
 Primary: OTHER Status:  
 Last On: Aug-1994

Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

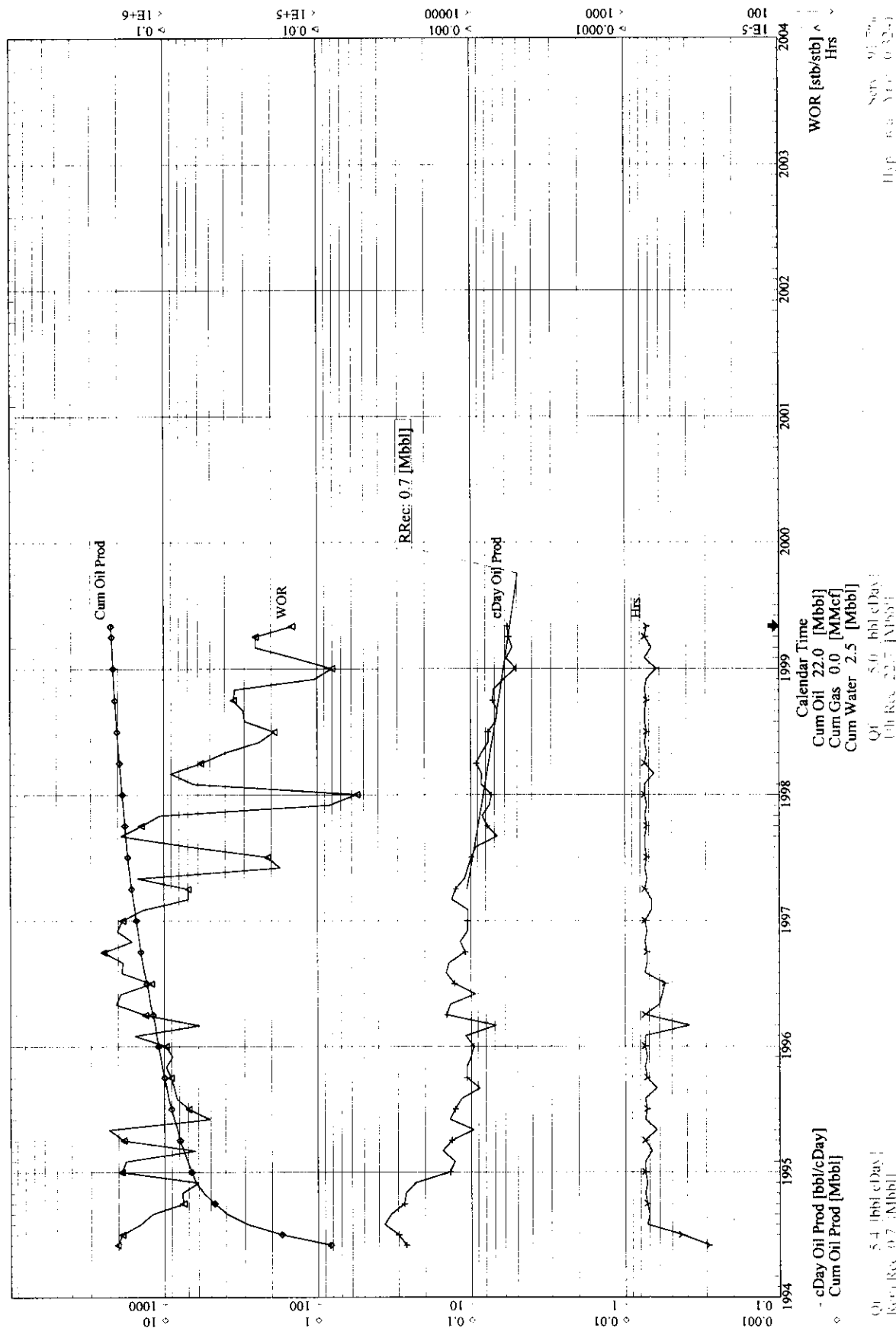


Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/04-15-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO1 4-15-2-29  
 Primary: OTHER Status:  
 Last On: Aug-1994



Group: **South Pierson Unit**  
Well: **00/05-15-002-29W1/0**  
Name: **HOME S. PIERSON UNIT NO. 1** 5-15-2-29  
Primary: **OTHER** Status:  
Last On: **Apr-1999**





# PRECAST SUMMARY

00/05-15-002-29W1/0

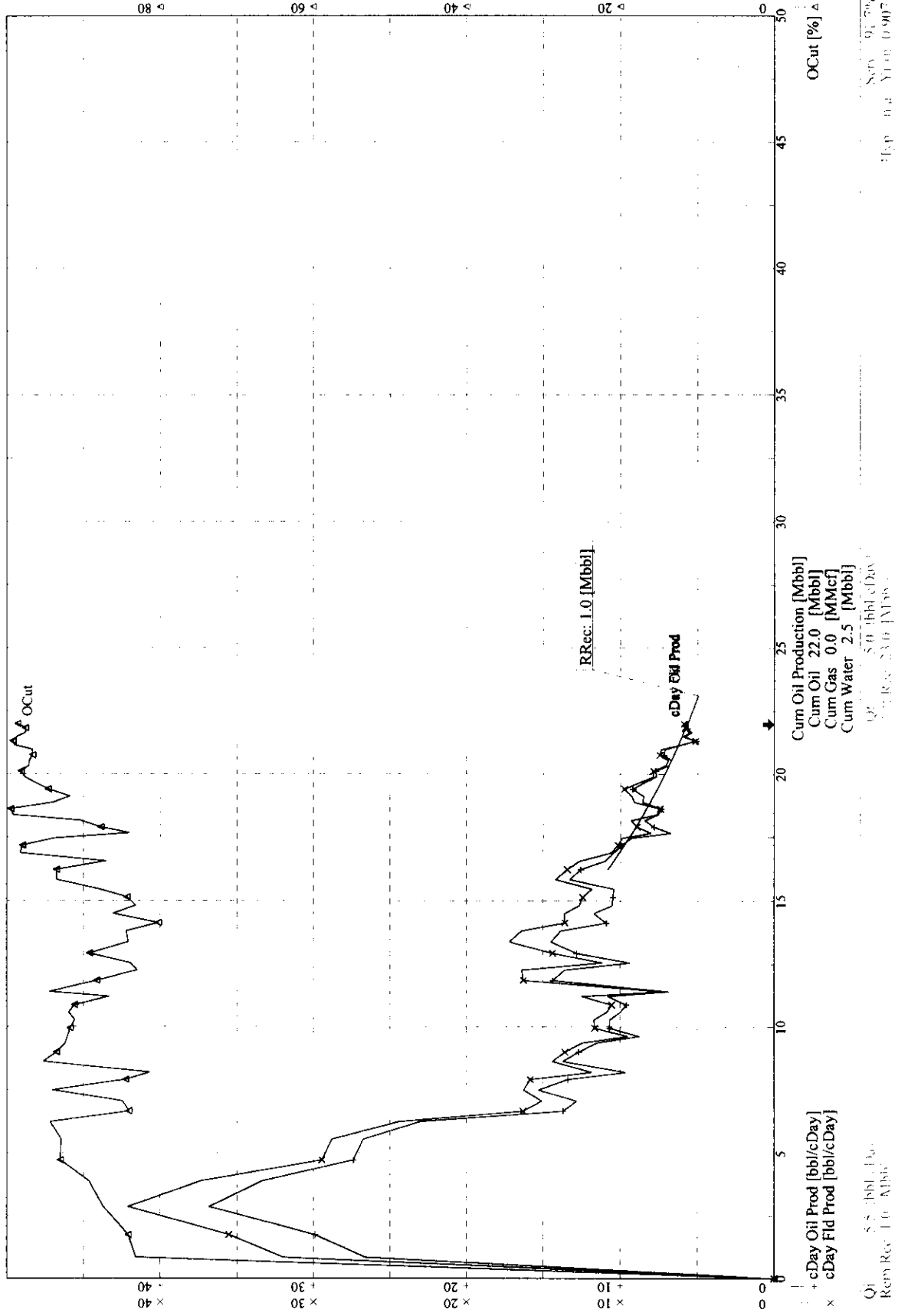
1. Temp1 (Hyp Time cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.8717
  - b) Decline Exponent (n) = 0.324
  - c) Initial Decline Rate (Qi) = 10.9 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 2.913E-02 [1/t]
  - e) Effective Decline Rate (Dei) = 28.193 [%/Yr]
  - f) Forecast Start Rate (Qo) = 5.5 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 91.7 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (1999/Sep)
  - j) Ultimate Recoverable (Np) = 22.7 [Mbb]
  - k) Remaining Recoverable = 0.7 [Mbb] (at 1999/04)
  - l) Tolerance = 80
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS			FORECASTS				
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Temp1 cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Remaining Reserves [Mbb]	Effective Decline [%/Yr]	[Fluid] [Liq-Liq] [GOR]
1997	734.4	9.1	18.6	9.4			26.213	
1998	718.0	7.4	21.3	7.0			n/a	
1999/04	720.0	5.6	22.0	5.5	22.0	0.7	n/a	
1999				5.2	22.8	-0.1	n/a	

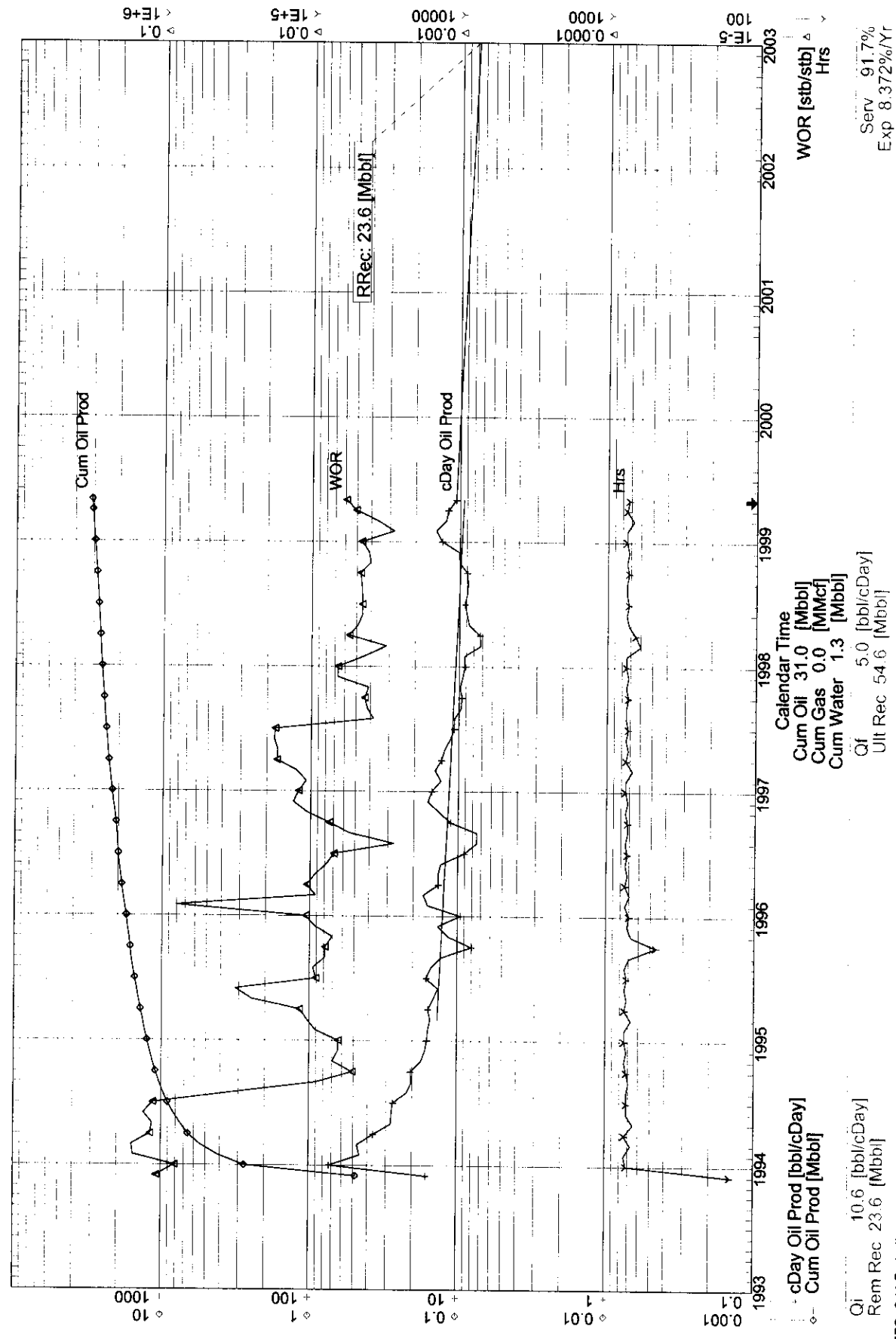
Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/05-15-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO. 1 5-15-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999



Group: **South Pierson Unit**  
 Well: **00/01-16-002-29W1/0**  
 Name: HOME PIERSON UNIT NO.1 1-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



# FORECAST SUMMARY

00/01-16-002-29W1/0

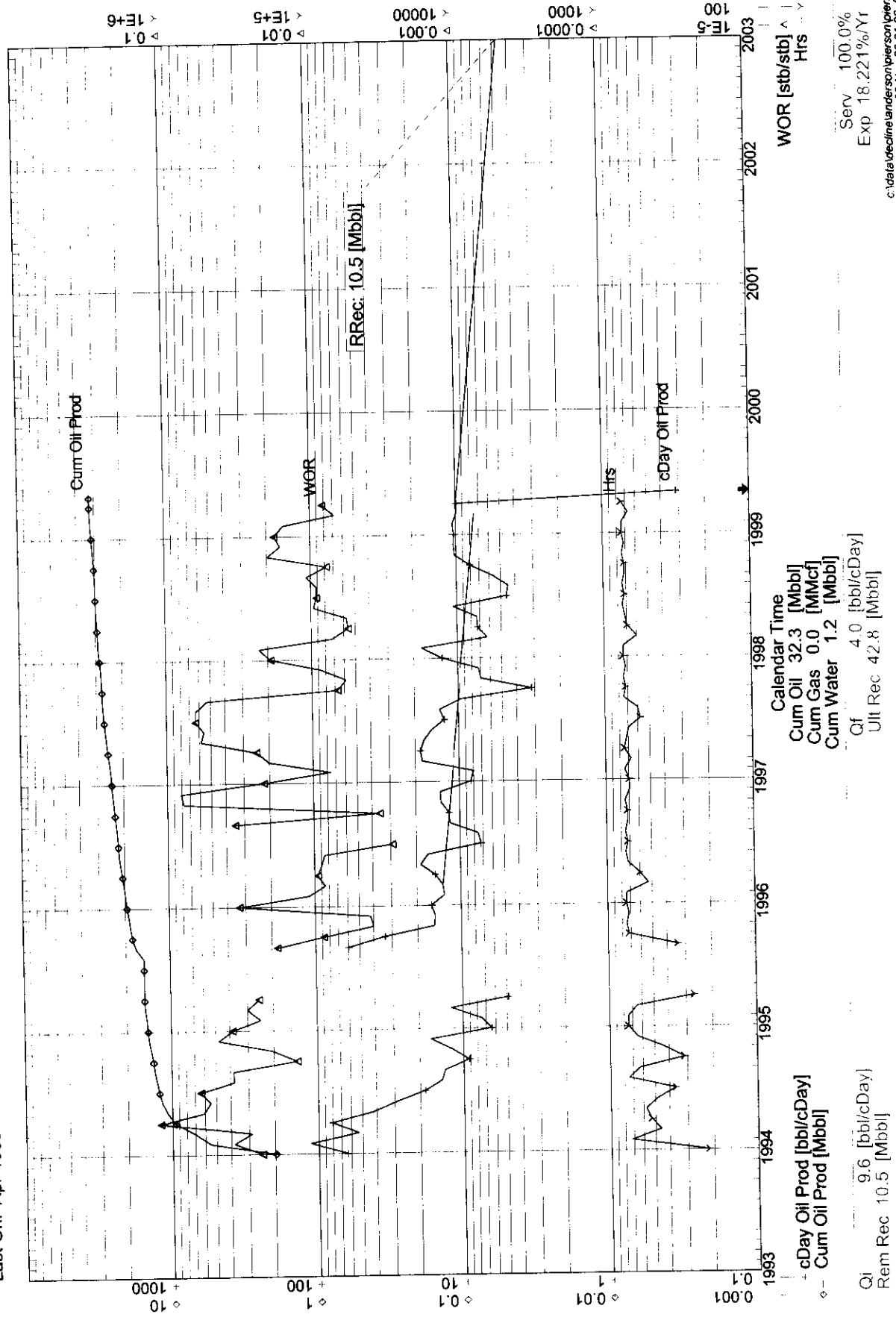
1. Temp3 (Exp. Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.4514
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 13.6 [bbl/cDay]
  - d) Nominal Decline Rate (D) = 7.286E-03 [1/t]
  - e) Effective Decline Rate (De) = 8.372 [%/Yr]
  - f) Forecast Start Rate (Qo) = 10.7 [bbl/cDay] (from: Last Data)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 91.7 [%]
  - i) Economic Limit (Qif) = 5.0 [bbl/cDay] (2007/Dec)
  - j) Ultimate Recoverable (Np) = 54.6 [Mbb]l
  - k) Remaining Recoverable = 23.6 [Mbb]l (at 1999/04)
  - l) Tolerance = 80
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS					[Fluid]	[Liq-Liq]	[GOR]
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbb]l	Temp3 cDay Oil Prod [bbl/cDay]	Cum [Mbb]l	Remaining Reserves [Mbb]l	Effective Decline [%/Yr]			
1995	689.5	13.2	17.4	14.8			8.372			
1996	730.0	12.7	22.1	13.6			8.372			
1997	730.0	11.1	26.1	12.5			8.372			
1998	716.0	9.2	29.5	11.4			8.372			
1999/04	720.0	12.4	31.0	10.7	31.0	23.6	8.372			
1999				10.3	33.5	21.1	8.372			
2000				9.6	37.0	17.6	8.372			
2001				8.8	40.2	14.4	8.372			
2002				8.1	43.2	11.4	8.372			
2003				7.4	45.9	8.7	8.372			
2004				6.8	48.3	6.2	8.372			
2005				6.2	50.6	4.0	8.372			
2006				5.7	52.7	1.9	8.372			
2007				5.2	54.6	0.0	n/a			

Field: SPIERSON SOUTH SPIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH SPIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: **South Pierson Unit**  
 Well: **02/01-16-002-29W1/0**  
 Name: HOME S. PIERSON UT #1 PROV HZ 1-16-2  
 Primary: OTHER Status:  
 Last On: Apr-1999



# FORECAST SUMMARY

02/01-16-002-29W1/0

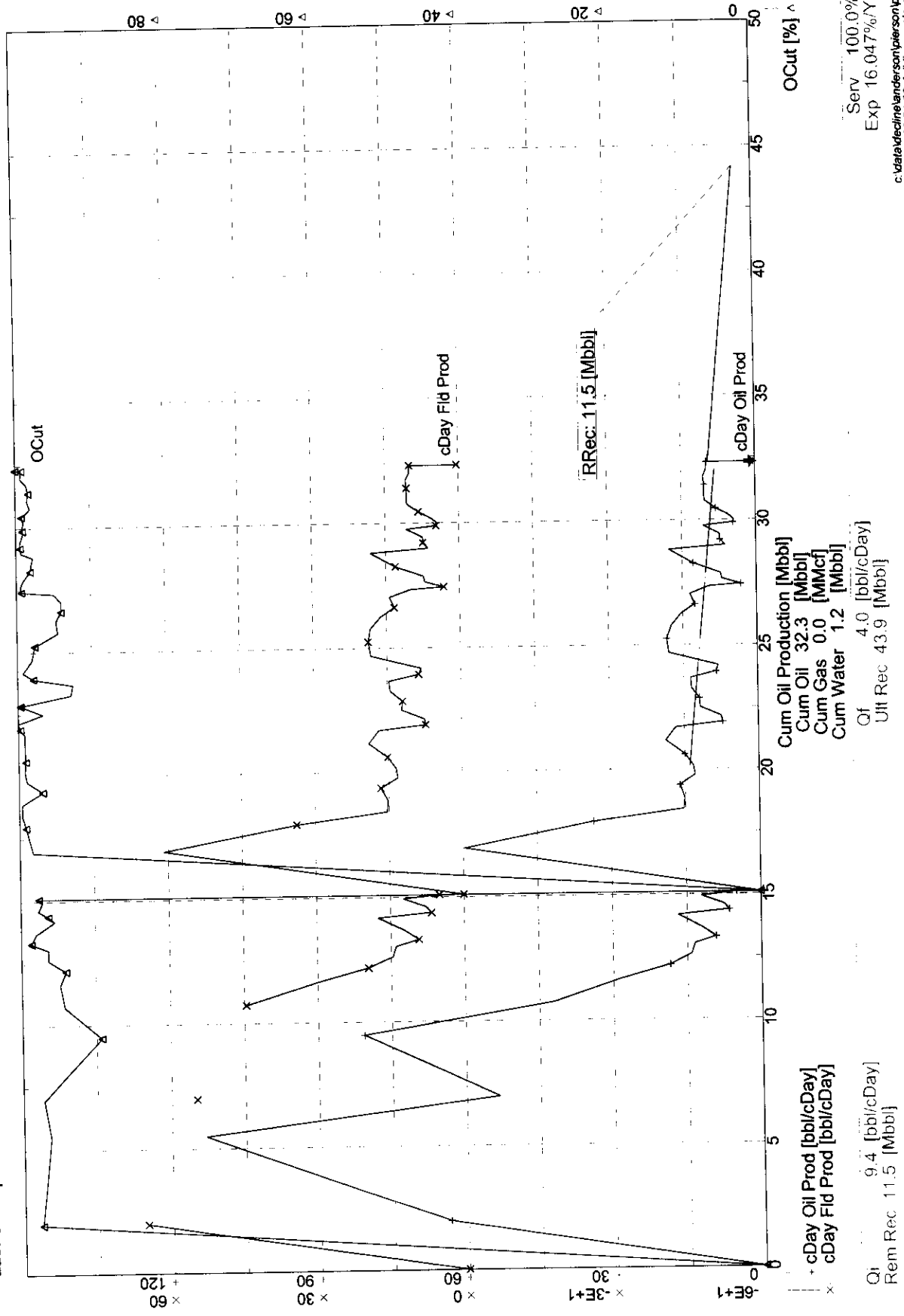
1. Temp4 (Exp. Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.3996
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 13.5 [bbl/cDay]
  - d) Nominal Decline Rate (D) = 1.676E-02 [1/t]
  - e) Effective Decline Rate (De) = 18.221 [%/Yr]
  - f) Forecast Start Rate (Qo) = 10.0 [bbl/cDay] (from: User-specified)
  - g) Forecast Start Date (to) = 1999/Mar
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit (Qf) = 4.0 [bbl/cDay] (2003/Oct)
  - j) Ultimate Recoverable (Np) = 42.8 [Mbb]l
  - k) Remaining Recoverable = 10.5 [Mbb]l (at 1999/04)
  - l) Tolerance = 80
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS					[Fluid]	[Liq-Liq]	[GOR]
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Temp4 cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Remaining Reserves [Mbb]	Effective Decline [%/Yr]			
1996	693.8	12.5	23.9	16.5			15.433			
1997	702.0	11.9	28.2	11.5			18.221			
1998	718.0	8.6	31.4	11.5			18.221			
1999/04	546.0	7.7	32.3	9.8	32.3	10.5	18.221			
1999				9.1	34.5	8.3	18.221			
2000				7.7	37.4	5.5	18.221			
2001				6.3	39.7	3.1	18.221			
2002				5.1	41.6	1.2	n/a			
2003				4.3	42.9	-0.1	n/a			

Field: SPIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

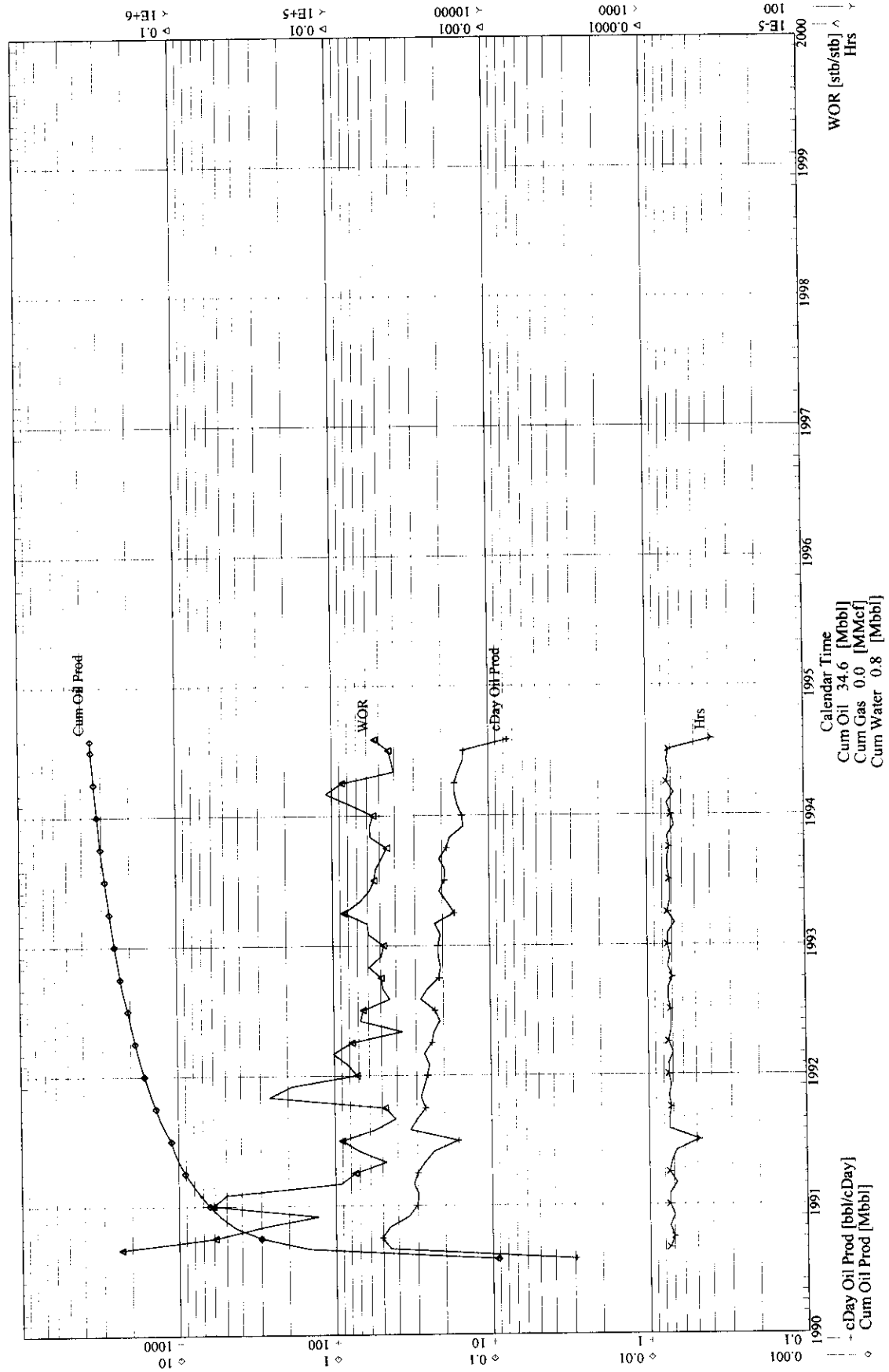
Group: **South Pierson Unit**  
 Well: **02/01-16-002-29W1/0**  
 Name: HOME S. PIERSON UT #1 PROV HZ 1-16-2  
 Primary: OTHER Status:  
 Last On: Apr-1999



Serv 100.0%  
 Exp 16.047%/Yr  
 c:\data\decline\anderson\pierson\pierson.dpd  
 08-Nov-99 21:06 [oil linear rate-cum (cday)]

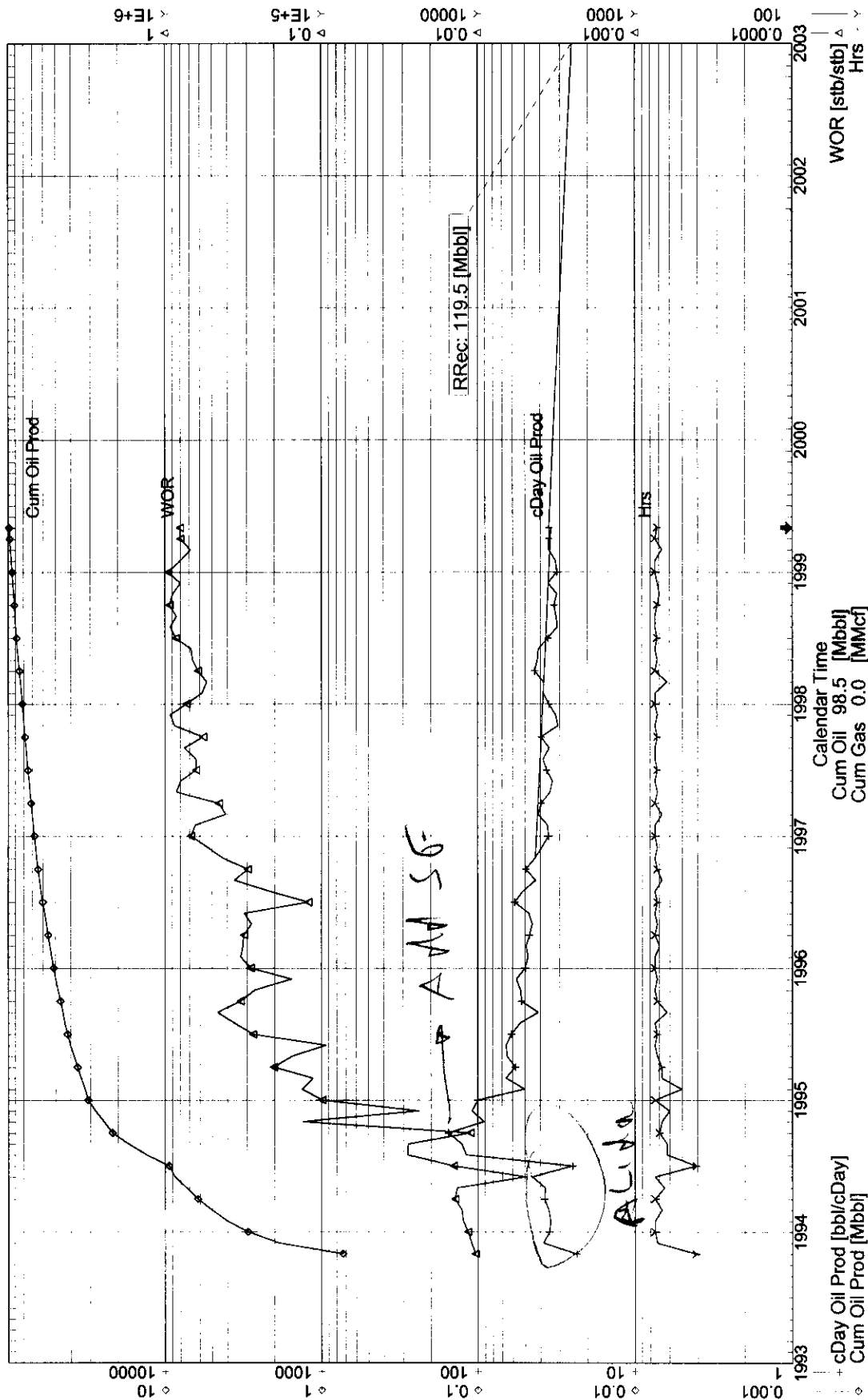
Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/02-16-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO1 2-16-2-29  
 Primary: OTHER Status:  
 Last On: Jul-1994





Group: **South Pierson Unit**  
 Well: **00/03-16-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO. 1 3-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999  
 Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



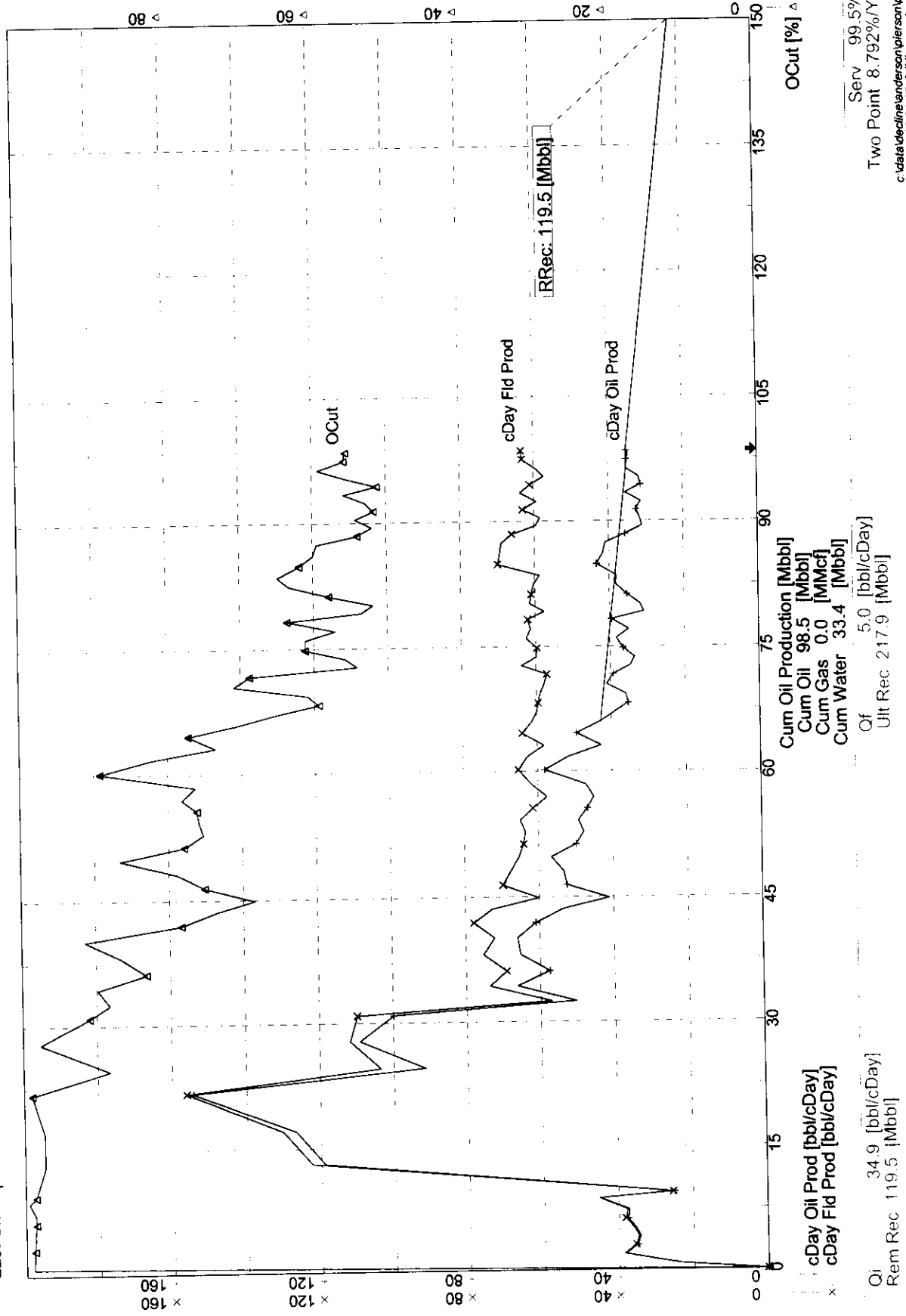
Calendar Time  
 Cum Oil 98.5 [Mbbbl]  
 Cum Gas 0.0 [MMcf]  
 Cum Water 33.4 [Mbbbl]  
 Qf 5.0 [bbl/cDay]  
 Ult Rec 217.9 [Mbbbl]

Qi 34.9 [bbl/cDay]  
 Rem Rec 119.5 [Mbbbl]

Serv 99.5%  
 Two Point 8.792%/Yr

Group: **South Pierson Unit**  
 Well: **00/03-16-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO. 1 3-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Qi 34.9 [bbl/cDay]  
 Rem Rec 119.5 [Mbb]

Serv 99.5%  
 Two Point 8.792%/Yr

c:\data\decline\anderson\pierson\pierson.dpd  
 08-Nov-99 21:13 [oil linear rate cum (cday)]

# FORECAST SUMMARY

00/03-16-002-29W1/0

1. Temp1 (2pt, Time, cDay Oil Prod)
  - a) Correlation Coefficient ( $r$ ) = 0.0000
  - b) Decline Exponent ( $n$ ) = 0.000
  - c) Initial Decline Rate ( $Q_i$ ) = 43.2 [bbl/cDay]
  - d) Nominal Decline Rate ( $D$ ) = 7.669E-03 [1/t]
  - e) Effective Decline Rate ( $De$ ) = 8.792 [%/Yr]
  - f) Forecast Start Rate ( $Q_o$ ) = 35.1 [bbl/cDay]
  - g) Forecast Start Date ( $t_o$ ) = 1999/Apr
  - h) Forecast Service Factor = 99.5 [%]
  - i) Economic Limit ( $Q_{el}$ ) = 5.0 [bbl/cDay] (2020/Jul)
  - j) Ultimate Recoverable ( $N_p$ ) = 217.9 [Mbbbl]
  - k) Remaining Recoverable = 119.5 [Mbbbl] (at 1999/04)
  - l) Tolerance = 80
  - m) Smoothing Factor = 1

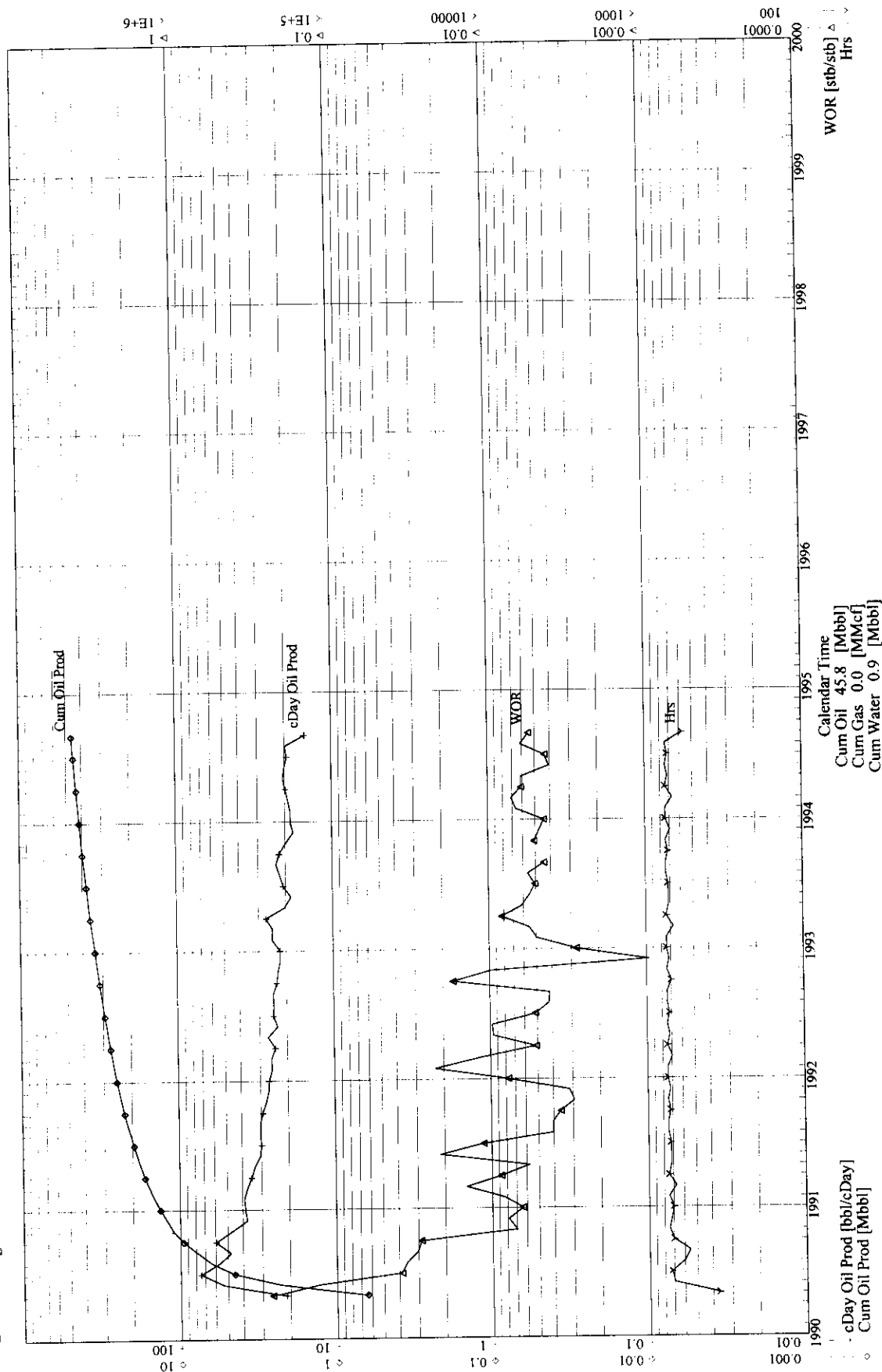
Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS							
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Temp1 cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Remaining Reserves [Mbbbl]	Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
1996	736.0	39.2	68.2	43.9			8.792			
1997	730.0	35.9	81.3	41.4			8.792			
1998	722.0	35.9	94.4	37.8			8.792			
1999/04	720.0	34.3	98.5	35.1	98.5	119.5	8.792			
				33.9	106.8	111.2	8.792			
				31.4	118.3	99.6	8.792			
				28.7	128.8	89.1	8.792			
2001				26.2	138.4	79.6	8.792			
2002				23.9	147.1	70.8	8.792			
2003				21.8	155.1	62.9	8.792			
2004				19.8	162.3	55.6	8.792			
2005										
2006				18.1	169.0	49.0	8.792			
2007				16.5	175.0	42.9	8.792			
2008				15.1	180.5	37.4	8.792			
2009				13.7	185.6	32.4	8.792			
2010				12.5	190.2	27.8	8.792			
2011				11.4	194.3	23.6	8.792			
2012				10.4	198.2	19.8	8.792			
2013				9.5	201.6	16.3	8.792			
2014				8.7	204.8	13.1	8.792			
2015				7.9	207.7	10.2	8.792			
2016				7.2	210.3	7.6	8.792			
2017				6.6	212.8	5.2	8.792			
2018				6.0	215.0	3.0	8.792			
2019				5.5	217.0	1.0	n/a			

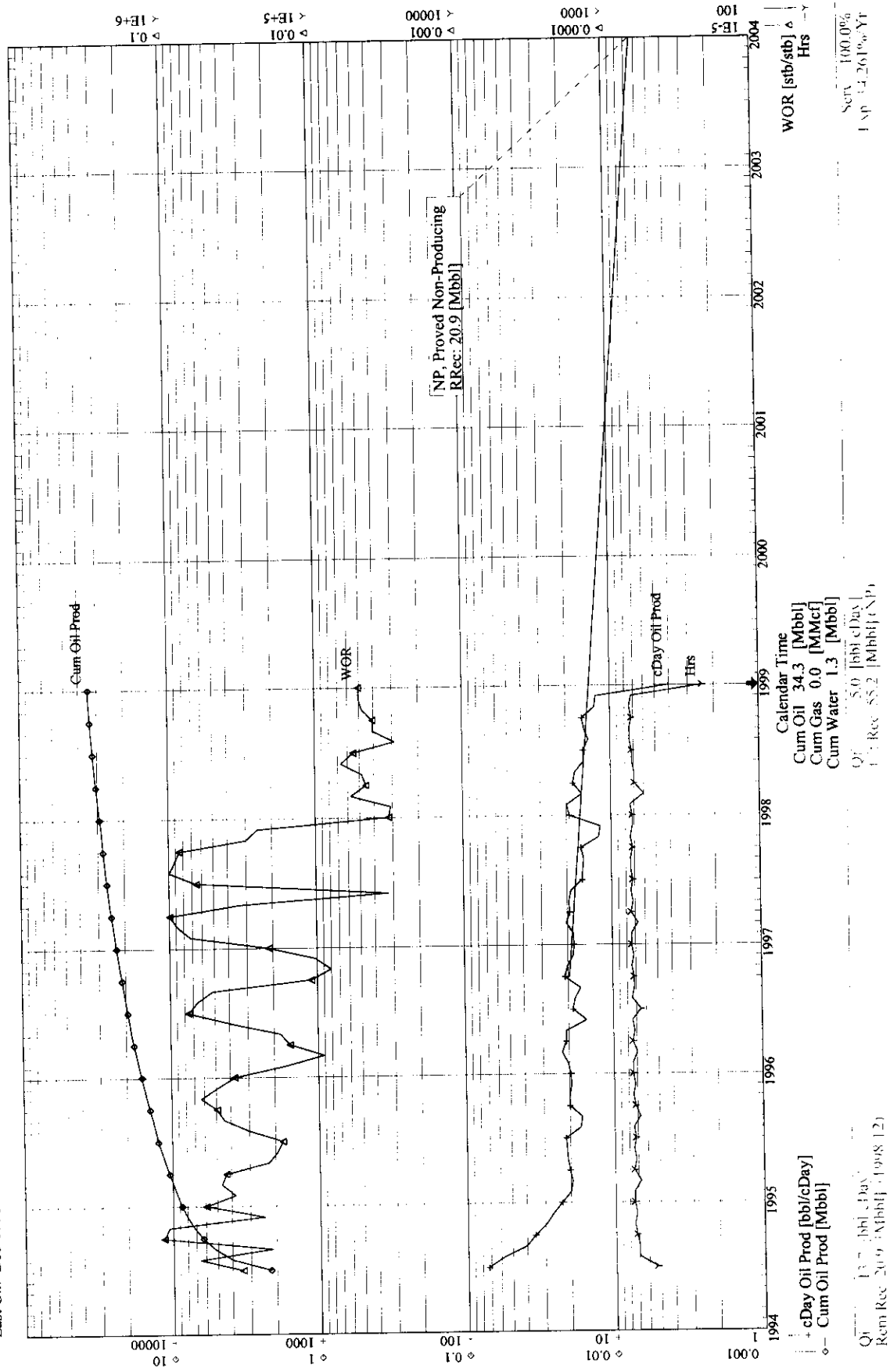
Range: Start of Curve Fit to Economic Limit			
Date	ACTUALS	FORECASTS	RemaininEffective
	Operating Hours	Temp1 cDay Oil ProdCum [bbl/cDay] [Mbb1]	Reserves Declin [Mbb1] [%/Yr]
2020		5.1 218.0	-0.1 n/a

Group: **South Pierson Unit**  
 Well: **00/04-16-002-29W1/0**  
 Name: **HOMES, PIERSON UNIT NO1 4-16-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Aug-1994**

Field: **S PIERSON SOUTH PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**



Group: **South Pierson Unit**  
 well: **00/05-16-002-29W1/0**  
 Name: **HOMES S. PIERSON UNIT NO. 1** 5-16-2-29  
 Primary: **OTHER** Status:  
 Last On: **Dec-1998**



# FORECAST SUMMARY

00/05-16-002-29W1/0

1. Temp2 (Exp,Time,cDay Oil Prod) - NP
  - a) Correlation Coefficient (r) = -0.6112
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 19.8 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 1.282E-02 [1/t]
  - e) Effective Decline Rate (De) = 14.261 [%/Yr]
  - f) Forecast Start Rate (Qo) = 14.2 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1998/Oct
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2005/Aug)
  - j) Ultimate Recoverable (Np) = 55.2 [Mbb]
  - k) Remaining Recoverable = 20.9 [Mbb] (at 1998/12)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Footnote(s):

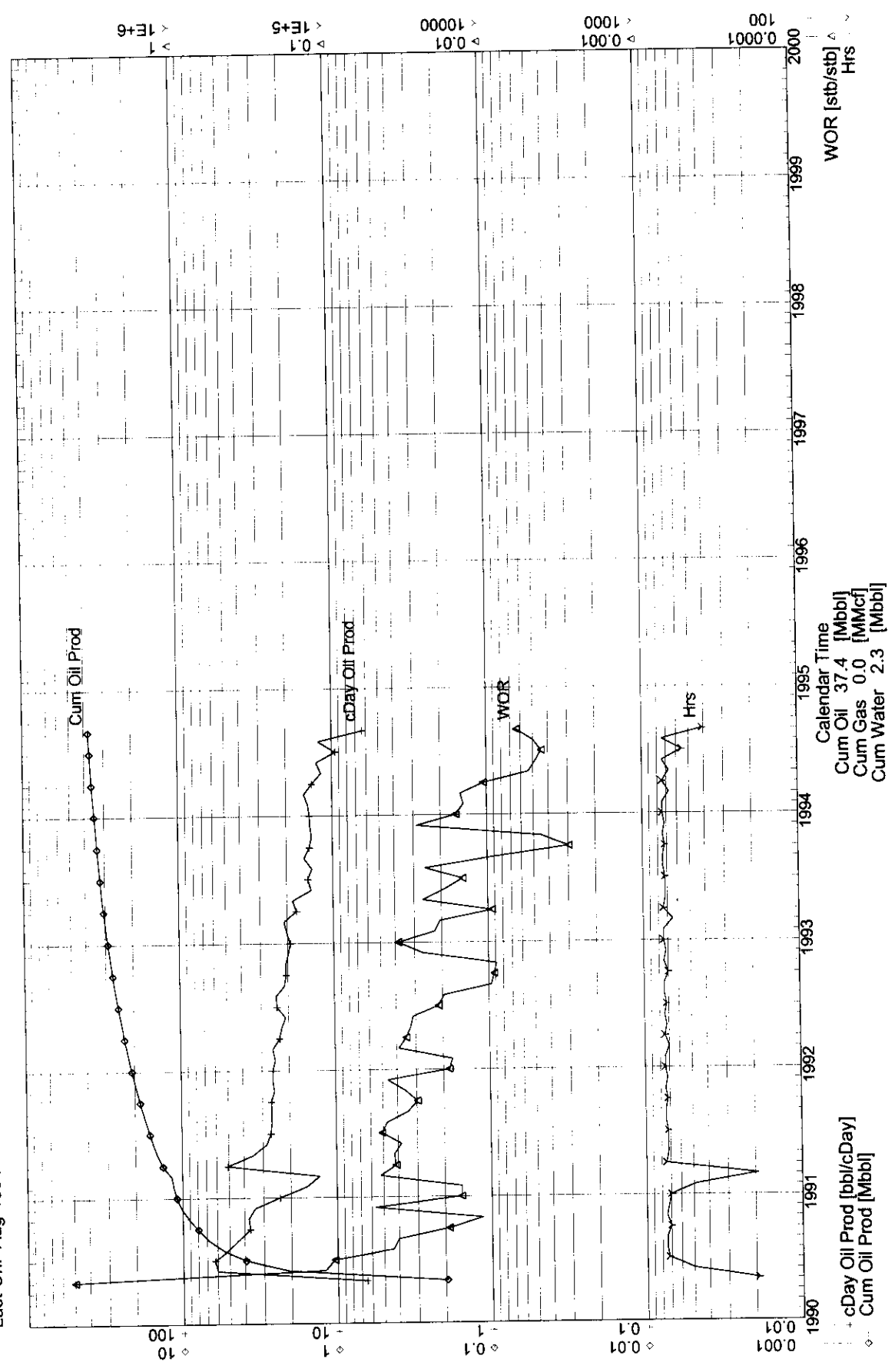
- (1) Temp2 (Exp,Time,cDay Oil Prod)

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS								
	Operating Hours		cDay Oil Prod [bbl/cDay]	Cum [Mbb]	cDay Oil Prod (1) [bbl/cDay]	Cum [Mbb]	Remaining Reserves [Mbb]	Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
1996	732.0		19.4	22.8	19.2			14.261			
1997	728.0		16.8	28.9	17.3			14.261			
1998	674.0		14.6	34.3	14.9			14.261			
1999					12.7	38.9	16.3	14.261			
2000					10.9	43.0	12.3	14.261			
2001					9.4	46.4	8.8	14.261			
2002					8.0	49.3	5.9	14.261			
2003					6.9	51.9	3.3	14.261			
2004						54.0	1.2	n/a			
2005					5.2	55.3	-0.1	n/a			

Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

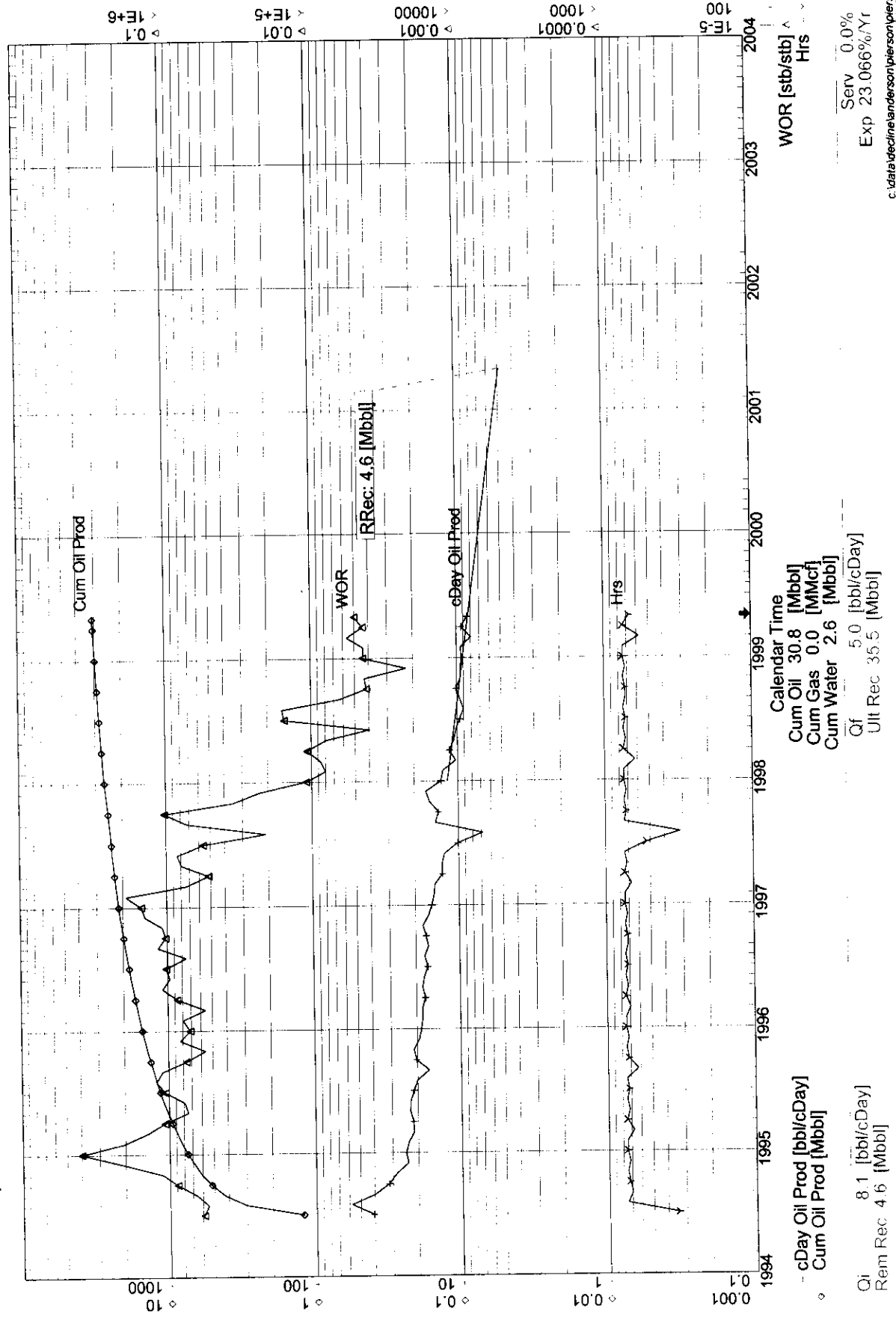
Group: South Pierson Unit  
 Well: 00/06-16-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO1 6-16-2-29  
 Primary: OTHER Status:  
 Last On: Aug-1994





Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: **South Pierson Unit**  
 Well: **00/07-16-002-29W1/0**  
 Name: HOME S: PIERSON UNIT NO. 1 7-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999



# ORECAST SUMMARY

00/07-16-002-29W1/0

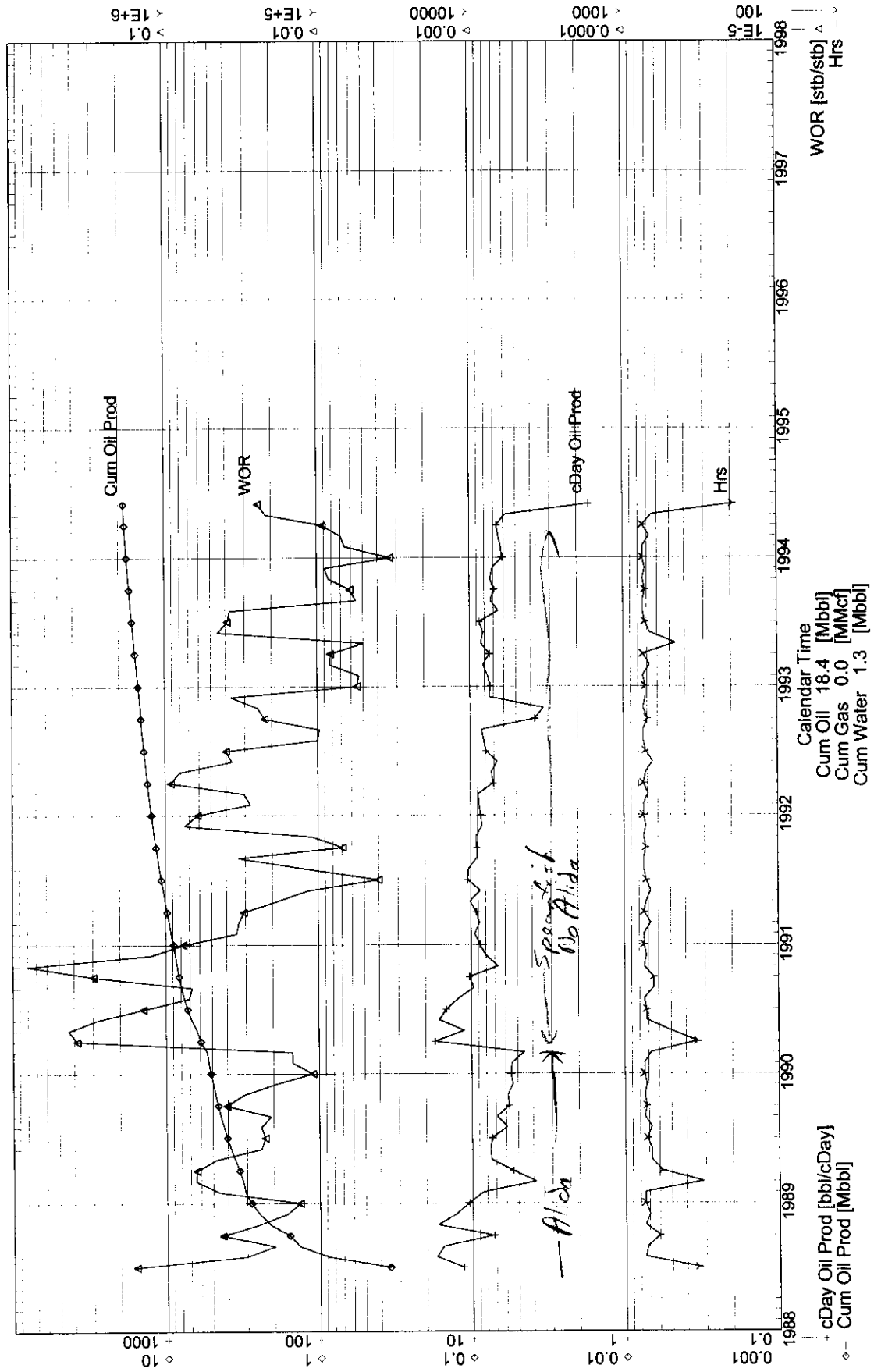
1. Temp1 (Exp,Time,cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.8586
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 12.1 [bbl/cDay]
  - d) Nominal Decline Rate (D) = 2.185E-02 [1/t]
  - e) Effective Decline Rate (De) = 23.066 [%/Yr]
  - f) Forecast Start Rate (Qo) = 8.3 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (fo) = 1999/Apr
  - h) Forecast Service Factor = 0 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2001/Apr)
  - j) Ultimate Recoverable (Np) = 35.5 [Mbb]l
  - k) Remaining Recoverable = 4.6 [Mbb]l (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS				
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbb]l	Temp1 cDay Oil Prod [bbl/cDay]	Cum [Mbb]l	Remaining Reserves [Mbb]l	Effective Decline [%/Yr]
1997	744.0	13.1	26.1	11.8			23.066
1998	724.0	10.1	29.8	10.3			23.066
1999/04	684.0	8.8	30.8	8.3	30.8	4.6	23.066
1999				7.5	32.7	2.8	23.066
2000				6.1	34.9	0.5	n/a
2001				5.1	35.6	-0.1	n/a

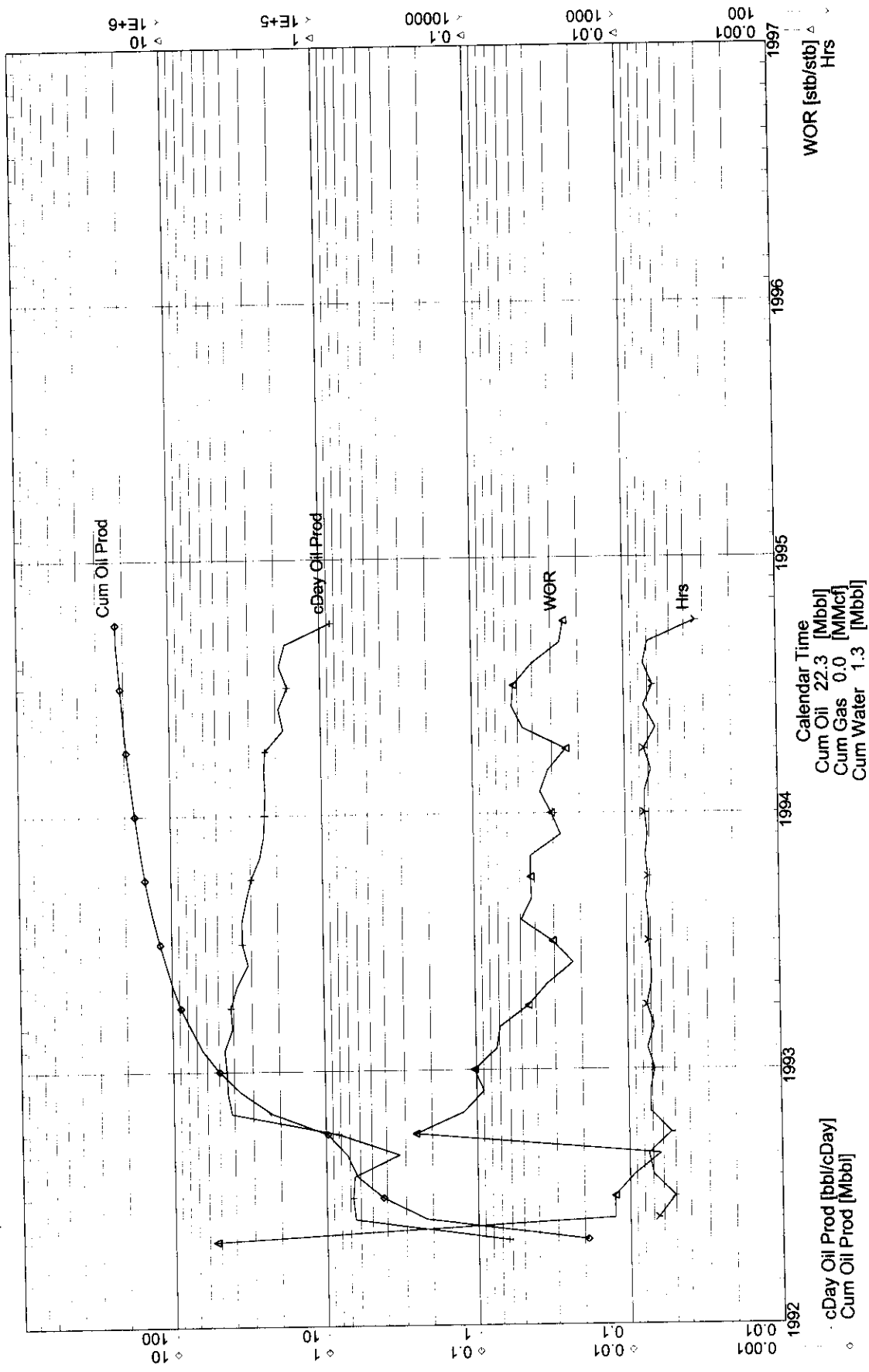
Field: S PIERO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: South Pierson Unit  
 Well: 00/08-16-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO1 8-16-2-29  
 Primary: OTHER Status:  
 Last On: May-1994



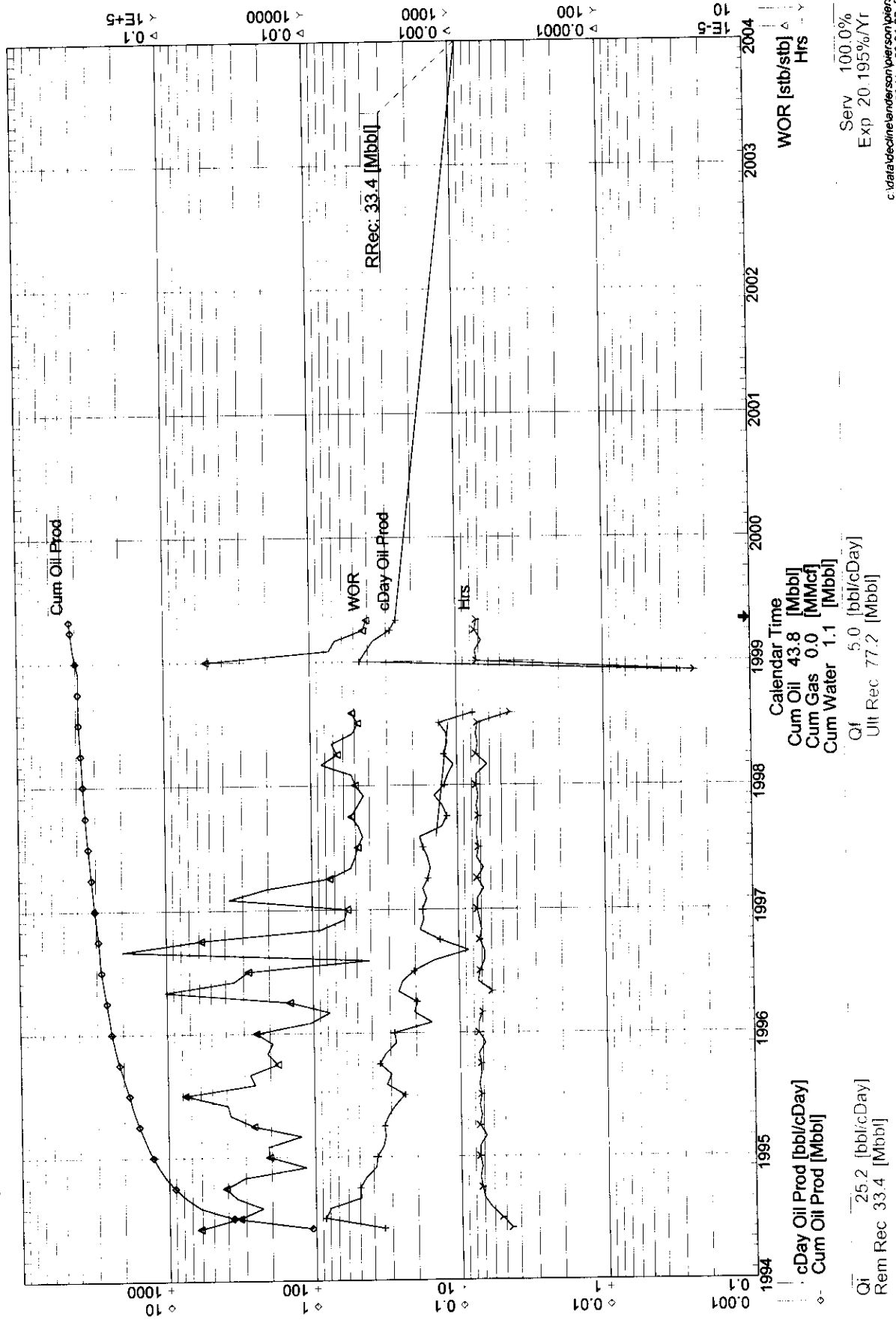
Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: **South Pierson Unit**  
 Well: **00/10-16-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 10-16-2-29  
 Primary: OTHER Status:  
 Last On: Sep-1994



Group: **South Pierson Unit**  
 Well: **00/11-16-002-29W1/0**  
 Name: HOME S. PIERSON NO.1 PROV 11-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: SPIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



# ORECAST SUMMARY

00/11-16-002-29W1/0

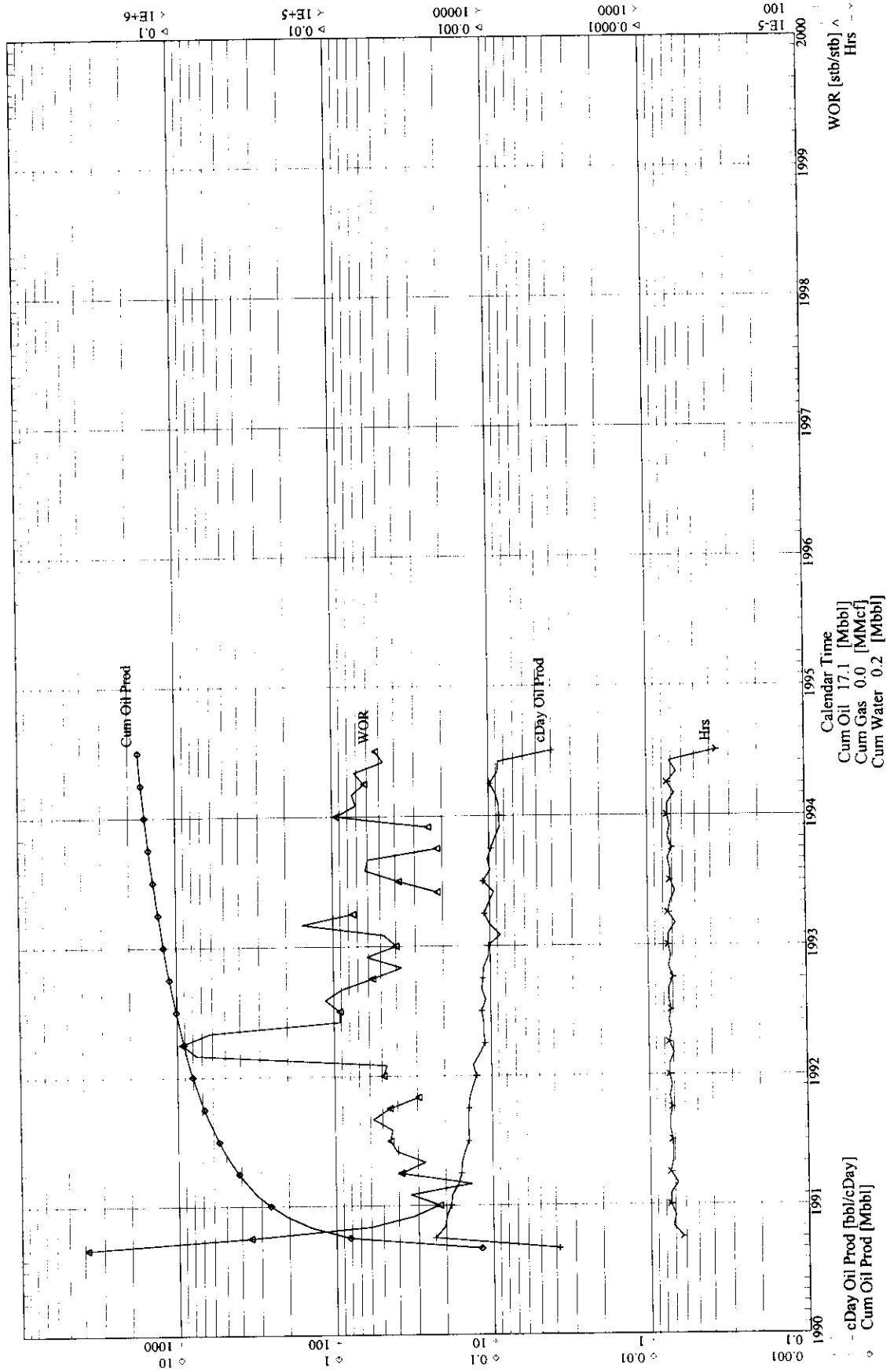
1. Temp2 (Exp. Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.4938
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 14.3 [bbl/cDay]
  - d) Nominal Decline Rate (D) = 1.880E-02 [1/t]
  - e) Effective Decline Rate (De) = 20.195 [%/Yr]
  - f) Forecast Start Rate (Qo) = 25.7 [bbl/cDay] (from: Last Data)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 100 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2006/Jul)
  - j) Ultimate Recoverable (Np) = 77.2 [Mbb]l
  - k) Remaining Recoverable = 33.4 [Mbb]l (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS							
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Temp2 cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Remaining Reserves [Mbb]	Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
1997	736.0	13.7	36.0	36.3			20.195			
1998	456.0	10.4	39.9	30.7			20.195			
1999/04	720.0	32.9	43.8	25.7	43.8	33.4	20.195			
1999				23.6	49.6	27.6	20.195			
2000				19.6	56.8	20.4	20.195			
2001				15.6	62.6	14.6	20.195			
2002				12.5	67.2	10.1	20.195			
2003				9.9	70.8	6.4	20.195			
2004				7.9	73.7	3.5	20.195			
2005				6.3	76.1	1.1	n/a			
2006				5.3	77.2	0.0	n/a			

Group: **South Pierson Unit**  
 Well: **00/12-16-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO 1 12-16-2-29  
 Primary: OTHER Status:  
 Last On: Jun-1994

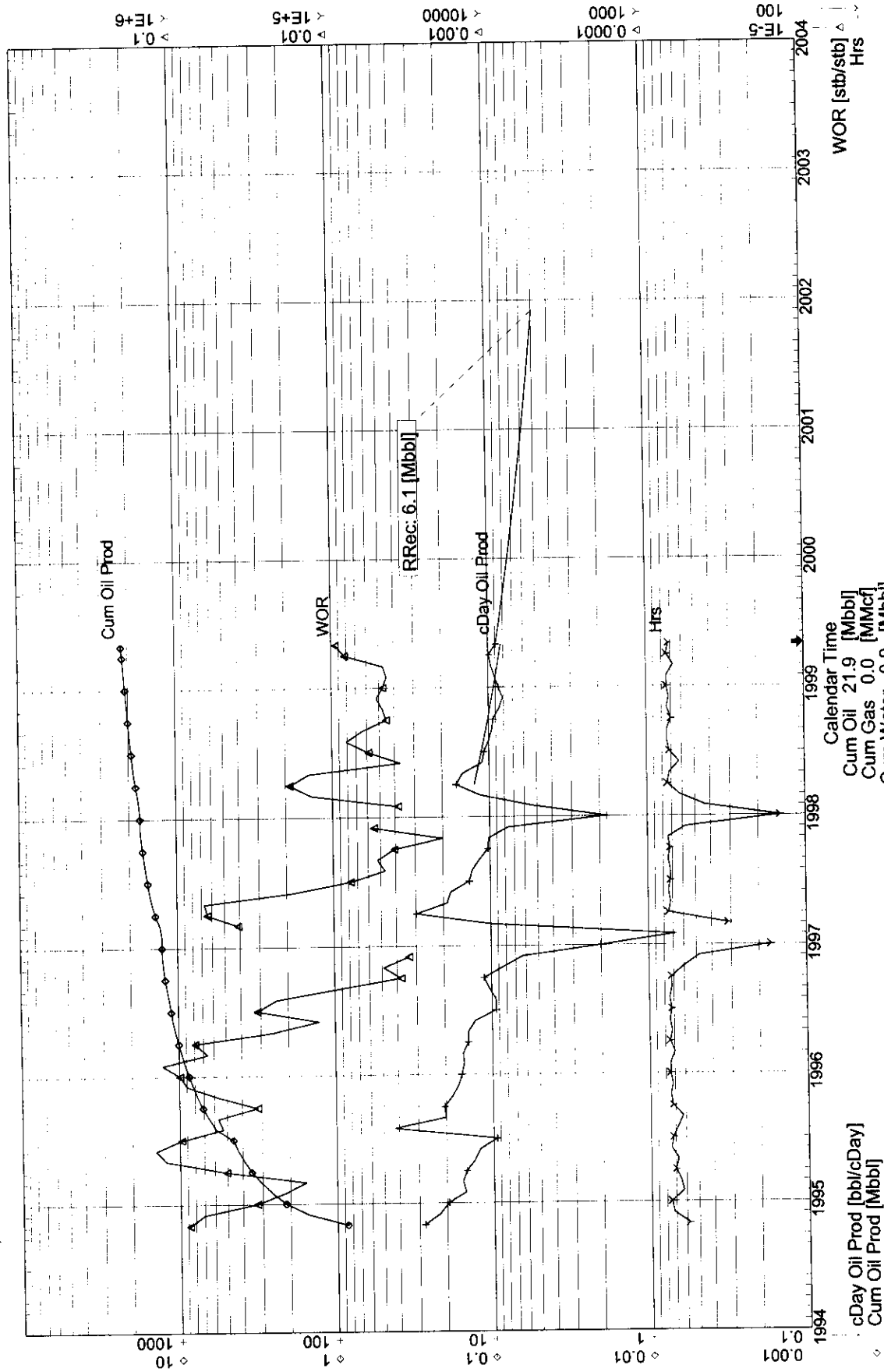
Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



# **South Pierson Unit**

Group: **00/13-16-002-29W1/0**  
 Well: **HOME S. PIERSON UNIT NO.1 13-16-2-29**  
 Name: **HOME S. PIERSON UNIT NO.1**  
 Primary: **OTHER** Status:  
 Last On: **Apr-1999**

Field: **S PIERSON SOUTH PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO.1**  
 Oper:  
 Source Date: **Apr-1999**



Oil 8.7 [bbl/cDay]  
 Rm Rec 6.1 [Mbbbl]  
 DECPRO 3.10  
 Petro-Soft Systems Ltd.

Calendar Time  
 Cum Oil 21.9 [Mbbbl]  
 Cum Gas 0.0 [MMcf]  
 Cum Water 0.9 [Mbbbl]  
 Qr 5.0 [bbl/cDay]  
 UI Rec 27.9 [Mbbbl]

Serv 0.0%  
 Hal 23.173%  
 c:\data\decline\pierson\pierson.dpd  
 03-Nov-99 14:12 [pierson]



# ORECAST SUMMARY

00/13-16-002-29W1/0

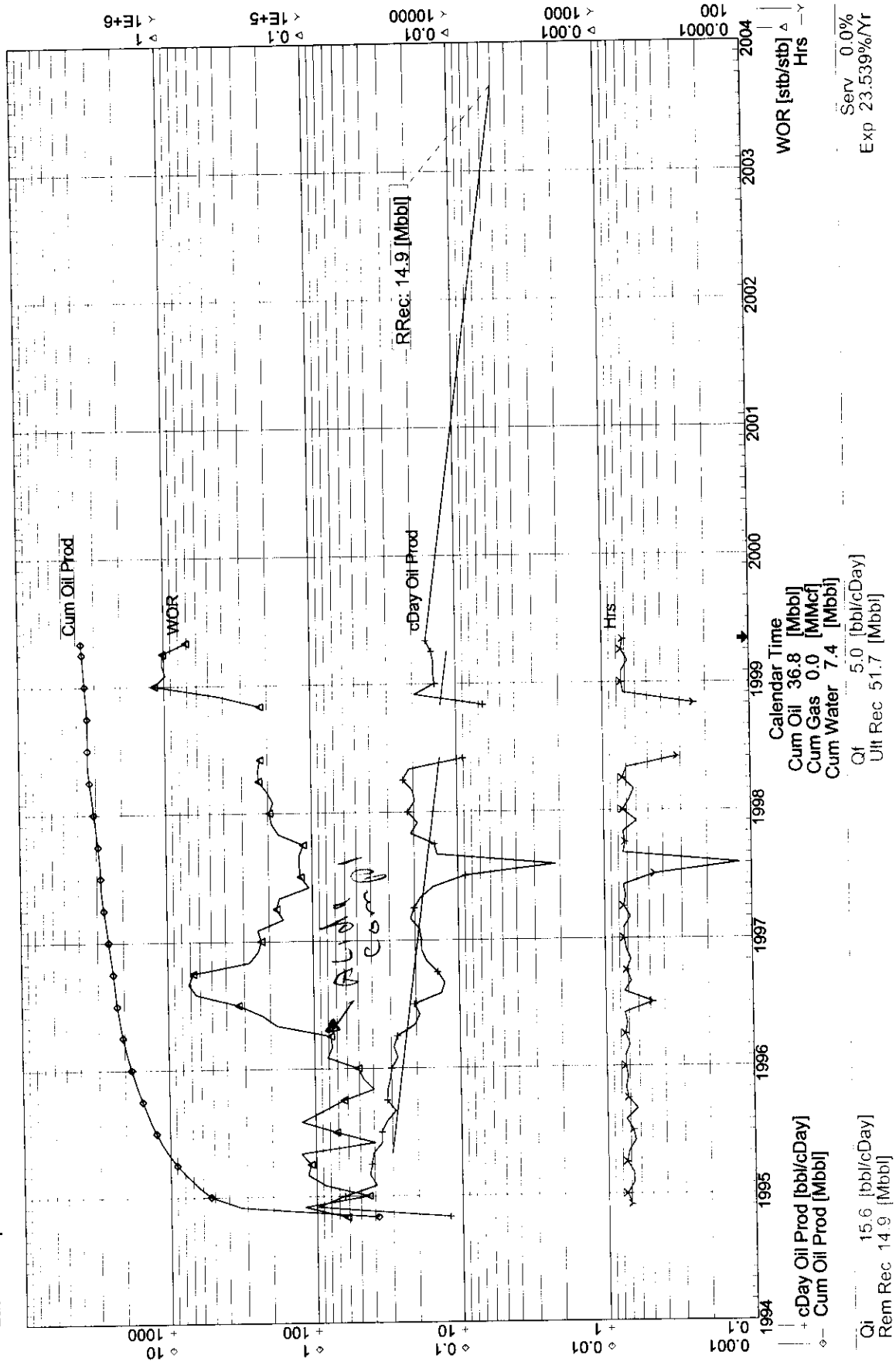
1. Temp3 (Har, Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = 0.7339
  - b) Decline Exponent (n) = 1.000
  - c) Initial Decline Rate (Qi) = 13.0 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 4.035E-02 [1/t]
  - e) Effective Decline Rate (Dei) = 32.622 [%/Yr]
  - f) Forecast Start Rate (Qo) = 8.9 [bbl/cDay] (from: Last Data)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 0 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2001/Nov)
  - j) Ultimate Recoverable (Np) = 27.9 [Mbbbl]
  - k) Remaining Recoverable = 6.1 [Mbbbl] (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS								
	Operating Hours		cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Temp3 cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Remaining Reserves [Mbbbl]	Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
1998	720.0		10.7	20.7	11.5	21.9	6.1	25.649			
1999/04	720.0		9.4	21.9	8.9			23.629			
1999					8.0	23.8	4.1	20.413			
2000					6.5	26.2	1.7	n/a			
2001					5.3	28.0	-0.1	n/a			

Group: **South Pierson Unit**  
 Well: **00/14-16-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO.1 14-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



# ORECAST SUMMARY

00/14-16-002-29W1/0

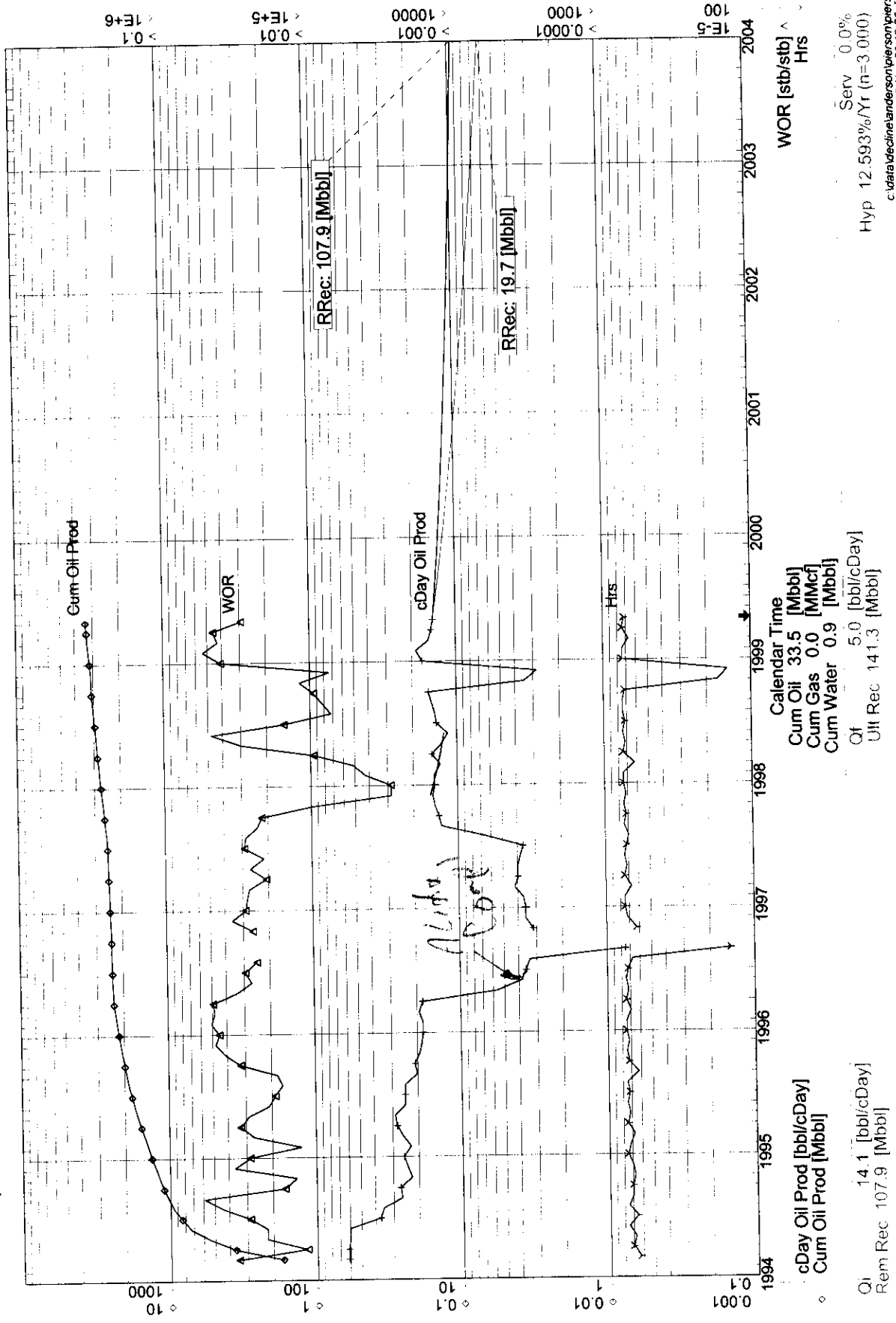
1. Temp1 (Exp. Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.5625
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 30.6 [bbl/cDay]
  - d) Nominal Decline Rate (D) = 2.237E-02 [1/t]
  - e) Effective Decline Rate (De) = 23.539 [%/Yr]
  - f) Forecast Start Rate (Qo) = 16.0 [bbl/cDay] (from: Last Data)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 0 [%]
  - i) Economic Limit (Qif) = 5.0 [bbl/cDay] (2003/Aug)
  - j) Ultimate Recoverable (Np) = 51.7 [Mbbbl]
  - k) Remaining Recoverable = 14.9 [Mbbbl] (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS							
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Temp1 cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Remaining Reserves [Mbbbl]	Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
1995	704.0	32.9	18.0	39.1			23.539			
1996	700.0	19.6	25.1	31.0			23.539			
1997	646.0	16.2	31.0	23.7			16.383			
1998	396.0	11.1	35.1	12.6			23.539			
1999/04	720.0	14.8	36.8	16.0	36.8	14.9	23.539			
				14.5	40.4	11.3	23.539			
1999				11.6	44.7	7.1	23.539			
2000				8.9	47.9	3.8	23.539			
2001				6.8	50.4	1.3	n/a			
2002				5.4	51.8	0.0	n/a			
2003										

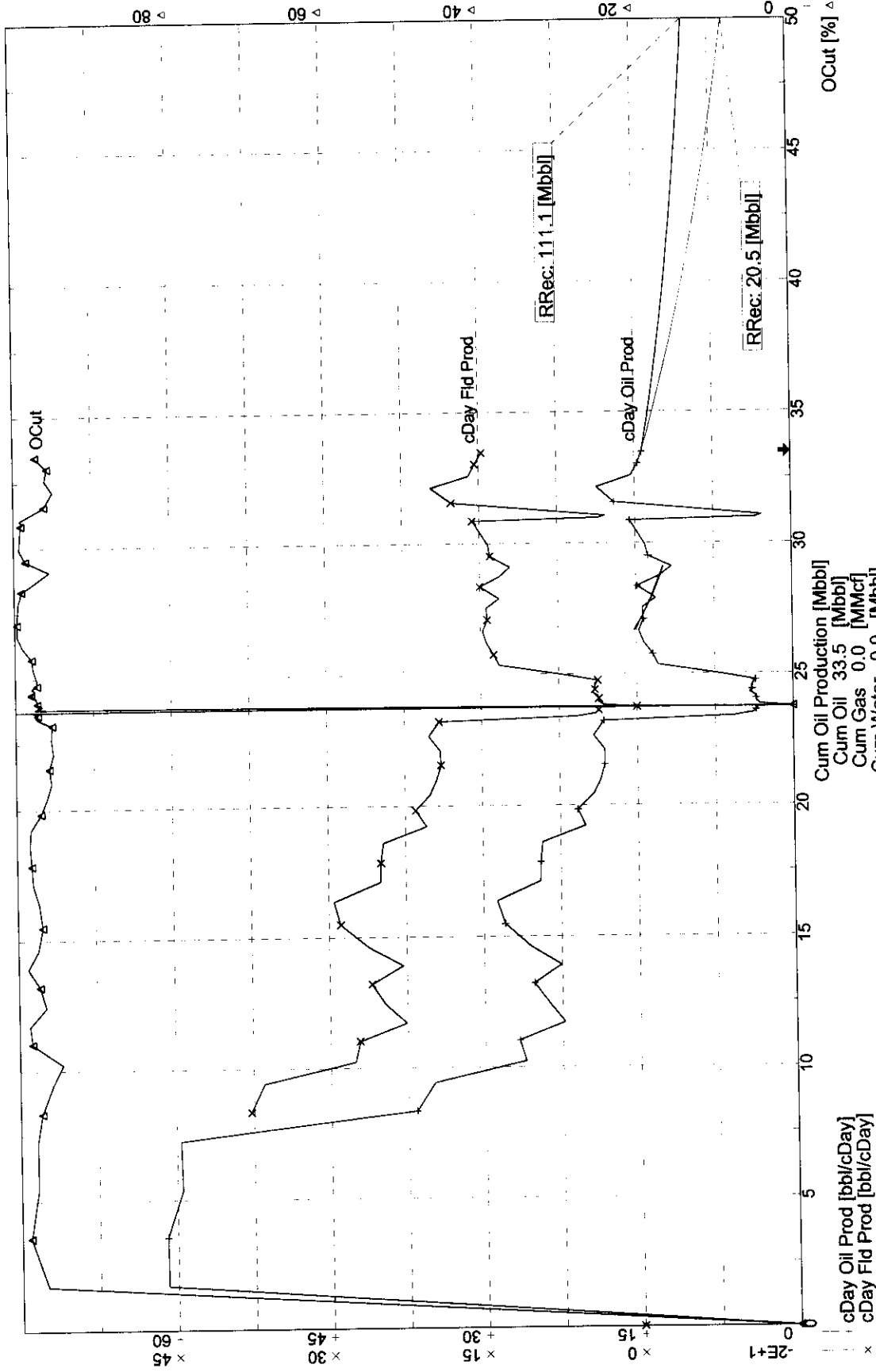
Group: **South Pierson Unit**  
 Well: **00/15-16-002-29W1/0**  
 Name: HOME S. PIERSON UNIT 1  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



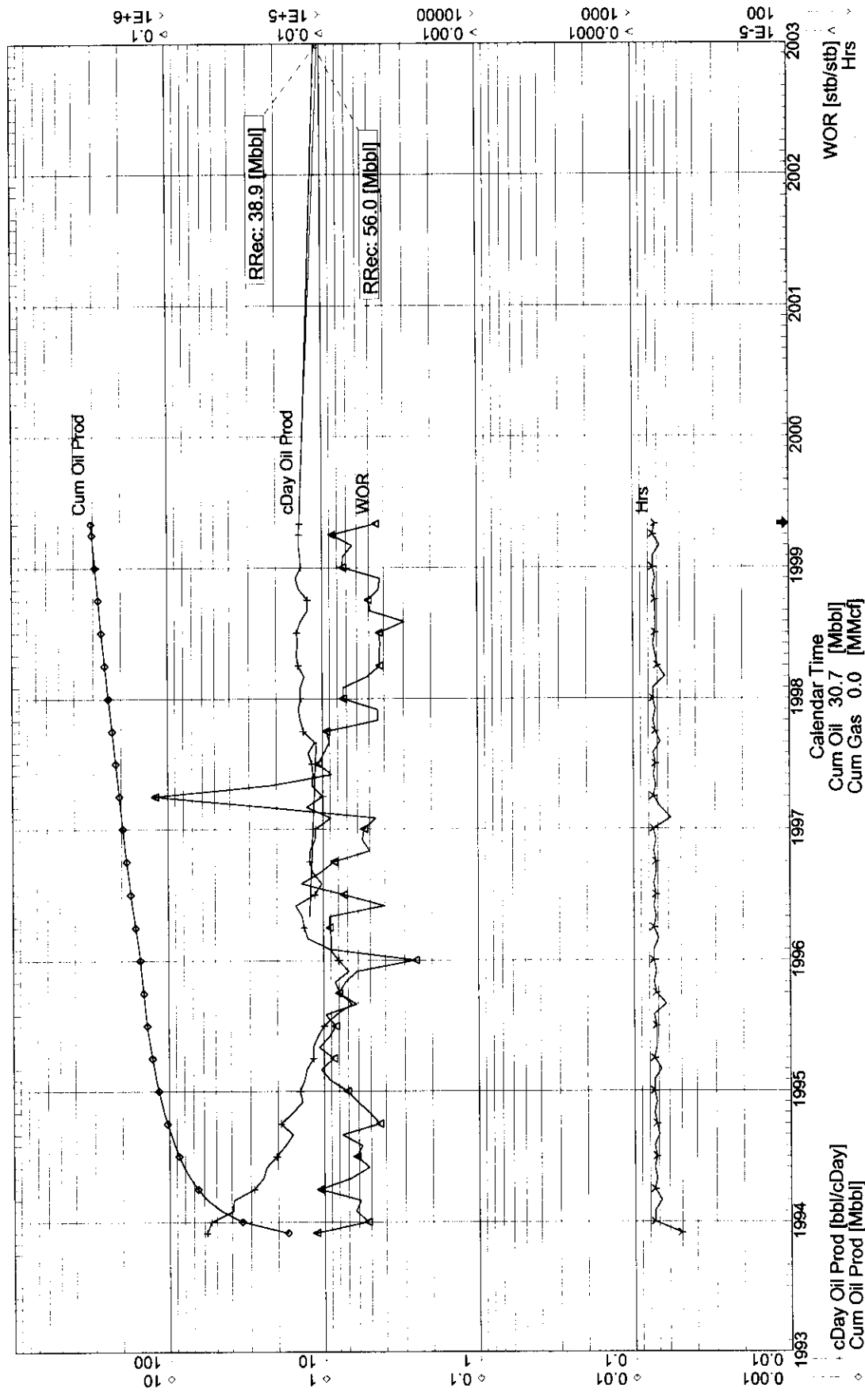
Group: **South Pierson Unit**  
 Well: **00/15-16-002-29W1/0**  
 Name: HOME S. PIERSON UNIT 1 15-16-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: SPIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Group: **South Pierson Unit**  
 Well: **00/01-17-002-29W1/0**  
 Name: HOME PIERSON UNIT NO.1 1-17-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

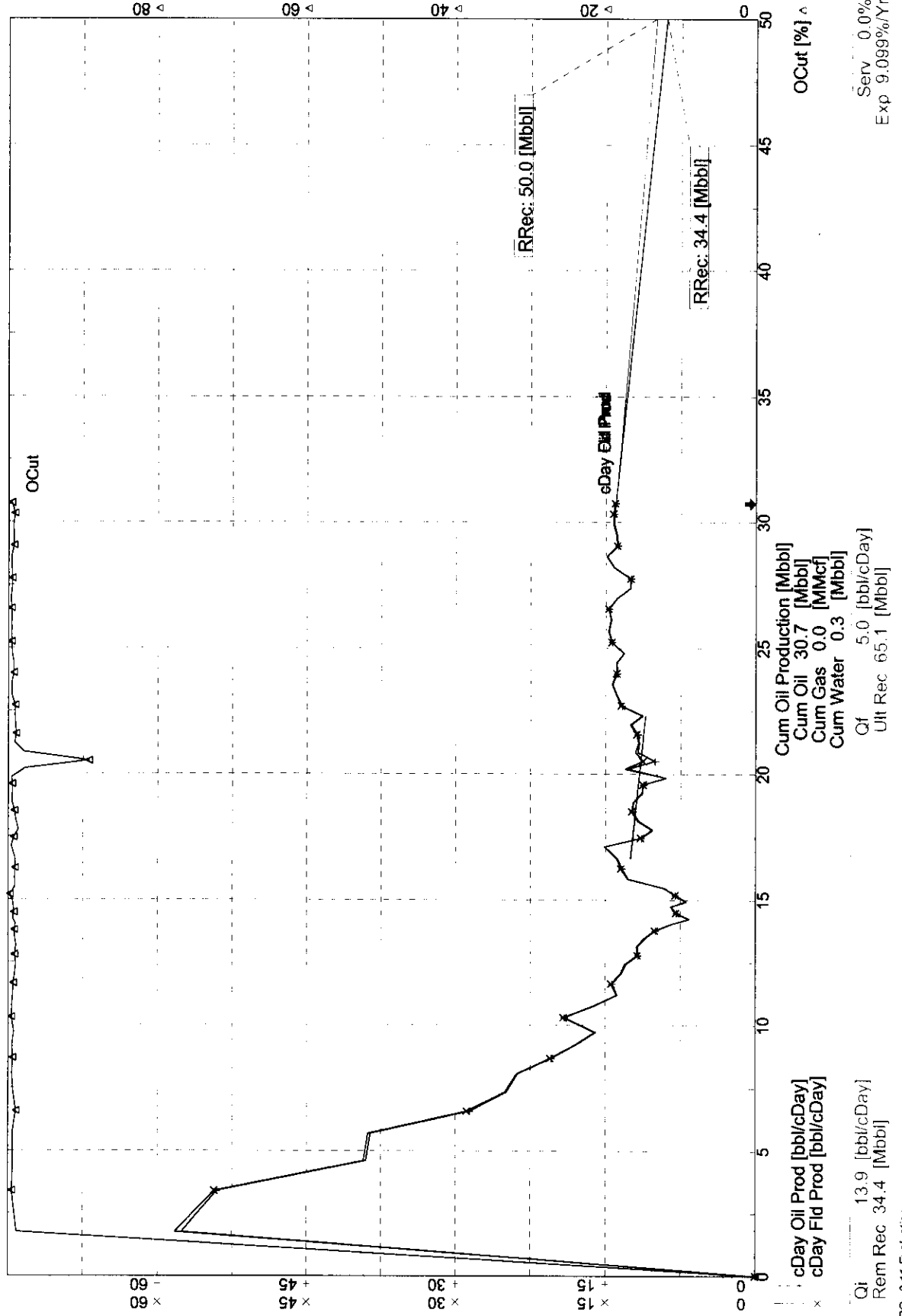


Calendar Time  
 Cum Oil 30.7 [Mbb]  
 Cum Gas 0.0 [MMcf]  
 Cum Water 0.3 [Mbb]  
 Qi 13.9 [bbl/cDay]  
 Rem Rec 56.0 [Mbb]  
 Qf 5.0 [bbl/cDay]  
 Ult Rec 86.8 [Mbb]  
 Serv 0.0%  
 Custom 6.925%/Yr (n=0.500)  
 c:\data\decline\pierson\pierson.dpd  
 12-Nov-99 12.29 [person]

# Group: **South Pierson Unit**

Well: **00/01-17-002-29W1/0**  
 Name: HOME PIERSON UNIT NO.1 1-17-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999

Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



00/01-17-002-29W1/0

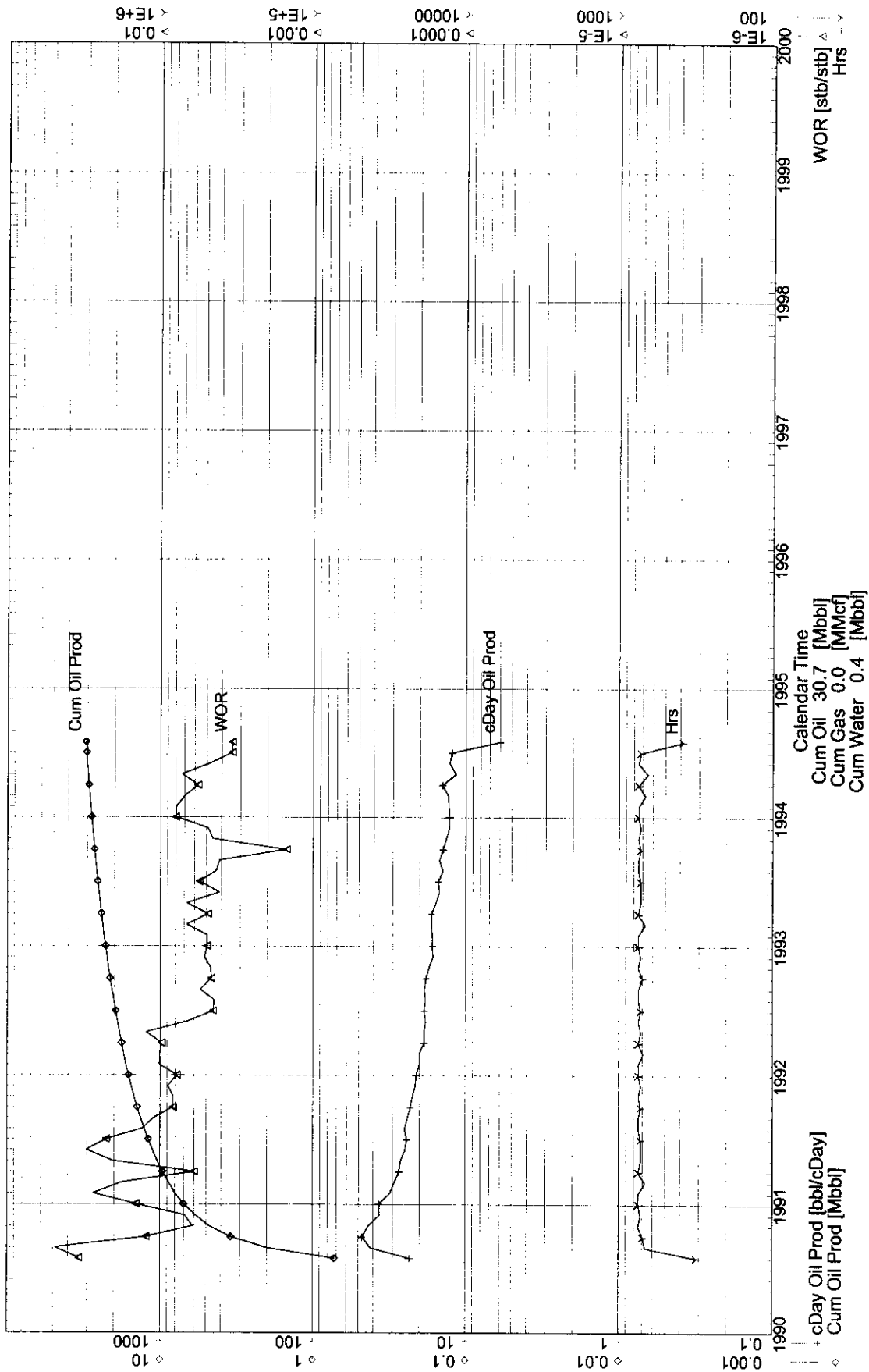
1. Temp3 (Exp,Time,cDay Oil Prod)
- Correlation Coefficient ( $r$ ) = -0.2995
  - Decline Exponent ( $n$ ) = 0.000
  - Initial Decline Rate ( $Q_i$ ) = 12.4 [bbl/cDay]
  - Nominal Decline Rate ( $D$ ) = 7.029E-03 [1/t]
  - Effective Decline Rate ( $De$ ) = 8.089 [%/Yr]
  - Forecast Start Rate ( $Q_0$ ) = 14.0 [bbl/cDay] (from: Last Data)
  - Forecast Start Date ( $t_0$ ) = 1999/Apr
  - Forecast Service Factor = 0 [%]
  - Economic Limit ( $Q_f$ ) = 5.0 [bbl/cDay] (2011/Jul)
  - Ultimate Recoverable ( $N_p$ ) = 69.6 [Mbbbl]
  - Remaining Recoverable = 38.9 [Mbbbl] (at 1999/04)
  - Tolerance = 75
  - Smoother Factor = 1

Range: Start of Curve Fit to Economic Limit

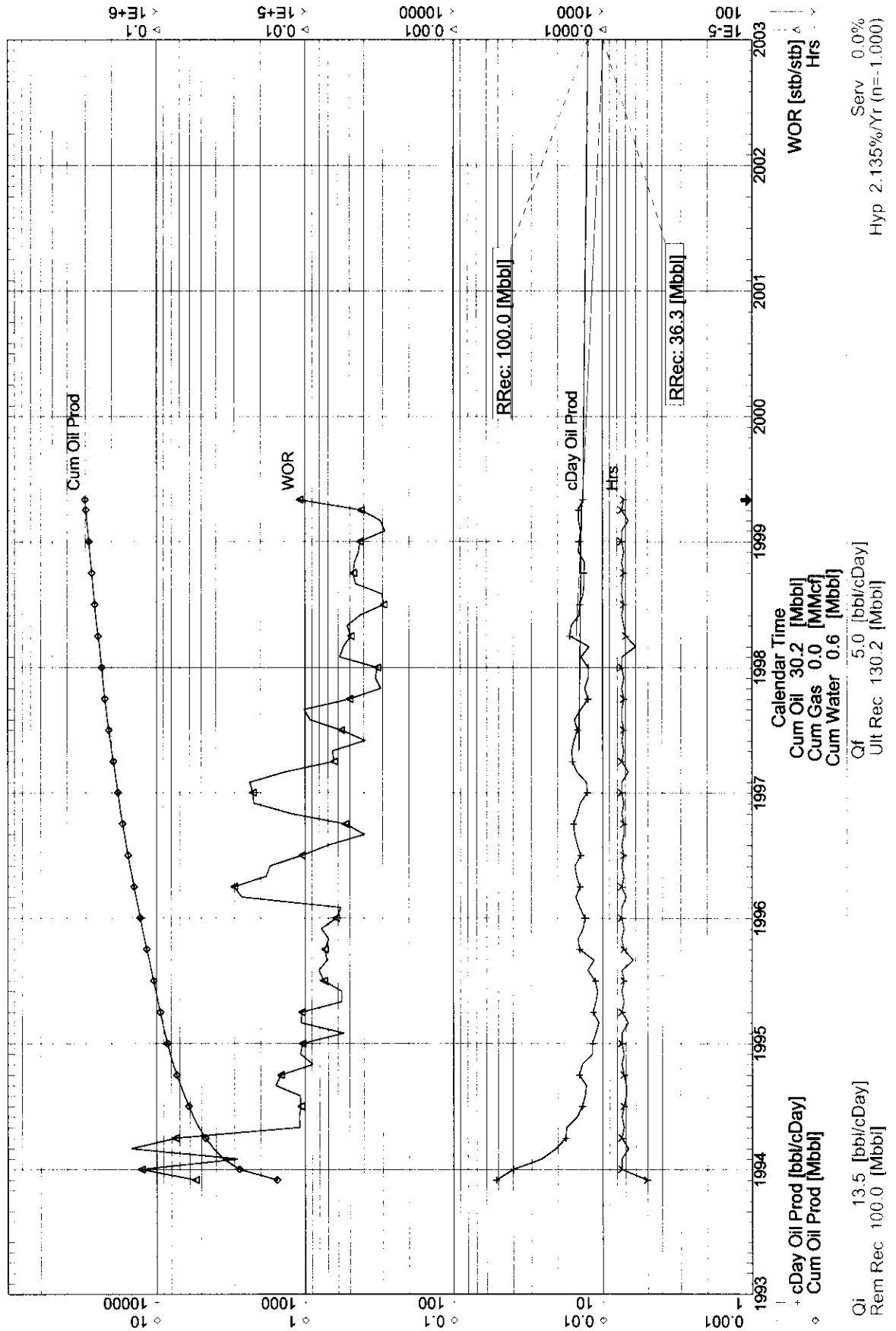
Date	ACTUALS		FORECASTS				Effective Decline [%/Yr]	Remaining Reserves [Mbbbl]	[Fluid]	[Liq-Liq]	[GOR]
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Temp3 cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Temp3 cDay Oil Prod [bbl/cDay]					
1996	730.7	12.1	19.6	17.5			8.089				
1997	710.0	12.1	24.0	16.3			8.089				
1998	718.0	13.9	29.1	15.0			8.089				
1999/04	720.0	14.0	30.7	14.0	30.7		8.089	38.9			
1999				13.6	34.0		8.089	35.6			
2000				12.6	38.7		8.089	31.0			
2001				11.6	42.9		8.089	26.7			
2002				10.7	46.8		8.089	22.8			
2003				9.8	50.4		8.089	19.2			
2004				9.0	53.7		8.089	15.9			
2005				8.3	56.8		8.089	12.9			
2006				7.6	59.6		8.089	10.1			
2007				7.0	62.1		8.089	7.5			
2008				6.4	64.5		8.089	5.2			
2009				5.9	66.6		8.089	3.0			
2010				5.4	68.6		n/a	1.0			
2011				5.1	69.7		n/a	-0.1			



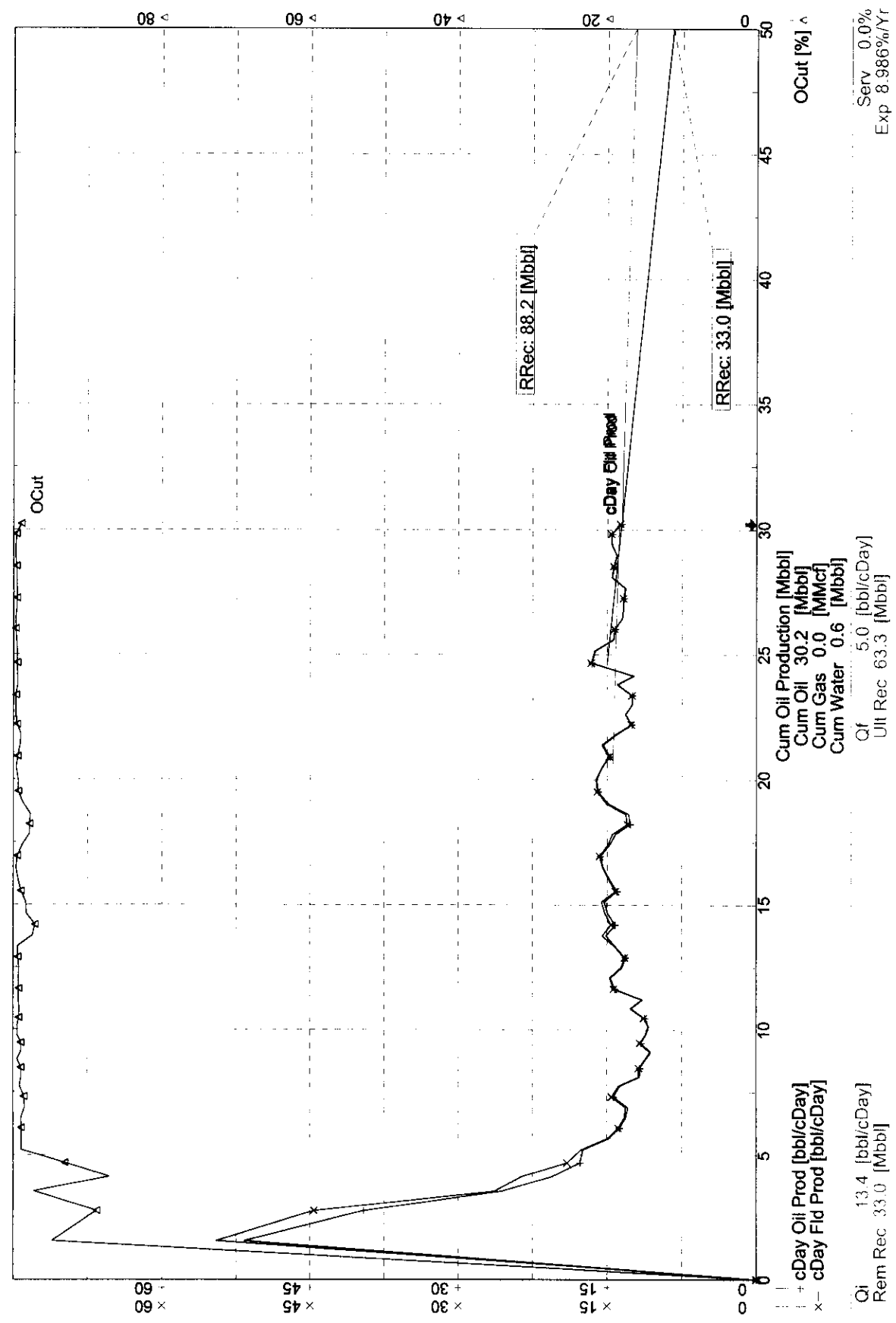
Group: **South Pierson Unit**  
 Well: **00/02-17-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 2-17-2-29  
 Primary: OTHER Status:  
 Last On: Jul-1994  
 Field: S PIERSO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Group: **South Pierson Unit**  
 Well: **00/03-17-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO.1 3-17-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999  
 Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

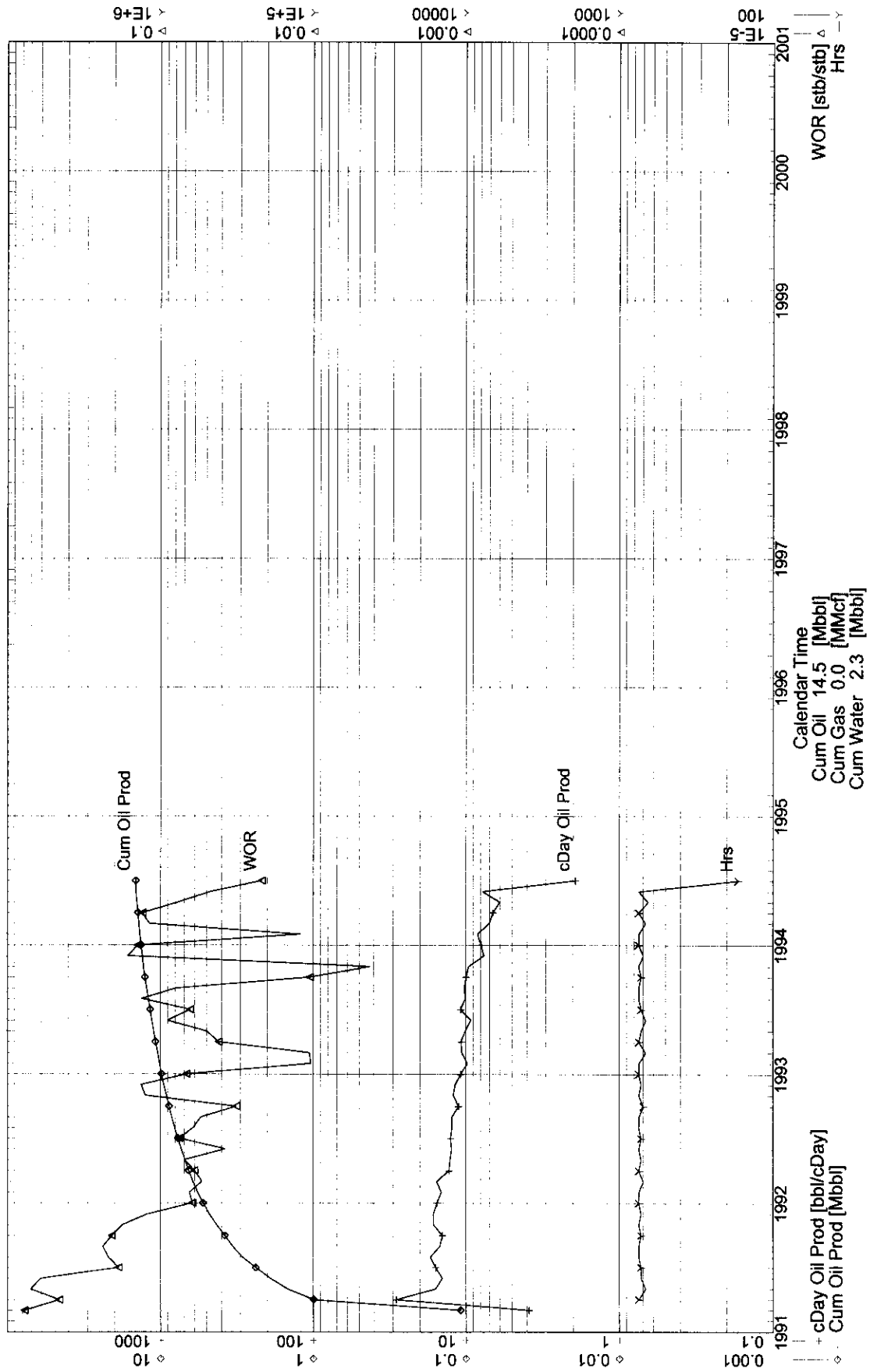


Group: **South Pierson Unit**  
 Well: **00/03-17-002-29W1/0**  
 Name: HOME S PIERSON UNIT NO.1 3-17-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999  
 Field: PIERSON PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

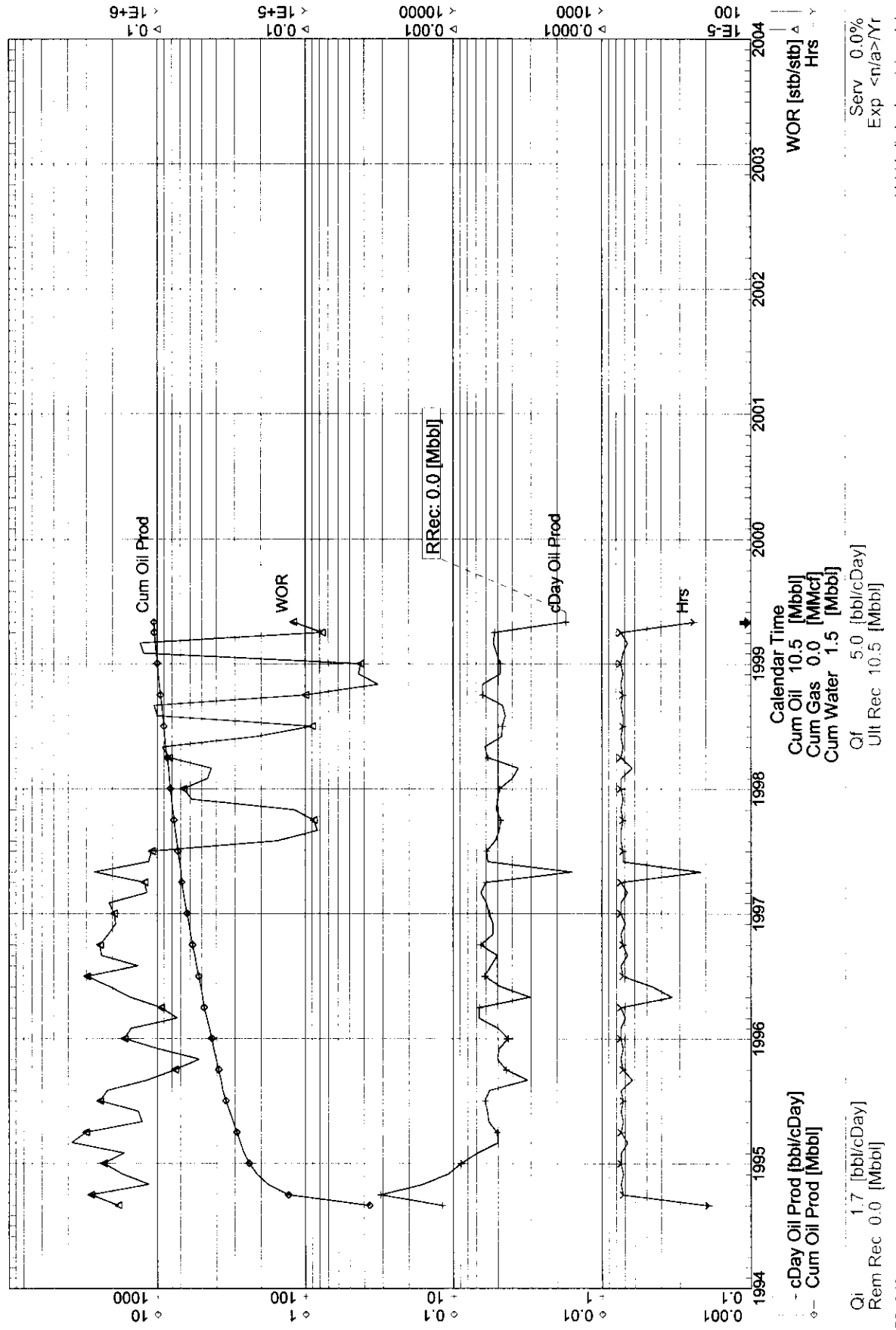


Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

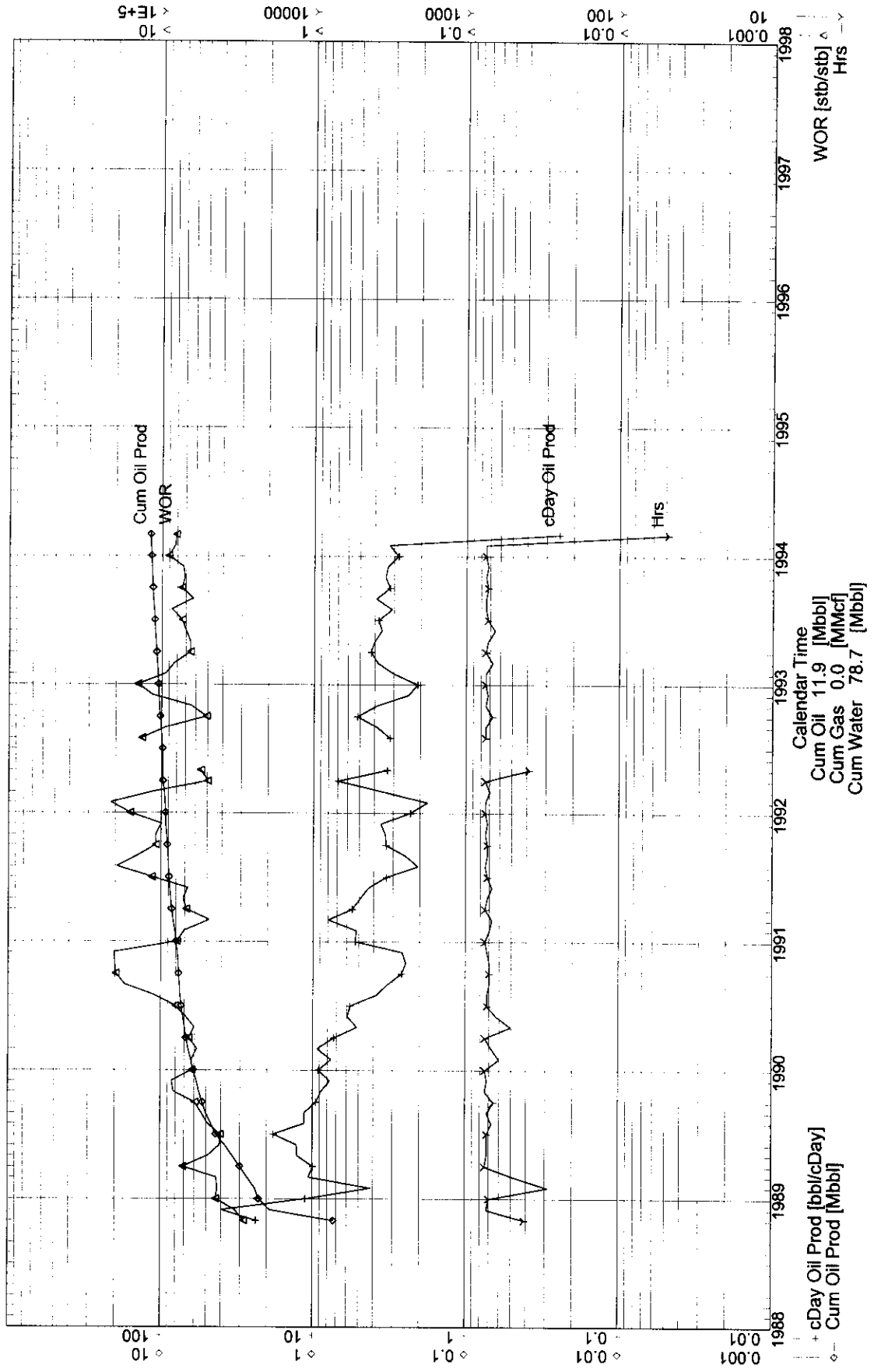
Group: **South Pierson Unit**  
 Well: **00/04-17-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 4-17-2-29  
 Primary: OTHER Status:  
 Last On: Jun-1994



Field: S PIERSO SOUTH PIERSON  
Pool: M0000000 UNDEFINED  
Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
Oper:  
Source Date: Apr-1999

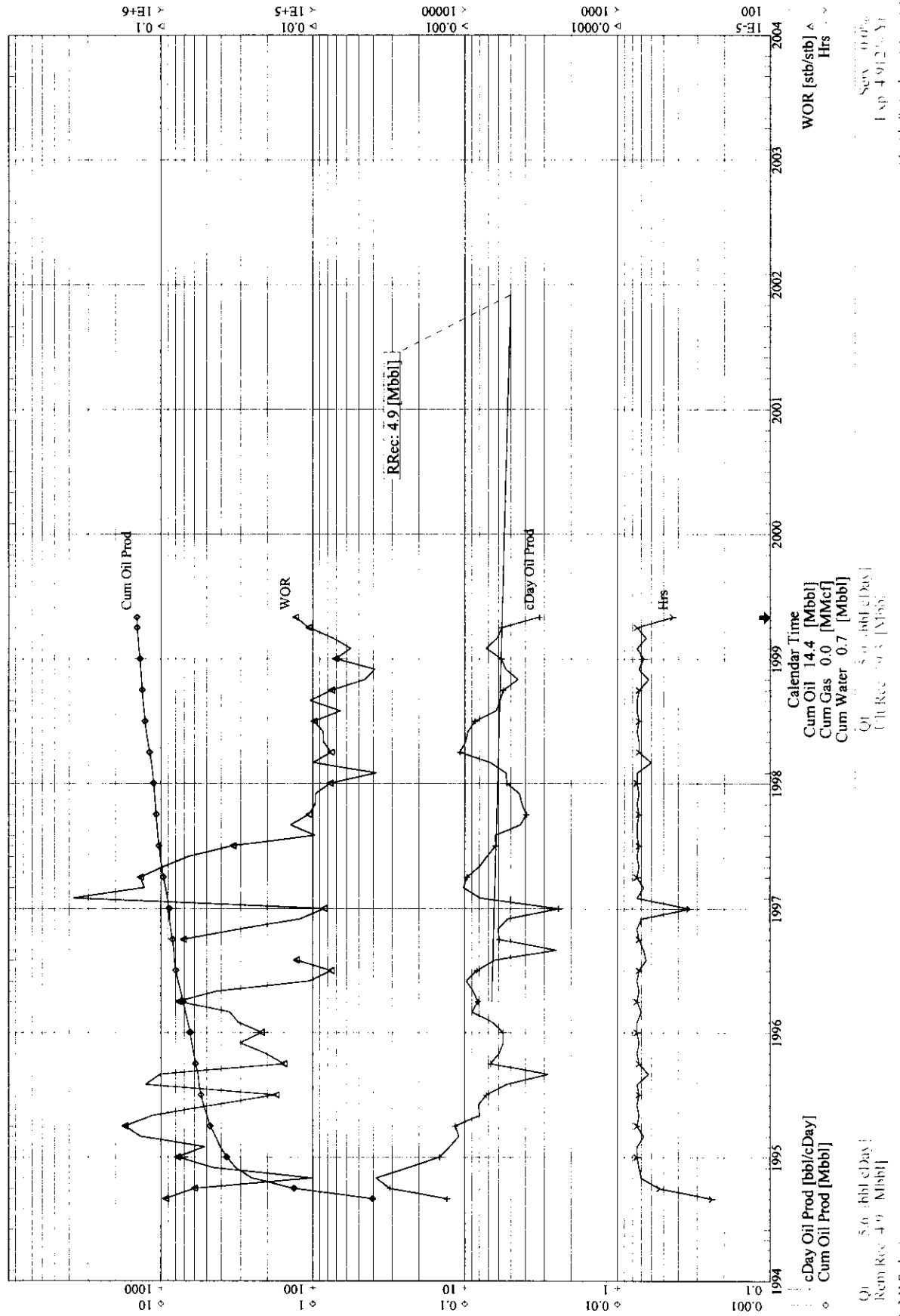


Group: **South Pierson Unit**  
 Well: **00/06-17-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 6-17-2-29  
 Primary: OTHER Status:  
 Last On: Feb-1994  
 Field: SPIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Group: **South Pierson Unit**  
 Well: **00/07-17-002-29W1/0**  
 Name: **HOMES S. PIERSON UNIT NO.A 7-17-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Apr-1999**

Field: **S PIERSON SOUTH PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**



# FORECAST SUMMARY

00/07-17-002-29W1/0

1. Temp2 (Exp. Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.1284
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 6.7 [bbl/cDay]
  - d) Nominal Decline Rate (D) = 4.197E-03 [1/r]
  - e) Effective Decline Rate (De) = 4.912 [%/Yr]
  - f) Forecast Start Rate (Qo) = 5.7 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1999/Apr
  - h) Forecast Service Factor = 0 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2001/Nov)
  - j) Ultimate Recoverable (Np) = 19.3 [Mbbbl]
  - k) Remaining Recoverable = 4.9 [Mbbbl] (at 1999/04)
  - l) Tolerance = 100
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

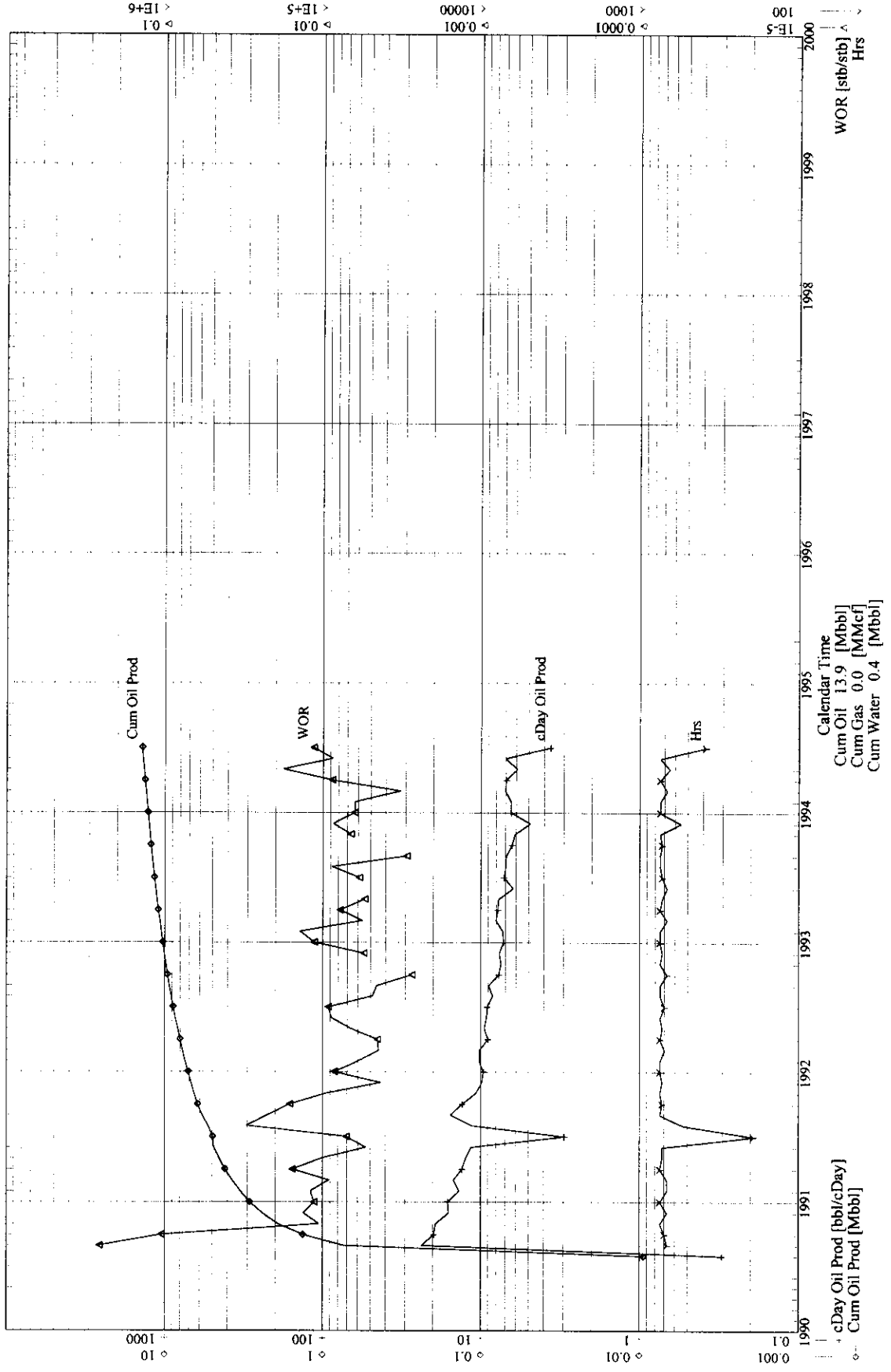
Date	ACTUALS		FORECASTS				
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Temp2 cDay Oil Prod [bbl/cDay]	Cum [Mbbbl]	Remaining Reserves [Mbbbl]	Effective Decline [%/Yr]
1996	674.4	6.3	8.8	6.5			4.912
1997	730.0	6.5	11.2	6.2			4.912
1998	706.0	7.0	13.7	5.9			4.912
1999/04	642.0	5.6	14.4	5.7	14.4	4.9	4.912
1999				5.6	15.7	3.5	4.912
2000				5.3	17.7	1.6	n/a
2001				5.1	19.4	-0.1	n/a



# South Pierson Unit

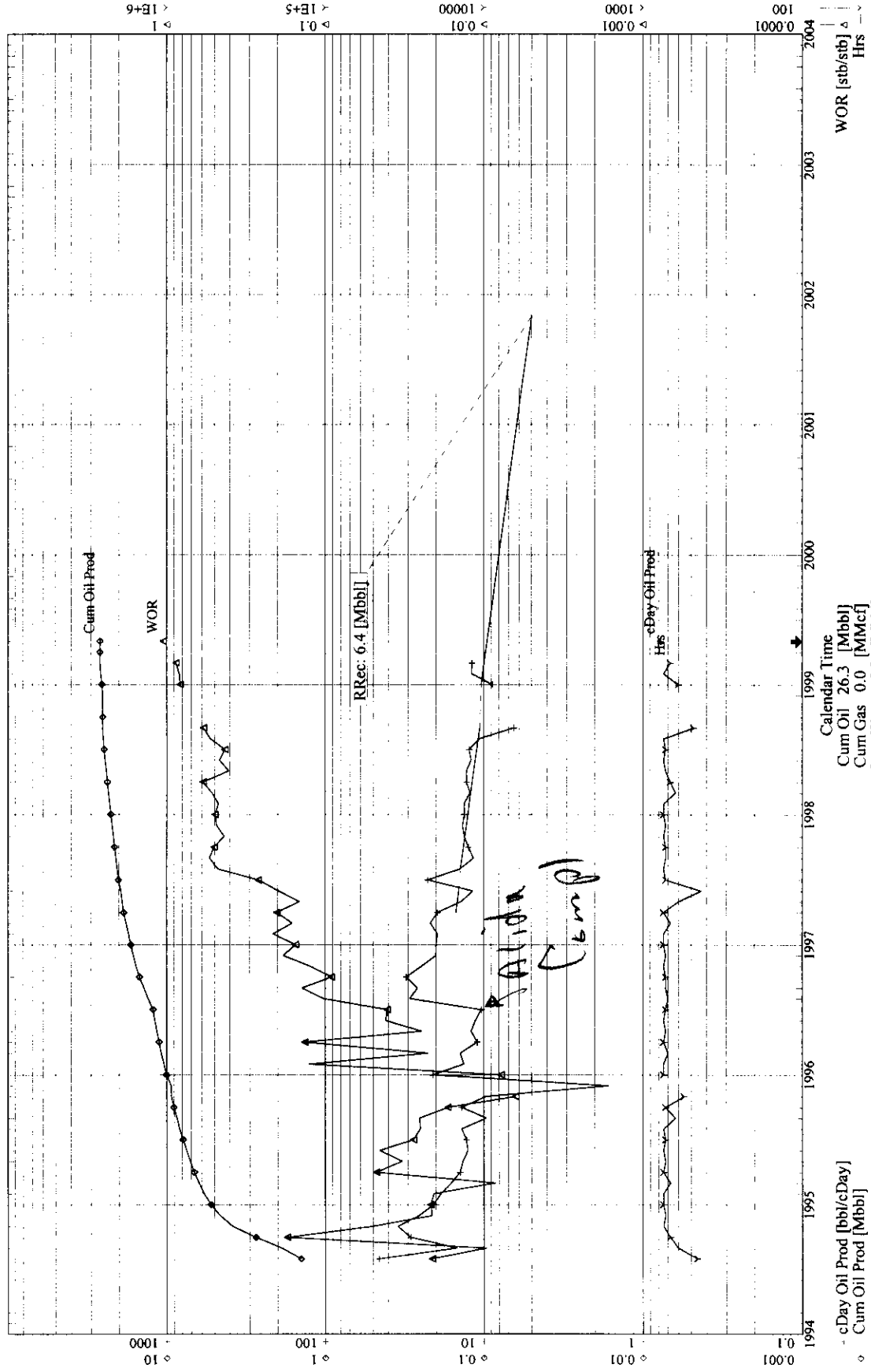
Group: 00/08-17-002-29W1/0  
 Well: HOME S. PIERSON UNIT NO.1 8-17-2-29  
 Name: OTHER Status:  
 Primary: OTHER Status:  
 Last On: Jun-1994

Field: SPIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Group: **South Pierson Unit**  
 Well: **00/09-17-002-29W1/0**  
 Name: **HOMES S. PIERSON NO.1 9-17-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Apr-1999**

Field: **PIERSON PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**



Calendar Time  
 Cum Oil 26.3 [Mbbbl]  
 Cum Gas 0.0 [MMcf]  
 Cum Water 5.2 [Mbbbl]  
 Q1 8.0 [bbl/cDay]  
 Q2 Rec 32.6 [Mbbbl] (NP)

Q1 9.3 [bbl/cDay]  
 Rec Rec 6.4 [Mbbbl] (1999-02)

# FORECAST SUMMARY

00/09-17-002-29W1/0

1. Temp1 (Exp,Time,cDay Oil Prod) - NP
  - a) Correlation Coefficient (r) = -0.6086
  - b) Decline Exponent (n) = 0.000
  - c) Initial Decline Rate (Qi) = 15.3 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 2.153E-02 [1/t]
  - e) Effective Decline Rate (De) = 22.766 [%/Yr]
  - f) Forecast Start Rate (Qo) = 9.9 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1999/Feb
  - h) Forecast Service Factor = 0 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2001/Oct)
  - j) Ultimate Recoverable (Np) = 32.6 [Mbbl]
  - k) Remaining Recoverable = 6.4 [Mbbl] (at 1999/04)
  - l) Tolerance = 75
  - m) Smoothing Factor = 1

## Footnote(s):

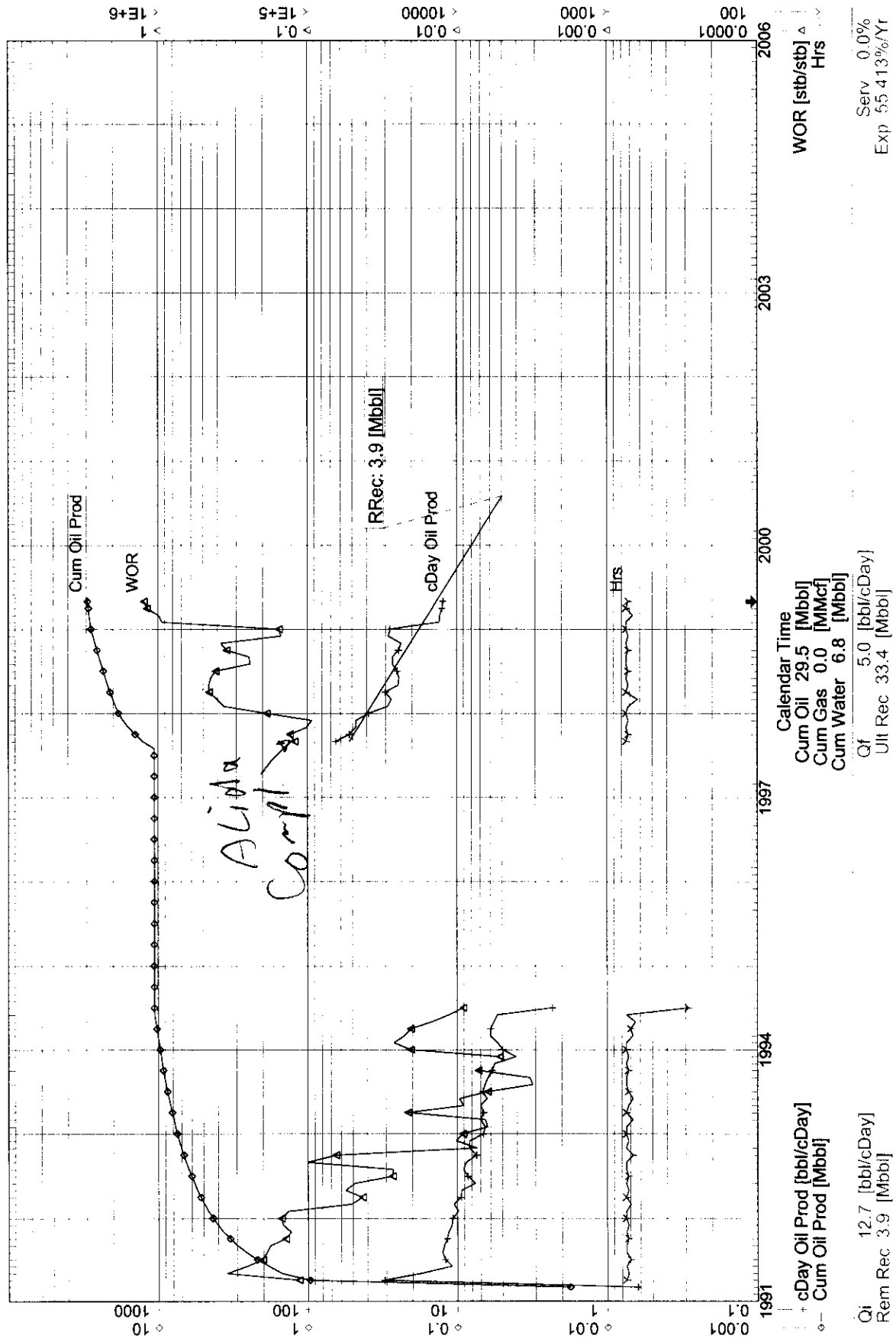
- (1) Temp1 (Exp,Time,cDay Oil Prod)

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS					Effective Decline [%/Yr]	Remaining Reserves [Mbbl]	[Fluid]	[Liq-Liq]	[GOR]
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbl]	cDay Oil Prod [bbl/cDay]	Cum [Mbbl]	(1)						
1997	688.8	14.6	22.5	12.4				17.613				
1998	504.0	8.4	25.6	8.5				22.766				
1999/04	366.0	6.1	26.3	9.5	26.3			22.766	6.4			
1999				8.6	28.4			22.766	4.2			
2000				7.0	31.0			n/a	1.7			
2001				5.5	32.7			n/a	0.0			

Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

Group: **South Pierson Unit**  
 Well: **00/10-17-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 10-17-2-29  
 Primary: OTHER Status:  
 Last On: Apr-1999



# ORECAST SUMMARY

00/10-17-002-29W1/0

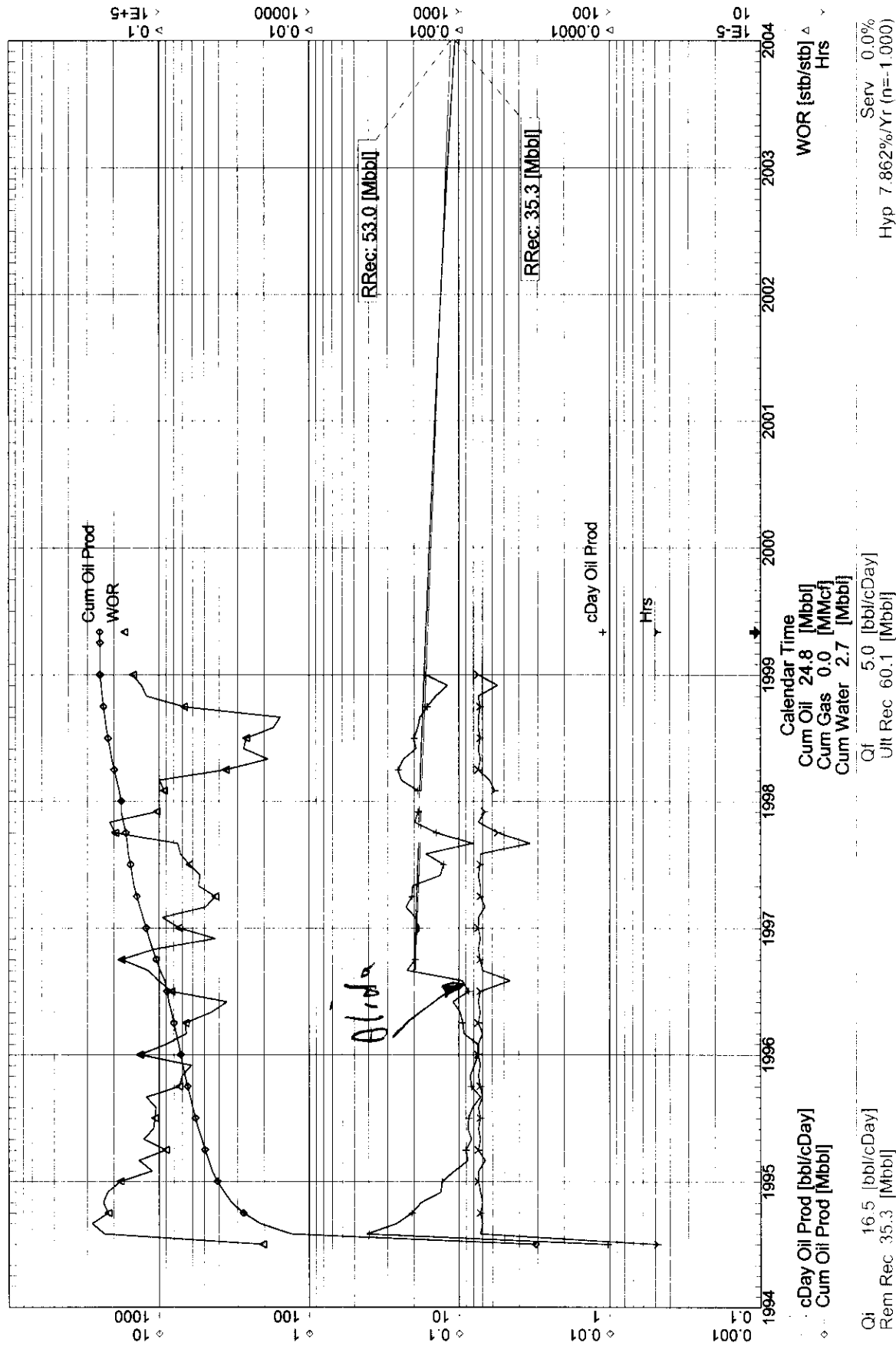
1. Temp1 (Exp Time, cDay Oil Prod)
  - a) Correlation Coefficient ( $r$ ) = -0.8986
  - b) Decline Exponent ( $n$ ) = 0.000
  - c) Initial Decline Rate ( $Q_i$ ) = 56.0 [bbl/cDay]
  - d) Nominal Decline Rate ( $D$ ) = 6.731E-02 [1/t]
  - e) Effective Decline Rate ( $De$ ) = 55.413 [%/Yr]
  - f) Forecast Start Rate ( $Q_o$ ) = 13.6 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date ( $t_o$ ) = 1999/Apr
  - h) Forecast Service Factor = 0 [%]
  - i) Economic Limit ( $Q_f$ ) = 5.0 [bbl/cDay] (2000/Jul)
  - j) Ultimate Recoverable ( $N_p$ ) = 33.4 [Mbb]l
  - k) Remaining Recoverable = 3.9 [Mbb]l (at 1999/04)
  - l) Tolerance = 75
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS							
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Temp1 cDay Oil Prod [bbl/cDay]	Cum [Mbb]	Remaining Reserves [Mbb]	Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
1997	734.4	50.2	18.3	46.0			55.413			
1998	724.0	26.6	28.0	26.5			55.413			
1999/04	720.0	12.7	29.5	13.6	29.5	3.9	55.413			
1999				10.2	32.1	1.3	n/a			
2000				6.1	33.5	0.0	n/a			

Group: **South Pierson Unit**  
 Well: **00/11-17-002-29W1/0**  
 Name: **HOME S. PIERSON UNIT NO.1 11-17-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Apr-1999**

Field: **PIERSON PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**



# ORECAST SUMMARY

00/11-17-002-29W1/0

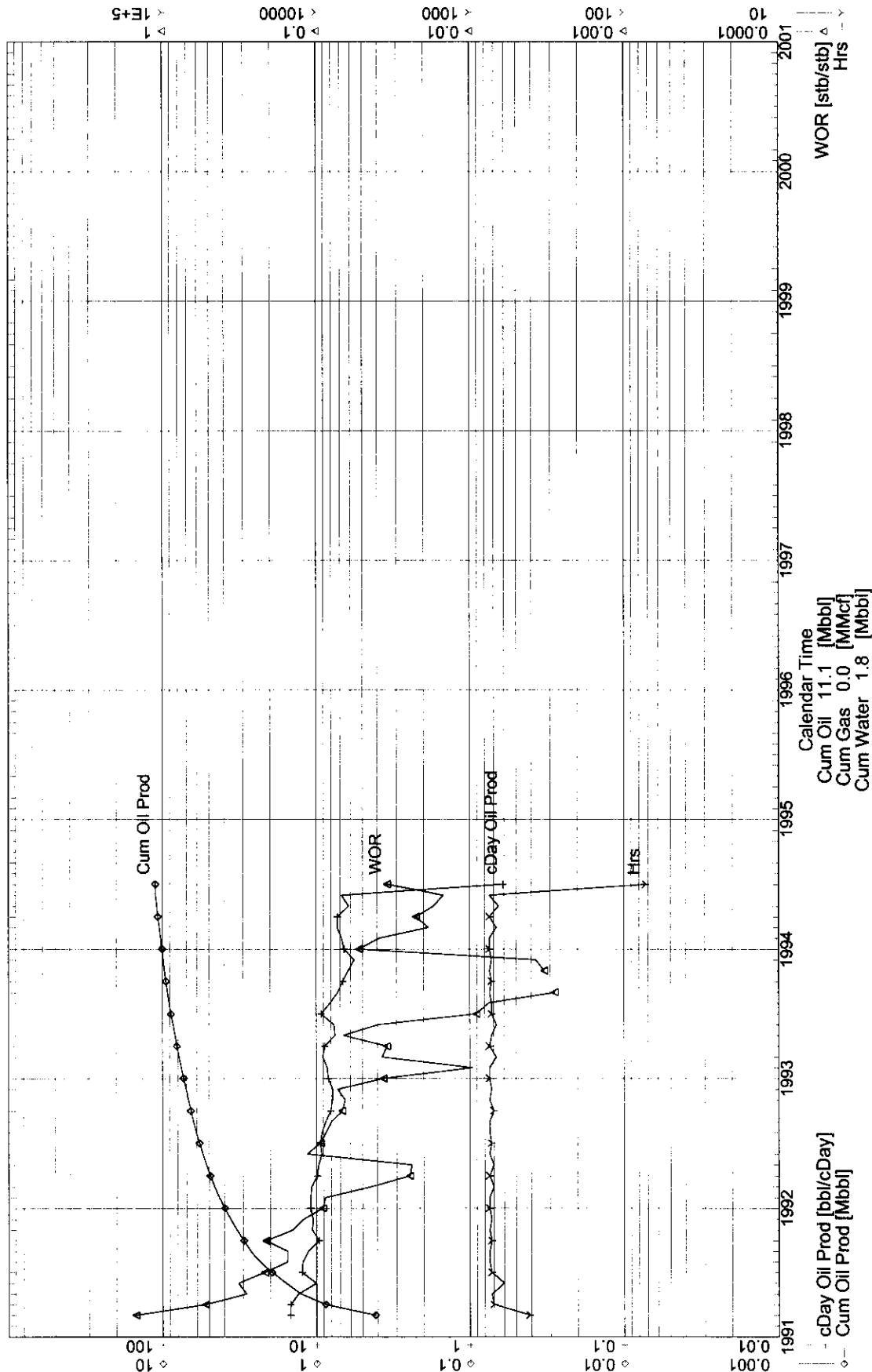
1. Temp1 (Hyp. Time, cDay Oil Prod)
  - a) Correlation Coefficient (r) = -0.2207
  - b) Decline Exponent (n) = -1.000
  - c) Initial Decline Rate (Qi) = 20.0 [bbl/cDay]
  - d) Nominal Decline Rate (Di) = 5.416E-03 [1/t]
  - e) Effective Decline Rate (Dei) = 6.499 [%/Yr]
  - f) Forecast Start Rate (Qo) = 17.1 [bbl/cDay] (from: Last Fit)
  - g) Forecast Start Date (to) = 1998/Dec
  - h) Forecast Service Factor = 0 [%]
  - i) Economic Limit (Qf) = 5.0 [bbl/cDay] (2008/Apr)
  - j) Ultimate Recoverable (Np) = 60.1 [Mbbf]
  - k) Remaining Recoverable = 35.3 [Mbbf] (at 1999/04)
  - l) Tolerance = 75
  - m) Smoothing Factor = 1

Range: Start of Curve Fit to Economic Limit

Date	ACTUALS		FORECASTS							
	Operating Hours	cDay Oil Prod [bbl/cDay]	Cum [Mbbf]	Temp1 cDay Oil Prod [bbl/cDay]	Cum [Mbbf]	Remaining Reserves [Mbbf]	Effective Decline [%/Yr]	[Fluid]	[Liq-Liq]	[GOR]
1996	724.8	19.9	12.2	19.6			5.567			
1997	612.0	15.5	17.8	15.7			7.074			
1998	698.0	18.9	24.7	17.6			7.613			
1999/04	12.0	0.3	24.8	16.6	24.8	35.3	7.811			
1999				16.1	28.7	31.4	8.240			
2000				15.1	34.2	25.9	8.980			
2001				13.8	39.2	20.8	9.866			
2002				12.5	43.8	16.3	10.946			
2003				11.2	47.9	12.2	12.291			
2004				9.9	51.5	8.5	14.013			
2005				8.6	54.7	5.4	16.297			
2006				7.3	57.3	2.7	19.470			
2007				6.0	59.5	0.5	n/a			
2008				5.1	60.1	-0.1	n/a			

Field: S PIERSON SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999

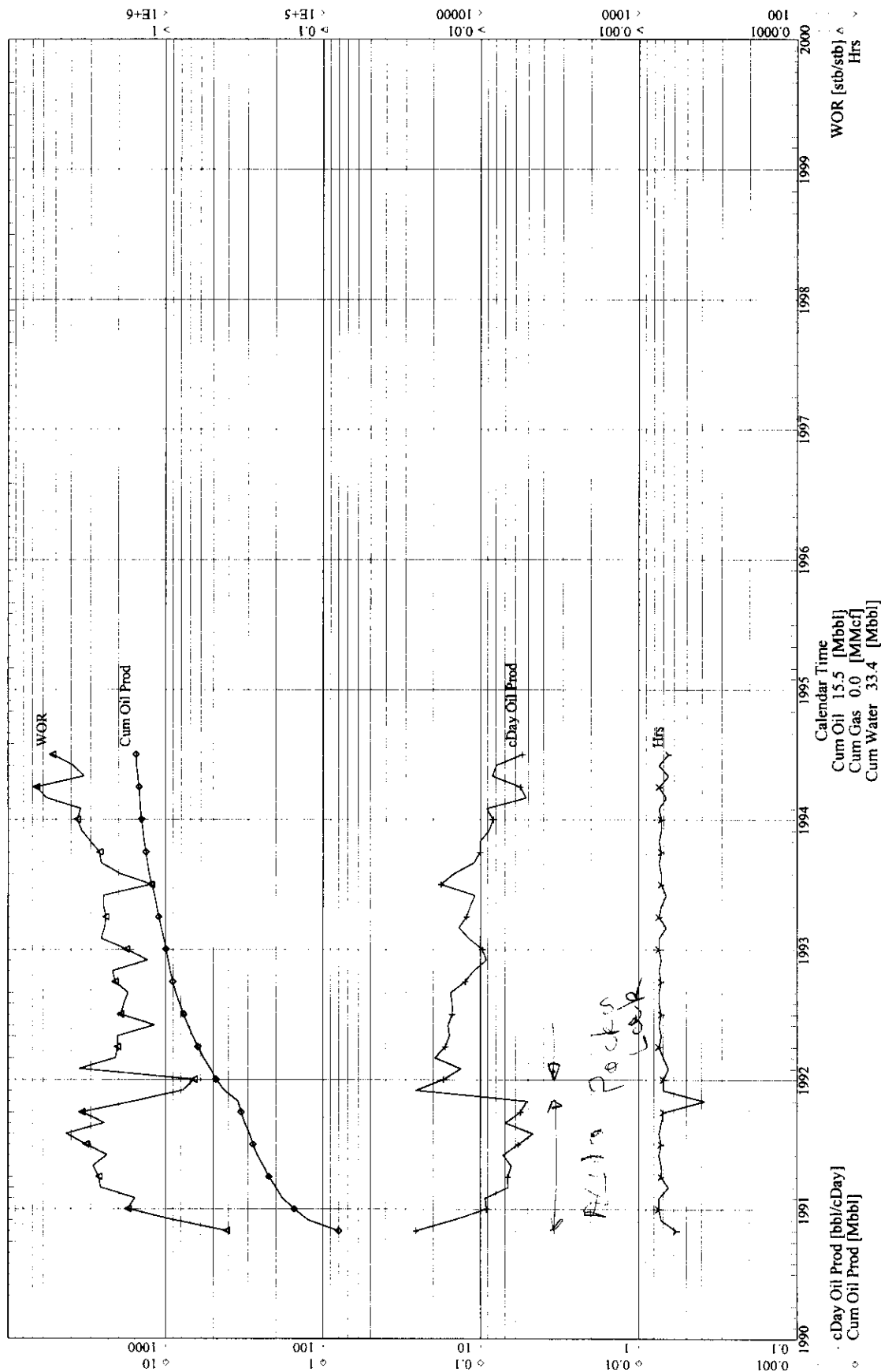
Group: South Pierson Unit  
 Well: 00/12-17-002-29W1/0  
 Name: HOME S. PIERSON UNIT NO1 12-17-2-29  
 Primary: OTHER Status:  
 Last On: Jun-1994





Group: **South Pierson Unit**  
 Well: **00/14-17-002-29W1/0**  
 Name: **TUNDRA S. PIERSON 14-17-2-29**  
 Primary: **OTHER** Status:  
 Last On: **Jun-1994**

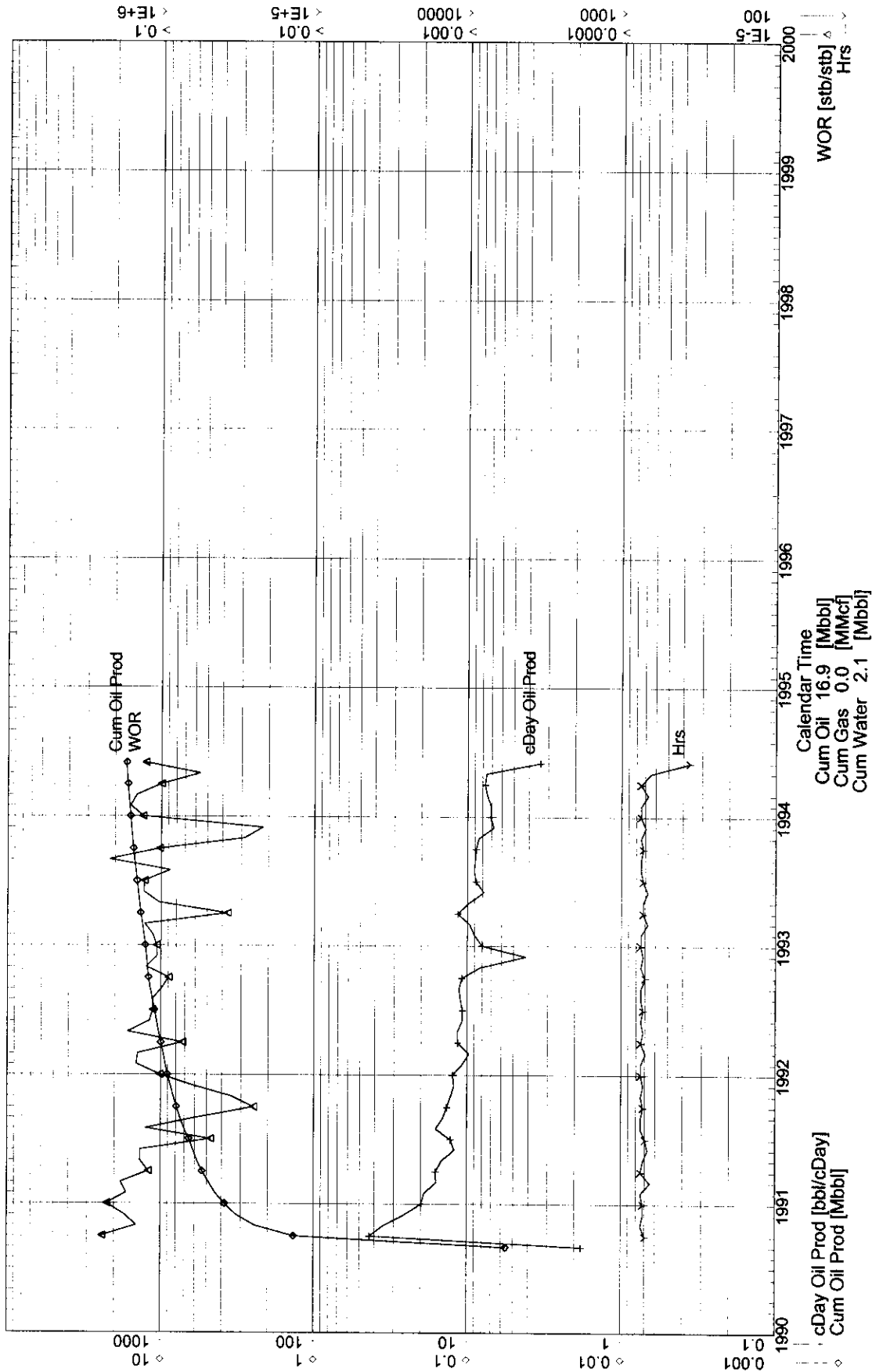
Field: **S PIERO SOUTH PIERSON**  
 Pool: **M0000000 UNDEFINED**  
 Unit: **M0735A00SOUTH PIERSON UNIT NO. 1**  
 Oper:  
 Source Date: **Apr-1999**



Calendar Time  
 Cum Oil 15.5 [Mbbbl]  
 Cum Gas 0.0 [MMcf]  
 Cum Water 33.4 [Mbbbl]

Group: **South Pierson Unit**  
 Well: **00/08-18-002-29W1/0**  
 Name: HOME S. PIERSON UNIT NO1 8-18-2-29  
 Primary: OTHER Status:  
 Last On: May-1994

Field: S PIERSO SOUTH PIERSON  
 Pool: M0000000 UNDEFINED  
 Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
 Oper:  
 Source Date: Apr-1999



Group: **South Pierson Unit**  
Well: **00/16-18-002-29W1/0**  
Name: HOME S. PIERSON UNIT NO1 16-18-2-29  
Primary: OTHER Status:  
Last On: Jul-1991

Field: SPIERSON SOUTH PIERSON  
Pool: M0000000 UNDEFINED  
Unit: M0735A00SOUTH PIERSON UNIT NO. 1  
Oper:  
Source Date: Apr-1999

