



**Chevron**

January 2, 1996

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**Eastern Business Unit**

Manitoba Oil and Natural Gas  
Conservation Board  
327, 450 Broadway Avenue  
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Dear Sir:

**ROUTLEDGE UNIT NO. 1**

Enclosed for your information is the 1994 Routledge Unit #1 Annual Progress Report.

If you require additional information, please contact Mr. Larry Skow at (403) 234-5834.

Your truly,

A handwritten signature in cursive script, appearing to read "M. N. Currie".

M. N. CURRIE  
Office Assistant

**Routledge Unit No. 1**  
**Progress Report No. 25**  
**January 1, 1994 to December 31, 1994**

**Chevron Canada Resources**  
**Business Unit**  
**December 1995**

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## **Routledge Unit No. 1**

### **A. Introduction**

Routledge Unit No. 1 became effective May 1, 1970. A pilot waterflood has been in operation in the Unit since March 1974. This report summarizes the operations of the Unit for the period January 1, 1994 to December 31, 1994. The information is presented for the pilot pattern and for the whole pool. A map of the Unit area is presented as Figure 1 which also shows the pilot waterflood area.

### **B. Operations**

#### **1. Production**

Oil production for the Unit during the report period averaged 50.4 m<sup>3</sup>/d with a GOR of 16.4 m<sup>3</sup>/m<sup>3</sup> and a WOR of 31.3 m<sup>3</sup>/m<sup>3</sup>. This compares with an average oil production rate of 54.6 m<sup>3</sup>/d and a GOR of 16 m<sup>3</sup>/m<sup>3</sup> during the previous report period. Cumulative field production to December 31, 1994 was 2,108,600 m<sup>3</sup>. Cumulative production since commencement of waterflood to December 31, 1994 was 869,736 m<sup>3</sup>. Details of production data are shown in Table 1 as well as graphically in attached figures.

#### **2. Water Injection Data**

Total water injected into the Pilot Waterflood Area during the report period averaged 69.1 m<sup>3</sup>/d. This compares with 63.5 m<sup>3</sup>/d injected during the previous report period. Cumulative water injected from commencement of waterflood to December 31, 1994 is 551 973 m<sup>3</sup>. Details of water injection data are shown in Table 1. Monthly injection wellhead pressure for the pilot injection well is shown in Table 1 and graphically in attached figures.

### **C. Reservoir Performance**

#### **1. Voidage**

The total voidage during the report period was 594 429 Rm<sup>3</sup>. The voidage replacement ratio was 0.64. Cumulative total voidage from commencement of production to December 31, 1994 was 20,350,726 Rm<sup>3</sup>. The oil formation volume factor is 1.06 Res. m<sup>3</sup>/m<sup>3</sup>. Voidage calculations are shown on Table 1.

#### **2. Recovery**

Cumulative field production to December 31, 1994 is 2,109 x 10<sup>3</sup>m<sup>3</sup> oil. Ultimate Recovery is currently estimated to be 2,532 x 10<sup>3</sup>m<sup>3</sup> oil which is 25.9% of the estimated original oil-in-place of 9,776 x 10<sup>3</sup>m<sup>3</sup>.

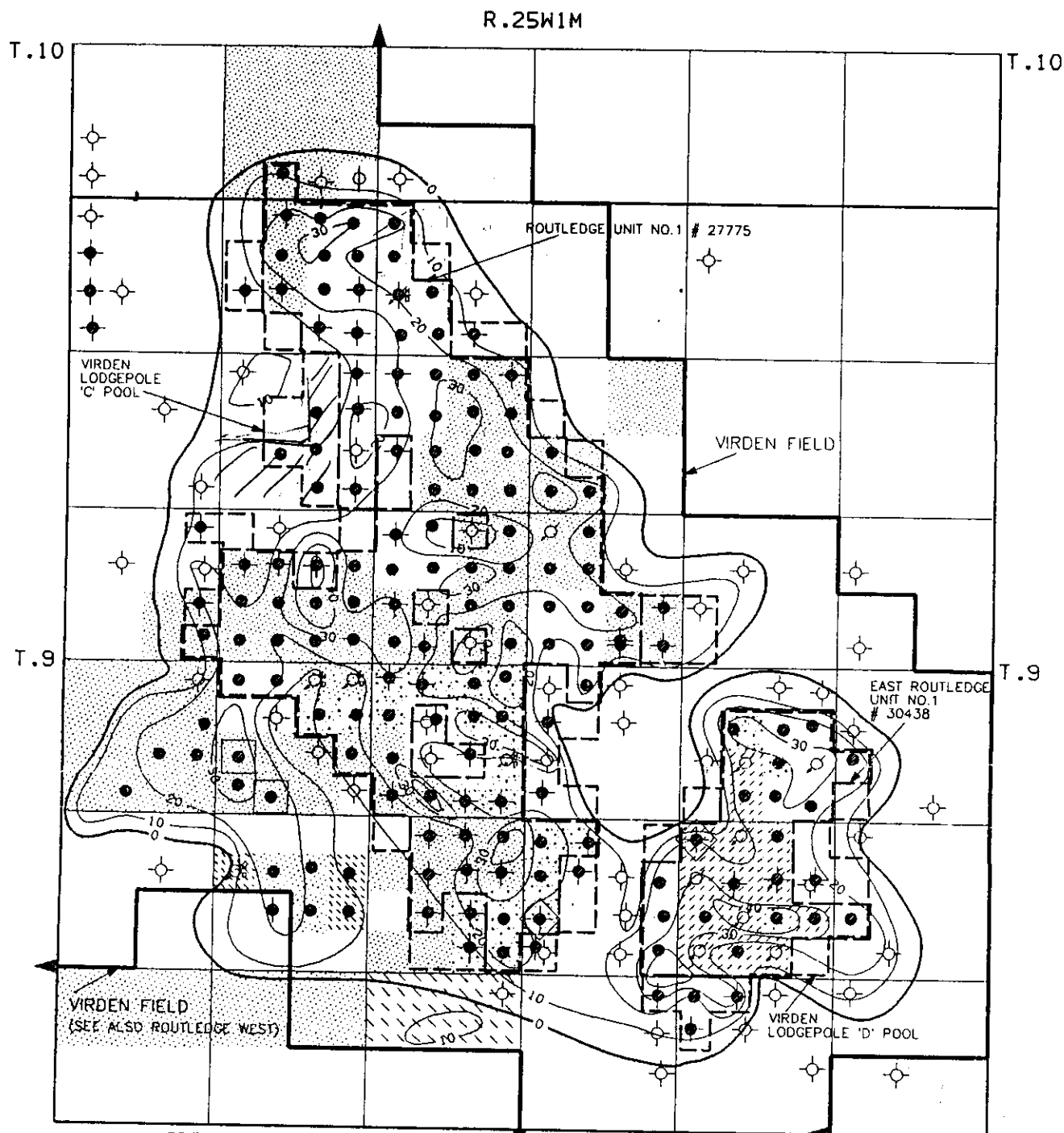
## Routledge Unit No. 1

### Field Operations Report

#### 3. Well Servicing Work

<u>Date</u>	<u>Well</u>	<u>Work Performed</u>
94-01	08-17-09-25	Corrosion inhibitor. Squeeze
94-01	10-08-09-25	Pump change; hole in tubing
94-01	06-20-09-25	Pump change; corrosion
94-03	01-09-09-25	Rig assisted inhibitor squeeze
94-03	08-09-09-25	Rig assisted inhibitor squeeze
94-03	16-09-09-25	Rig assisted dewax job; SI for 2 days; rig assisted corrosion inhibitor squeeze
94-03	03-16-09-25	Pump change; could not unseat packer; shot off tubing; left packer in hole; re-ran new packer & tubing; rig assisted corrosion inhibitor squeeze
94-03	05-16-09-25	Rig assisted corrosion inhibitor squeeze
94-03	13-17-09-25	Pump change; slow bleed off
94-03	04-20-09-25	Pump change and rig assisted corrosion inhibitor squeeze
94-03	08-20-09-25	Rig assisted corrosion inhibitor squeeze
94-04	13-17-09-25	Re-work; internal corrosion on 60 mm tubing; packer mandrel corroded
94-04	04-21-09-25	<b>PERMANENTLY ABANDONED</b>
94-05	11-22-09-25	Pump change; efficiency down
94-05	05-06-28-09	Pump change; debris
94-06	14-17-09-25	Pump change; stimulation
94-07	08-17-09-25	Corrosion inhibitor squeeze
94-08	09-20-09-25	Pump change
94-08	07-21-09-25	Pull rods
94-08	10-28-09-25	<b>SUSPENDED</b>
94-08	05-33-09-25	Acid stimulation
94-09	02-20-09-25	Pump change; worn pump; tubing replaced due to leak
94-10	01-09-09-25	Corrosion inhibitor squeeze
94-10	08-09-09-25	Corrosion inhibitor squeeze
94-10	16-09-09-25	Dewaxed pump; performed corrosion inhibitor squeeze
94-10	03-16-09-25	Corrosion inhibitor squeeze
94-10	05-16-09-25	Corrosion inhibitor squeeze
94-10	13-17-09-25	Corrosion inhibitor squeeze
94-10	04-20-09-25	Corrosion inhibitor squeeze
94-10	08-20-09-25	Corrosion inhibitor squeeze
94-10	05-27-09-25	<b>PERMANENTLY ABANDONED</b>
94-11	08-09-09-25	Pump change
94-11	01-19-09-25	<b>PERMANENTLY ABANDONED</b>
94-11	07-21-09-25	<b>PERMANENTLY ABANDONED</b>
94-11	05-22-09-25	Pump change; rods hanging up

FIGURE 1



ROUTLEDGE UNIT #1 - OPERATOR - CHEVRON CANADA  
CHEVRON UNIT PARTICIPATION 54.77844%  
EAST ROUTLEDGE UNIT #1 - OPERATOR SAMEKAN OIL 39.3%  
CHEVRON UNIT PARTICIPATION 20.2467%

LAND LEGEND

- 100% CHEVRON
- O.J.V.
- N.O.J.V.
- ROYALTY INTEREST
- GAS RIGHTS
- LICENCE

ROUTLEDGE  
TOTAL NET PAY  
LODGEPOLE MEMBERS

WELL LEGEND

- DRILLED AFTER OCT. 1989
- STATUS CHANGE IN 1990
- ID INSUFFICIENT DATA

WELLS UPDATED OCT. 1990

CUTOFFS:  $\mu = 7.5\%$   
 $K = 1 \text{ md}$

SCALE: 1 : 47 520

GEOLOGY UPDATED L. GIRARD 1988  
PROJECT: VIRDEN ROUTLEDGE

TABLE 1

Routledge Unit No. 1  
Whole Project

Month	Oil m3	Gas E3 m3	Water m3	GOR m3/m3	WOR m3/m3	Total Voidage Rm3	Water Injection m3	m3/d	Water Injection Pressure kPa	Voidage Replacement Ratio VRR
Jan-94	1,641.0	52.94	48,581.0	16.1	29.6	50,320.5	47,639.8	1,536.8	7900	0.95
Feb-94	1,493.1	53.33	45,160.4	16.3	30.2	46,743.1	43,224.0	1,543.7	5700	0.92
Mar-94	1,643.1	53.00	49,844.4	16.2	30.3	51,586.1	47,760.7	1,540.7	0	0.93
Apr-94	1,584.0	52.80	49,164.1	16.5	31.0	50,843.1	47,084.6	1,569.5	6100	0.93
May-94	1,557.5	50.24	49,697.5	16.5	31.9	51,348.5	47,908.4	1,545.4	6800	0.93
Jun-94	1,488.0	49.60	45,824.1	17.1	30.8	47,401.4	44,503.3	1,483.4	6000	0.94
Jul-94	1,541.8	49.74	47,444.2	16.3	30.8	49,078.5	45,726.7	1,475.1	6000	0.93
Aug-94	1,538.5	49.63	47,130.6	16.5	30.6	48,761.4	49,575.4	1,599.2	5800	1.02
Sep-94	1,424.8	47.49	44,939.8	16.6	31.5	46,450.1	2,410.0	80.3	5900	0.05
Oct-94	1,515.7	48.89	47,273.3	16.4	31.2	48,879.9	2,480.0	80.0	5900	0.05
Nov-94	1,449.7	48.32	48,339.1	16.3	33.3	49,875.8	1,040.0	34.7	5900	0.02
Dec-94	1,493.3	48.17	51,557.6	16.0	34.5	53,140.5	0.0	0.0	5900	0.00
Period Totals	18,370.5	50.35	574,956.1	16.4	31.3	594,428.8	379,352.9	1,040.7	5658	0.64
Cumulative to 31-Dec-94	2,108,600.0		18,115,610.0			20,350,726.0	16719432			0.82
Pre Unit Production	1,238,863.9		3,279,857.9							
Cumulative to date since commencement of waterflood	869,736.1		14,835,752.1							

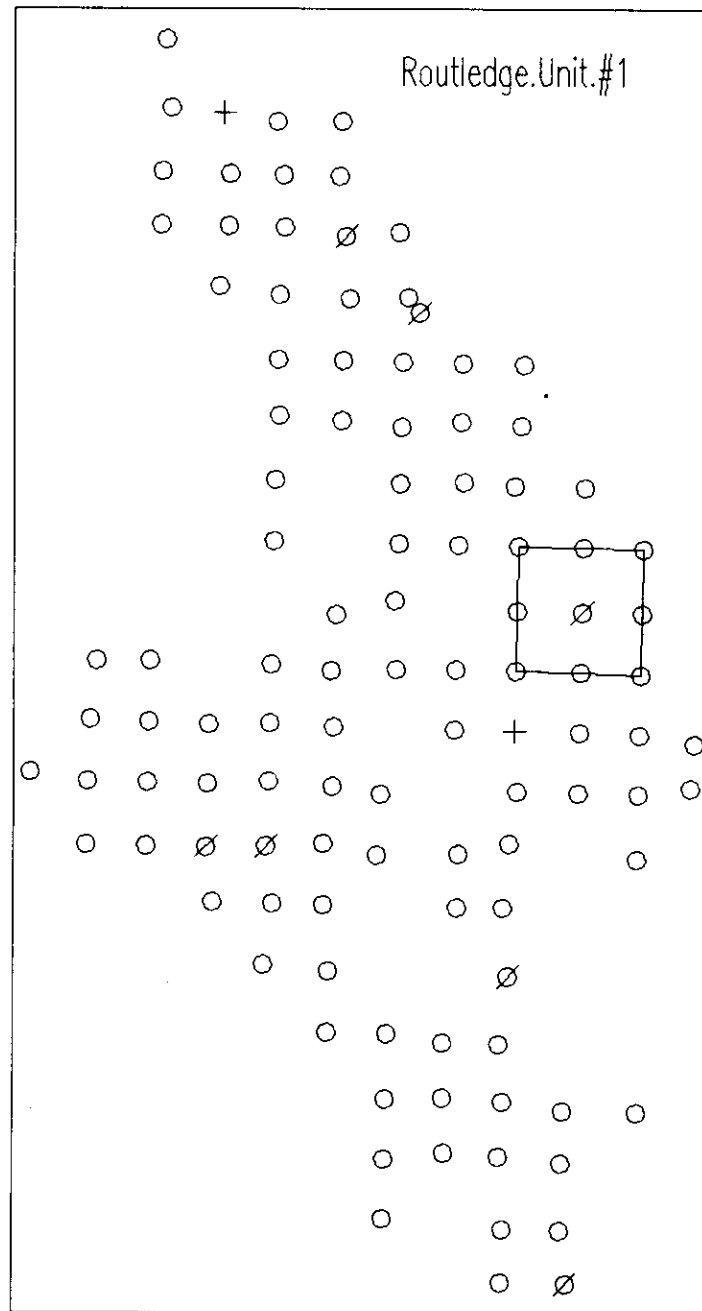
TABLE 1

Routledge Unit No. 1  
Pattern 1

Month	Oil m3	Gas E3 m3	E3 m3/d	Water m3	m3/d	GOR m3/m3	WOR m3/m3	Total Voidage Rm3	Water Injection m3	m3/d	Water Injection Pressure kPa	Voidage Replacement Ratio VRR
Jan-94	85.7	2.76	0.00	1,203.7	38.83	0.0	14.0	1,294.5	2,480.0	80.0	7900	1.92
Feb-94	78.2	2.79	0.00	1,040.1	37.15	0.0	13.3	1,123.0	2,240.0	80.0	5700	1.99
Mar-94	90.4	2.92	0.00	1,151.0	37.13	0.0	12.7	1,246.8	2,480.0	80.0	0	1.99
Apr-94	89.1	2.97	0.00	1,088.3	36.28	0.0	12.2	1,182.6	2,220.0	74.0	6100	1.88
May-94	84.2	2.72	0.00	1,104.4	35.63	0.0	13.1	1,193.7	2,480.0	80.0	6800	2.08
Jun-94	78.6	2.62	0.00	830.2	27.67	0.0	10.6	913.5	2,400.0	80.0	6000	2.63
Jul-94	74.6	2.40	0.00	1,082.3	34.91	0.0	14.5	1,161.3	2,480.0	80.0	6000	2.14
Aug-94	75.4	2.43	1.18	1,148.1	37.04	15.6	15.2	1,228.0	2,480.0	80.0	5800	2.02
Sep-94	69.2	2.31	1.10	1,107.5	36.92	15.9	16.0	1,180.8	2,410.0	80.3	5900	2.04
Oct-94	77.1	2.49	1.23	1,142.0	36.84	15.9	14.8	1,223.7	2,480.0	80.0	5900	2.03
Nov-94	71.3	2.38	1.10	1,128.5	37.62	15.4	15.8	1,204.1	1,040.0	34.7	5900	0.86
Dec-94	77.3	2.49	1.20	1,271.8	41.03	15.5	16.5	1,353.7	0.0	0.0	5900	0.00
Period Totals	951.0	2.61	5.80	13,297.8	36.42	6.5	14.1	14,305.8	25,190.0	69.1	5658	1.76
Cumulative to 31-Dec-94	26,977.4	1,073.8		211,762.7				240,358.7	551,973.1			2.30
Cumulative to 31-Dec-93	26,026.4	1,068.0		198,465.0								

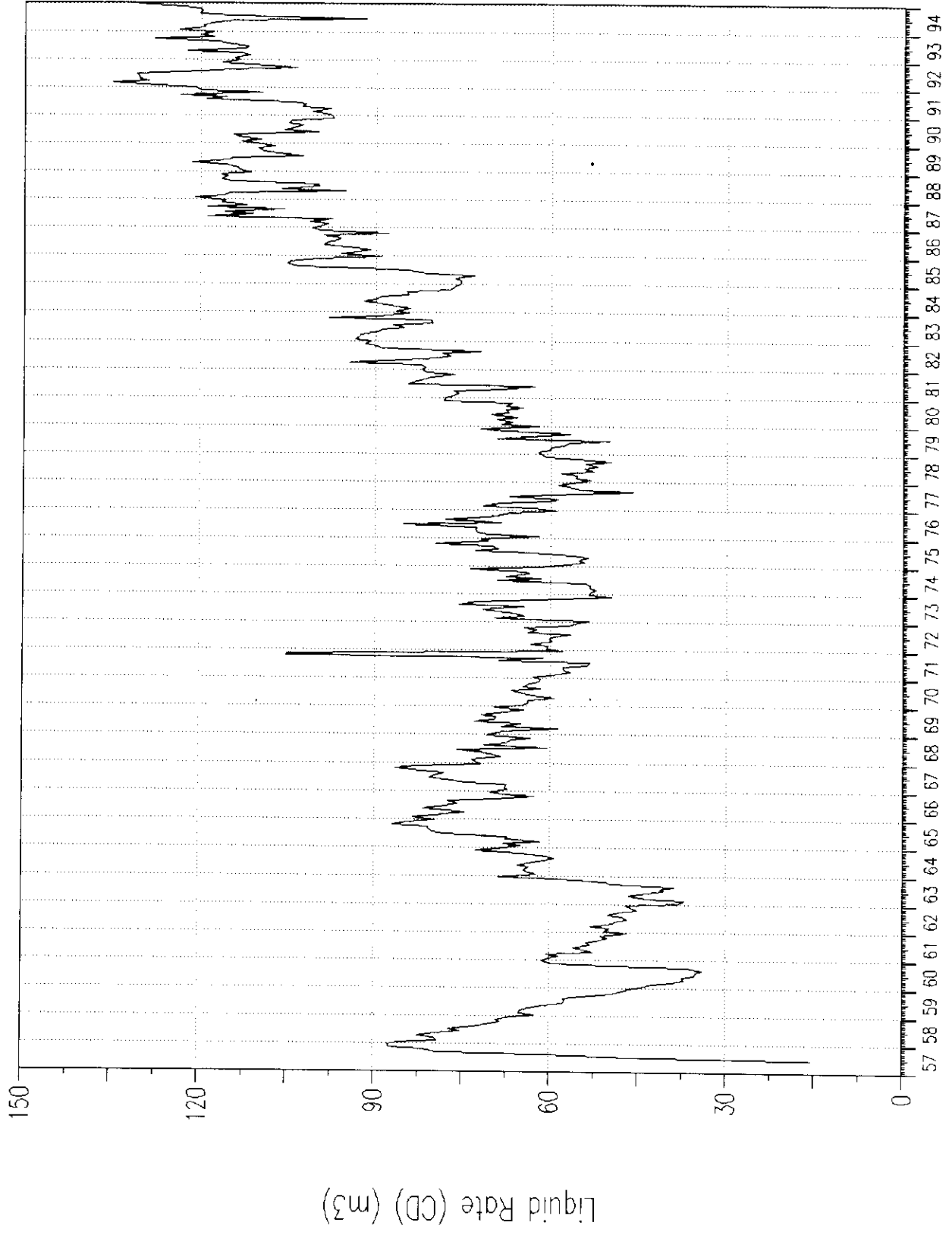


FIGURE 2



○ Oil Producer    ∅ Water Injector    + Plugged & Abandoned

Routledge Unit 1  
Pattern #1



Routledge Unit 1  
13-22

