

# **WASKADA UNIT NO. 4**

## **WATERFLOOD PROGRESS REPORT**

**January 1, through December 31, 2011**

### **PennWest Exploration**

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## **INTRODUCTION**

The WASKADA UNIT NO.4 pressure maintenance project commenced water injection into the Lower Amaranth designed and in accordance with Manitoba Energy and Mines Approval No. PM 58.

PRESSURE MAINTENANCE: Governed by Board Order No. PM 58

### UNIT INFORMATION:

UNITIZED ZONE: Lower Amaranth

Original Unit, Jan.1, 1984 Board Order; Unitization Order No. 31

POOL: Waskada Lower Amaranth A (03 29A)

This report documents the performance of the Waskada Lower Amaranth pressure maintenance project for the period of January 1 to December 31, 2011.

Unit # 4 is part of main Waskada. The Waskada field is situated on the northeast rim of the Williston Basin in southern Manitoba. It comprises a large portion of Township 1 and 2, Ranges 25 and 26 (W1PM).

The Waskada Fields produce light density crude (approximately 36° API), predominantly from the Lower Amaranth formation. The interlaminated, shallow marine to subtidal succession of sandstones, siltstones, and shale progressively onlaps the Mississippian unconformity surface from basin center, up dip to the north and eastern basin limits in Saskatchewan and Manitoba. The fine grained reservoir rock has a complex reservoir characterization with 13 to 16 % porosity and permeability on the order of 0.5 to 15 md. The lower Amaranth, the oldest Mesozoic unit is a clastic red bed sequence lying directly on the Paleozoic erosional surface. It consists of a series of dolomitic siltstones and sandstones interbedded with argillaceous siltstones and shales. The section is usually subdivided into a lower sandy unit and an overlying shale unit. The lower sequence is the oil production zone. The bulk of pay is founded in the laminated sandstone/siltstone facies.

The Lower Amaranth has been classified into four general lithological types:

1. Interbedded shale/siltstone/sandstone by grain size, color and texture

2. Siltstone – This lithology occurs in distinct intervals up to two or three meters in thickness. It is generally light green in color and dolomitic.
3. Laminated sandstone – This occurs in distinct sandy intervals with a wide range of grain sizes and primary sedimentary structures.
4. Massive sandstone – This lithology occurs in thin intervals and usually associated with the laminated sandstones facies. Beds are usually light grey to reddish grey in color and coarse to medium – grained.

### **UNIT HISTORY**

#### **Waskada Unit #4 (Unit History)**

<b>Abbreviated Well ID</b>	<b>Date Well Spudded</b>	<b>On Prod YYYY/MM</b>	<b>Org Operator Name</b>	<b>Ground Elevation (m)</b>	<b>TVD (m)</b>
00/16-11-001-26W1/0	7/11/1982	1982/08	Omega Hydcbns Ltd	462.3	946
00/14-12-001-26W1/0	3/6/1982	1982/07	Omega Hydcbns Ltd	465.6	935
00/01-13-001-26W1/0	12/9/1981	1982/03	Omega Hydcbns Ltd	466.2	945
00/02-13-001-26W1/0	8/9/1982	1982/10	Omega Hydcbns Ltd	466	953
00/03-13-001-26W1/0	8/13/1982	1982/10	Omega Hydcbns Ltd	464.3	949
00/04-13-001-26W1/0	7/24/1982	1982/09	Omega Hydcbns Ltd	465.3	955
00/05-13-001-26W1/0	7/20/1982	1982/09	Omega Hydcbns Ltd	465.8	953.5
00/06-13-001-26W1/0	6/15/1982	1982/07	Omega Hydcbns Ltd	465.8	951
00/07-13-001-26W1/0	8/5/1982	1982/09	Omega Hydcbns Ltd	466.5	946
00/08-13-001-26W1/0	7/31/1982	1982/11	Omega Hydcbns Ltd	466.7	952
00/10-13-001-26W1/0	6/22/1982	1982/08	Omega Hydcbns Ltd	465.7	952
00/11-13-001-26W1/0	6/19/1982	1982/11	Omega Hydcbns Ltd	464.2	952
00/12-13-001-26W1/0	7/28/1982	1982/09	Omega Hydcbns Ltd	465.6	953
00/13-13-001-26W1/0	6/26/1982	1982/07	Omega Hydcbns Ltd	467.8	953
00/14-13-001-26W1/0	11/22/1981	1982/04	Omega Hydcbns Ltd	464.5	950
00/15-13-001-26W1/0	7/8/1981	1981/11	Omega Hydcbns Ltd	465.9	954
00/08-14-001-26W1/0	6/10/1982	1982/08	Omega Hydcbns Ltd	466	944.6
00/09-14-001-26W1/0	8/16/1982	1982/11	Omega Hydcbns Ltd	464.5	948
00/10-14-001-26W1/0	9/6/1982	1982/12	Omega Hydcbns Ltd	464.6	953
00/15-14-001-26W1/0	8/21/1982	1982/11	Omega Hydcbns Ltd	465.2	950
00/16-14-001-26W1/0	2/17/1982	1982/04	Omega Hydcbns Ltd	462.9	942
00/01-23-001-26W1/0	6/29/1982	1982/08	Omega Hydcbns Ltd	466.3	953
00/02-23-001-26W1/0	10/21/1982	1982/12	Omega Hydcbns Ltd	463.8	953

<b>Abbreviated Well ID</b>	<b>Date Well Spudded</b>	<b>On Prod YYYY/MM</b>	<b>Org Operator Name</b>	<b>Ground Elevation (m)</b>	<b>TVD (m)</b>
00/07-23-001-26W1/2	9/18/1982		NCE Petrofund Corp	466.4	947
02/08-23-001-26W1/0	5/25/1983	1983/06	Omega Hydcbns Ltd	465.9	950
A0/08-23-001-26W1/0	2/25/1991	1991/03	Omega Hydcbns Ltd	463.8	963
02/01-24-001-26W1/0	5/30/1983	1983/06	Omega Hydcbns Ltd	464.5	947
00/02-24-001-26W1/0	6/29/1982	1982/12	Omega Hydcbns Ltd	464.4	953
B0/02-24-001-26W1/0	10/29/1997	1997/12	NCE Rsrcs	465.5	960
00/03-24-001-26W1/0	6/20/1983	1983/07	Omega Hydcbns Ltd	467.1	950
02/03-24-001-26W1/0	10/13/2011			465.6	911.4
C0/03-24-001-26W1/0	4/5/1991	1991/04	Omega Hydcbns Ltd	467.9	965
00/04-24-001-26W1/0	6/24/1983	1983/07	Omega Hydcbns Ltd	469	950
C0/04-24-001-26W1/0	3/2/1991	1991/03	Omega Hydcbns Ltd	465.7	960.5
00/05-24-001-26W1/0	6/14/1983	1983/07	Omega Hydcbns Ltd	465.1	957
00/06-24-001-26W1/0	6/28/1983	1983/07	Omega Hydcbns Ltd	467.1	948
02/06-24-001-26W1/0	10/20/2011			465.8	909.6
A0/06-24-001-26W1/0	4/1/1991	1991/04	Omega Hydcbns Ltd	467.9	960
00/07-24-001-26W1/0	9/24/1981	1981/11	Omega Hydcbns Ltd	466.1	961
02/08-24-001-26W1/0	7/30/1983	1983/08	Omega Hydcbns Ltd	468.3	930

## Waskada Unit #4 (Production & Injection History)

Abbreviated Well ID	First Prod YYYY/MM	On Inject. YYYY/MM	Last Prod. YYYY/MM	Cumulative OIL Prod. (m3)	Cumulative WTR Prod. (m3)	First 12 mo. Ave WC%	Last Inject. YYYY/MM
00/16-11-001-26W1/0	1982/08	1985/12	1985/12	474	3864	85	1989/04
00/14-12-001-26W1/0	1982/07		1989/07	1010	913	62.7	
00/01-13-001-26W1/0	1982/03		2011/09	12992	11771	4.6	
00/02-13-001-26W1/0	1982/10		2011/01	11933	1611	14.2	
00/03-13-001-26W1/0	1982/10		1997/01	2982	1142	32.7	
00/04-13-001-26W1/0	1982/09		1990/03	1842	1023	42.8	
00/05-13-001-26W1/0	1982/09	1984/06	1984/05	792	415	40	2006/11
00/06-13-001-26W1/0	1982/07		1990/04	6436	33350	74.7	
00/07-13-001-26W1/0	1982/09	1985/12	1985/11	2006	376	17.3	2011/02
00/08-13-001-26W1/0	1982/11		1989/09	2456	461	17.5	
00/10-13-001-26W1/0	1982/08		2011/11	10823	1673	27.5	
00/11-13-001-26W1/0	1982/11		2011/07	5212	3569	32.7	
00/12-13-001-26W1/0	1982/09		1997/09	4217	2102	36.1	
00/13-13-001-26W1/0	1982/07	1984/06	1984/05	2754	1905	34.5	2005/10
00/14-13-001-26W1/0	1982/04		2011/11	11721	6689	41.6	
00/15-13-001-26W1/0	1981/11	1984/06	1984/05	3663	633	14.5	2006/10
00/08-14-001-26W1/0	1982/08		2000/06	7315	12918	54.5	
00/09-14-001-26W1/0	1982/11		1989/12	3892	12526	60.4	
00/10-14-001-26W1/0	1982/12		1986/06	636	10533	57.5	
00/15-14-001-26W1/0	1982/11	1984/06	1984/05	612	4790	88.6	2000/06
00/16-14-001-26W1/0	1982/04		1991/01	5246	1745	15.3	
00/01-23-001-26W1/0	1982/08		2011/11	15405	11720	41.2	
00/02-23-001-26W1/0	1982/12		1990/03	2263	34836	81.2	
00/07-23-001-26W1/2		1984/08					2001/09
02/08-23-001-26W1/0	1983/06		1996/06	6276	27059	58.8	
A0/08-23-001-26W1/0	1991/03		2011/11	4603	1329	17.5	
02/01-24-001-26W1/0	1983/06		1996/05	5263	3369	11.5	
00/02-24-001-26W1/0	1982/12		2011/07	15971	14768	57	
B0/02-24-001-26W1/0	1997/12		2011/11	4756	308	10.2	
00/03-24-001-26W1/0	1983/07		2011/11	19539	61793	42.1	
02/03-24-001-26W1/0							
C0/03-24-001-26W1/0	1991/04		2011/11	2551	1077	23.8	
00/04-24-001-26W1/0	1983/07		2011/11	30078	78741	64	
C0/04-24-001-26W1/0	1991/03		2011/11	3577	5251	45.7	
00/05-24-001-26W1/0	1983/07	1984/06	1984/05	2593	2027	43.9	1993/04
00/06-24-001-26W1/0	1983/07		2011/11	12216	2531	16	
02/06-24-001-26W1/0							
A0/06-24-001-26W1/0	1991/04		2011/04	2659	3284	23	

Abbreviated Well ID	First Prod YYYY/MM	On Inject. YYYY/MM	Last Prod. YYYY/MM	Cumulative OIL Prod. (m3)	Cumulative WTR Prod. (m3)	First 12 mo. Ave WC%	Last Inject. YYYY/MM
00/07-24-001-26W1/0	1981/11	1984/06	1984/05	3040	290	7.3	2009/06
02/08-24-001-26W1/0	1983/08		2011/11	14088	10756	4.7	

## **DISCUSSION:**

### **Production Performance**

Production Response versus Injection: Since injection began, mid 1985, injection rates fluctuated to some degree amongst the injectors; it is difficult to link any production responses to any specific injector. Water breakthrough of certain producers could not be directly correlated with over injection in associated injectors. Some wells showed no change in oil rate when injection was ceased in 1989-90.

### **Voidage Replacement Ratio Calculation**

What could be described as very limited success, the waterflood was not maintained properly and injection rate dropped year after year in most cases. The cumulative VRR in the pool is about 1.08 and the current monthly VRR is zero (No active injector).

PennWest has no plans to re-activate the old injectors (see Appendix C).

To understand the past performance of the Lower Amaranth waterflood, we are doing some reservoir engineering work to come up with potential solutions. One of our plans is to do a pilot program in section 2: The objective of the pilot is to:

1. See if we can continuously inject water into the Lower Amaranth Formation
  - i. Particle size less than 1 micron
  - ii. Total Suspended Solid (TSS) less than 10 ppm
  - iii. Oil less than 10 ppm
2. Inject below the frac pressure
3. Test the simulation model that we have built.

## **Corrosion and Scale Prevention Program**

We currently inject ScalCor down all the new horizontal wells. In addition to that, PennWest will be installing cathodic protection on the wells. Also, the new gathering system is Fiberglass and as such is not susceptible to corrosion.

## **SUMMARY AND RECOMMENDATIONS** **[Producers]**

### **Current Producing Wells**

1. 00/01-13-001-26W1/0
2. 00/10-13-001-26W1/0
3. 00/14-13-001-26W1/0
4. B0/02-24-001-26W1/0
5. 00/03-24-001-26W1/0
6. C0/03-24-001-26W1/0
7. 00/04-24-001-26W1/0
8. C0/04-24-001-26W1/0
9. 00/06-24-001-26W1/0
10. 02/08-24-001-26W1/0

### **Current Suspended Wells**

1. 00/02-13-001-26W1/0
2. 00/11-13-001-26W1/0
3. 00/02-24-001-26W1/0
4. A0/06-24-001-26W1/0

### **Abandoned Wells**

1. 00/14-12-001-26W1/0
2. 00/03-13-001-26W1/0
3. 00/04-13-001-26W1/0



4. 00/06-13-001-26W1/0
5. 00/08-13-001-26W1/0
6. 00/12-13-001-26W1/0
7. 00/08-14-001-26W1/0
8. 00/09-14-001-26W1/0
9. 00/10-14-001-26W1/0
10. 00/16-14-001-26W1/0
11. 00/02-23-001-26W1/0
12. 02/08-23-001-26W1/0
13. 02/01-24-001-26W1/0

#### **[Injectors]**

##### **Current Injecting Wells**

None

##### **Current Suspended Wells**

1. 00/05-13-001-26W1/0 (since 2006/11)
2. 00/07-13-001-26W1/0 (since 2011/02)
3. 00/13-13-001-26W1/0 (since 2005/10)
4. 00/15-13-001-26W1/0 (since 2006/10)

##### **Abandoned Wells**

1. 00/16-11-001-26W1/0 (since 1989/04)
2. 00/15-14-001-26W1/0 (since 2000/06)
3. 00/07-23-001-26W1/2 (since 2001/09)
4. 00/05-24-001-26W1/0 (since 1993/04)
5. 00/07-24-001-26W1/0 (since 2009/06)

The behavior of a Waskada Unit 4 producers are indicated by examining the oil rate versus time plots (see Appendix B). Waskada Unit 4 exhibited relatively high initial oil

productivity (most of the wells drilled in the past are verticals), rapidly declining to flat/low decline rates, with almost no discernible water flood response. This behavior can be explained by drop in the reservoir pressure from initial (approximately 8700 kPag) to above in some wells or below in others bubble point pressure (about 4200 kPag) followed by solution gas breakout which adversely affected the relative permeability to oil. (see Table # 2)

Also, it is believed that fracture stimulation treatments, performed on these wells prior to initiation of water injection, “broke” through into the higher productivity Mississippian zone and that majority of injected water to date has entered this zone. This is one of the major explanations for lack of waterflood response to date and the continued decline in oil productivities.

**TABLES****Waskada Unit #4****Table 1: Rates History**

Date	OIL		Water		Inj Water	
Year	m3/year	m3/day	m3/year	m3/day	m3/year	m3/day
1981	891	2.44	154	0.42	0	0.00
1982	14,701	40.28	7,215	19.77	0	0.00
1983	37,397	102.46	34,057	93.31	0	0.00
1984	26,933	73.79	33,400	91.51	0	0.00
1985	19,314	52.91	34,523	94.58	73,162	200.44
1986	12,945	35.46	43,742	119.84	134,971	369.78
1987	15,258	41.80	28,894	79.16	86,108	235.91
1988	10,751	29.45	23,051	63.15	43,873	120.20
1989	7,954	21.79	22,723	62.26	4,701	12.88
1990	5,812	15.92	11,723	32.12	10,613	29.08
1991	8,956	24.54	10,018	27.45	36,491	99.97
1992	7,311	20.03	16,486	45.17	66,196	181.36
1993	7,060	19.34	18,650	51.10	56,746	155.47
1994	6,296	17.25	15,906	43.58	30,651	83.98
1995	7,691	21.07	15,621	42.80	22,900	62.74
1996	6,364	17.44	10,418	28.54	28,328	77.61
1997	5,288	14.49	6,833	18.72	21,899	60.00
1998	5,366	14.70	5,577	15.28	16,369	44.85
1999	4,174	11.44	4,629	12.68	18,559	50.85
2000	3,484	9.54	3,487	9.55	10,759	29.48
2001	3,016	8.26	2,747	7.53	9,240	25.32
2002	2,981	8.17	1,890	5.18	6,490	17.78
2003	2,536	6.95	1,517	4.15	7,229	19.81
2004	2,269	6.22	3,251	8.91	8,263	22.64
2005	1,789	4.90	2,915	7.99	9,895	27.11
2006	2,588	7.09	1,213	3.32	5,897	16.16
2007	2,395	6.56	1,809	4.96	1,296	3.55
2008	3,357	9.20	2,920	8.00	1,513	4.14
2009	3,676	10.07	2,132	5.84	4,100	11.23
2010	3,505	9.60	2,692	7.38	5,562	15.24
2011	1,839	6.59	2,951	10.21	70.8	0.19

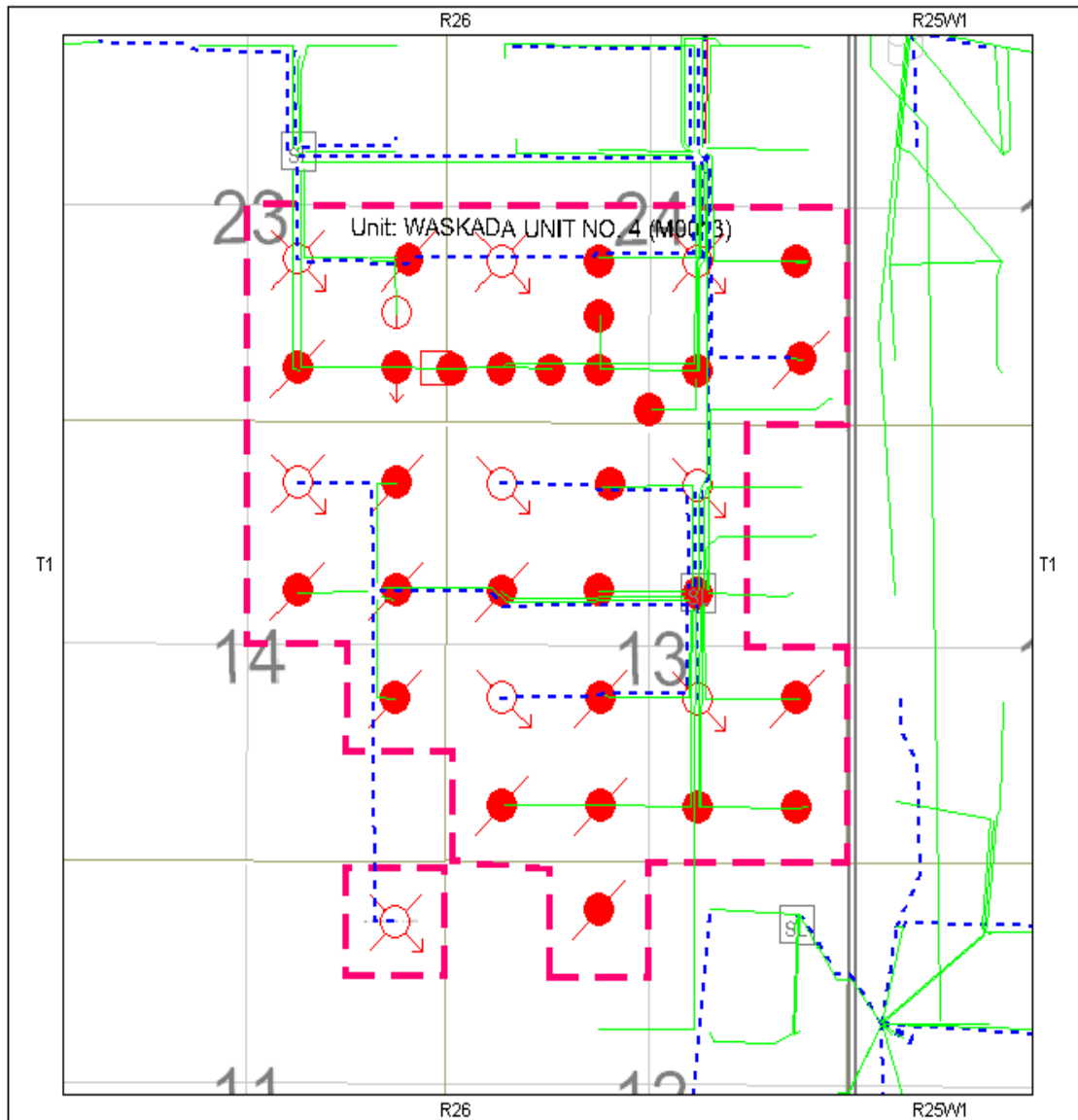
## Waskada Unit #4

**Table 2: Pressure Survey**


<b>Location</b>	<b>Shut In Date</b>	<b>Date of Survey</b>	<b>Type of Survey</b>	<b>Pressure @ Datum Depth (kPa)</b>
00/11-13-001-26W1/0		2008	BHP, Assuming WC from Last Prod'n	7150
00/13-13-001-26W1/0	Dec-89	(469 days)	Static Gradient	9046
00/15-13-001-26W1/0	Dec-89	(103 days)	Static Gradient	13899
00/15-14-001-26W1/0	Dec-89	(39 days)	Static Gradient	10120
B0/02-24-001-26W1/0		2008	BHP, Assuming WC from Last Prod'n	1472
00/03-24-001-26W1/0	May-91	(7 days)	Static Gradient	4281
00/04-24-001-26W1/0		2008	BHP, Assuming WC from Last Prod'n	2104
00/06-24-001-26W1/0	May-91	(7 days)	Static Gradient	3994
A0/06-24-001-26W1/0		2008	BHP, Assuming WC from Last Prod'n	8993

## **APPENDIX A**

## Appendix A – Area Map

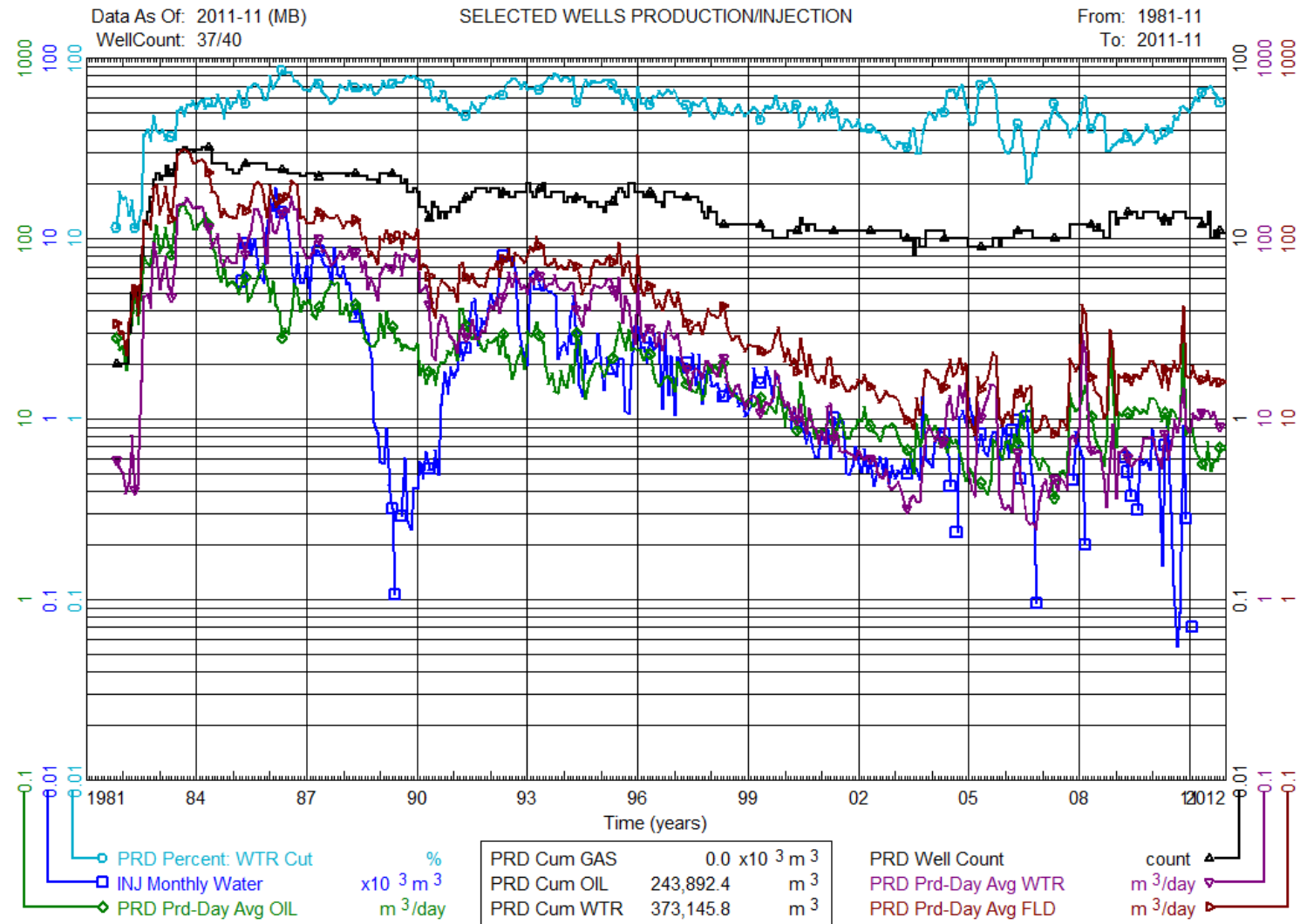


WELL SYMBOLS									
• OIL	AO	PTN	DSA	WI					
○ LCT	AWI	STN	CMM	DRL					
⊙ RDR	WD	AMS	AWD	SWI					
▲ SO	WSC	JSA	SL						

<b>PennWest</b> Exploration		
Waskada Unit #4		
	By :	Date : 2011/04/14
	Scale = 1:21088	Project : Waskada

## **APPENDIX B**

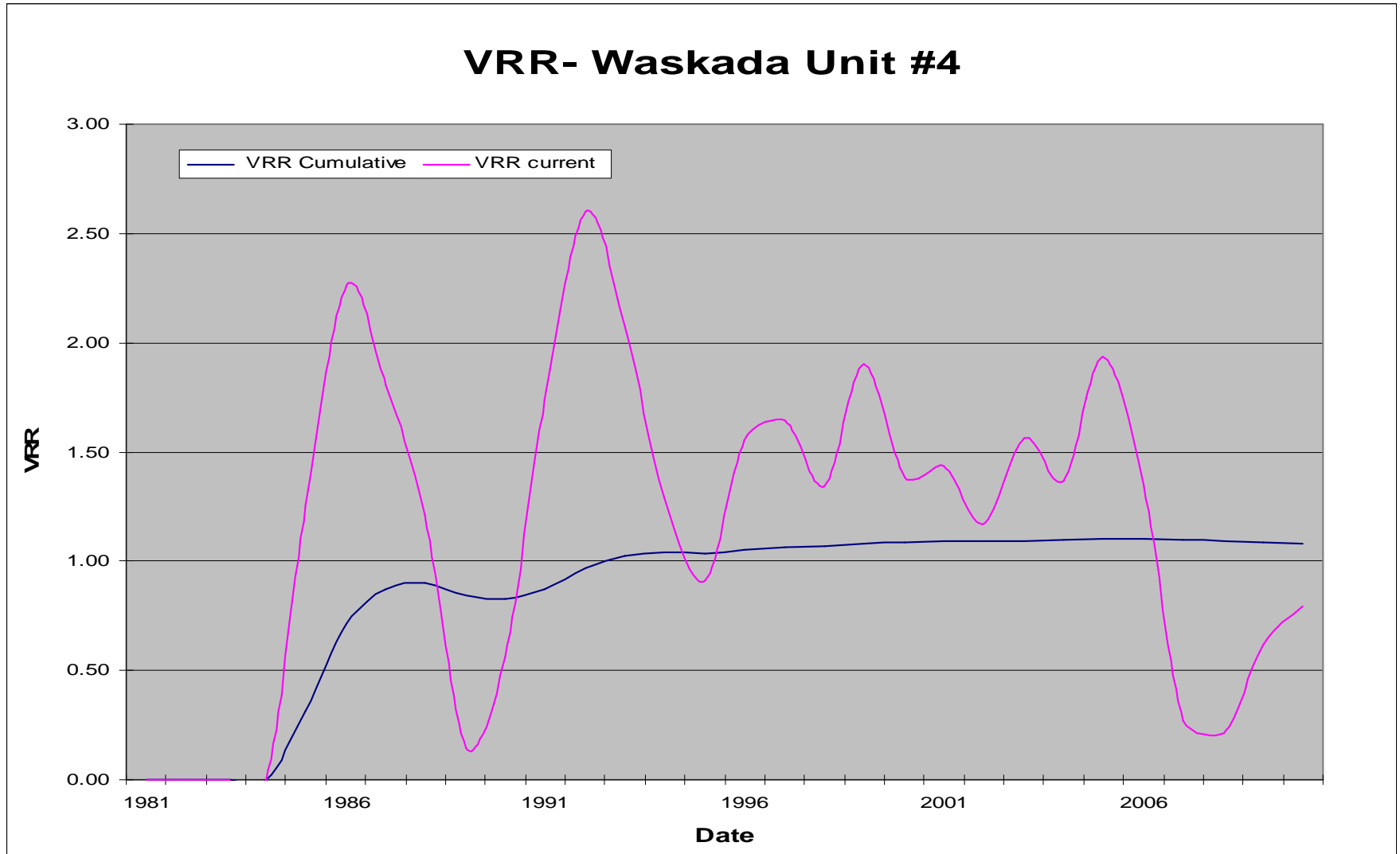
## Appendix B – Production and Injection History plot





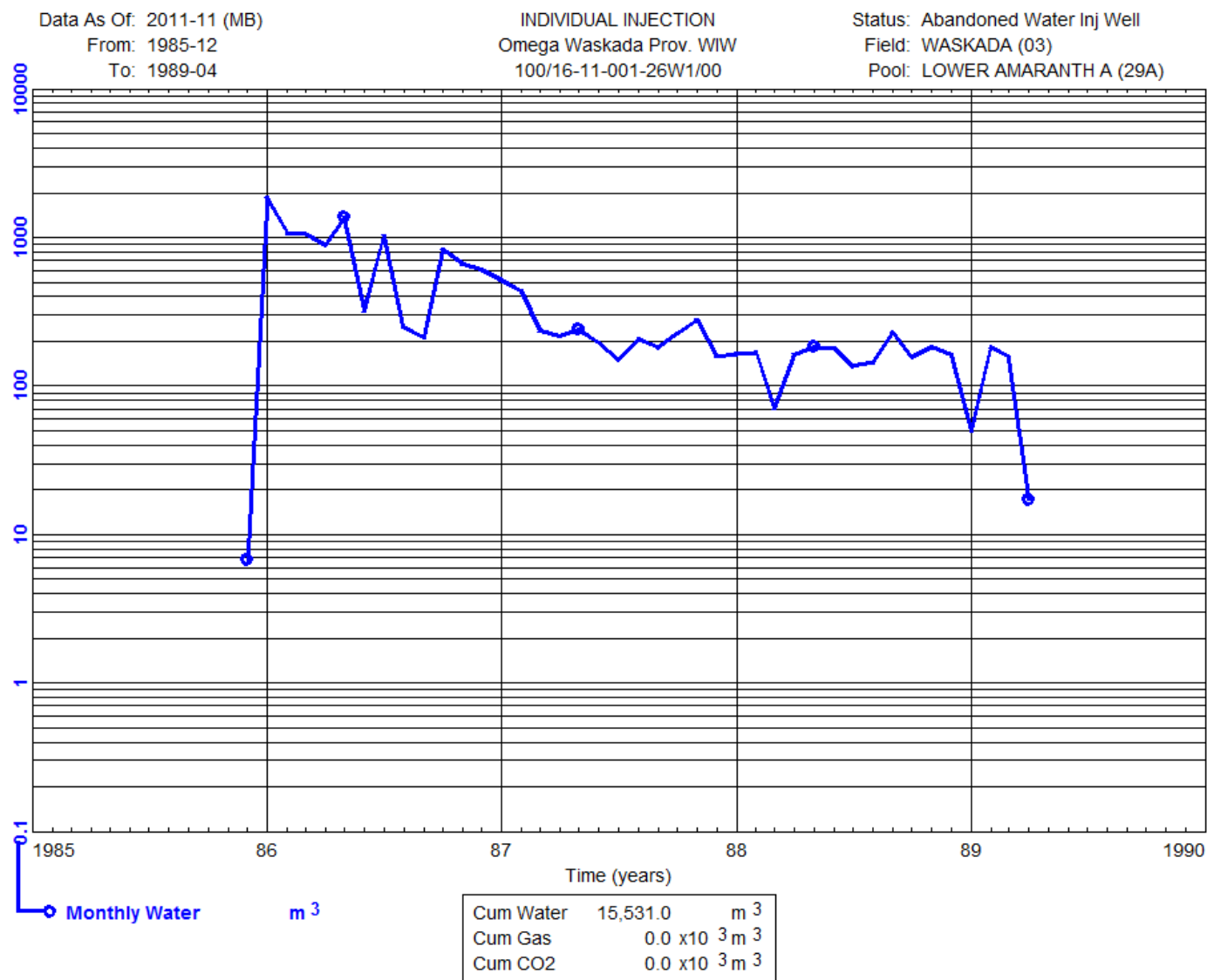
## **APPENDIX C**

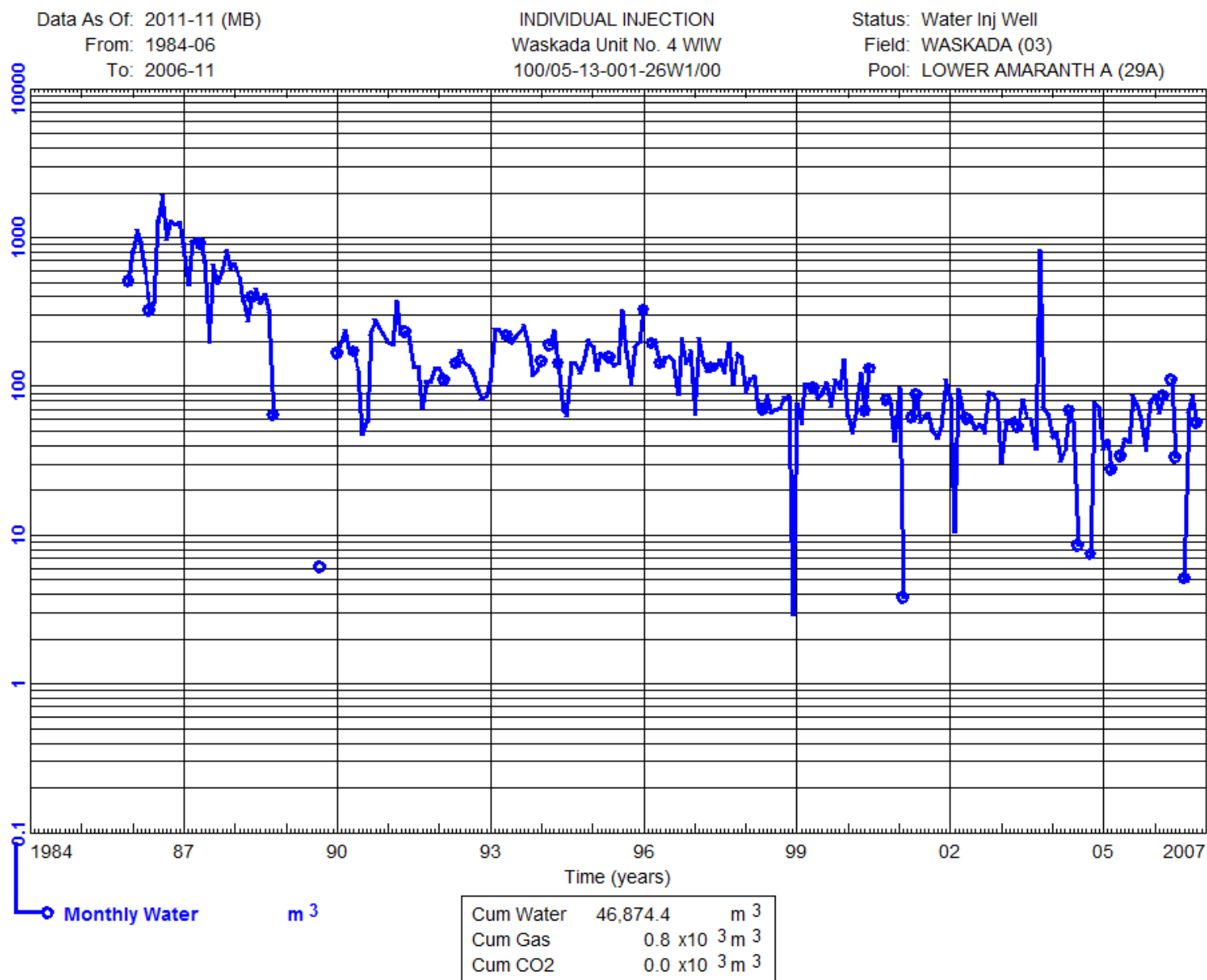
## Appendix C – Voidage Replacement Ratio VRR



## **APPENDIX D**

## Appendix D – Production and Injection Profiles (Individual wells)





Data As Of: 2011-11 (MB)

From: 1985-12

To: 2011-02

INDIVIDUAL INJECTION

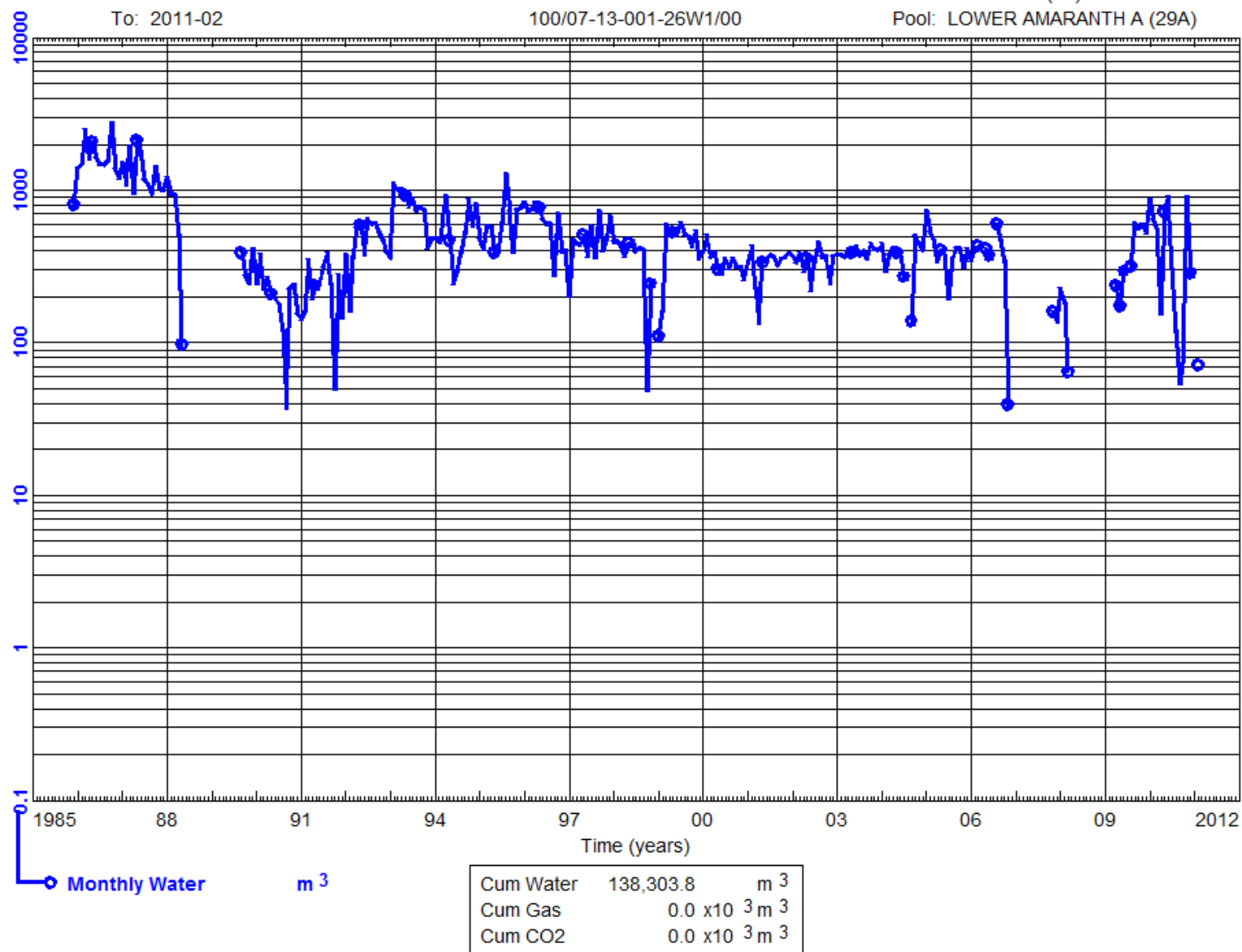
Waskada Unit No. 4 WIW

100/07-13-001-26W1/00

Status: Water Inj Well

Field: WASKADA (03)

Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)

From: 1984-07

To: 2005-10

INDIVIDUAL INJECTION

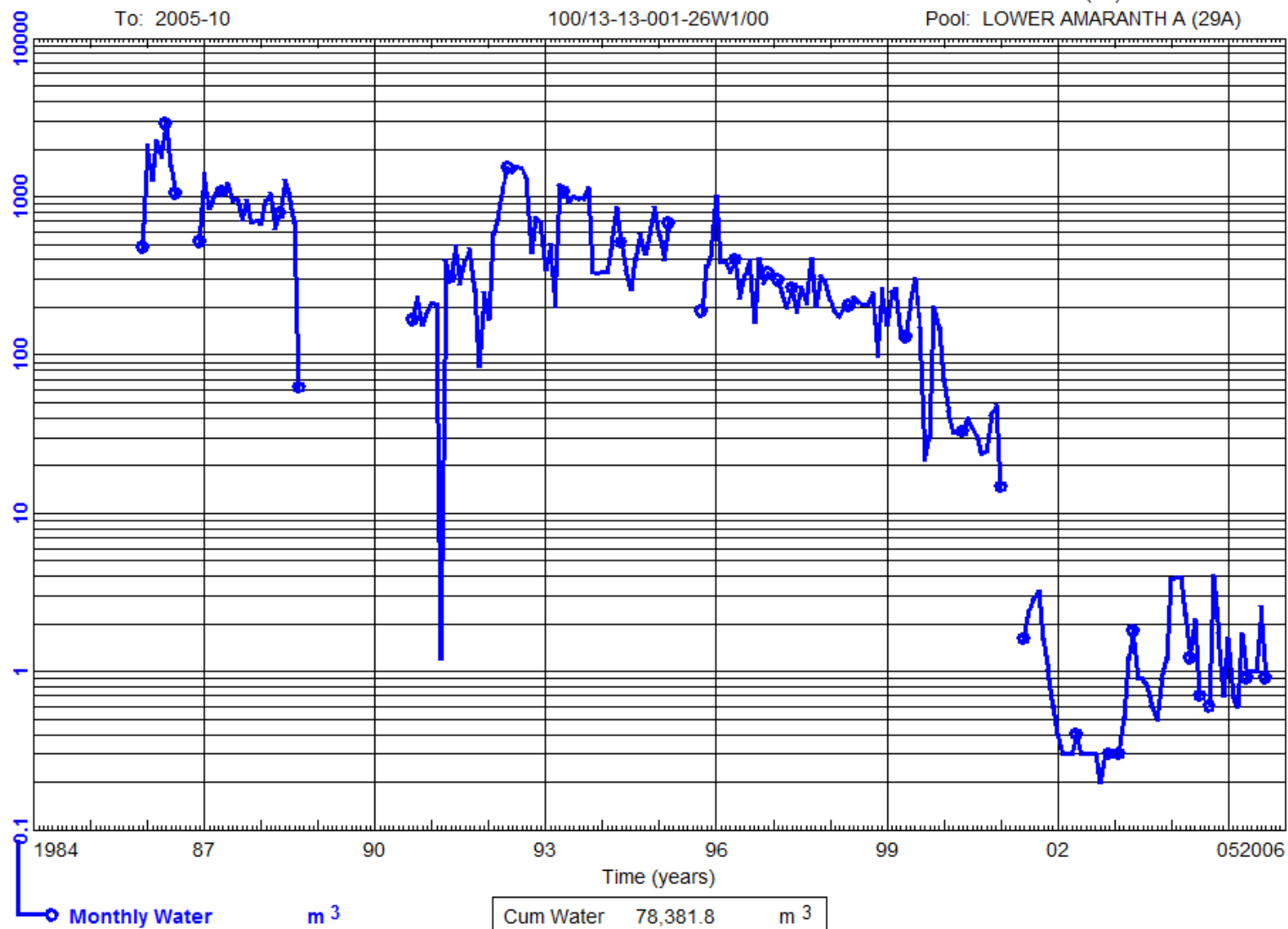
Waskada Unit No. 4 WIW

100/13-13-001-26W1/00

Status: Water Inj Well

Field: WASKADA (03)

Pool: LOWER AMARANTH A (29A)



Cum Water	78,381.8	m <sup>3</sup>
Cum Gas	2.6 x10 <sup>3</sup>	m <sup>3</sup>
Cum CO2	0.0 x10 <sup>3</sup>	m <sup>3</sup>

Data As Of: 2011-11 (MB)

From: 1984-06

To: 2006-10

INDIVIDUAL INJECTION

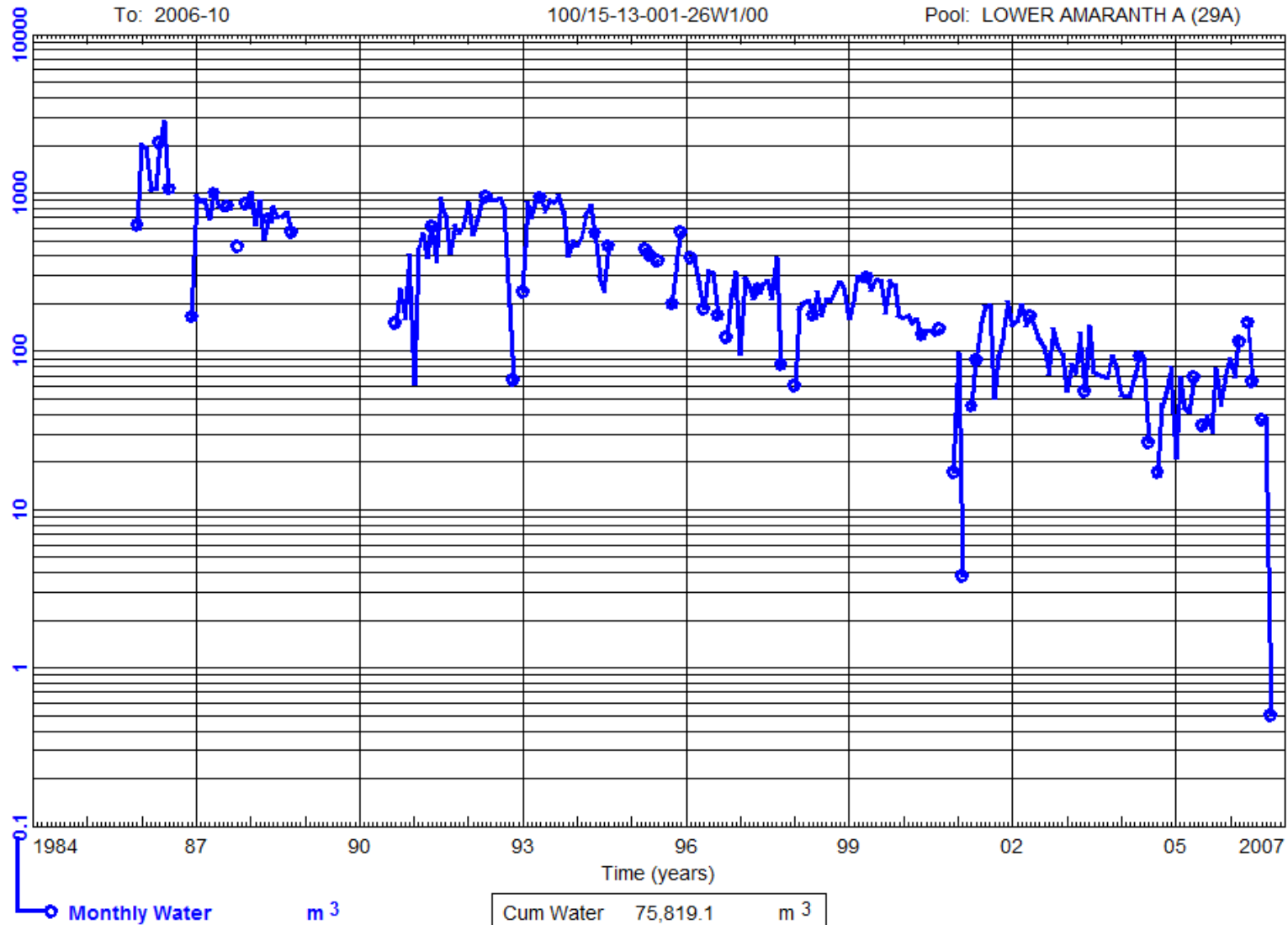
Waskada Unit No. 4 WIW

100/15-13-001-26W1/00

Status: Water Inj Well

Field: WASKADA (03)

Pool: LOWER AMARANTH A (29A)



Cum Water	75,819.1	m <sup>3</sup>
Cum Gas	1.6 x10 <sup>3</sup>	m <sup>3</sup>
Cum CO2	0.0 x10 <sup>3</sup>	m <sup>3</sup>



Data As Of: 2011-11 (MB)

From: 1984-06

To: 2000-06

INDIVIDUAL INJECTION

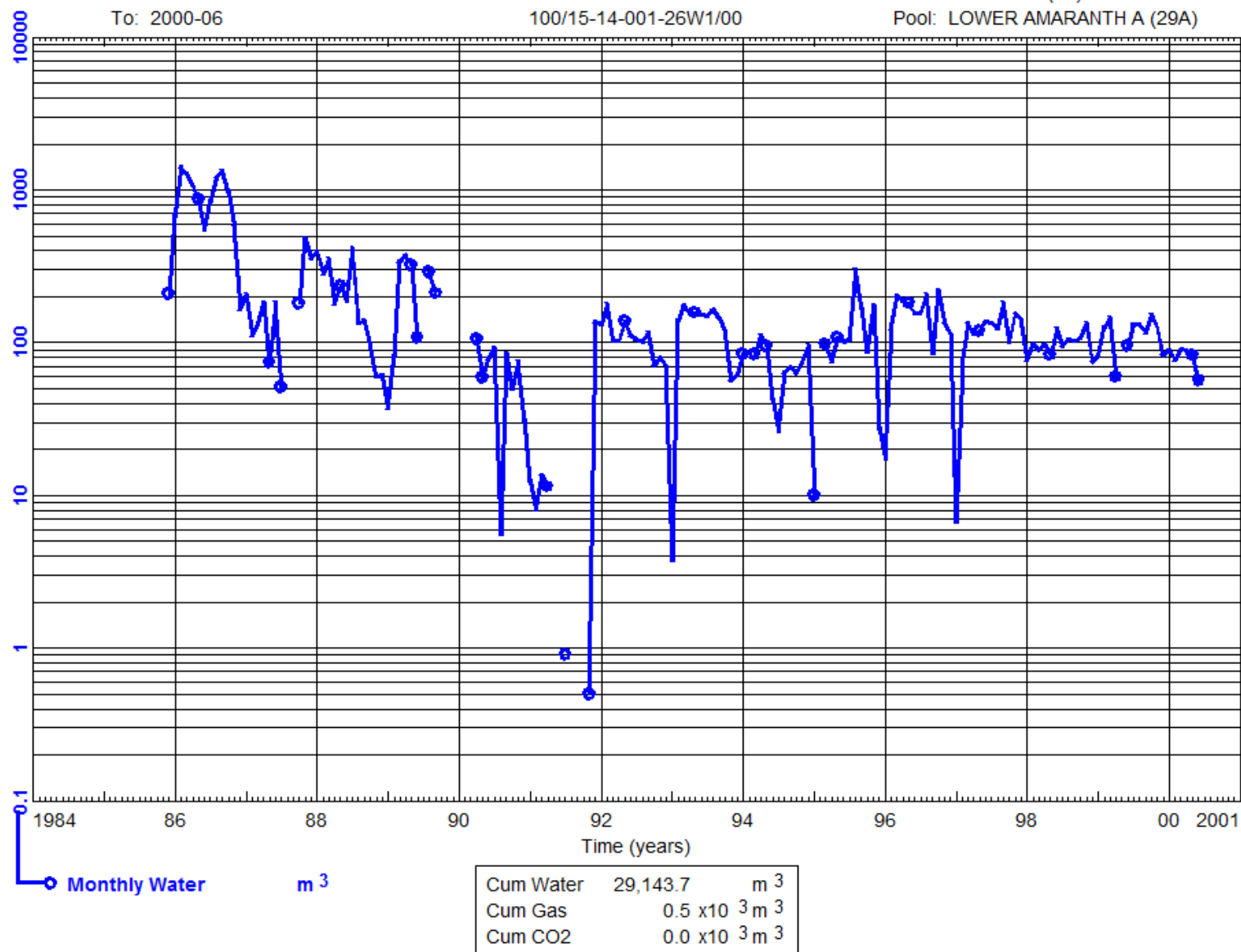
Waskada Unit No. 4 WIW

100/15-14-001-26W1/00

Status: Abandoned Water Inj Well

Field: WASKADA (03)

Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)

From: 1984-08

To: 2001-09

INDIVIDUAL INJECTION

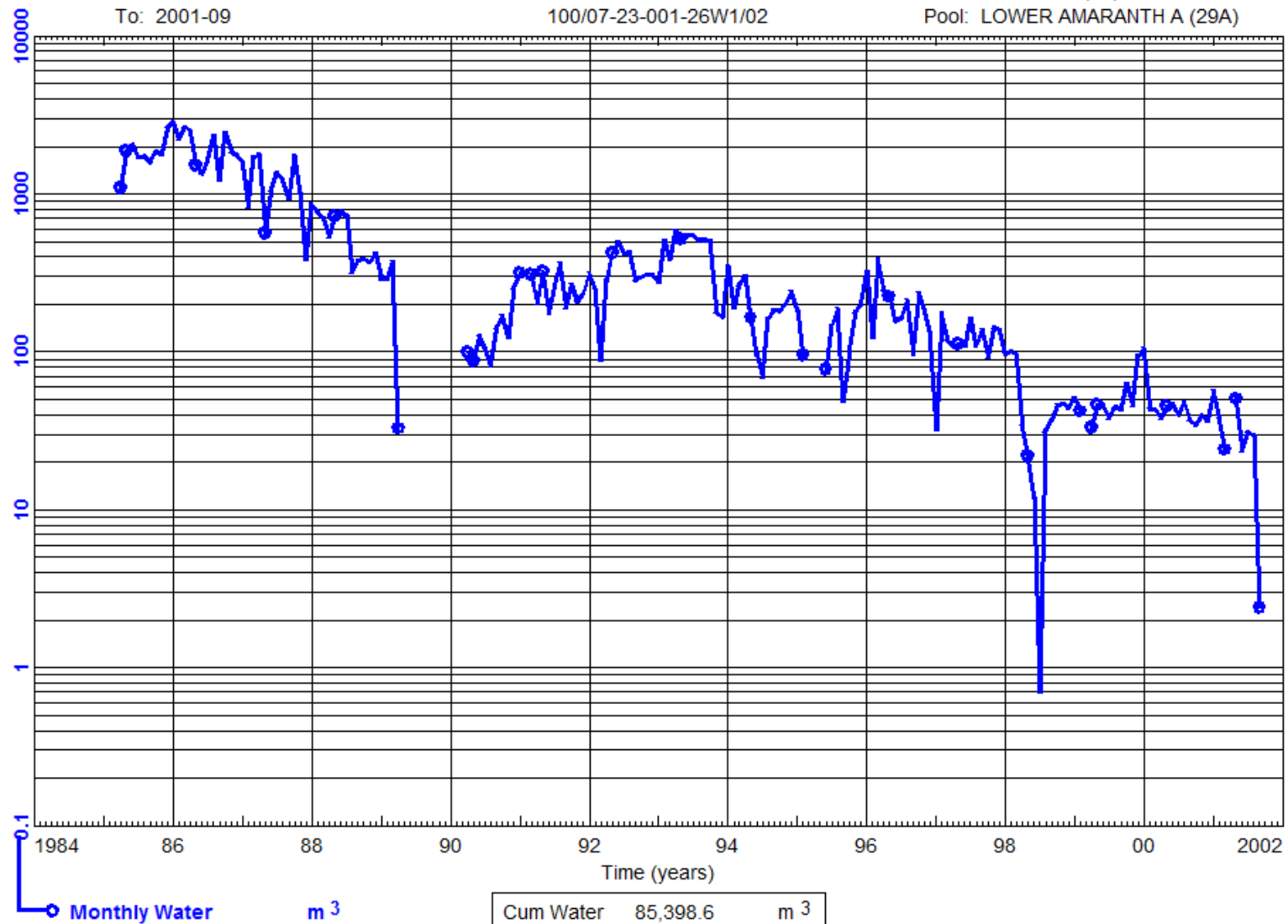
Waskada Unit No. 4 WIW

100/07-23-001-26W1/02

Status: Abandoned Water Inj Well

Field: WASKADA (03)

Pool: LOWER AMARANTH A (29A)



Cum Water	85,398.6	$m^3$
Cum Gas	0.3 x10 <sup>3</sup>	$m^3$
Cum CO2	0.0 x10 <sup>3</sup>	$m^3$

Data As Of: 2011-11 (MB)

From: 1984-06

To: 1993-04

INDIVIDUAL INJECTION

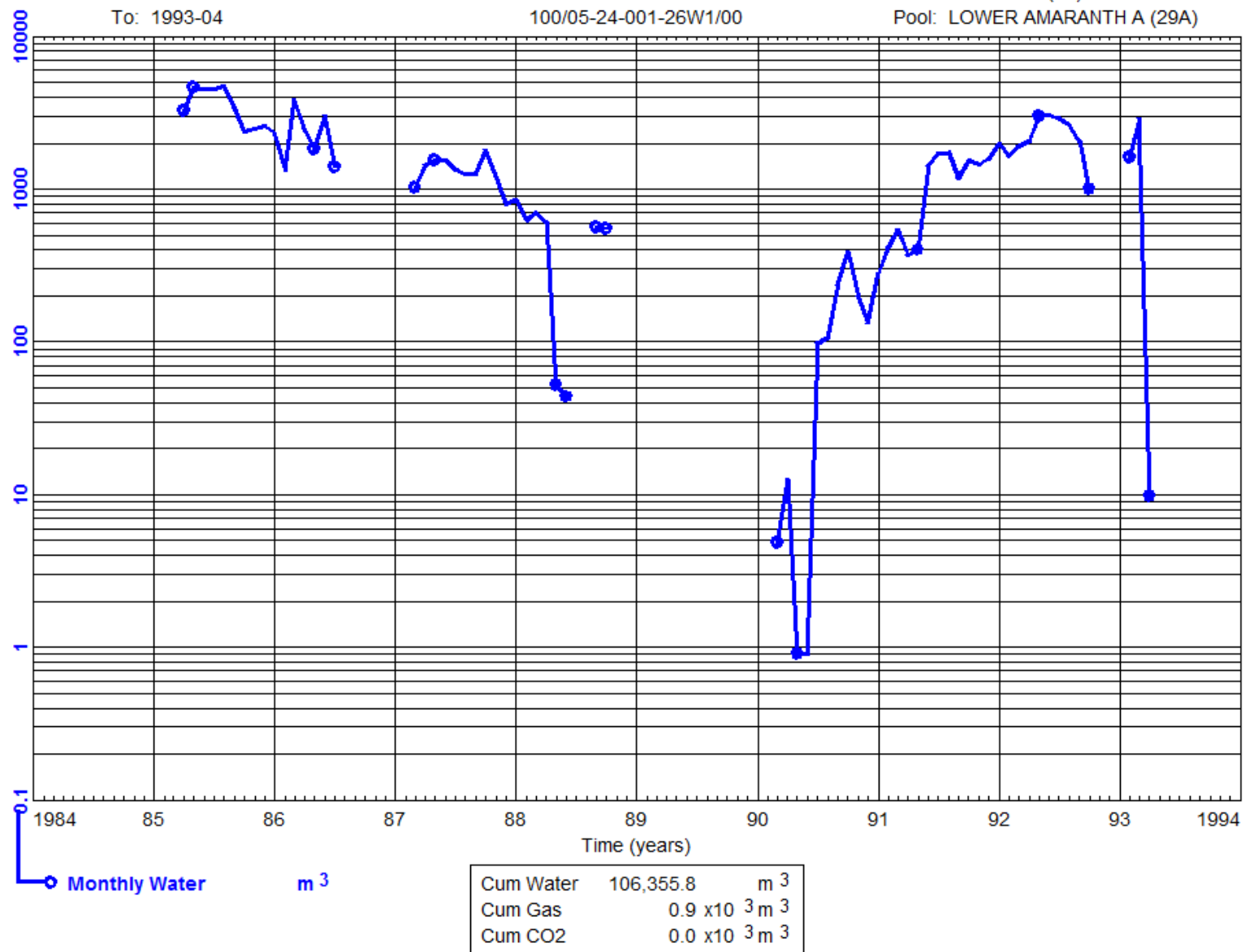
Waskada Unit No. 4 WIW

100/05-24-001-26W1/00

Status: Abandoned Water Inj Well

Field: WASKADA (03)

Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)

From: 1984-07

To: 2009-06

INDIVIDUAL INJECTION

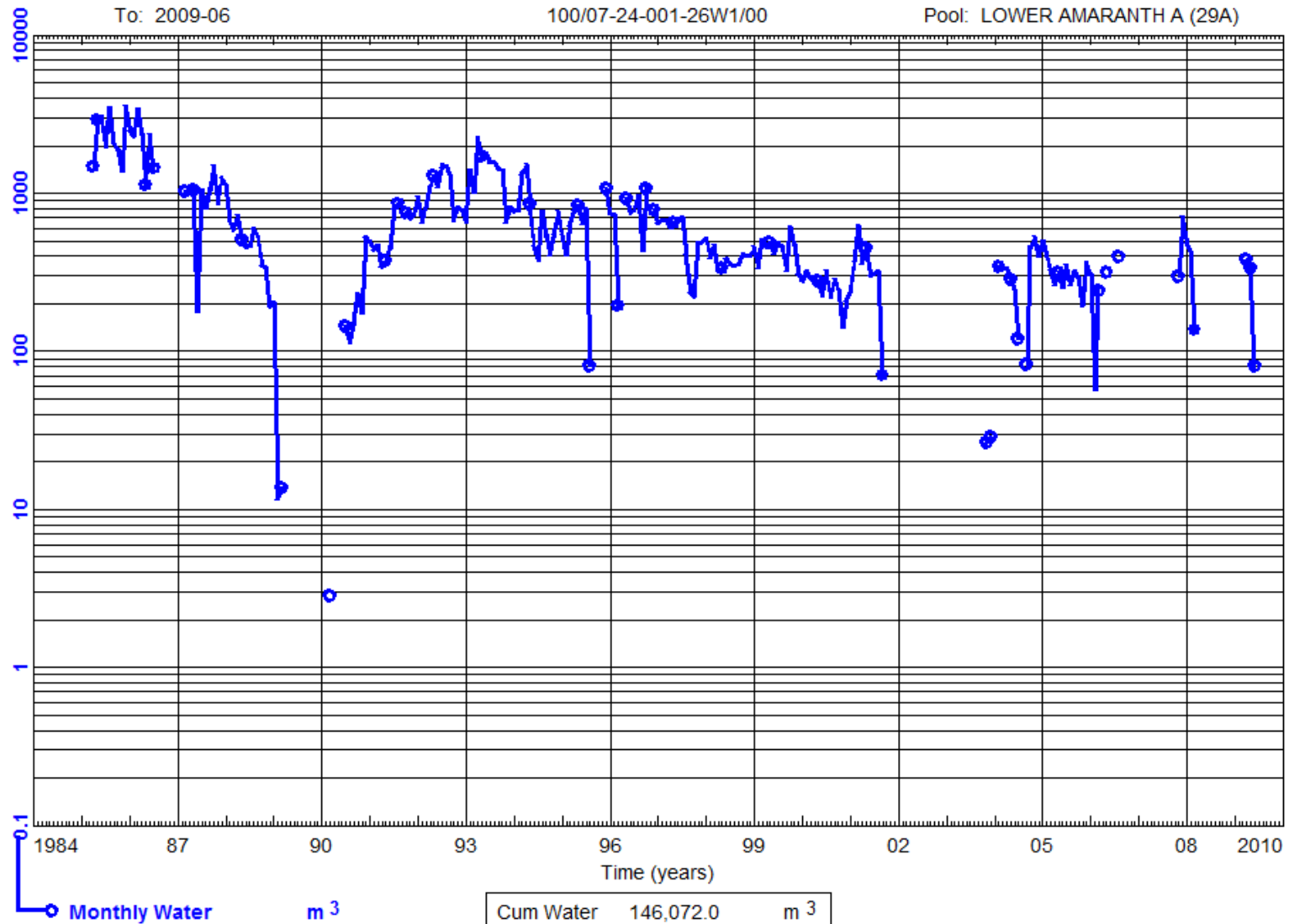
Waskada Unit No. 4 Prov. WIW

100/07-24-001-26W1/00

Status: Abandoned Water Inj Well

Field: WASKADA (03)

Pool: LOWER AMARANTH A (29A)

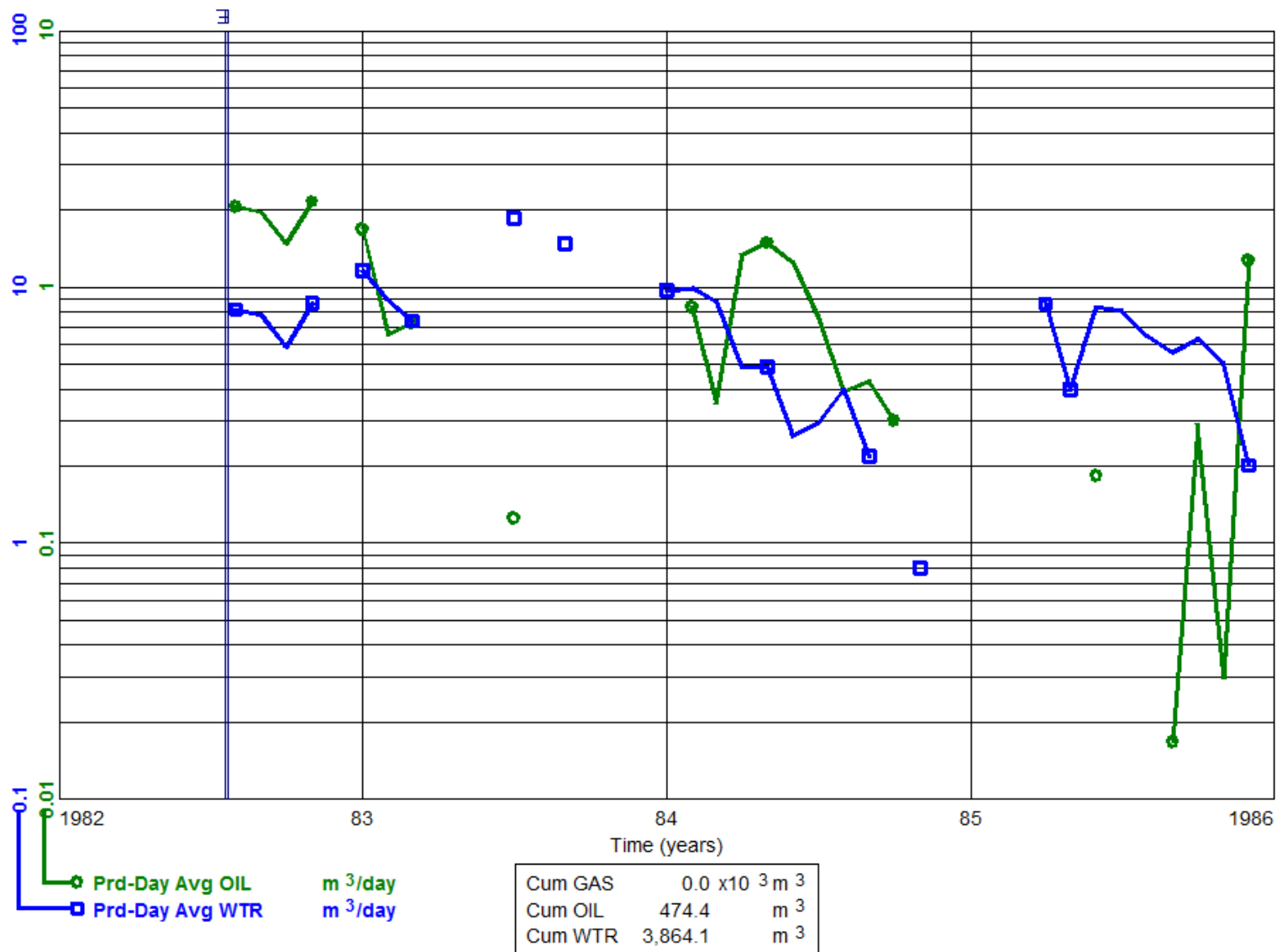


Cum Water	146,072.0	m <sup>3</sup>
Cum Gas	0.6 x10 <sup>3</sup>	m <sup>3</sup>
Cum CO2	0.0 x10 <sup>3</sup>	m <sup>3</sup>

Data As Of: 2011-11 (MB)  
 From: 1982-08  
 To: 1985-12

INDIVIDUAL PRODUCTION  
 Omega Waskada Prov. WIW  
 100/16-11-001-26W1/00

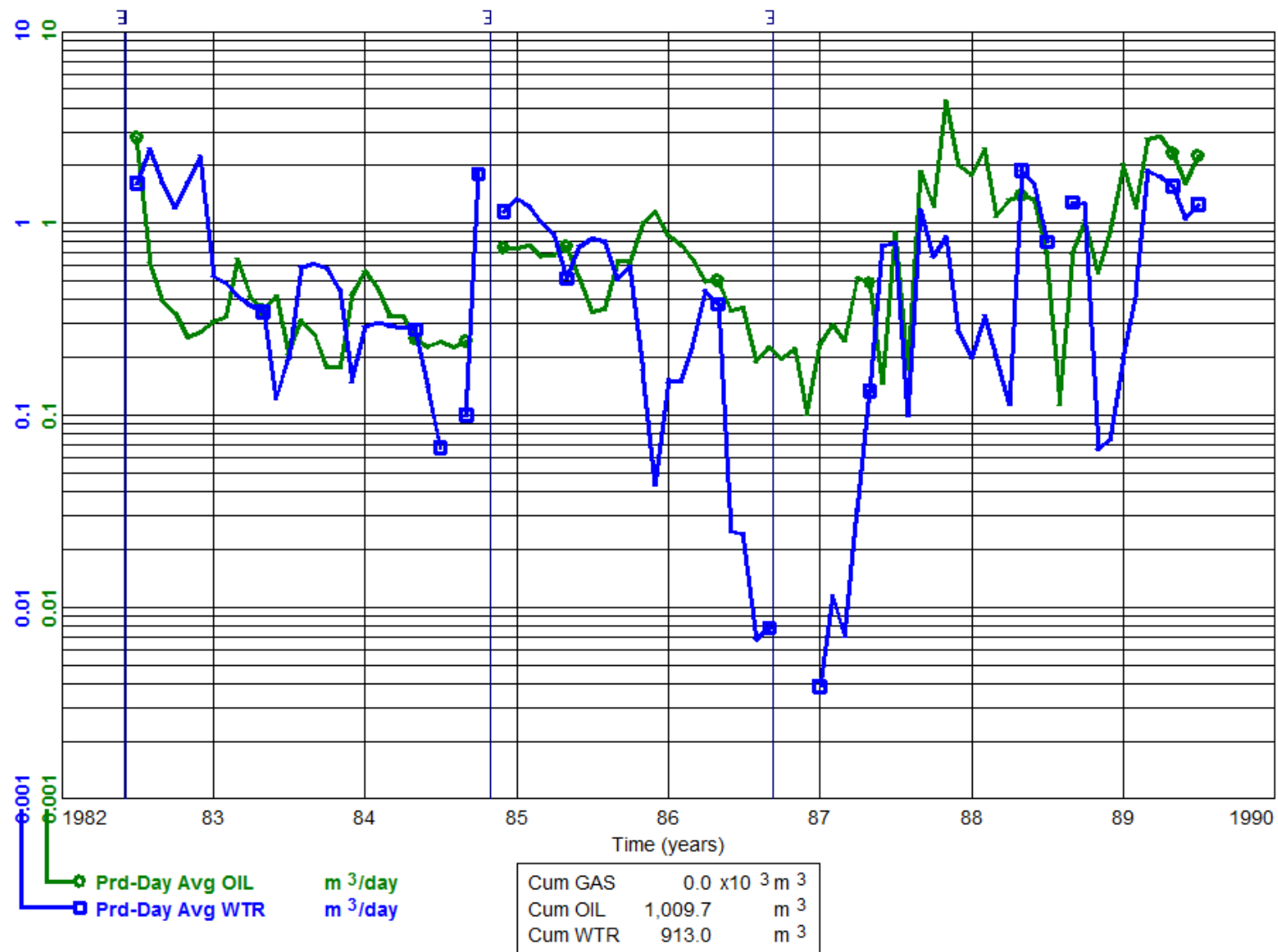
Status: Abandoned Water Inj Well  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-07  
 To: 1989-07

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/14-12-001-26W1/00

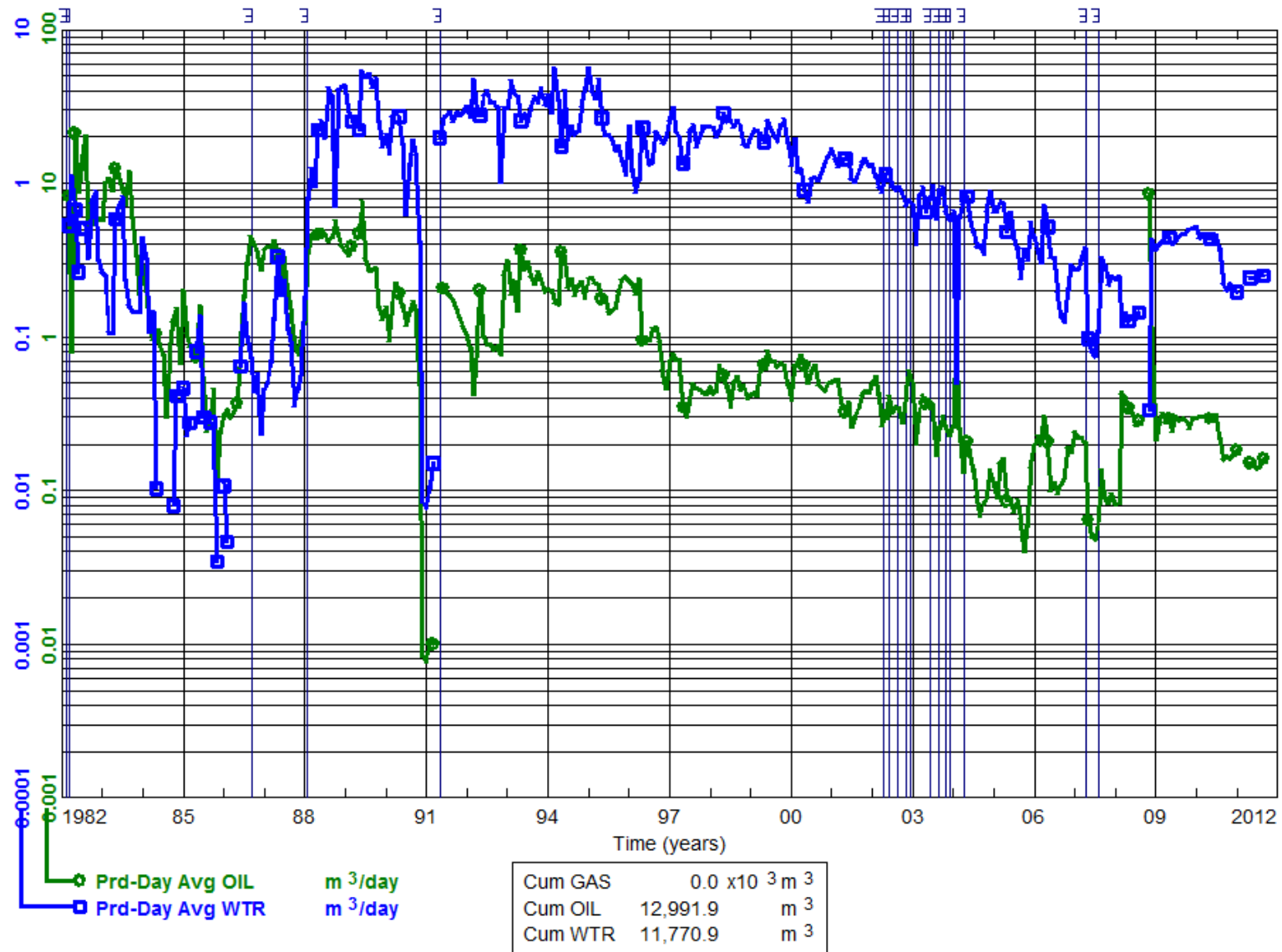
Status: Abandoned Producer  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
From: 1982-03  
To: 2011-09

INDIVIDUAL PRODUCTION  
Waskada Unit No. 4  
100/01-13-001-26W1/00

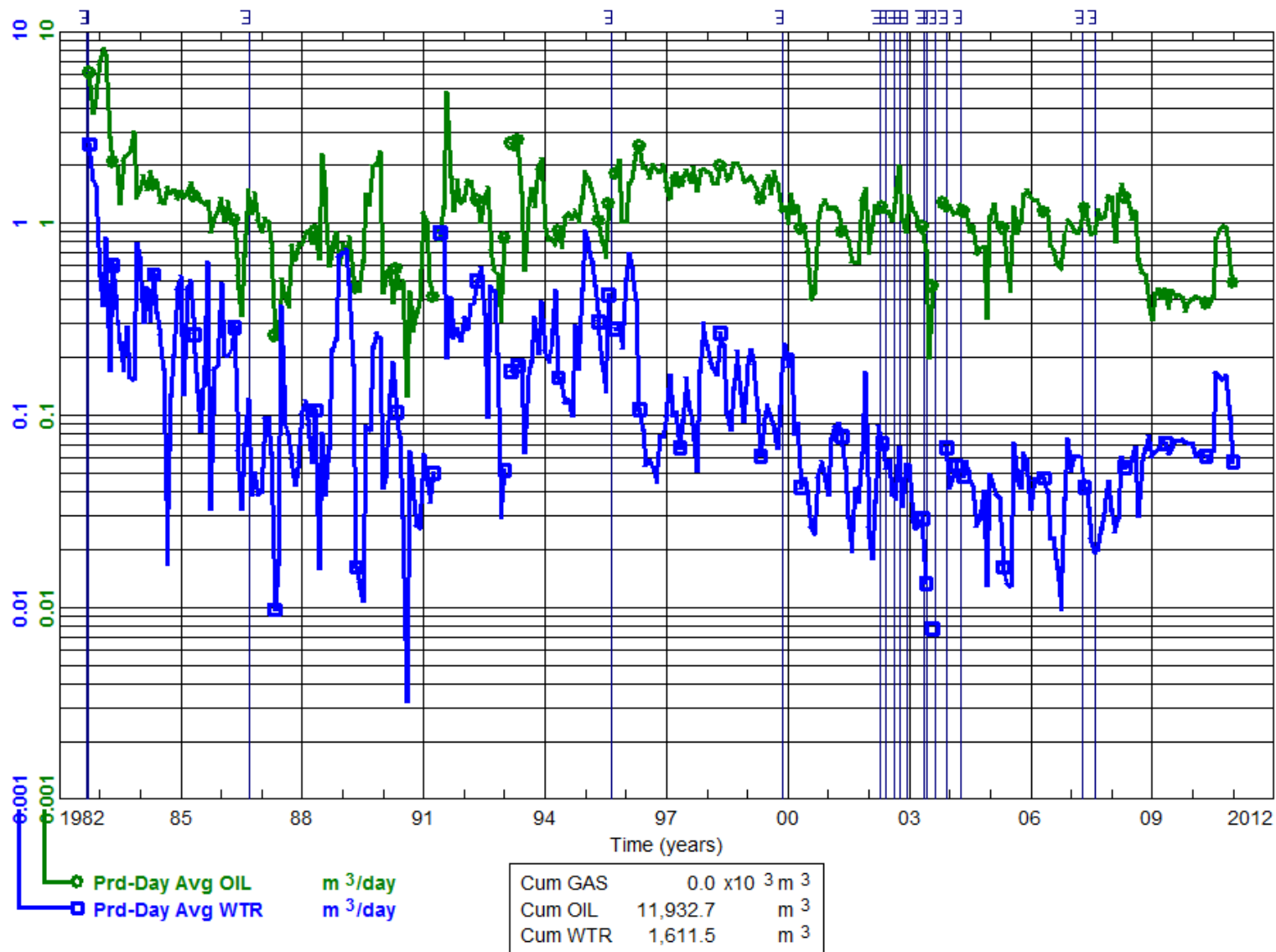
Status: Capable Of Oil Prod  
Field: WASKADA (03)  
Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-10  
 To: 2011-01

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/02-13-001-26W1/00

Status: Capable Of Oil Prod  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)

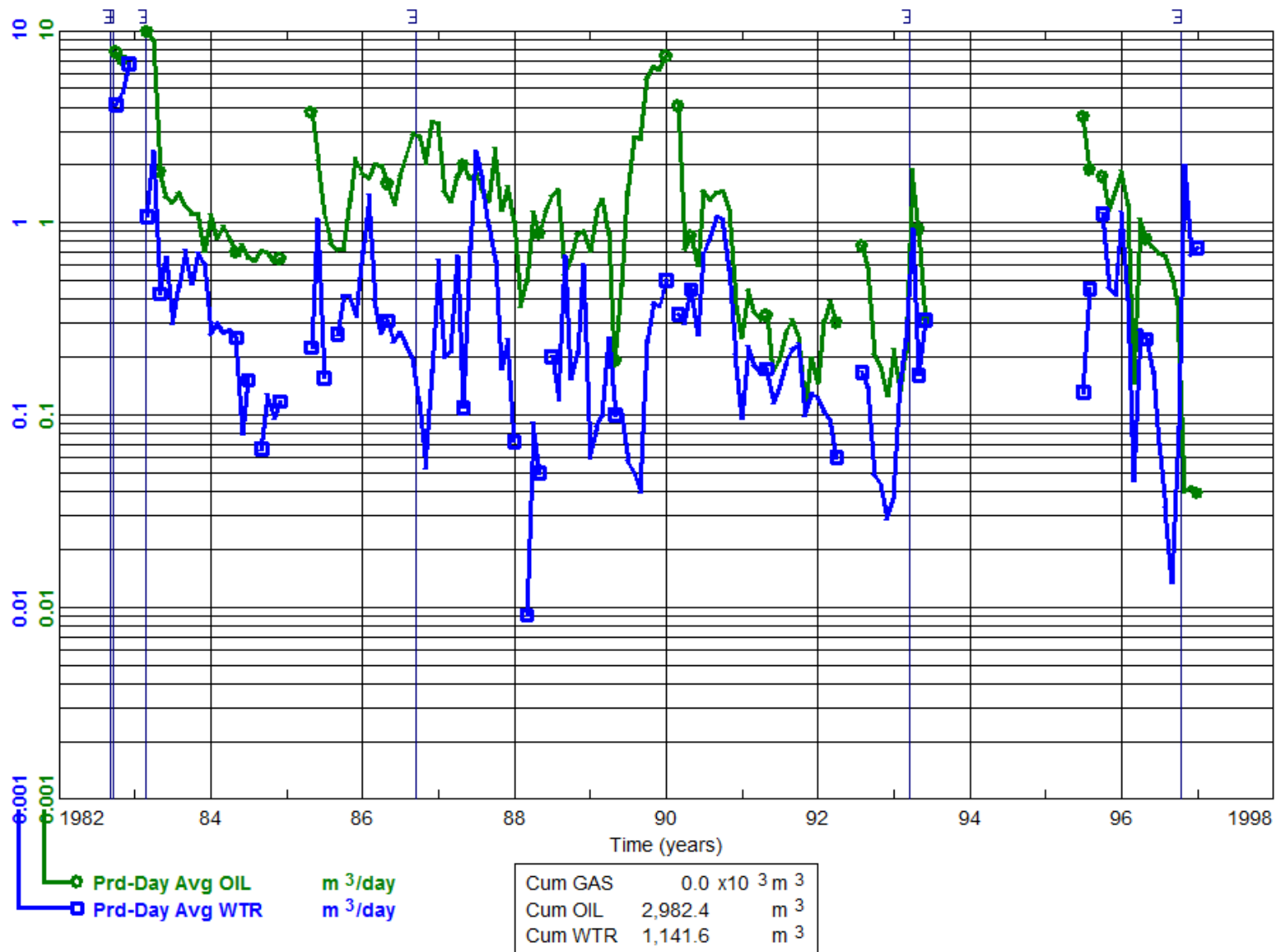




Data As Of: 2011-11 (MB)  
 From: 1982-10  
 To: 1997-01

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/03-13-001-26W1/00

Status: Abandoned Producer  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)

From: 1982-09

To: 1990-03

# INDIVIDUAL PRODUCTION

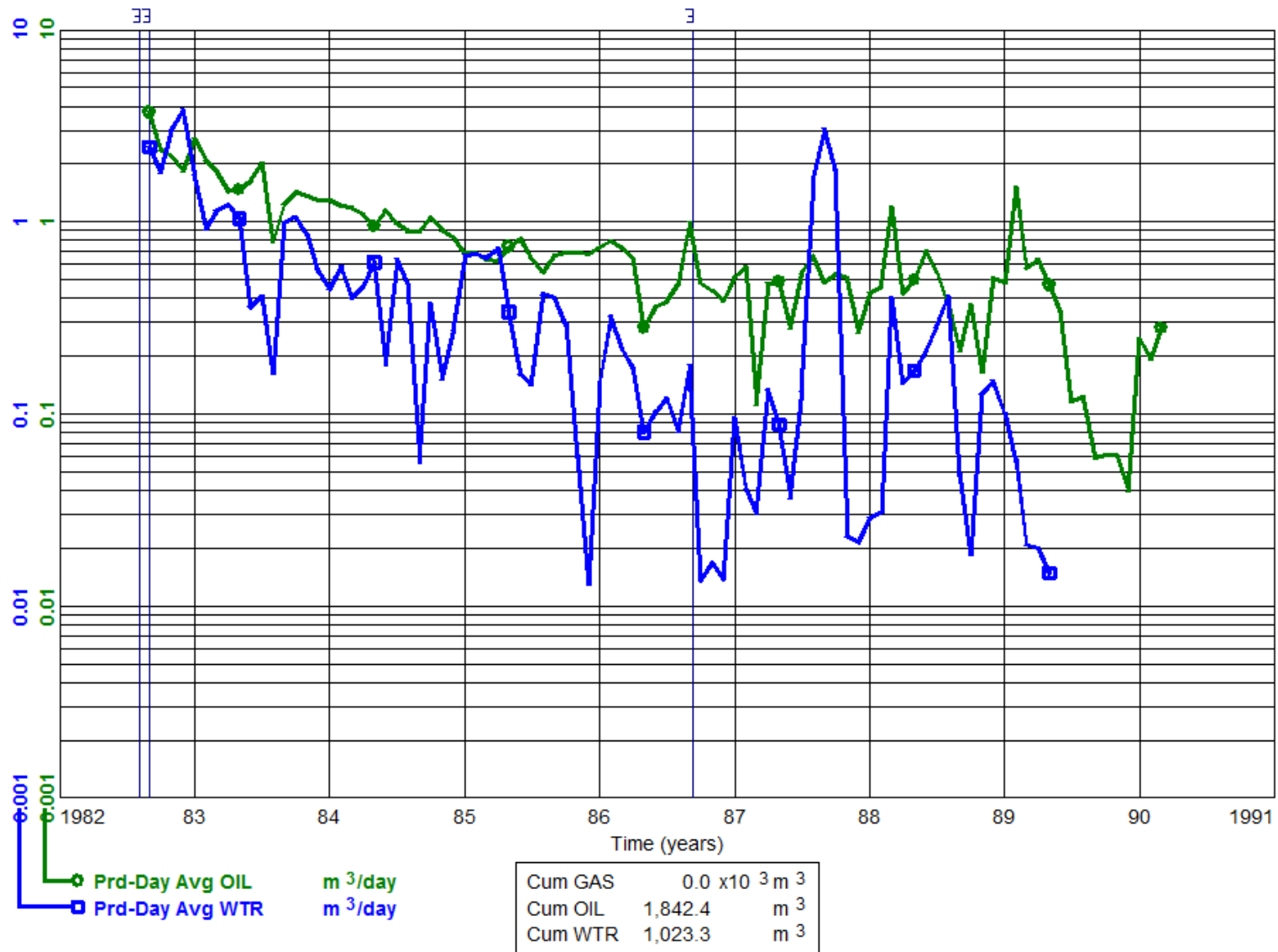
Waskada Unit No. 4

100/04-13-001-26W1/00

Status: Abandoned Producer

Field: WASKADA (03)

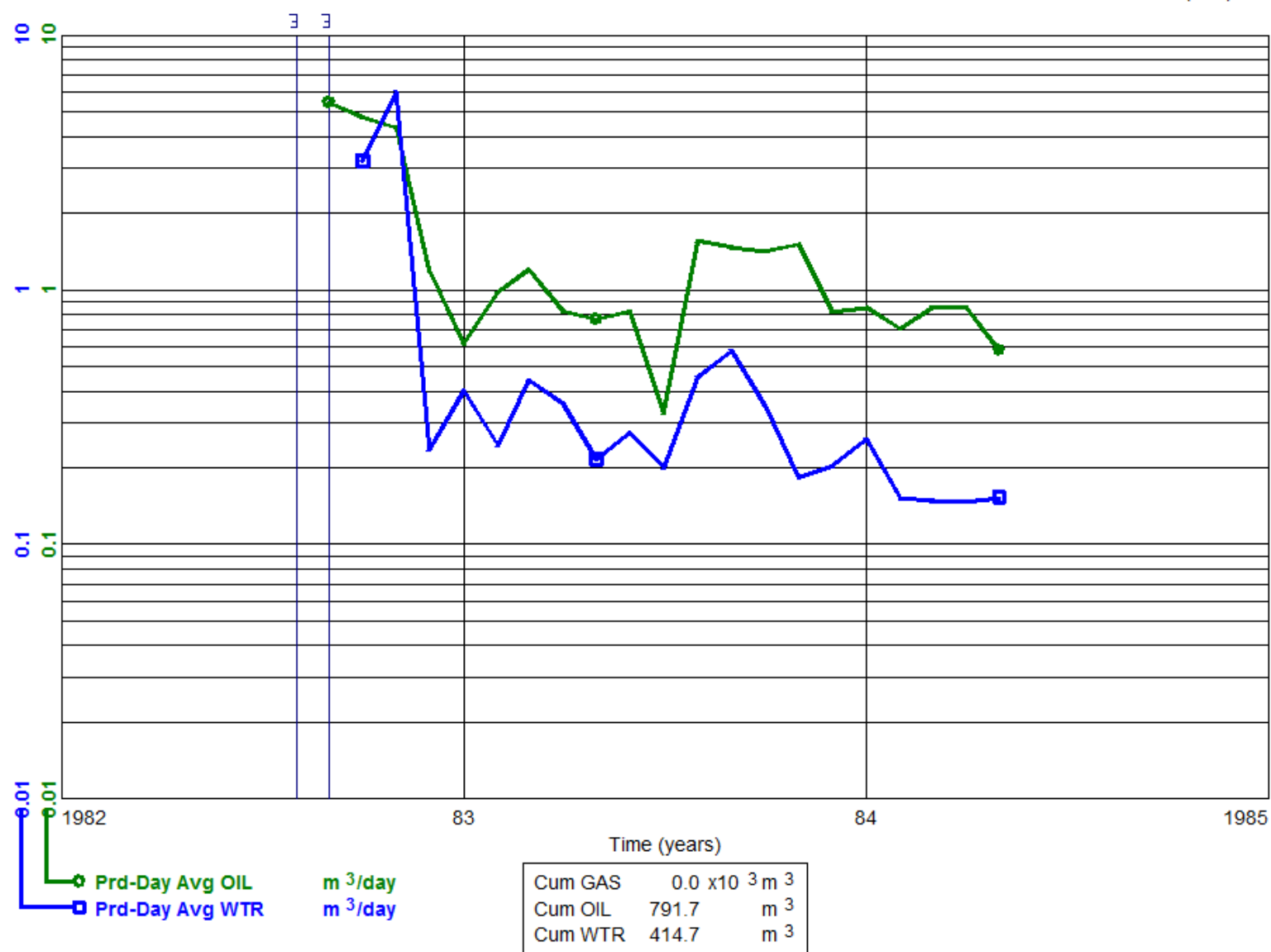
Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-09  
 To: 1984-05

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4 WIW  
 100/05-13-001-26W1/00

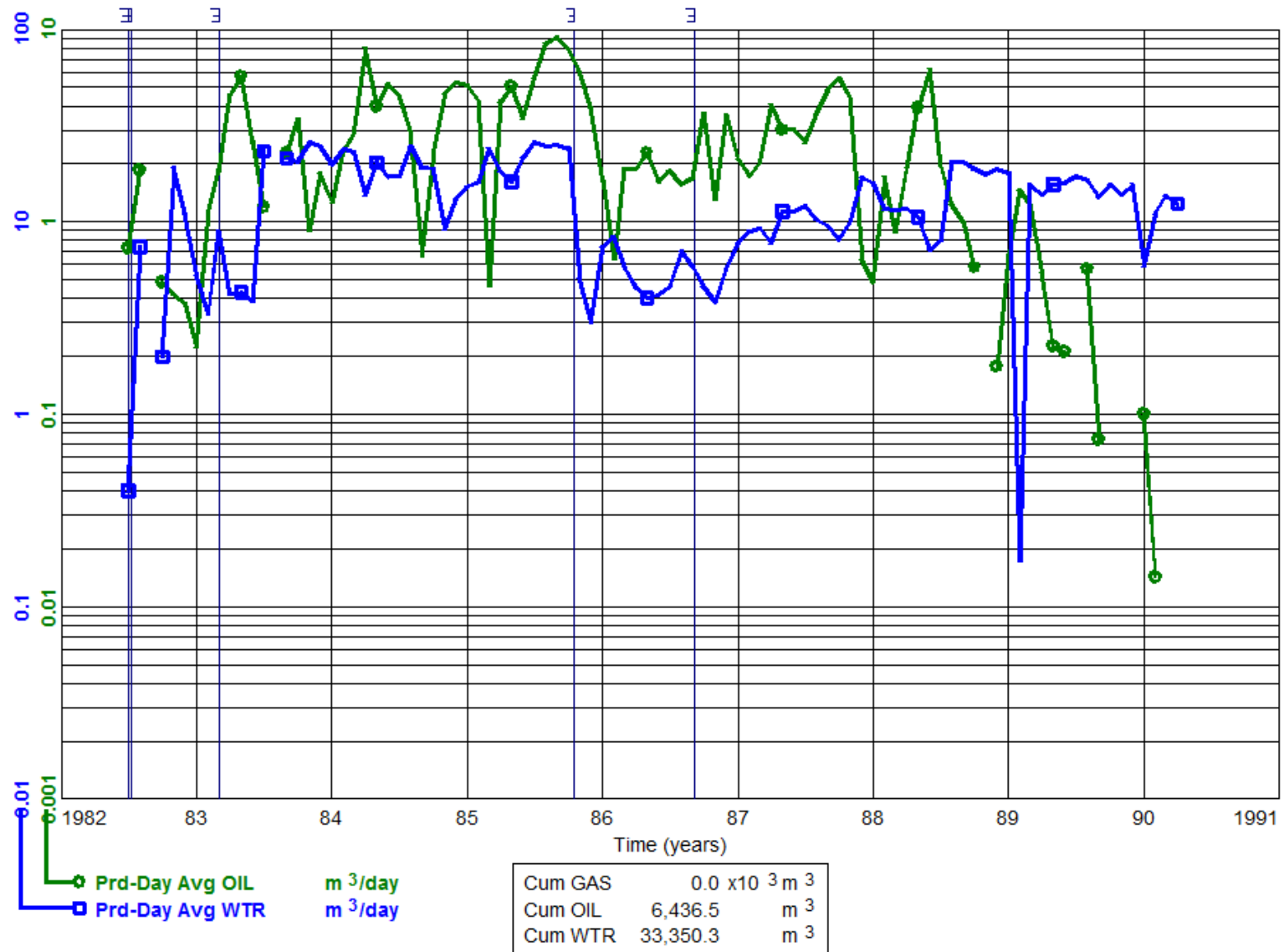
Status: Water Inj Well  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-07  
 To: 1990-04

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/06-13-001-26W1/00

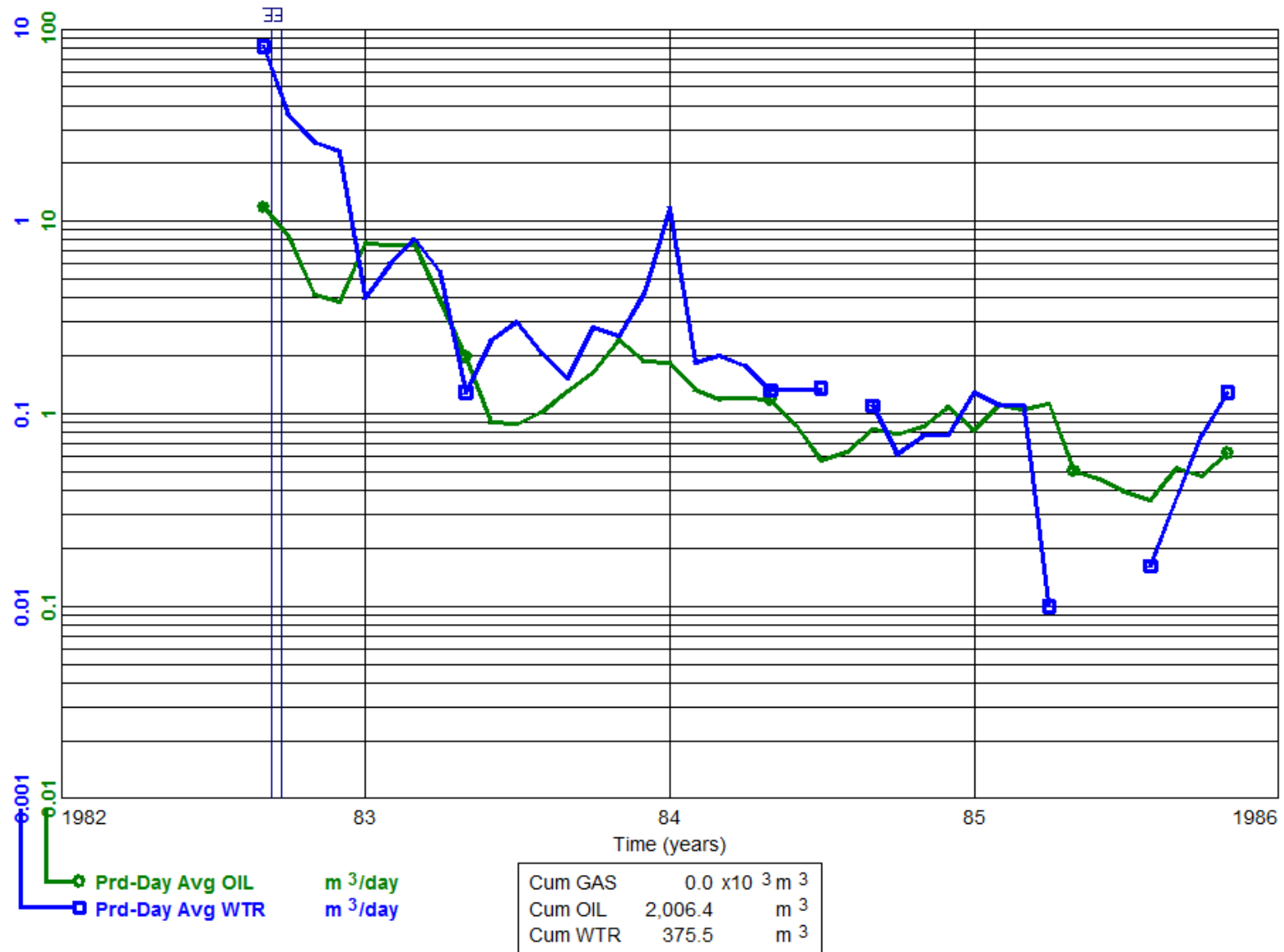
Status: Abandoned Producer  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-09  
 To: 1985-11

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4 WIW  
 100/07-13-001-26W1/00

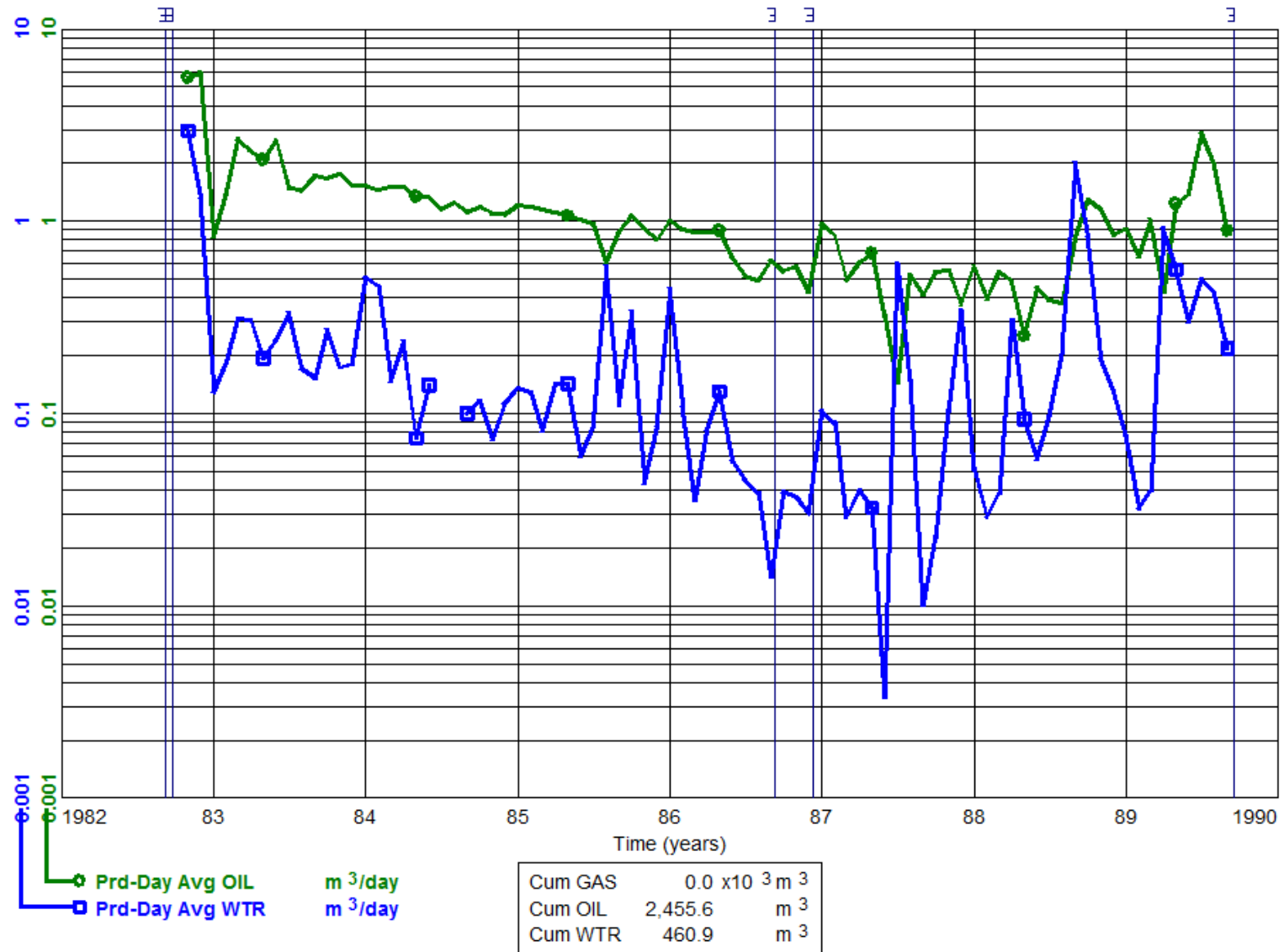
Status: Water Inj Well  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
From: 1982-11  
To: 1989-09

INDIVIDUAL PRODUCTION  
Waskada Unit No. 4  
100/08-13-001-26W1/00

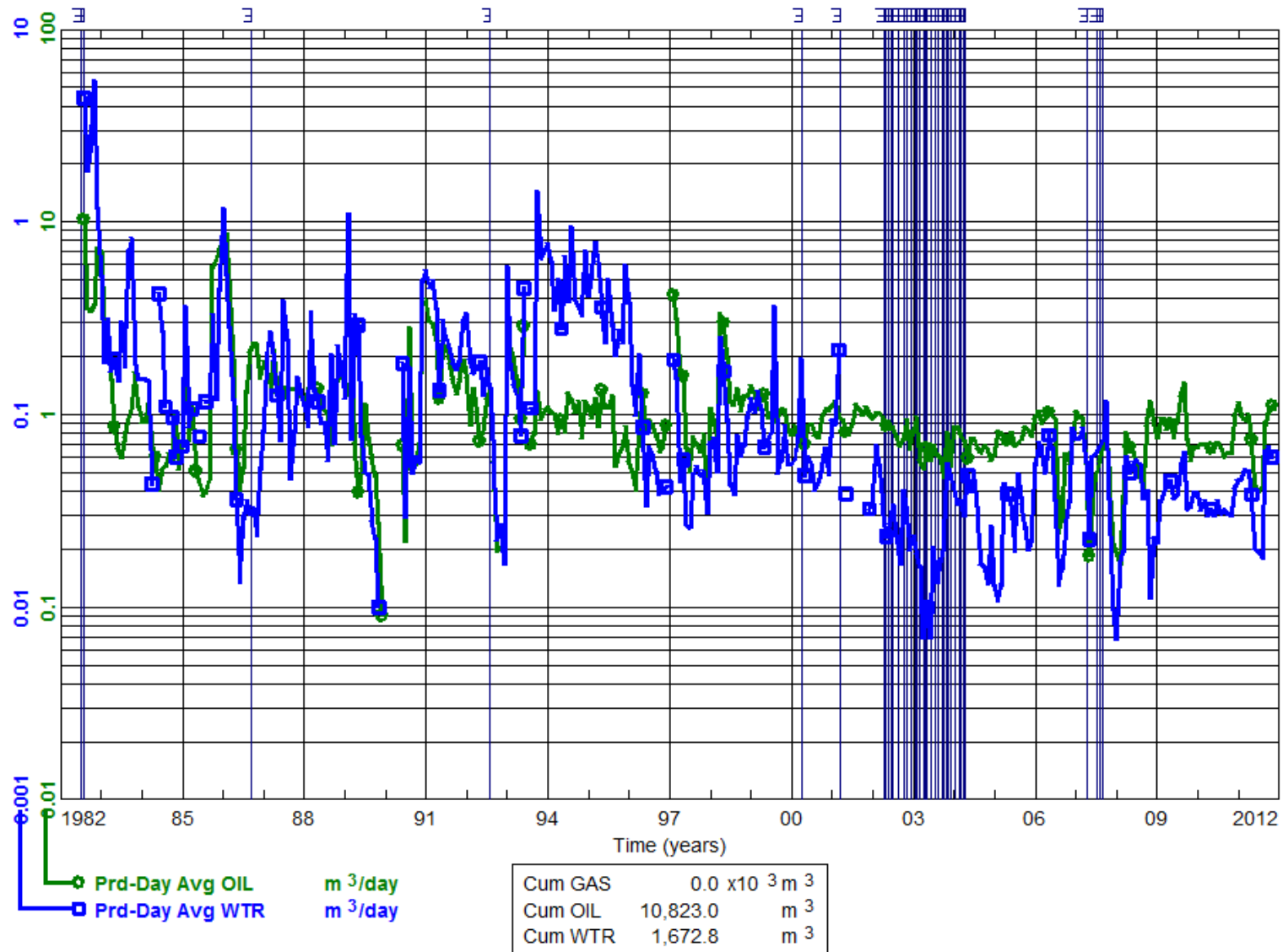
Status: Abandoned Producer  
Field: WASKADA (03)  
Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-08  
 To: 2011-11

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/10-13-001-26W1/00

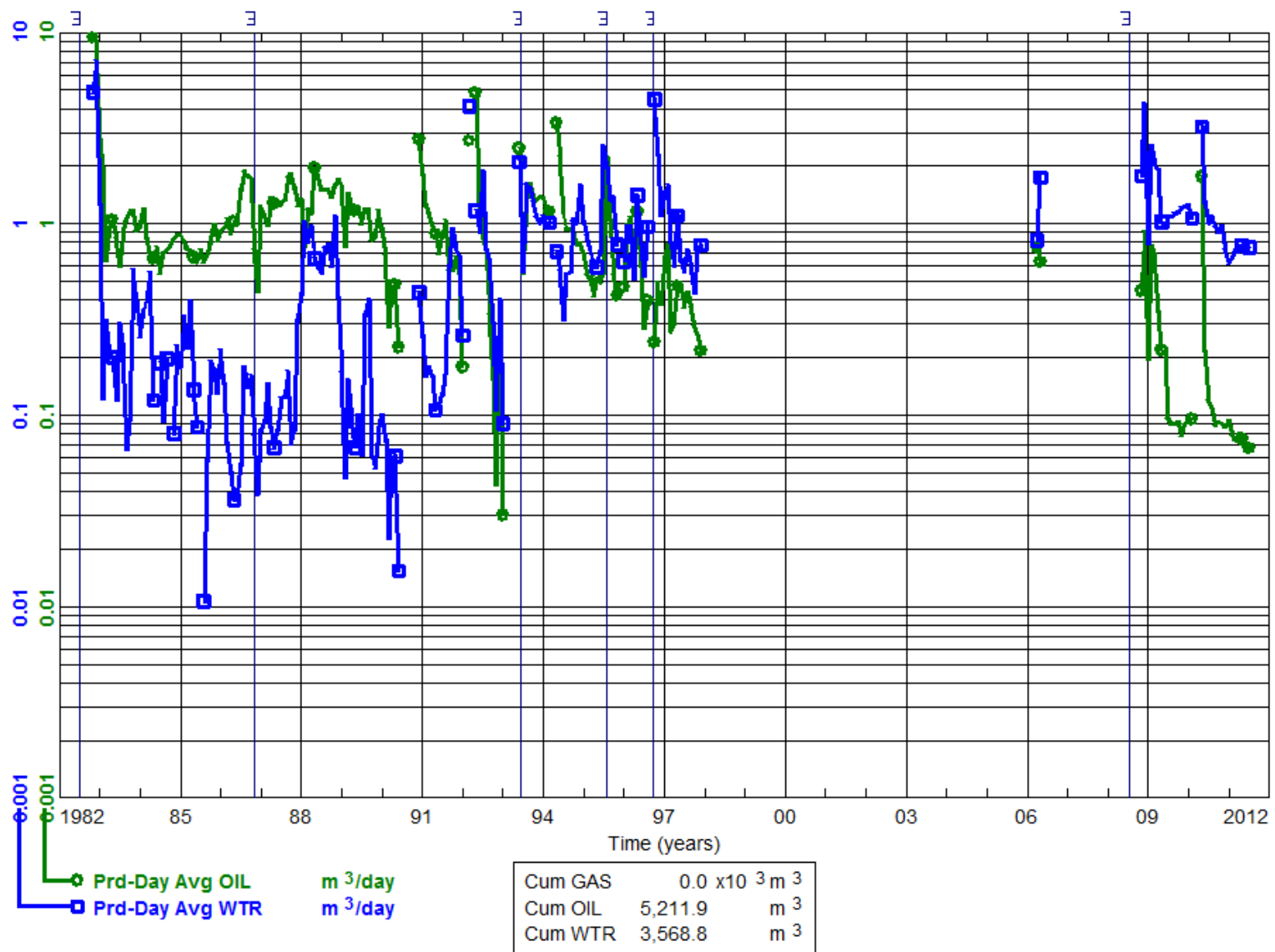
Status: Capable Of Oil Prod  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-11  
 To: 2011-07

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/11-13-001-26W1/00

Status: Capable Of Oil Prod  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)

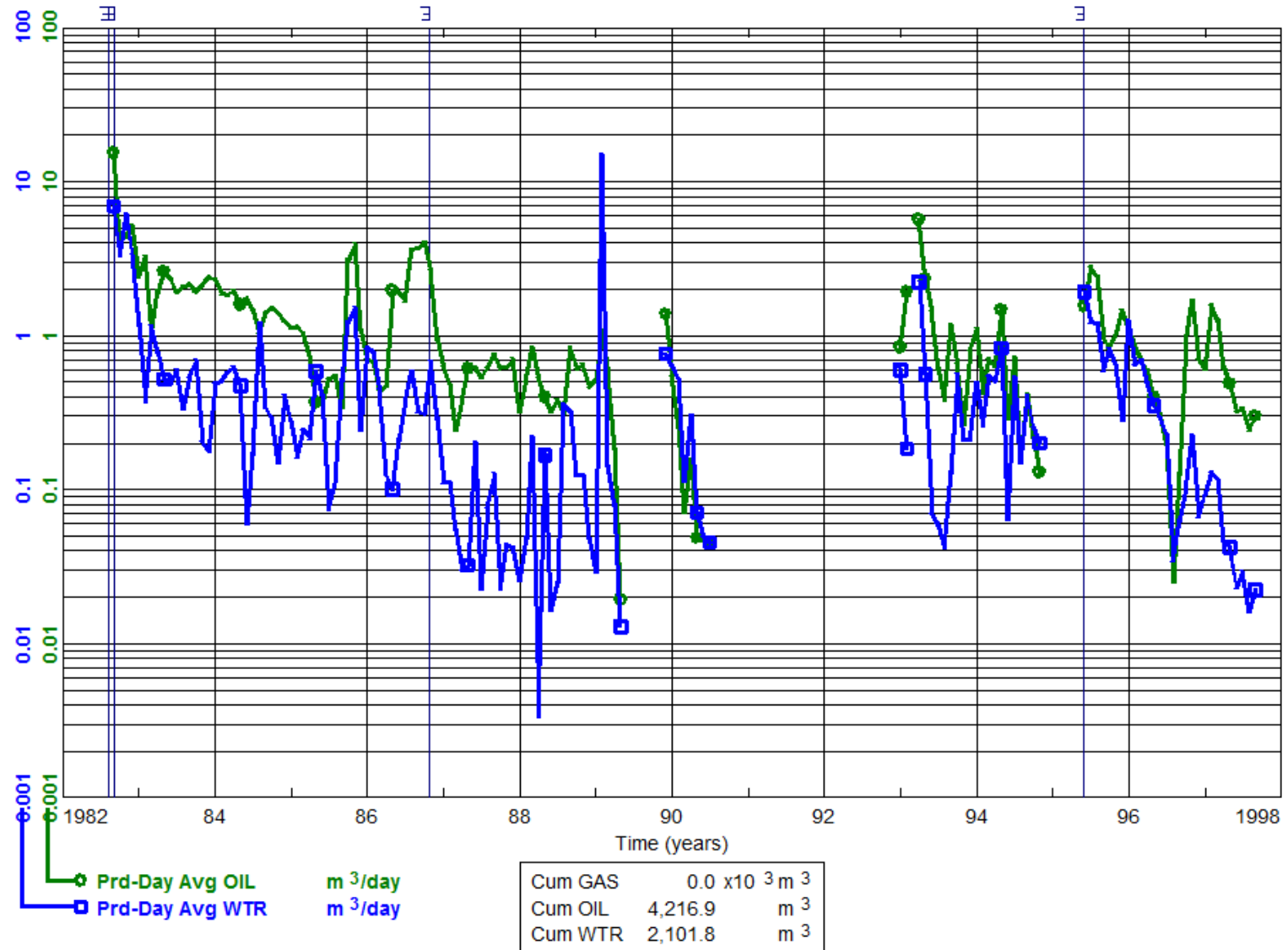




Data As Of: 2011-11 (MB)  
 From: 1982-09  
 To: 1997-09

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/12-13-001-26W1/00

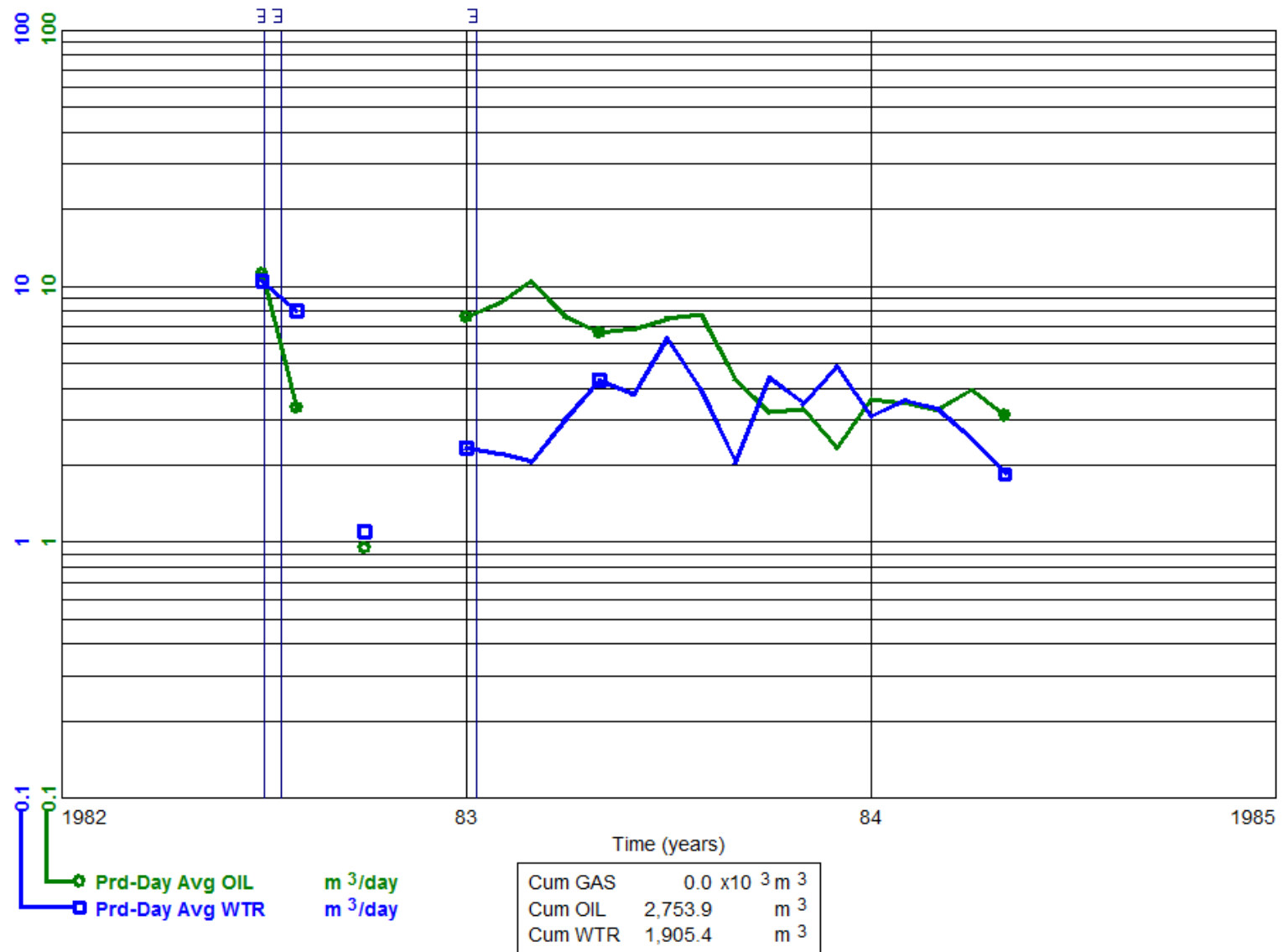
Status: Abandoned Producer  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-07  
 To: 1984-05

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4 WIW  
 100/13-13-001-26W1/00

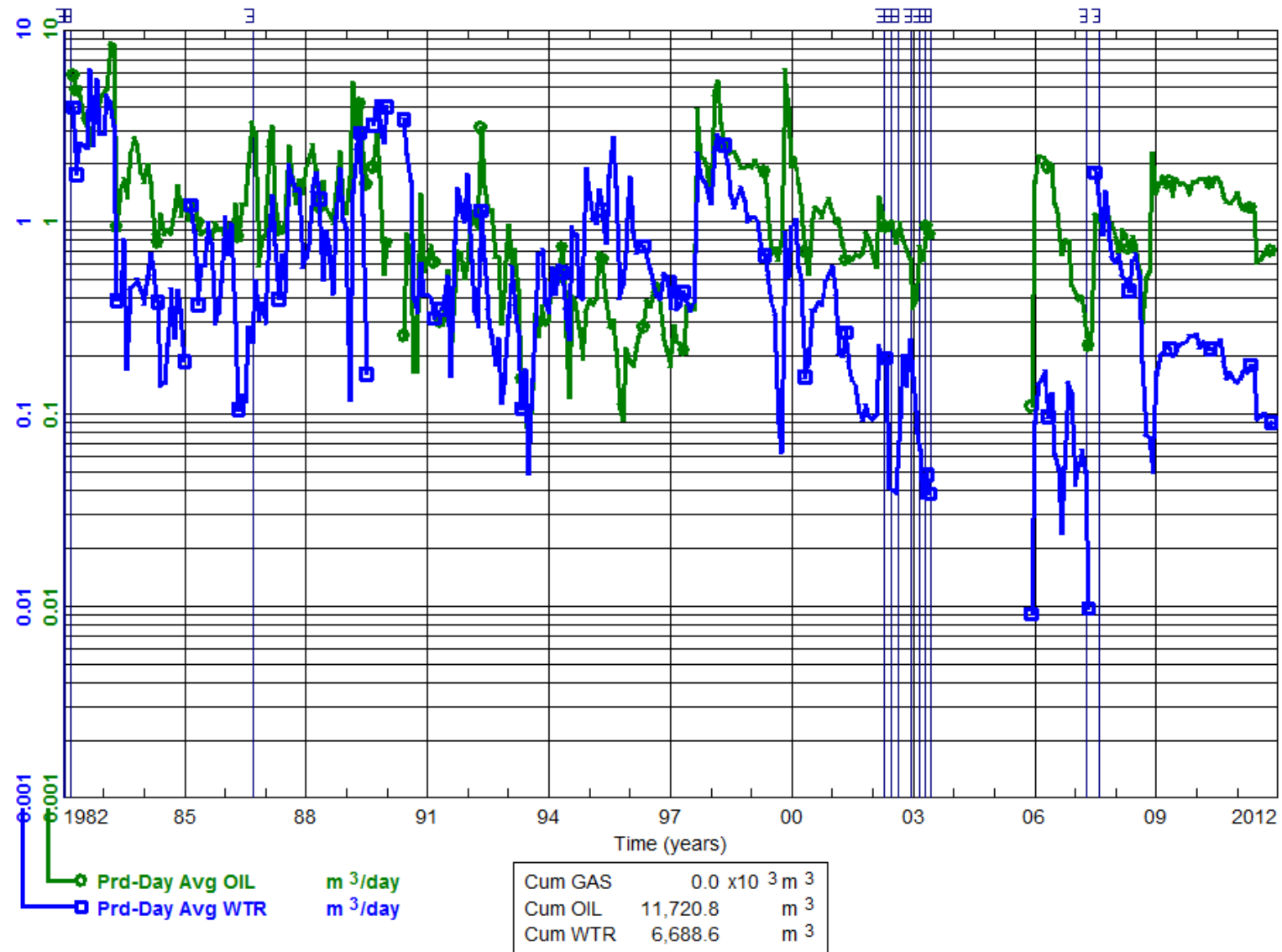
Status: Water Inj Well  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
From: 1982-04  
To: 2011-11

INDIVIDUAL PRODUCTION  
Waskada Unit No. 4  
100/14-13-001-26W1/00

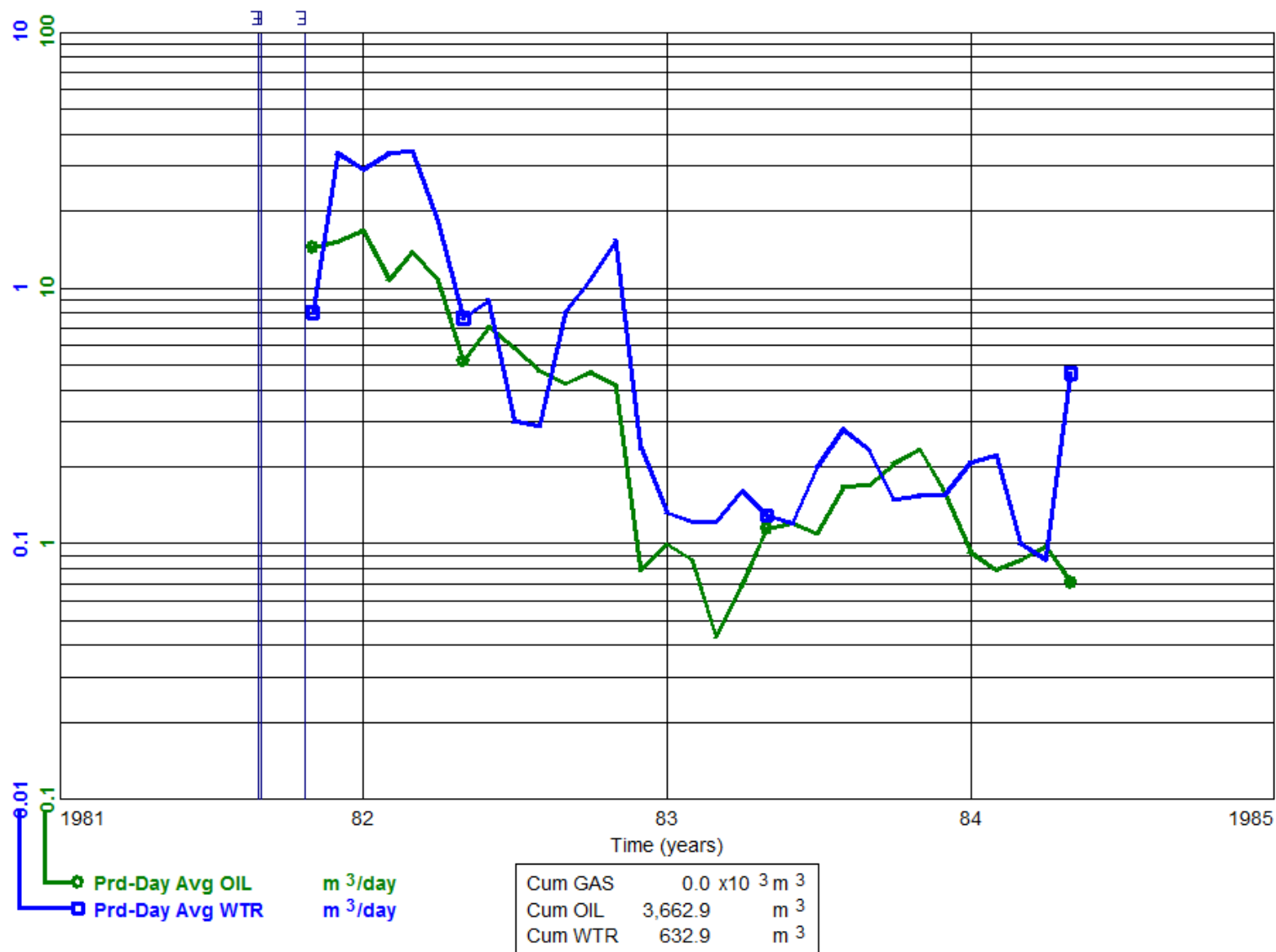
Status: Capable Of Oil Prod  
Field: WASKADA (03)  
Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1981-11  
 To: 1984-05

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4 WIW  
 100/15-13-001-26W1/00

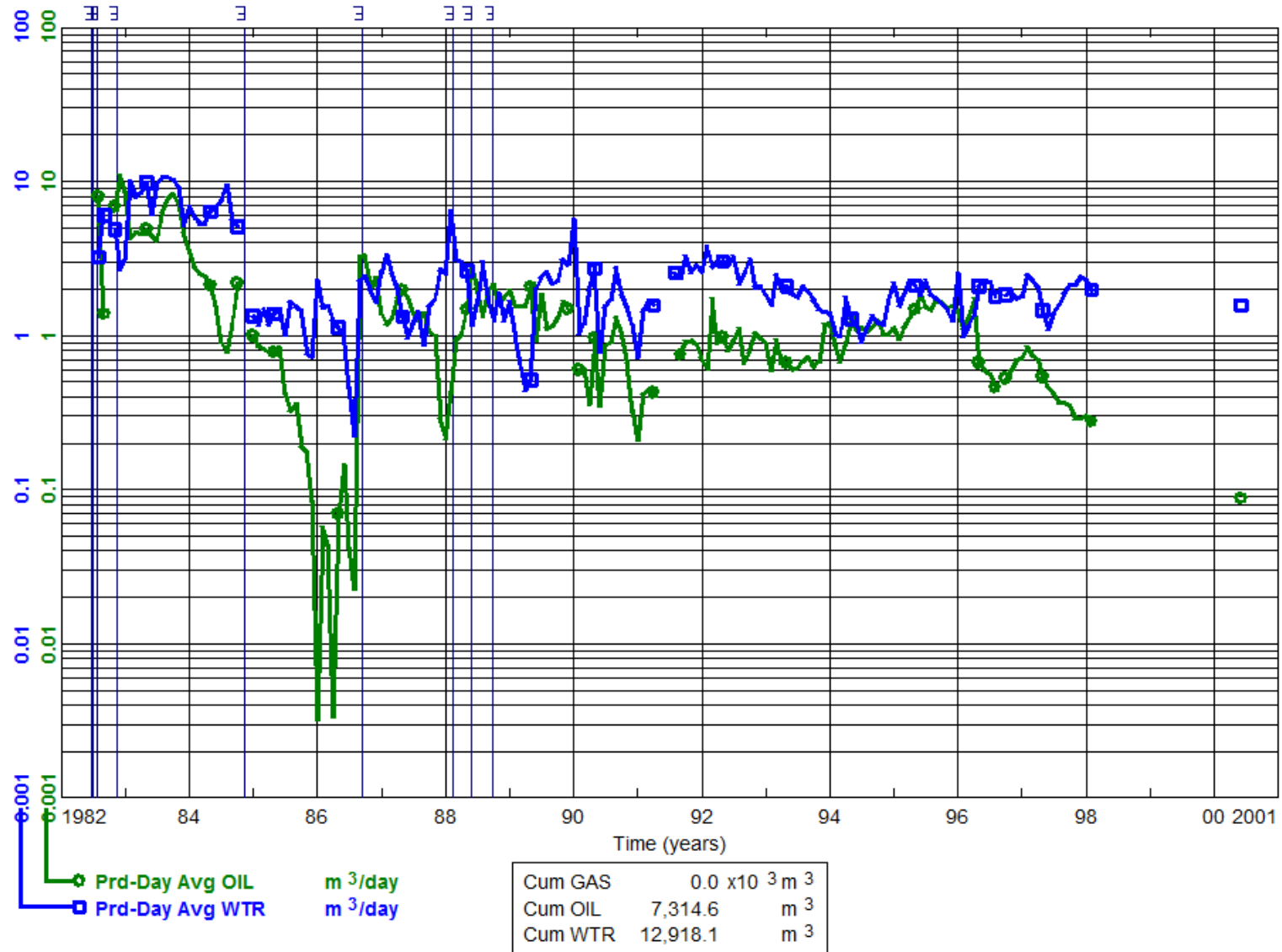
Status: Water Inj Well  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-08  
 To: 2000-06

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/08-14-001-26W1/00

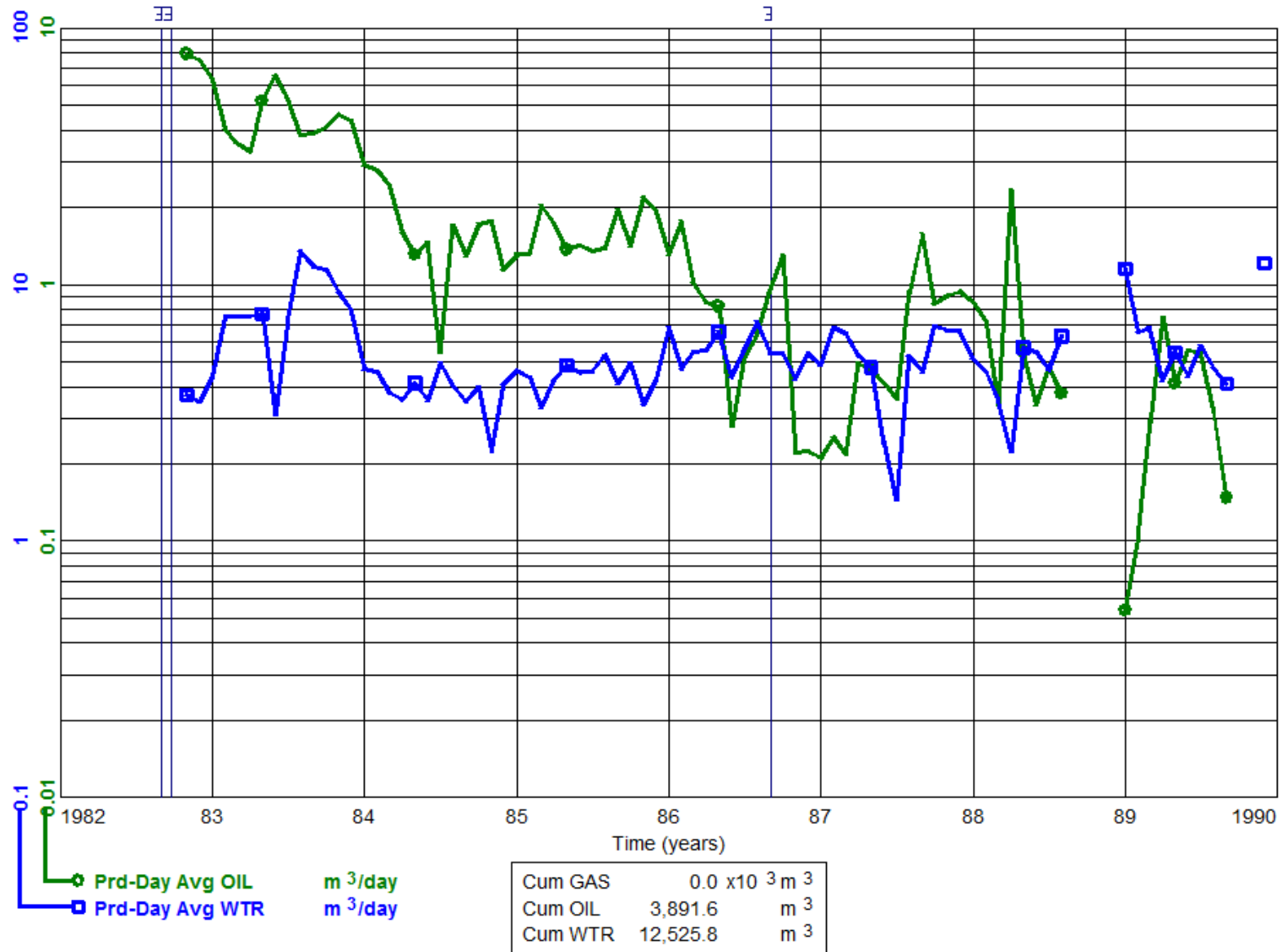
Status: Abandoned Producer  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-11  
 To: 1989-12

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/09-14-001-26W1/00

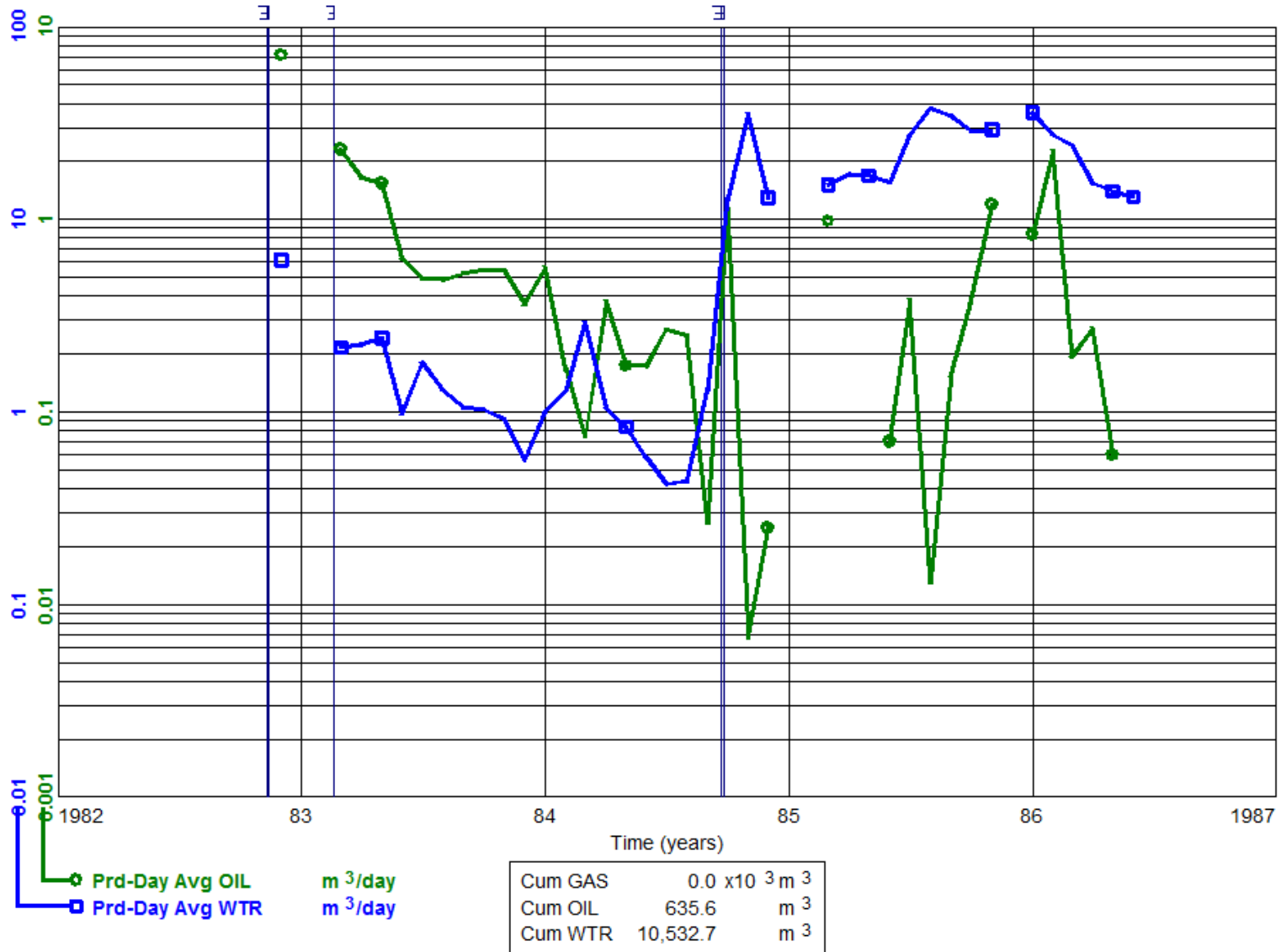
Status: Abandoned Producer  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-12  
 To: 1986-06

INDIVIDUAL PRODUCTION  
 Omega Waskada  
 100/10-14-001-26W1/00

Status: Abandoned Producer  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)

From: 1982-11

To: 1984-05

INDIVIDUAL PRODUCTION

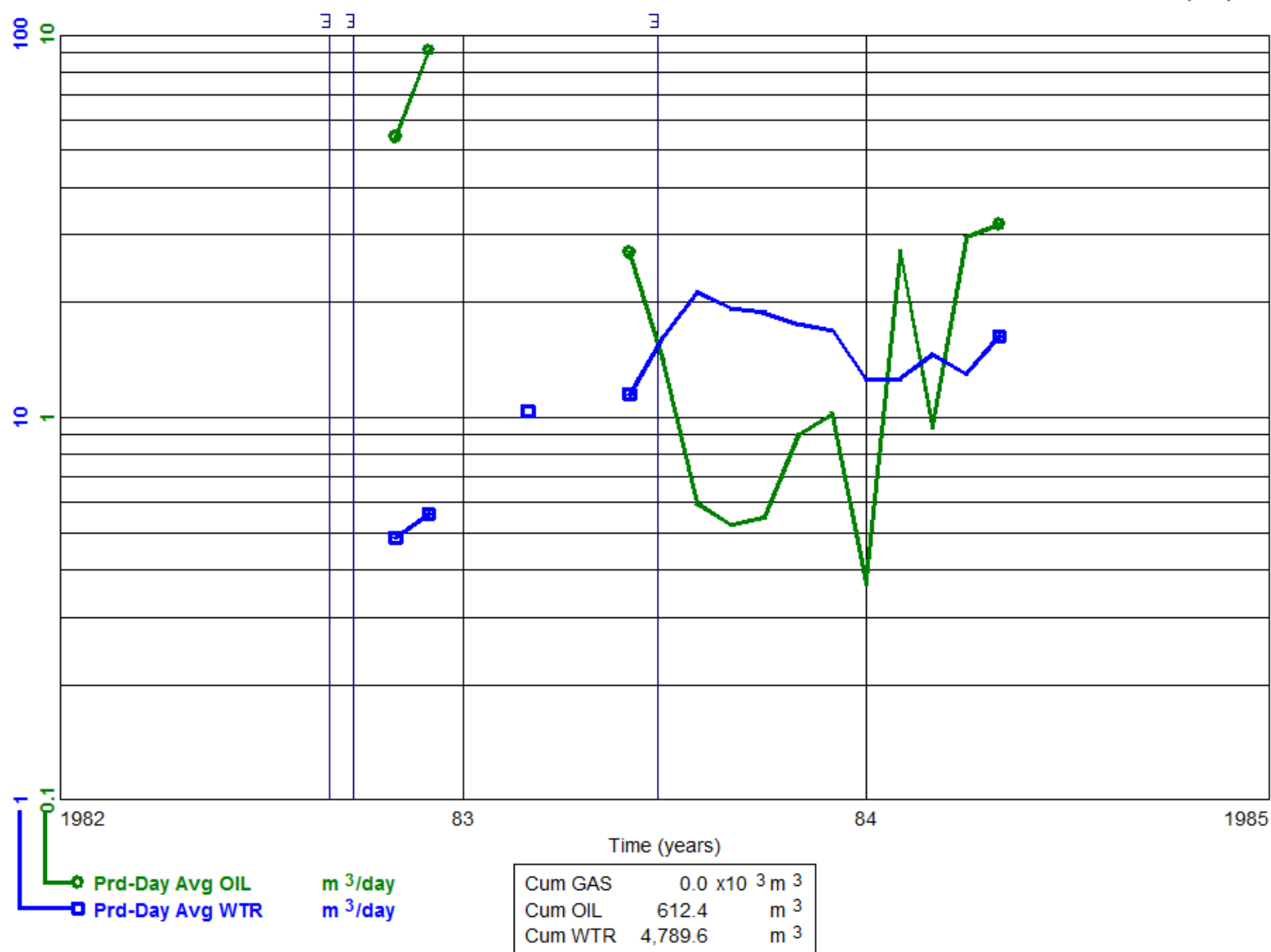
Waskada Unit No. 4 WIW

100/15-14-001-26W1/00

Status: Abandoned Water Inj Well

Field: WASKADA (03)

Pool: LOWER AMARANTH A (29A)

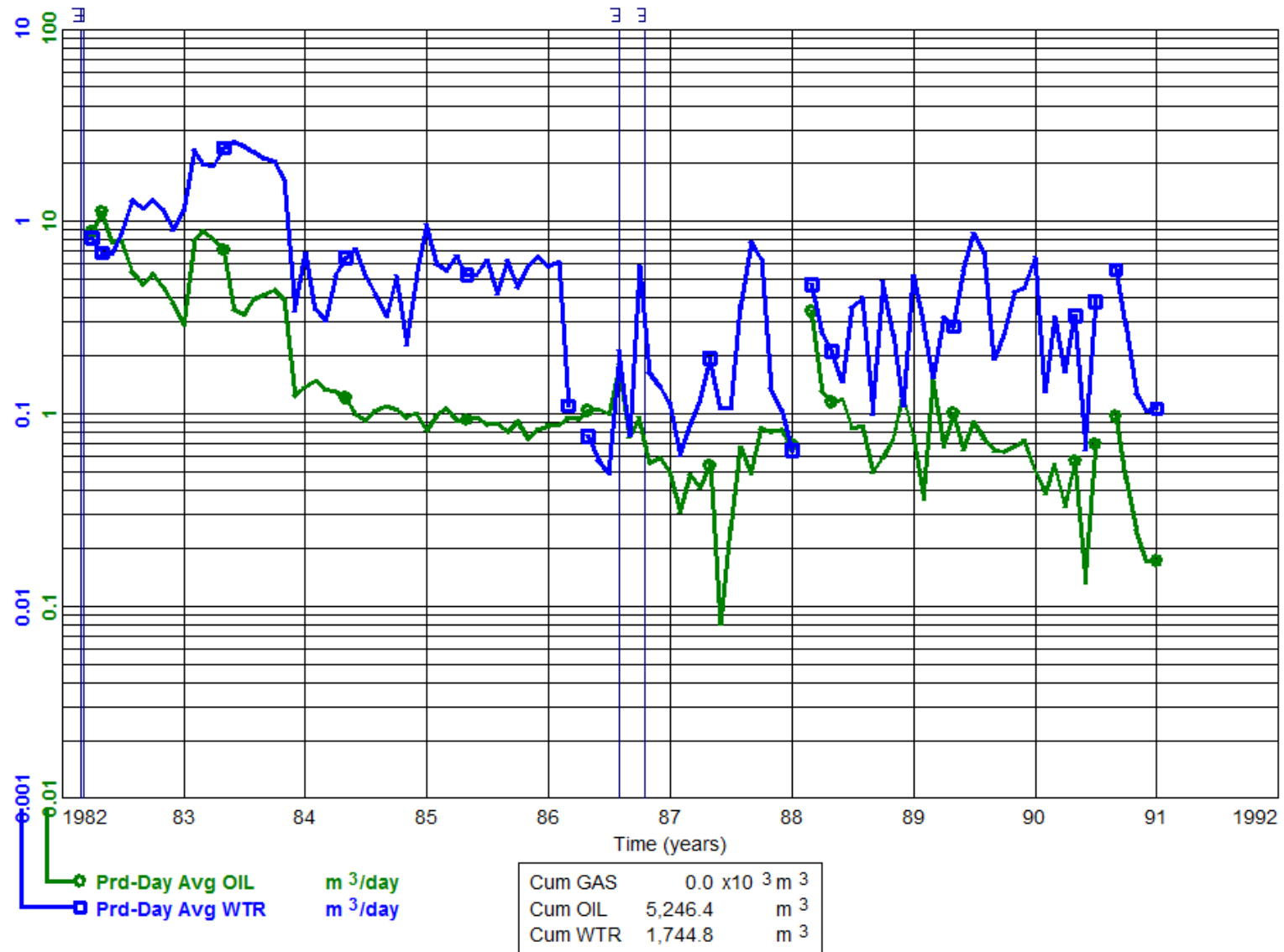




Data As Of: 2011-11 (MB)  
From: 1982-04  
To: 1991-01

INDIVIDUAL PRODUCTION  
Waskada Unit No. 4  
100/16-14-001-26W1/00

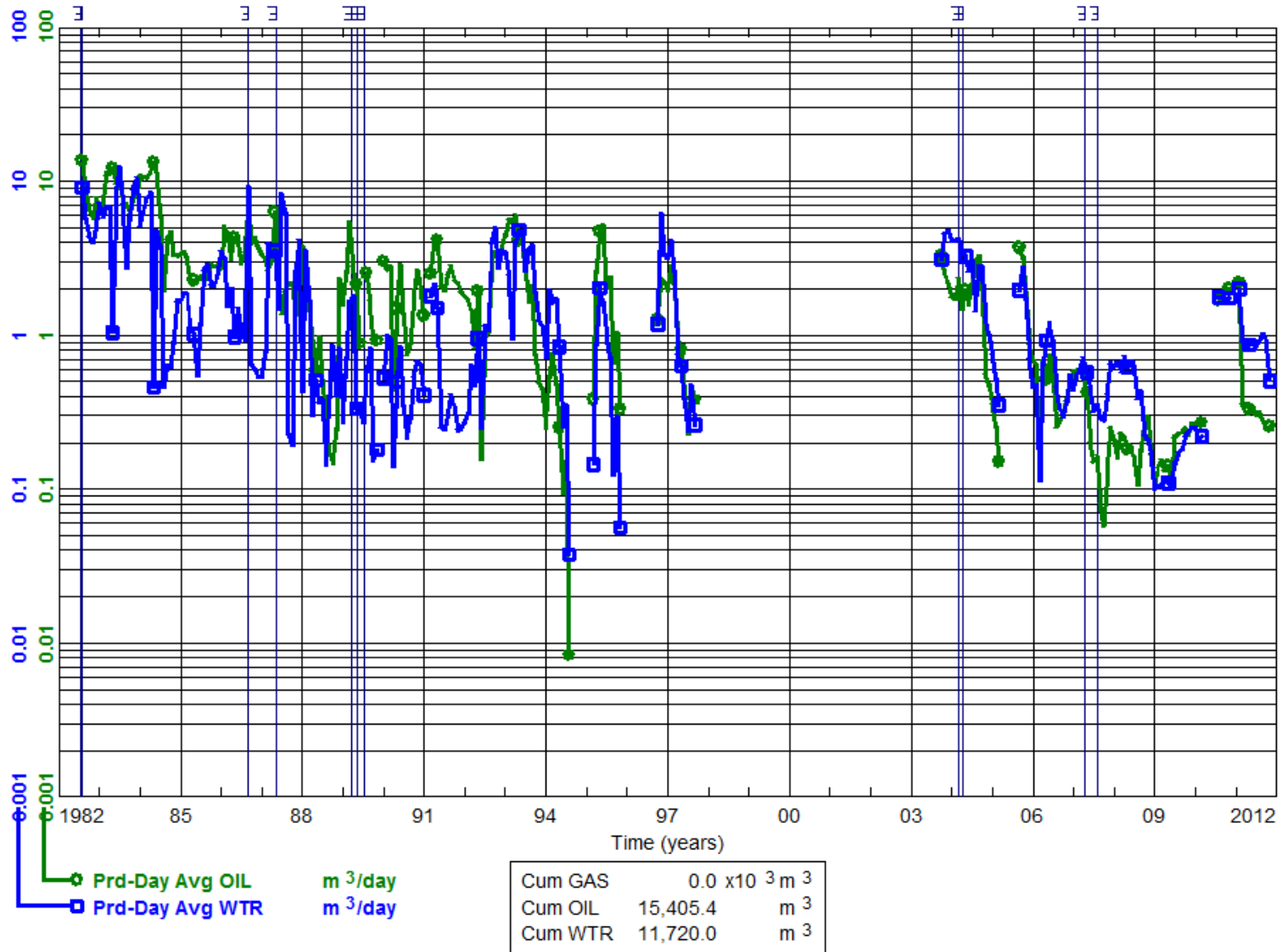
Status: Abandoned Producer  
Field: WASKADA (03)  
Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-08  
 To: 2011-11

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4 COM  
 100/01-23-001-26W1/00

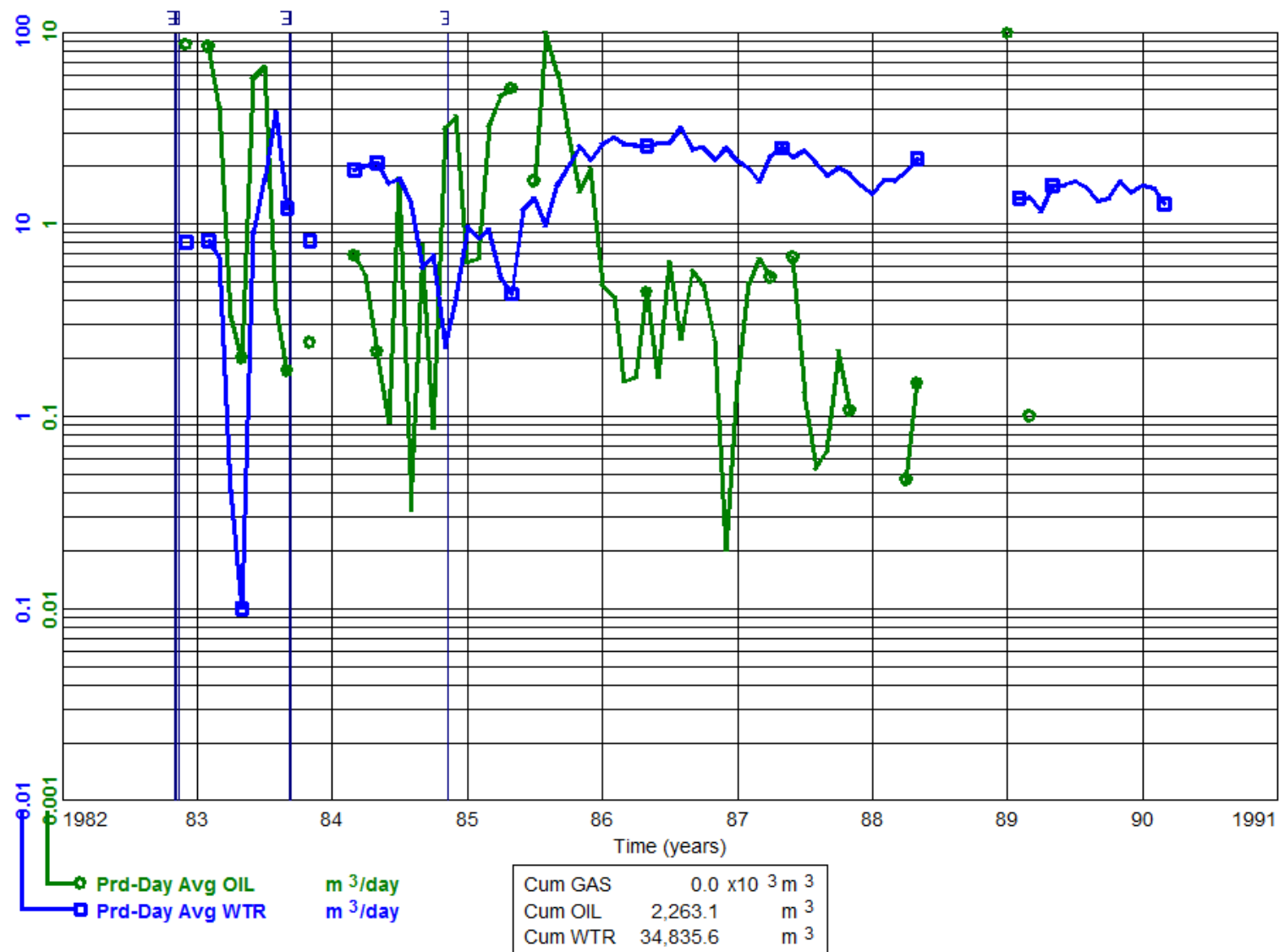
Status: Comingled  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-12  
 To: 1990-03

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/02-23-001-26W1/00

Status: Abandoned Producer  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)

From: 1983-06

To: 1996-06

INDIVIDUAL PRODUCTION

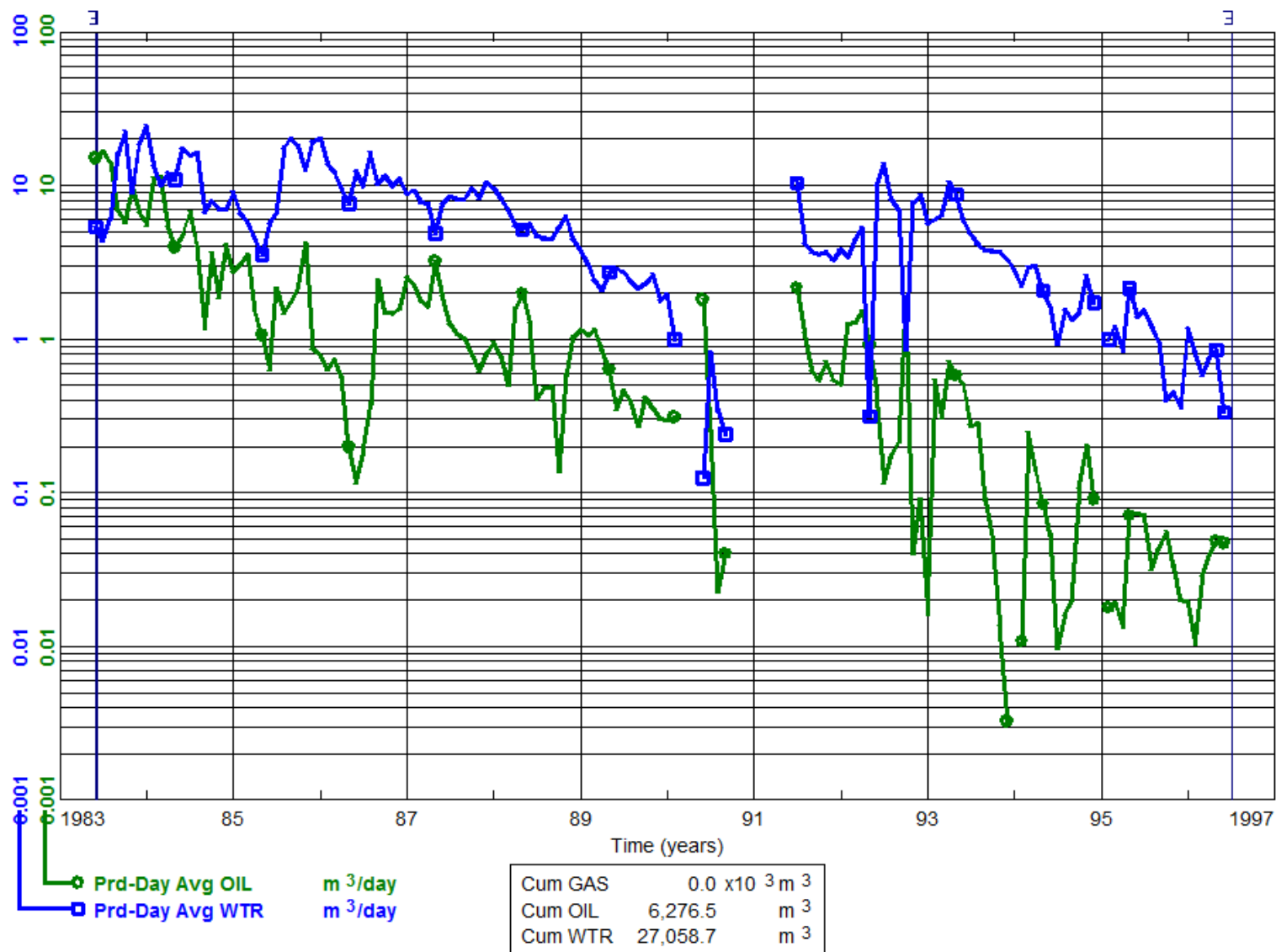
Waskada Unit No. 4

102/08-23-001-26W1/00

Status: Abandoned Producer

Field: WASKADA (03)

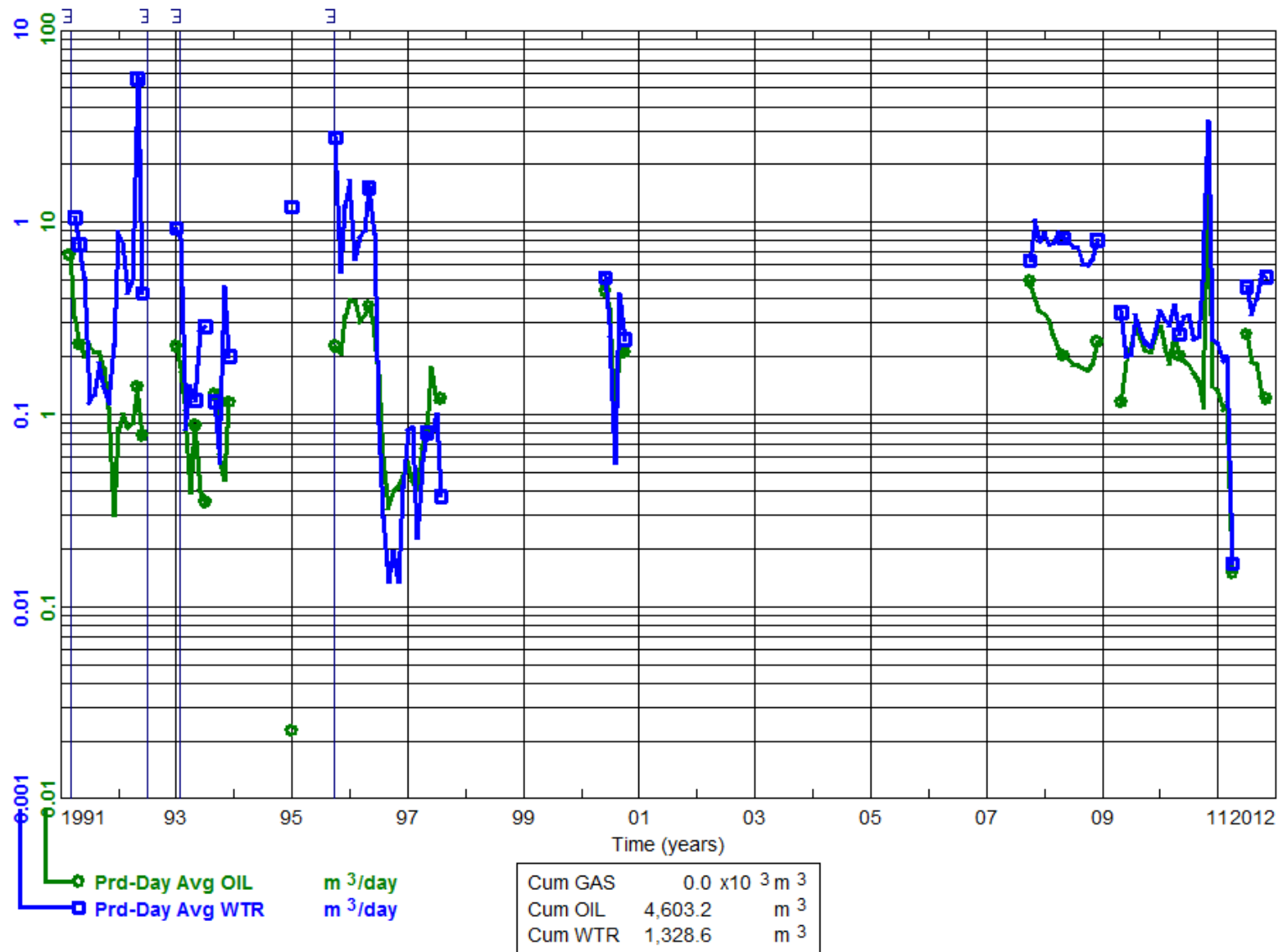
Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1991-03  
 To: 2011-11

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 1A0/08-23-001-26W1/00

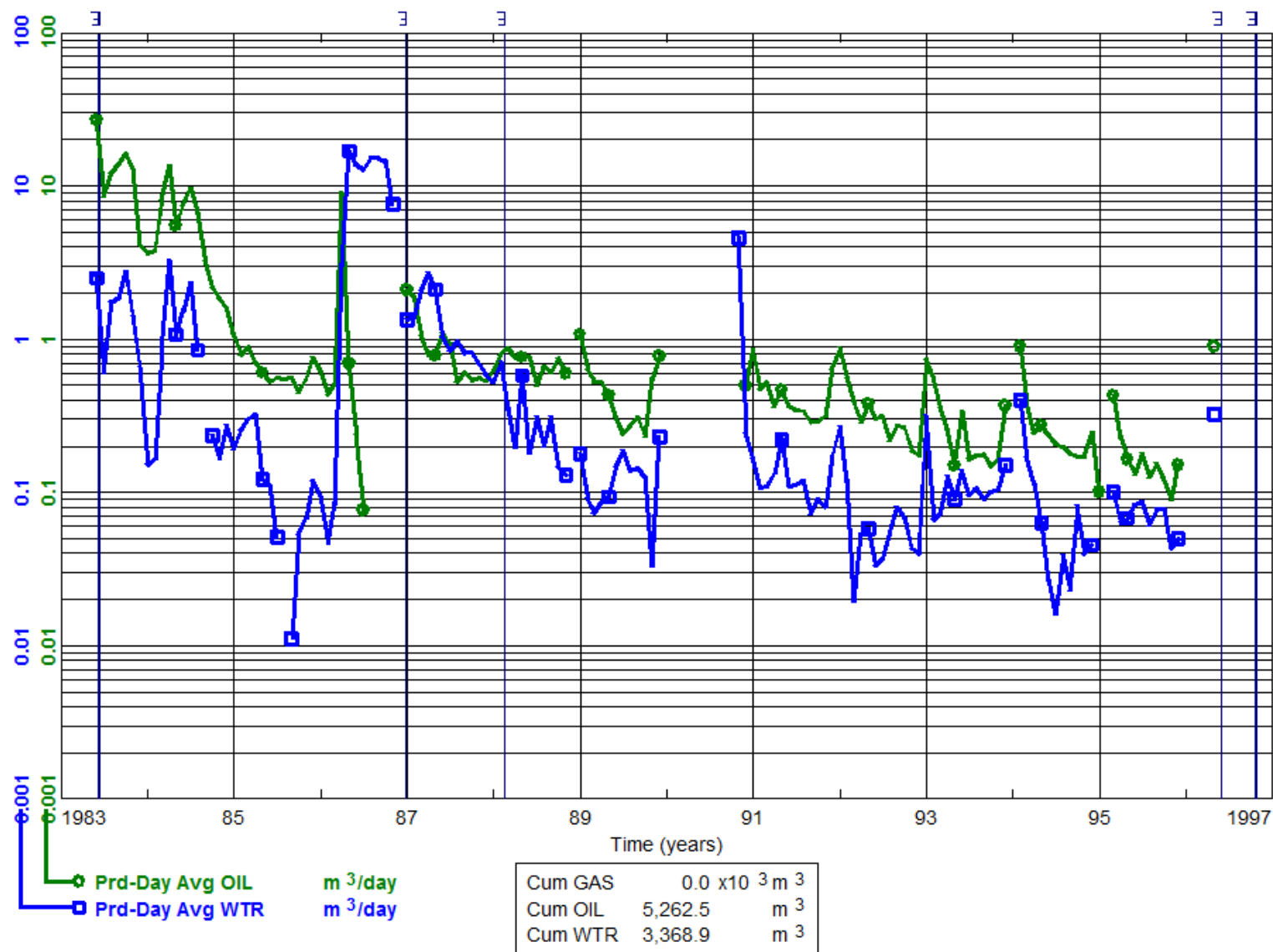
Status: RESUMED COOP  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1983-06  
 To: 1996-05

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4 Prov.  
 102/01-24-001-26W1/00

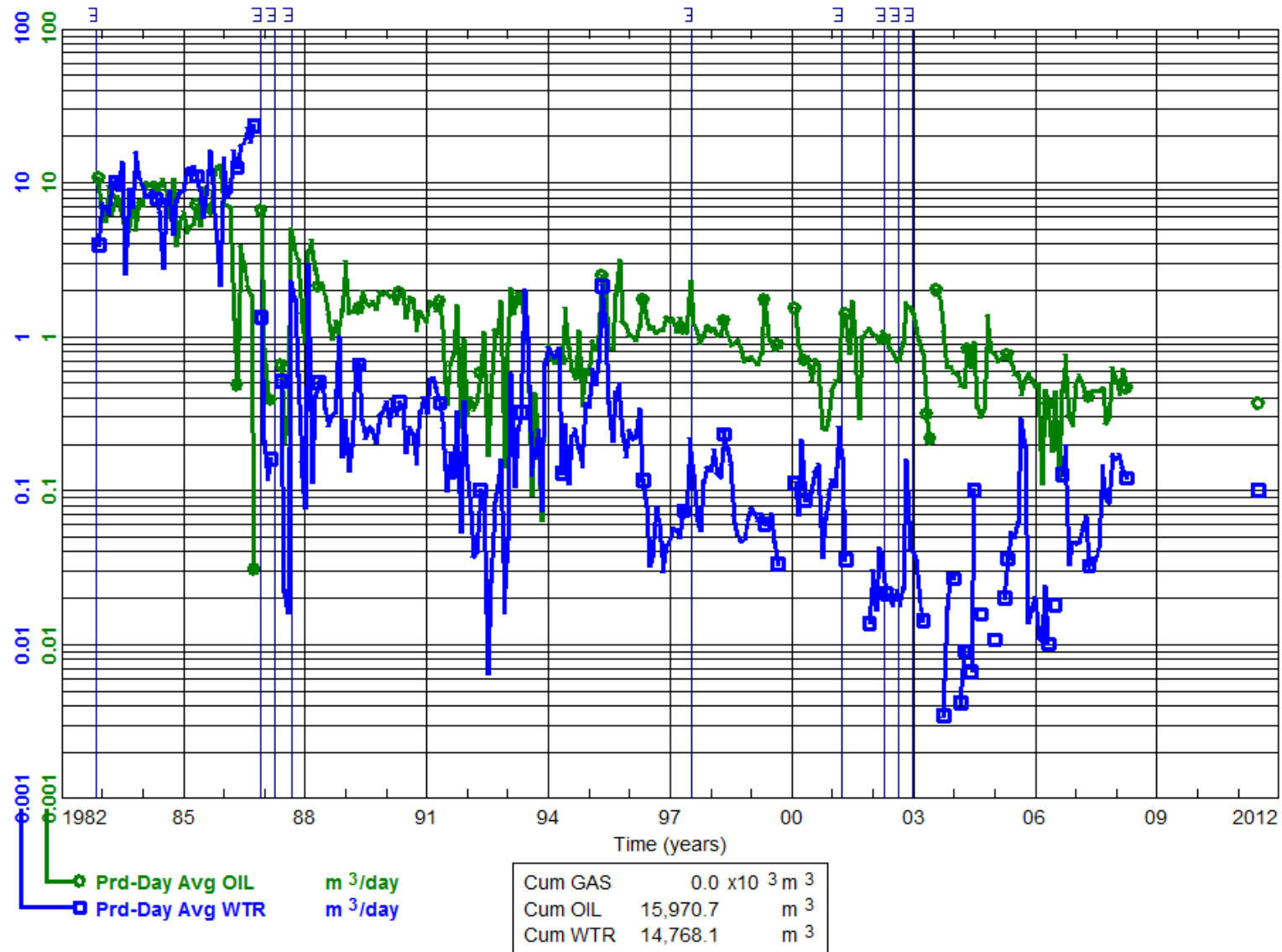
Status: Abandoned Producer  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1982-12  
 To: 2011-07

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4 Prov.  
 100/02-24-001-26W1/00

Status: Capable Of Oil Prod  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)

From: 1997-12

To: 2011-11

# INDIVIDUAL PRODUCTION

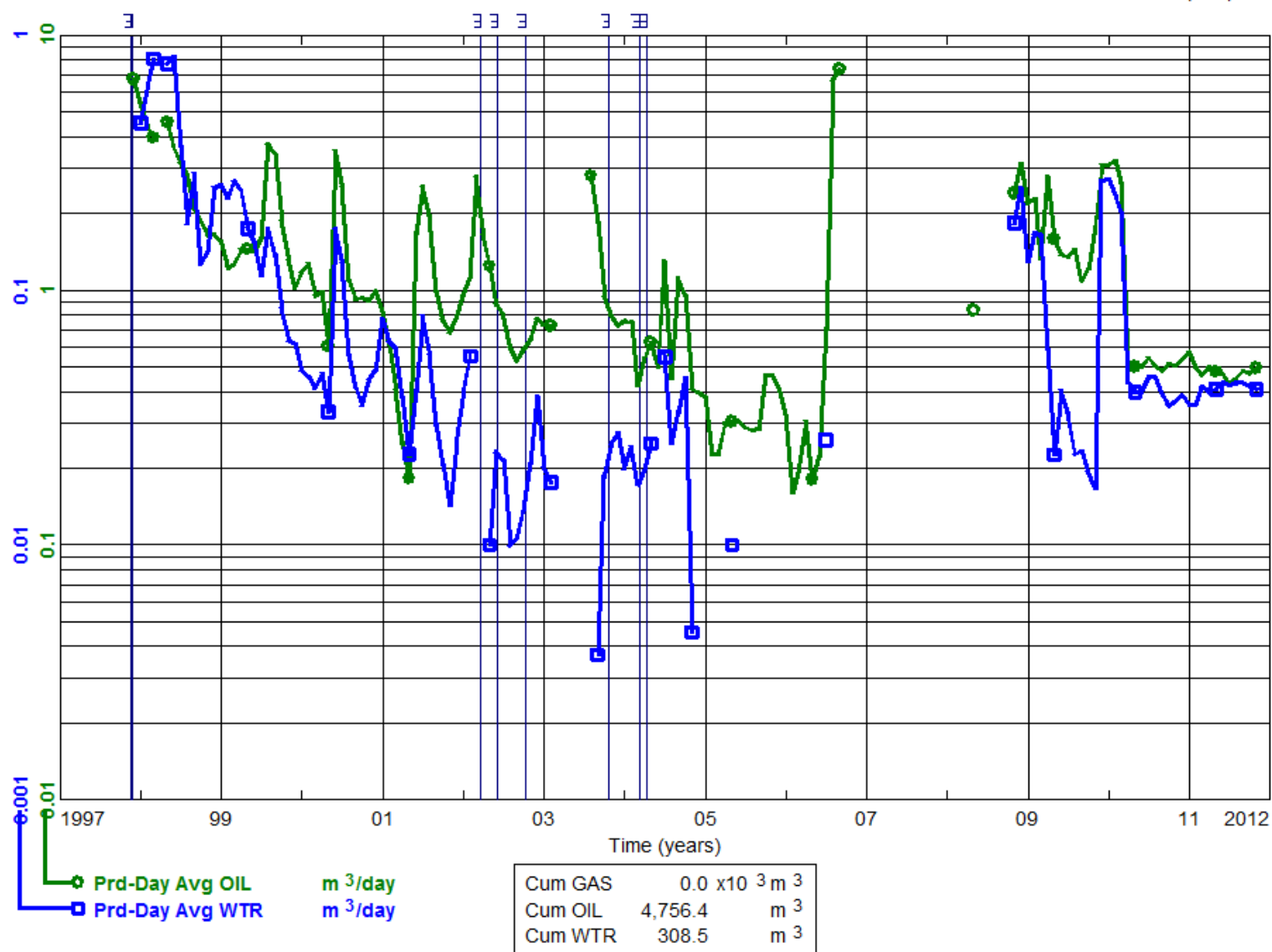
Waskada Unit No. 4 Prov.

1B0/02-24-001-26W1/00

Status: Capable Of Oil Prod

Field: WASKADA (03)

Pool: LOWER AMARANTH A (29A)





Data As Of: 2011-11 (MB)

From: 1983-07

To: 2011-11

# INDIVIDUAL PRODUCTION

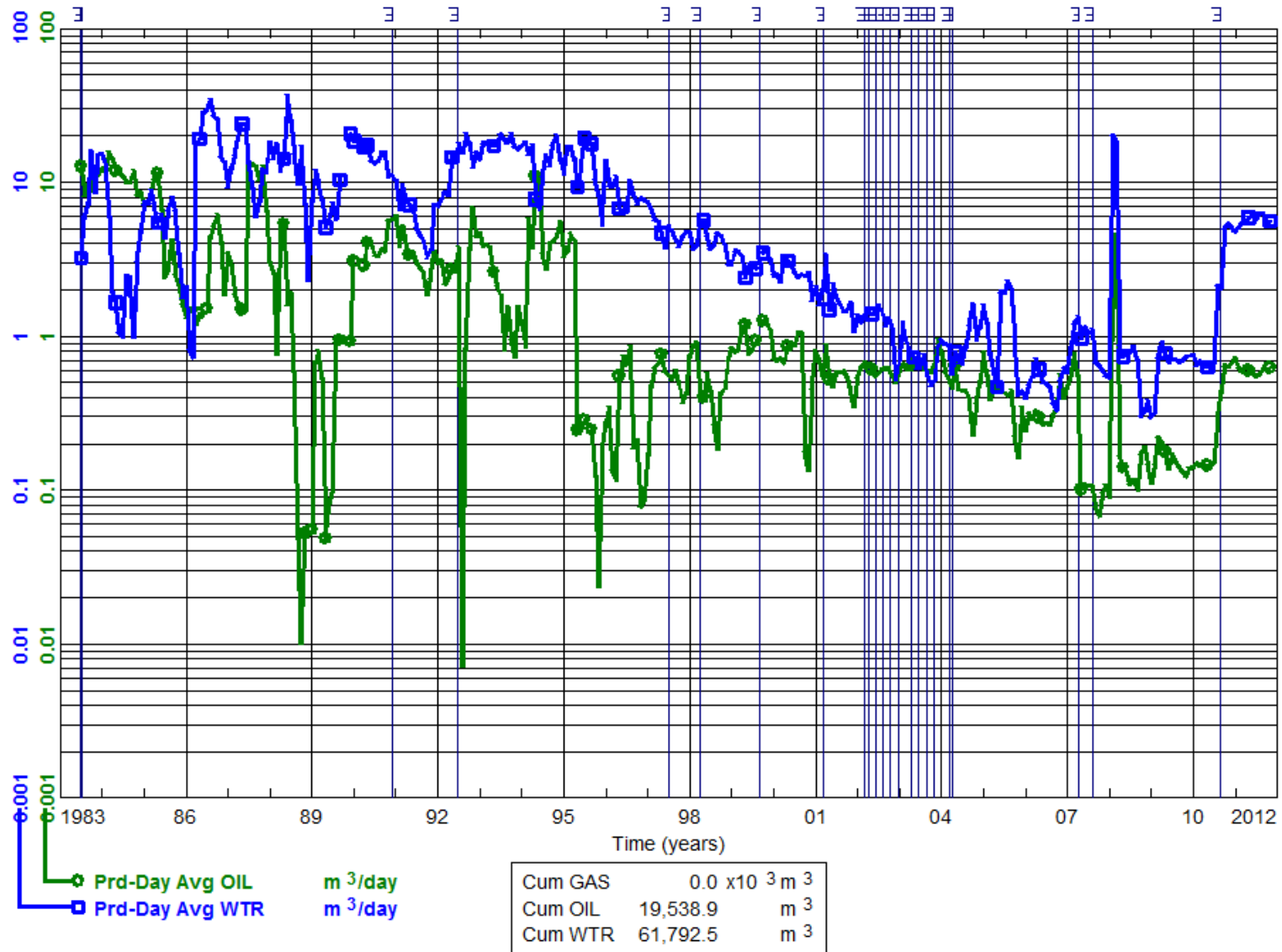
Waskada Unit No. 4

100/03-24-001-26W1/00

Status: Capable Of Oil Prod

Field: WASKADA (03)

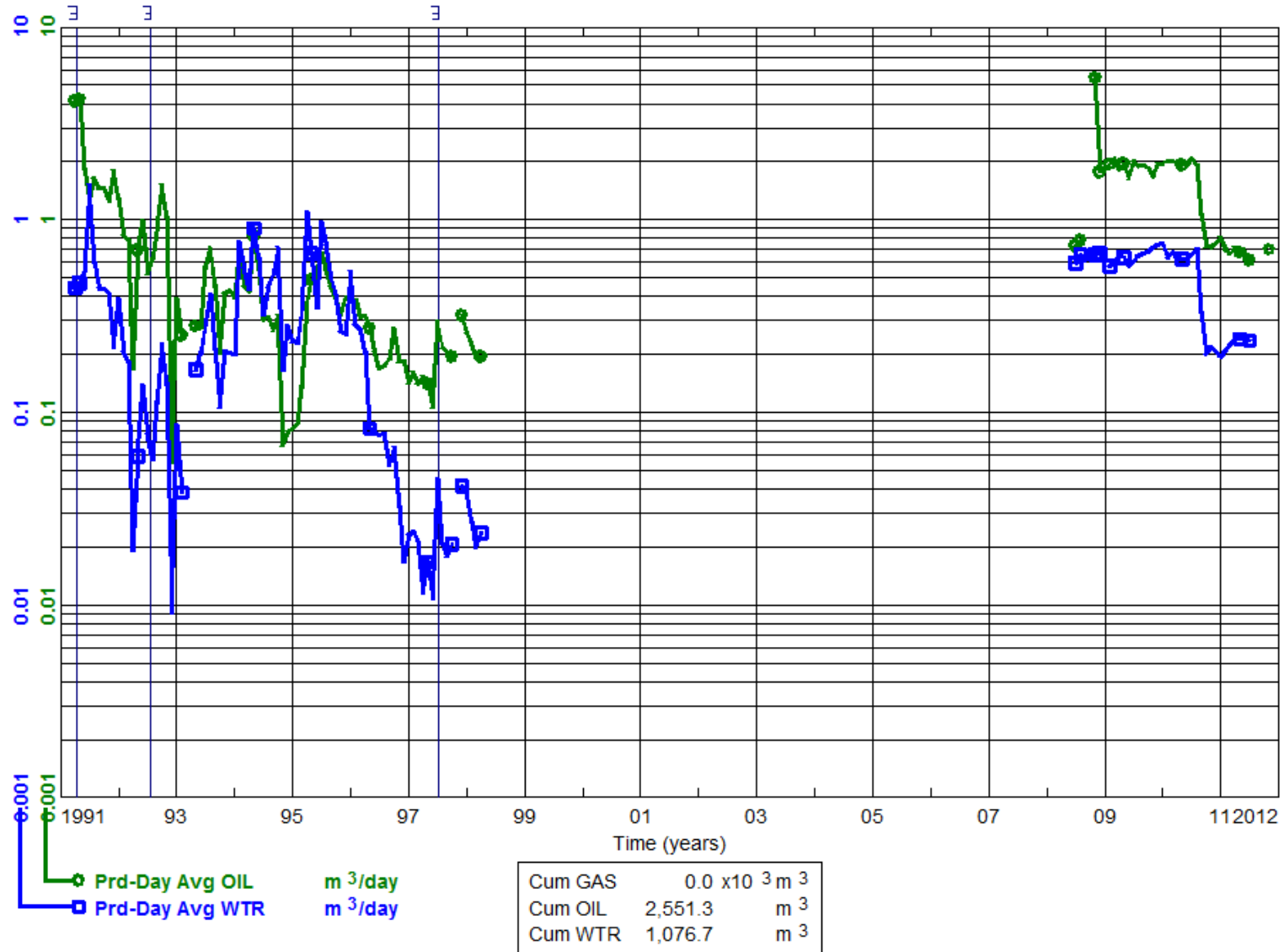
Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
From: 1991-04  
To: 2011-11

INDIVIDUAL PRODUCTION  
Waskada Unit No. 4  
1C0/03-24-001-26W1/00

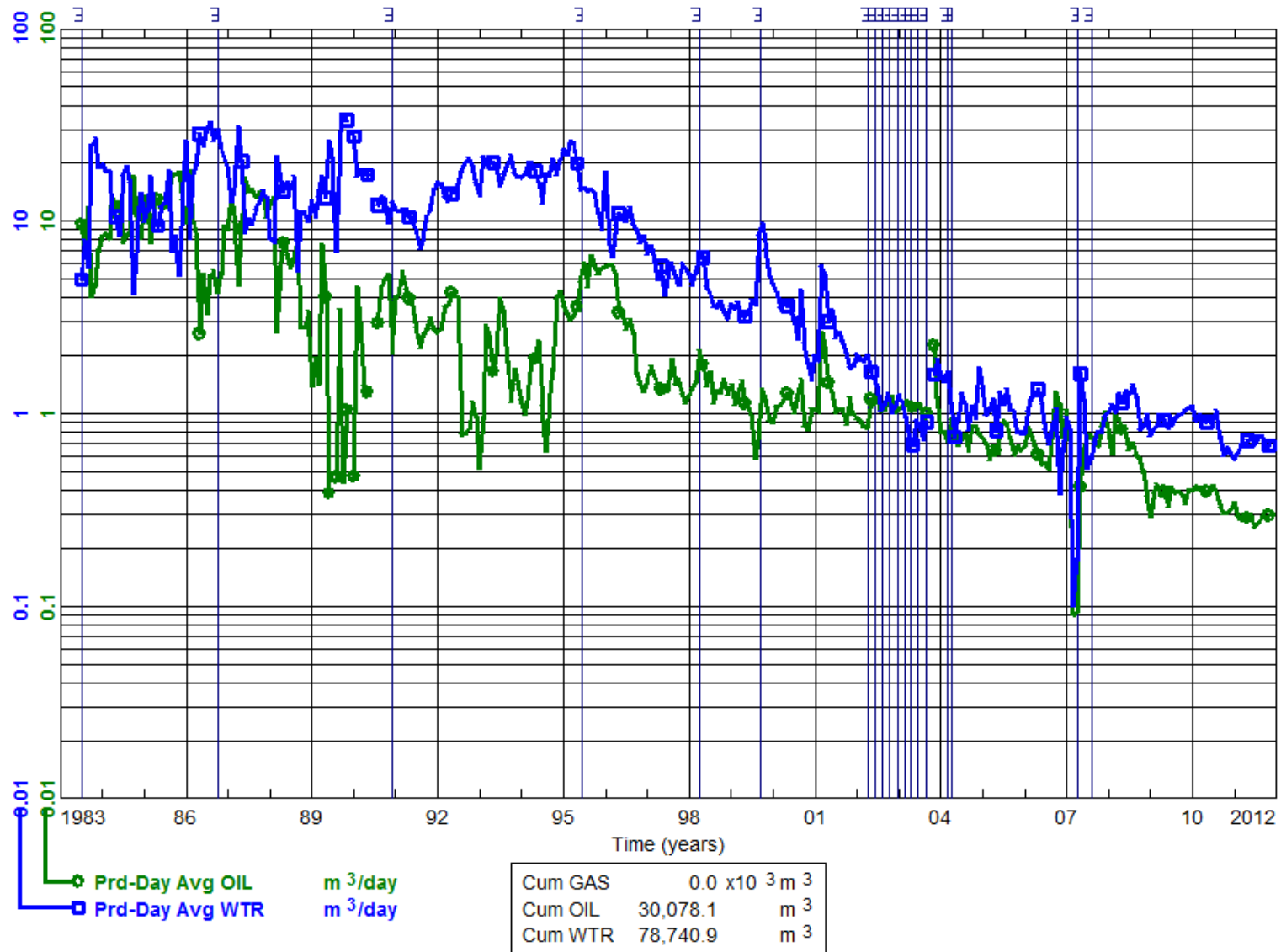
Status: Capable Of Oil Prod  
Field: WASKADA (03)  
Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1983-07  
 To: 2011-11

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/04-24-001-26W1/00

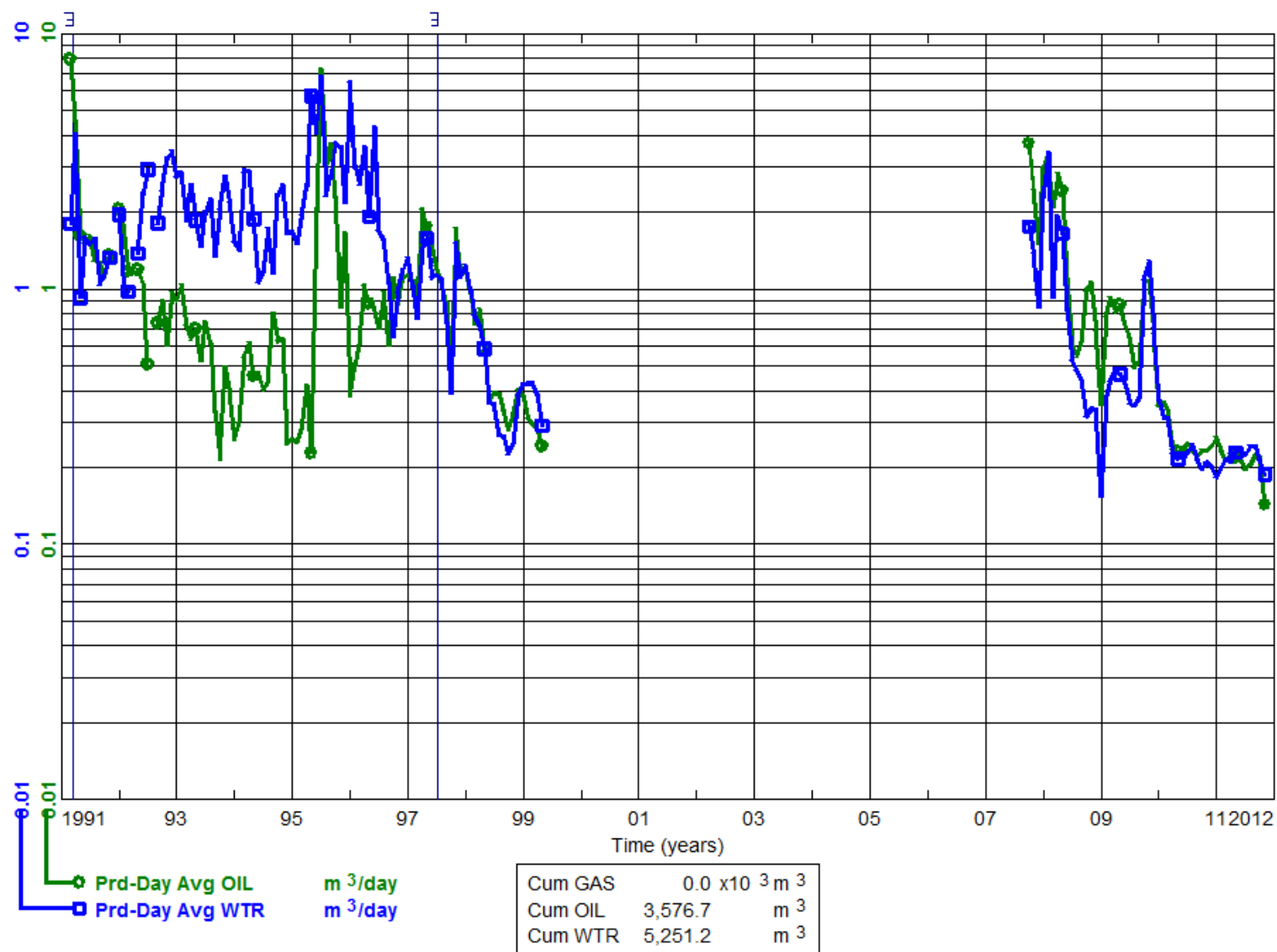
Status: Capable Of Oil Prod  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
From: 1991-03  
To: 2011-11

INDIVIDUAL PRODUCTION  
Waskada Unit No. 4 DIR  
1C0/04-24-001-26W1/00

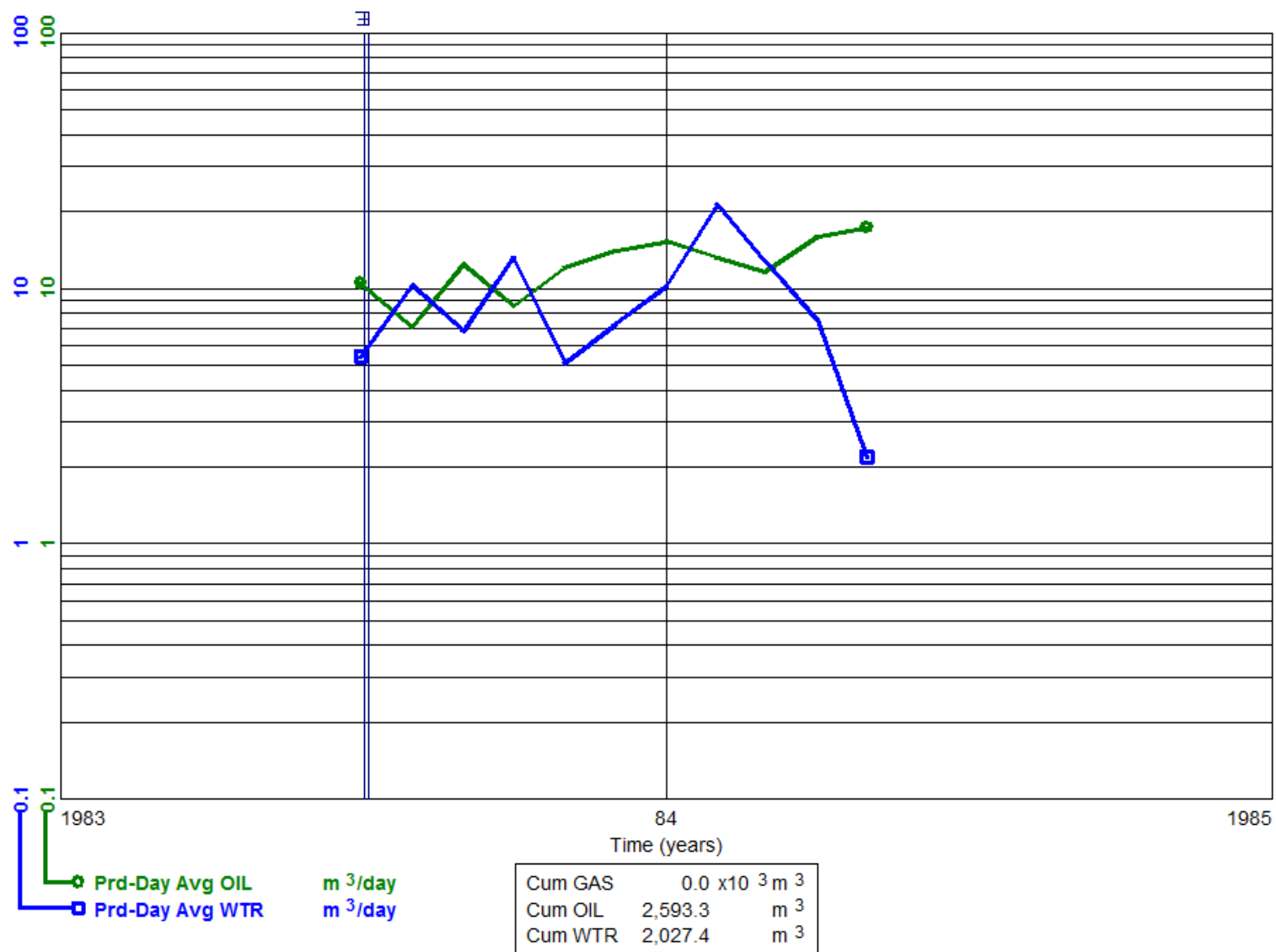
Status: Capable Of Oil Prod  
Field: WASKADA (03)  
Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1983-07  
 To: 1984-05

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4 WIW  
 100/05-24-001-26W1/00

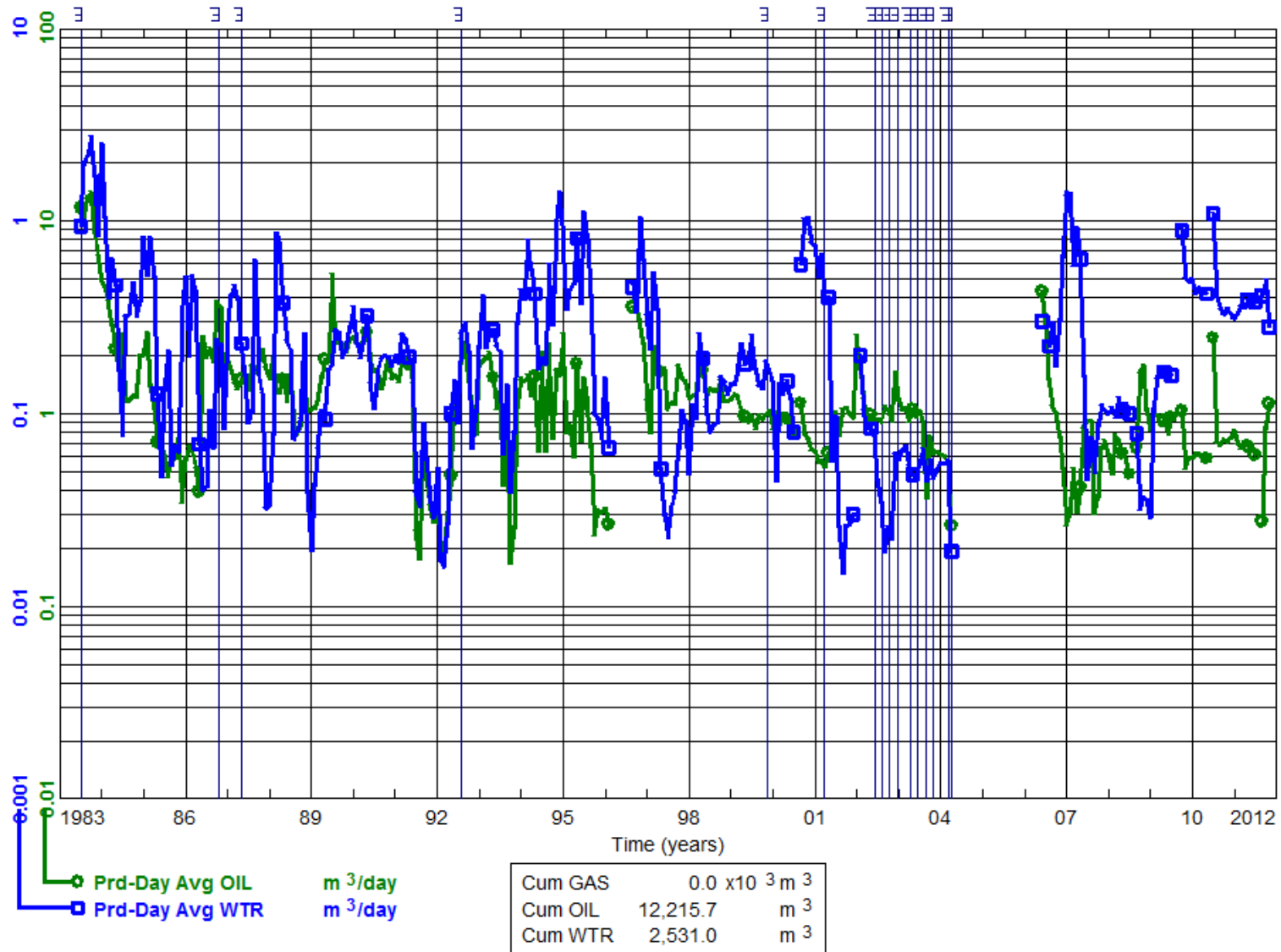
Status: Abandoned Water Inj Well  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1983-07  
 To: 2011-11

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 100/06-24-001-26W1/00

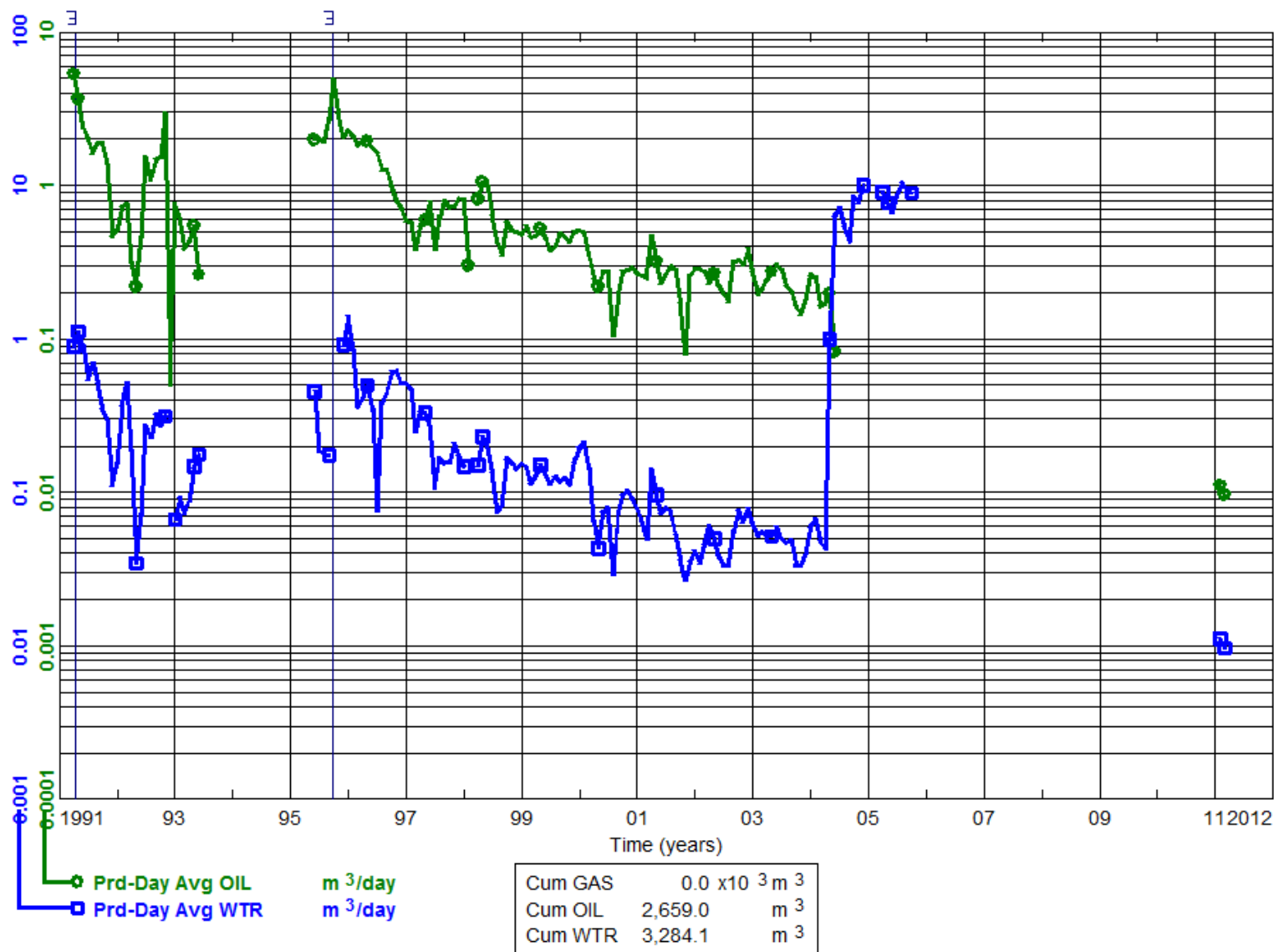
Status: Capable Of Oil Prod  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1991-04  
 To: 2011-04

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4  
 1A0/06-24-001-26W1/00

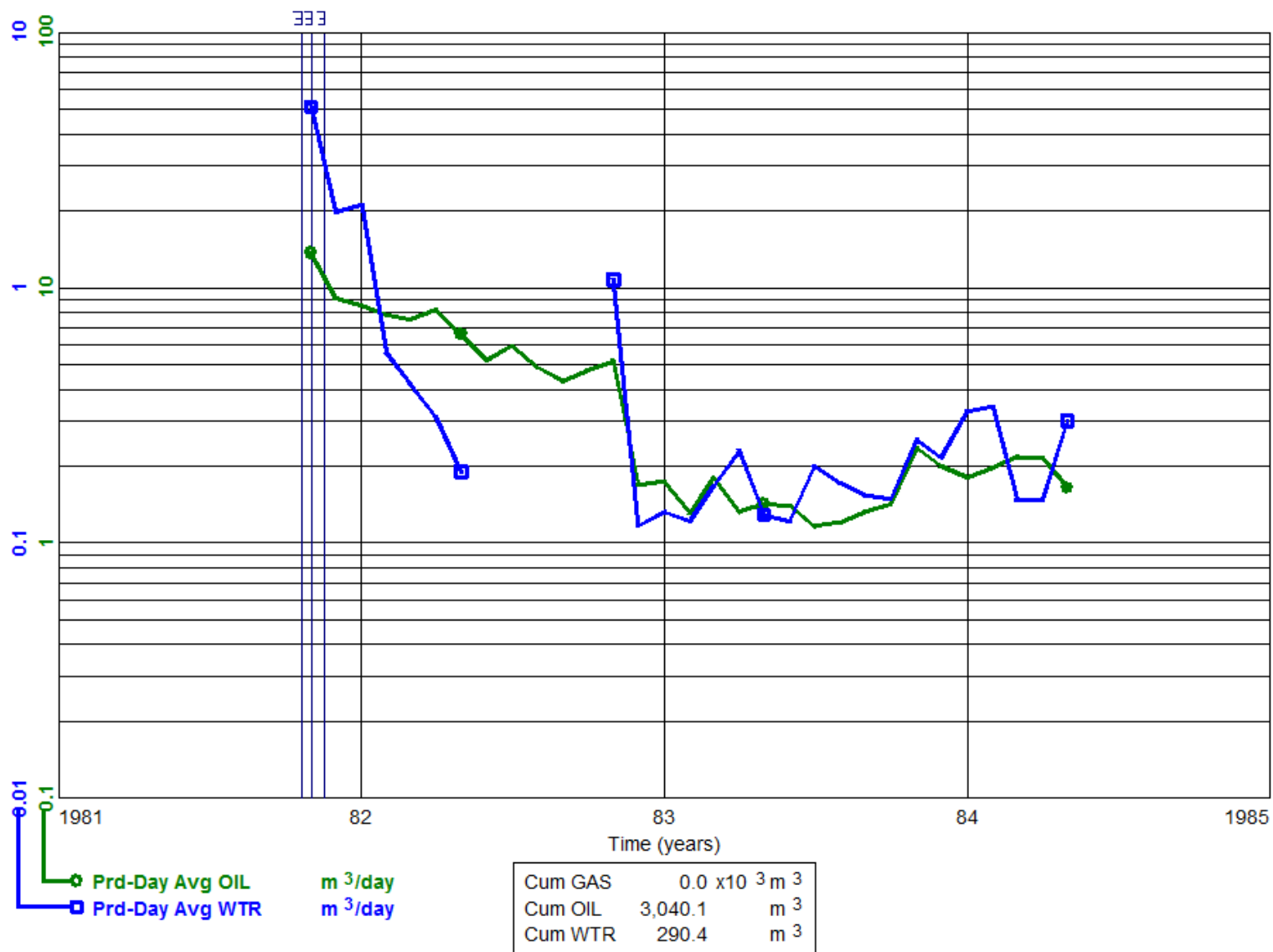
Status: Capable Of Oil Prod  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)



Data As Of: 2011-11 (MB)  
 From: 1981-11  
 To: 1984-05

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4 Prov. WIW  
 100/07-24-001-26W1/00

Status: Abandoned Water Inj Well  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)





Data As Of: 2011-11 (MB)  
 From: 1983-08  
 To: 2011-11

INDIVIDUAL PRODUCTION  
 Waskada Unit No. 4 Prov.  
 102/08-24-001-26W1/00

Status: Capable Of Oil Prod  
 Field: WASKADA (03)  
 Pool: LOWER AMARANTH A (29A)

