~~Simplot Chandler Lease~~ Application
Deepwell Disposal
2-17-10-18 & 11-18-10-18

FIELD / POOL FILE

NEW FILE

WASKADA
L. ATHABASCA
REDUCED
SPACING

~~NGE~~
~~WASKADA, DRILLING~~
~~PROGRAM~~

NCE RESOURCES GROUP

2300 CANADA TRUST TOWER, 421 - 7th AVE. S.W., CALGARY, ALBERTA, CANADA T2P 4K9 TELEPHONE (403) 218-8625
OPERATIONS FAX 264-1256

TELECOPIER TRANSMISSION FORM

TO: John Fox

COMPANY: MB Energy & Mines

FAX NO.: 1-204-945-0586

FROM: LEIGH MUIR

PHONE NO: _____ **FAX NO:** (403) 264-1256

DATE: Oct 24/97

NO. PAGES (INCLUDING THIS PAGE): 5

John, Please disregard yesterdays fax & replace with this one!
Plse call if you would like to discuss.

This letter contains Reservoir pressures, instead of wellhead pres!

Leigh.

cc Norm McGregor - for your info!

IF YOU HAVE ANY QUESTIONS OR IF THERE ARE ANY PROBLEMS WITH TRANSMISSION PLEASE CONTACT KAREN BOSE AT (403) 218-8692.

NCE RESOURCES GROUP

2300 CANADA TRUST TOWER, 421-7th AVE. S.W.,CALGARY,ALBERTA,CANADA T2P 4K9 TELEPHONE (403) 218-8625 FAX (403) 269-5858

October 23, 1997

Manitoba Energy and Mines
Petroleum & Energy Branch
#360, 1395 Ellice Avenue
Winnipeg, MB R3G 3P2

Attention: Mr. John Fox, P. Eng.
Chief Petroleum Engineer

Dear Sir;

Re: Reservoir Pressure for Infill Drilling Program
Lower Amaranth Formation
Proposed Locations:
16B-25-01-26-W1M, and
02B-24-01-26-W1M
Waskada Field, Manitoba

In accordance with your request, attached please find the data gathered from the nearest injection/producing well(s) during the past week, in an effort to identify the reservoir pressure within the vicinity of the new infill well locations. Also, below is our interpretation of this data:

A) Infill Location 16B-25-01-26

i) Injector Location: 15-25-01-26-W1M

Shut-in on: Oct 15, 1997 @ 1:45 PM

Shut-in Res. Press: 17,500 KPa (initial reservoir press. upon shut-in)

Shut-in Res. Press: **13,335 KPa,** (reservoir press. after 8 days from shut-in, ie. on Oct 23, 1997 @ 9:00 AM)

ii) Producer Location: 10-25-01-26-W1M

Shut-in on: Oct 17, 1997

Shut-in Res. Press: 517 KPa (initial reservoir press. upon shut-in)

Shut-in Press: **1,255 KPa,** (reservoir press. after 6 days from shut-in, from casing pressure and fluid level survey, assuming a salt water gradient)

The above data indicates that the possible range of reservoir pressure that could be encountered would be 1,255-13,335 KPa.

B) Infill Location 02B-24-01-26

i) Injector Location: 15-13-01-26-W1M

Shut-in on: Oct 15, 1997 @ 1:35 PM

Shut-in Press: 12,685 KPa (initial reservoir press. upon shut-in)

Shut-in Press: **11,935 KPa,** (after 8 days form shut-in, ie. on Oct 23, 1997 @ 10:00 AM)

The above data indicates that the highest reservoir pressure that could be encountered would be 11,935 KPa.

Therefore, over-pressuring of the Lower Amaranth formation may exist to a modest degree in isolated "pockets" surrounding certain injectors where reservoir quality is very tight. (ie. as is evidenced by the historically low injection rates and high injection pressures) To ensure that all appropriate precautions are taken, we have arranged for a truckload ofbarrite weight material to be on stand-by in Waskada, to be used in the event of encountering high reservoir pressures while drilling the infill wells.

If you would like to discuss the above information in further detail, please contact the undersigned at (403) 218-8715.

Yours truly,
NCE RESOURCES GROUP INC.

Leigh Muir, P. Eng.
Petroleum Engineer

Attach 1: 15-25 and 15-13,
Attach 2: 10-25.

WATER INJECTION
WELLHEAD PRESSURES

LOCATION	DAY/DATE	TIME	WELLHEAD PRESSURE	
	OCTOBER			
15-25-1-28	WED.15th	1:45 pm	7550 kPa +	9535KPa = 17,085 KPa
	THUR.16th	9:00 am	7000 kPa	
	FRI. 17th	9:00 am	5900 kPa	sucked 1.6 H2O
	SAT.18th	9:00 am	5050 kPa	
	SUN.19th	9:00 am	4900 kPa	sucked 1.4 H2O
	MON.20th	9:00 A.M.	4500 KPA	sucked 1.1 H2O
	TUES.21st	9:00 A.M.	4200 KPA	sucked 1.0 H2O
	WED.22nd	9:00 A.M.	4000 KPA	sucked 1.2 H2O
	THUR.23rd	9:00 A.M.	3800 KPA	
	FRI. 24th	HYDR +	9535	(9.81 KPa/m X 1.08 X 900 m)
			13,335 KPa.	
LOCATION	DAY/DATE	TIME	PRESSURE	
	OCTOBER			
15-13-1-28	WED.15th	1:35 pm	3150 kPa +	9535KPa = 12,685 KPa
	THUR.16th	10:20 am	3050 kPa	
	FRI. 17th	10:20 am	3000 kPa	sucked 0.795 H2O
	SAT.18th	10:20 am	2800 kPa	
	SUN.19th	10:20 am	2700 kPa	sucked 1.1 H2O
	MON.20th	10:20 A.M.	2600 KPA	sucked 1.2 H2O
	TUES.21st	10:00 A.M.	2400 KPA	sucked 1.0 H2O
	WED.22nd	10:00 A.M.	2400 KPA	
	THUR.23rd	10:00 A.M.	2400 KPA	
	FRI. 24th	+	9535	
			11,935 KPa.	

Post-it Fax Note 7671E | Date | # of pages ▸ 3
To Leigh Mun | From
Co./Dept. | Co.
Phone # | Phone #
Fax # | Fax #

ATTACH #1

[redacted]

WELLHEAD PRESSURES

LOCATION	DAY/DATE	TIME	CHP PRESSURE	
	OCTOBER			
10-25-1-26	WED.15th			
	THUR.16th			
	FRI. 17th	SHUT-IN	75 psi	95 jts
	SAT.18th			
	SUN.19th			93 jts
	MON.20th			
	TUES.21st			
	WED.22nd			
	THUR.23rd		NE 1400 Kpa	90 jts
	FRI. 24th			

517 KPa

75 psi

CHP = ~~800~~ 800 KPa (116 psi)

X 9.6 m

864 m

- 907 m TOP PERF

43 m

X 9.81 KPa/m

X 1.08 S.G. S.W.

1) HYD 455 KPa

2) CHP 800 KPa

TOTAL EST RES. PRESS : 1255 KPa (6 day SI)

ATTACH #2

NCE RESOURCES GROUP

2300 CANADA TRUST TOWER, 421 - 7th AVE. S.W., CALGARY, ALBERTA, CANADA T2P 4K9 TELEPHONE (403) 218-8625
OPERATIONS FAX 264-1256

TELECOPIER TRANSMISSION FORM

TO: John FOX

COMPANY: MB E&M

FAX NO.: 1-204-945-0586

FROM: L. MUIR

PHONE NO: 403-218-8715 **FAX NO:** (403) 264-1256

DATE: oct 17/97

NO. PAGES (INCLUDING THIS PAGE): 2

John,

Here is the press data for 11A-8, currently collecting rest of data & will FAX on MON/TUES next week.

Leigh

IF YOU HAVE ANY QUESTIONS OR IF THERE ARE ANY PROBLEMS WITH TRANSMISSION PLEASE CONTACT KAREN BOSE AT (403) 218-8692.

NCE RESOURCES GROUP

2300 CANADA TRUST TOWER, 421-7th AVE. S.W.,CALGARY,ALBERTA,CANADA T2P 4K9 TELEPHONE (403) 218-8625 FAX (403) 269-5858

October 17, 1997

Manitoba Energy and Mines
Petroleum & Energy Branch
#360, 1395 Ellice Avenue
Winnipeg, MB R3G 3P2

Attention: Mr. John Fox, P. Eng.
Chief Petroleum Engineer

Dear Sir;

Re: Reservoir Pressure for Infill Drilling Program
Lower Amaranth Formation
Proposed Location 11A-8-2-25-W1M
Waskada Field, Manitoba

In accordance with your request, below please find the estimated reservoir pressure obtained from the nearest injection well to the above proposed infill location:

Injector Location:	5-8-2-25-W1M
Shut-in on:	Oct 15, 1997 @ 1:25 PM
Shut-In Press:	800 Kpa
Additional Press:	0 Kpa on Oct 16, 1997 @ 10:30 AM 0 Kpa on Oct 17, 1997 @ 10:30 AM

Therefore, without knowing the fluid level in the tubing at 5-8 but assuming that it is full, the maximum reservoir pressure can be estimated a follows:

9482 KPa = 890m x 9.81 Kpa/m x 1.086 (80,000 ppm).

Therefore, it is not expected that blowout conditions will exist upon penetrating the Lower Amaranth formation in the 11A-8-2-25 W1M well.

Yours truly,
NCE RESOURCES GROUP INC.

Leigh Muir, P. Eng.
Petroleum Engineer

Manitoba

Memorandum

Date October 7, 1997

To John Fox, P. Eng.
MB Energy & Mines
Petroleum & Energy Branch
360, 1395 Ellice Ave. Winnipeg, MB R3G 2P3

From Terry Brown, Manager
Com. Ec. Dev. Services
P.O. Box 389
Deloraine, MB R0M 0M0

Telephone

Subject **REDUCED WELL SPACING - WASKADA OILFIELD**

Please be advised that the Deloraine Office for Rural Development has no concerns with the application for reduced well spacing in the Waskada Oilfield.

First | Fold

Terry Brown
Regional Manager

*lmm

cc Ed Sawatsky

FEED FAX THIS END

FAX

To: John Fox
Dept.: Energy + Mines
Fax No.: 945-0586
No. of Pages: One
From: Terry Brown
Date: 10/7/97
Company:
Fax No.:
Comments:

Post-it fax pad 7903E

PS-1-25 894-01-00930

Manitoba Agriculture MEMO

Soils and Crops Branch · Box 1149 · Carman, MB · R0G 0J0
(Phone: 204 745-2040) · (Fax: 204 745-2299)

Date: October 3, 1997

To: John Fox, P.Eng.
Petroleum & Energy Branch
Manitoba Energy & Mines
360-1395 Ellice Avenue
Winnipeg,MB R3G

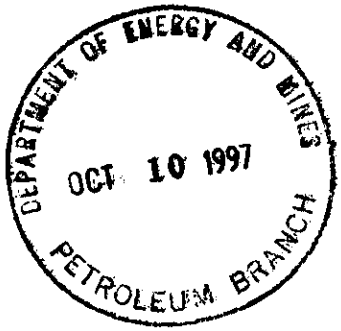
From: Ken McGill, Manager
Soil Resource Section

Subject: Reduced Spacing Application - Waskada Field

I have reviewed the NCE Resources Group application to drill three wells on reduced spacing in the Waskada Field on SE4-24-26W, NE4-25-26W and, NW8-2-25W.

Clearly, the indicated locations of these proposed wells will pose a nuicance to the land manager. However, assuming the company can reach a satisfactory agreement with the land owners, I have no additional concerns.

Ken McGill
Manager



October 15, 1997

Mr. Leigh Muir, P.Eng.
Petroleum Engineer
NCE Resources Group
2300 Canada Trust Tower
421-7th Avenue SW
Calgary AB T2P 4K9

Dear Mr. Muir:

Re: Reduced Spacing Application - Waskada Field

Attached is copy of Ministerial Spacing Order No. 13 establishing three (3) additional special spacing units in the Waskada Field. Ministerial Spacing Order No. 13 also includes four (4) special spacing units in Waskada Unit No. 4, previously approved under Board Order No. SU 7 dated January 23, 1991.

The following well siting conditions apply to any infill well drilled under this order:

1) only non built-up roads are to be used to access the infill wells, and where feasible, the infill wells are to be located on existing access roads;

2) NCE is to minimize the actively used portion of the well site;

3) approval of the RM of Arthur or Brenda is required for any well to be located less than 45 m from a municipal road allowance; and

4) NCE is to install underground hydro and run flowlines to the infill wells to minimize the disruption of agricultural operations.

The Branch has not received a waterflood progress report for the Waskada Lower Amaranth units, as required under Section 73 of the Drilling and Production Regulation, since 1992. As a result no recent technical data is available to evaluate waterflood performance or to evaluate the infill well recovery predictions submitted by NCE in its application.

Omega drilled four infill wells on 4 ha spacing in Waskada Unit No. 4 in 1991. The company estimated the infill wells would have initial productivity of 2 m^3/d per well and

recover an additional 3.3% OOIP or 4000 m^3 per well. Initial productivity for the 1991 infill wells was 2.3 m^3/d per well and the incremental recoverable reserves are estimated at 1800 m^3 per well, less than 1/2 the original estimate. Factors that may have affected the 1991 infill well performance such as low reservoir pressure and inadequate voidage replacement were not addressed in NCE's application.

NCE is requested to run a pressure survey to determine the average reservoir pressure at each of the infill wells. Results of the pressure surveys are to be submitted to the Branch. NCE is also requested to submit an evaluation of the infill drilling project with its 1997 waterflood progress report, due by March 1, 1998. The evaluation is to include the following information:

(1) current reservoir pressure and current and cumulative VRR information for the infill project areas;

(2) a depletion strategy for maximizing recovery from the Lower Amaranth and Mission Canyon formations including proposed waterflood modifications and injection targets; and

(3) potential for expanding infill drilling including comments on the merits of horizontal drilling.

The special reduced spacing applies to both the Amaranth and Mission Canyon formations. Where the Mission Canyon is not unitized and there are different royalty or working interest owners in a special spacing unit, as is the case with the proposed 2B-24-1-26 well and the existing 4C-24-1-26 well, all interests in the special spacing unit must be pooled before the well can be produced from the Mission Canyon. NCE may want to review the feasibility of vertically enlarging the units in the Waskada Field, where possible, to include both the Amaranth and Mission Canyon formations. NCE is also required to apply for approval under Section 52 of the Drilling and Production Regulation, if it intends to commingle production from both zones.

Attached for your reference is a copy of the waterflood approval for the Waskada Lower Amaranth units. If you have any questions in respect of this matter, please contact John Fox, Chief Petroleum Engineer at (204) 945-6574.

Yours truly,

L. R. Dubreuil, Director
Petroleum and Energy

Manitoba

Action/Route Slip

DATE: September 30, 1997

TO: Bob Dubreuil

FROM: John Fox

Telephone: 945-6574

SUBJECT: Reduced Spacing Application - Waskada Unit No.'s 1, 4 & 8

NCE Resources Group has applied for reduced spacing for a single well in each of Waskada Unit No.'s 1, 4 & 8. NCE has secured a rig to drill the infill wells starting in mid-October.

Recommendation

Notice of the application has been sent to the Departments of Rural Development, Environment and Agriculture for their comments.

In order to expedite disposition of the application, NCE has been requested to obtain the consent of the surface owners for the infill locations. Provided all affected surface owners consent to the infill locations, it is recommended that

(a) public notice of the application be waived; and

(b) Ministerial Spacing Order No. 13 (attached) be issued approving special spacing units in the Waskada Field.

It is also recommended that well siting conditions, identical to those prescribed for Omega's 1991 infill program be included as part of the approval. Any additional comments and concerns from the other departments will be incorporated into the infill well siting conditions. NCE should also be required to submit a detailed evaluation of the infill wells and comment on additional infill drilling and waterflood modifications in its 1997 waterflood progress report.

Discussion

NCE has applied to drill three infill wells as outlined on Figure 1. The 2B-24-1-26 location in Waskada Unit No. 4 and the 6B-25-1-26 location in Waskada Unit No. 1 are located on 8 ha spacing. The 11A-8-2-25 location in Waskada Unit No. 8 is located on 4 ha spacing. NCE has indicated the infill locations are in areas where the existing wells are approaching their economic limit, and ultimate recovery from the Lower Amaranth is low. The company estimates the infill wells will recover an additional 1.2-3.0% of the OOIP in the infill project area. NCE's OOIP, current production, ultimate and incremental recovery predictions are listed on Table 1. NCE also indicated it may convert additional wells in the infill project areas to injection to create a line-drive versus the current 9-spot injection pattern (see Fig. 1). The Branch agrees with NCE's estimate of remaining recoverable reserves for the infill project areas. However, it is difficult to determine from the information provided, whether there is unswept oil at the proposed infill locations.

Omega drilled four infill wells on 4 ha spacing in Waskada Unit No. 4 in 1991. The company estimated the infill wells would have initial productivity of 2 m^3/d per well and recover an additional 3.3% OOIP or 4000 m^3 per well. Figure 2 is a combined production plot for the four 1991 infill wells. Initial production was 2.3 m^3/d per well but declined rapidly. Current daily production from the wells is 2.4 m^3/d. The ultimate recoverable reserves for the infill wells is 7100 m^3, less than 1/2 the original estimate.

NCE's infill project has targeted areas of low recovery. However, there is a large discrepancies between NCE's and Omega's estimates of OOIP for the 2B-24 infill project area. NCE estimates OOIP of 426.4 10^3m^3, compared to Omega's 1991 estimate of 183.8 10^3m^3, almost 57% less. Using Omega's OOIP estimate the ultimate recovery for the infill project area is 24% OOIP, not 10.4% OOIP as NCE predicted.

There are other factors that may affect the success of NCE's infill project that have not been addressed in the application. In 1991, the average reservoir pressure at the infill wells was only 4220 kPa, just slightly above the bubble point. A review of the proposed infill wells indicates some of the offsetting injectors are shut-in (see Fig. 1) and the infill project areas may not be receiving adequate pressure support. NCE has not provided any reservoir pressure or voidage replacement data in support of the infill locations, nor has the company outlined a depletion strategy.

NCE has not commented on the merits of using horizontal wells as an alternative to infill drilling. There is only one horizontal well drilled into the Lower Amaranth in the Waskada Field. The 9-25-1-26 horizontal well, just south of the proposed 16B-25 infill location was disappointing. The initial productivity of the 9-25 horizontal well was 6.6 m^3/d with recoverable reserves of 2460 m^3 (see Fig. 3).

It is suggested that the Branch treat NCE's infill drilling application as a pilot project and request the company provide an evaluation of the infill wells in its 1997 waterflood progress report that includes the following information:

(1) the current reservoir pressure and VVR data in the infill project areas;

(2) a depletion strategy for maximizing recovery from the Lower Amaranth and Mission Canyon formations including proposed waterflood modifications and injection targets; and

(3) potential for expanding infill drilling including comments on the merits of horizontal drilling.

A copy of the application has been forwarded to the Departments of Rural Development, Environment and Agricultural for their comments. The departments have been asked to comment by October 3, 1997 to accommodate NCE's drilling window. The proposed infill wells are located on agricultural land. The other department's comments on Omega's 1991 infill drilling are attached . Any additional comments and concerns from the other departments will be incorporated into the infill well siting conditions. It is proposed that the following well siting conditions, identical to those prescribed for Omega's 1991 infill program, be included as part of the approval:

(1) locating wells on existing access roads where feasible;

(2) minimizing the actively used portion of the well site;

(3) using non built-up roads; and

(4) installing underground hydro and running flowlines.

Normally applications for reduced spacing are advertised. It is suggested in this case, if NCE obtains the written consent of the surface owners, that notice of the application can be waived.

Provided the surface owners consent to the infill locations, it is recommended that Ministerial Spacing Order No. 13 (attached) be issued approving special spacing units in the Waskada Field.

SPACING ORDER NO. 13

Pertaining to Special Spacing Units for the Amaranth and Mission Canyon Formations in the Waskada Field

1. Schedules A and B outline special spacing units in the Waskada Field, for the purpose of producing oil from the Amaranth and Mission Canyon formations.

2. The target area of each special spacing unit shall be as outlined on Schedules A and B.

3. Board Order No. SU 7 dated January 23, 1991 is hereby rescinded.

_____ Date

_____
Director of Petroleum for
Minister of Energy and Mines

Table 1

Reservoir, Production and Recovery Data

	Project Area					Infill Location					
Unit	OOIP	Current Production	Cumulative Production	Remaining Recoverable Reserves	Ultimate Recovery Factor	Infill Location	Reduced Spacing Unit	OOIP	Incremental Recoverable Reserves	Recovery Factor	Project Area Incremental Recovery Factor
	m^3	m^3/d	m^3	m^3	%		ha	m^3	m^3	%	%
Waskada Unit No.1	450549	3.1	27586	1924	6.5	16B-25-1-26	8	56386	6400-12800	12.0-24.1	1.5-3.0
Waskada Unit No. 4	426356	2.3	43247	906	10.4	2B-24-1-26	8	53607	6800-13500	12.6-25.2	1.5-3.0
Waskada Unit No. 8	547851	4.3	48351	8824	10.4	11A-8-2-25	4	23296	6600-13700	28.3-58.8	1.2-2.5

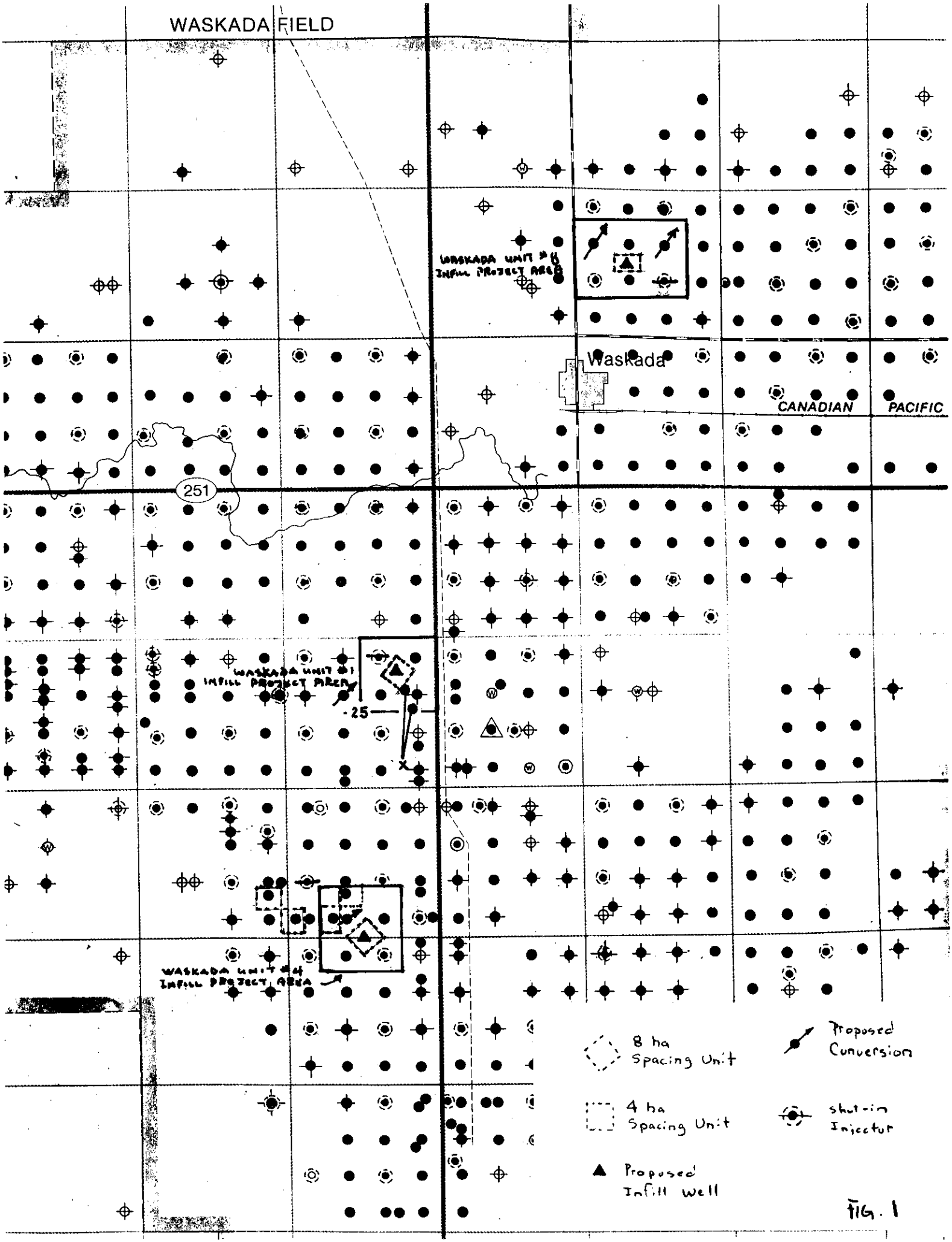

WASKADA FIELD
WASKADA UNIT #4
INFILL PROJECT AREA
Waskada
CANADIAN PACIFIC
251
-25
WASKADA UNIT #3
INFILL PROJECT AREA
WASKADA UNIT #4
INFILL PROJECT AREA
8 ha
Spacing Unit
4 ha
Spacing Unit
Proposed
Infill well
Proposed
Conversion
shut-in
Injector

FIG. 1

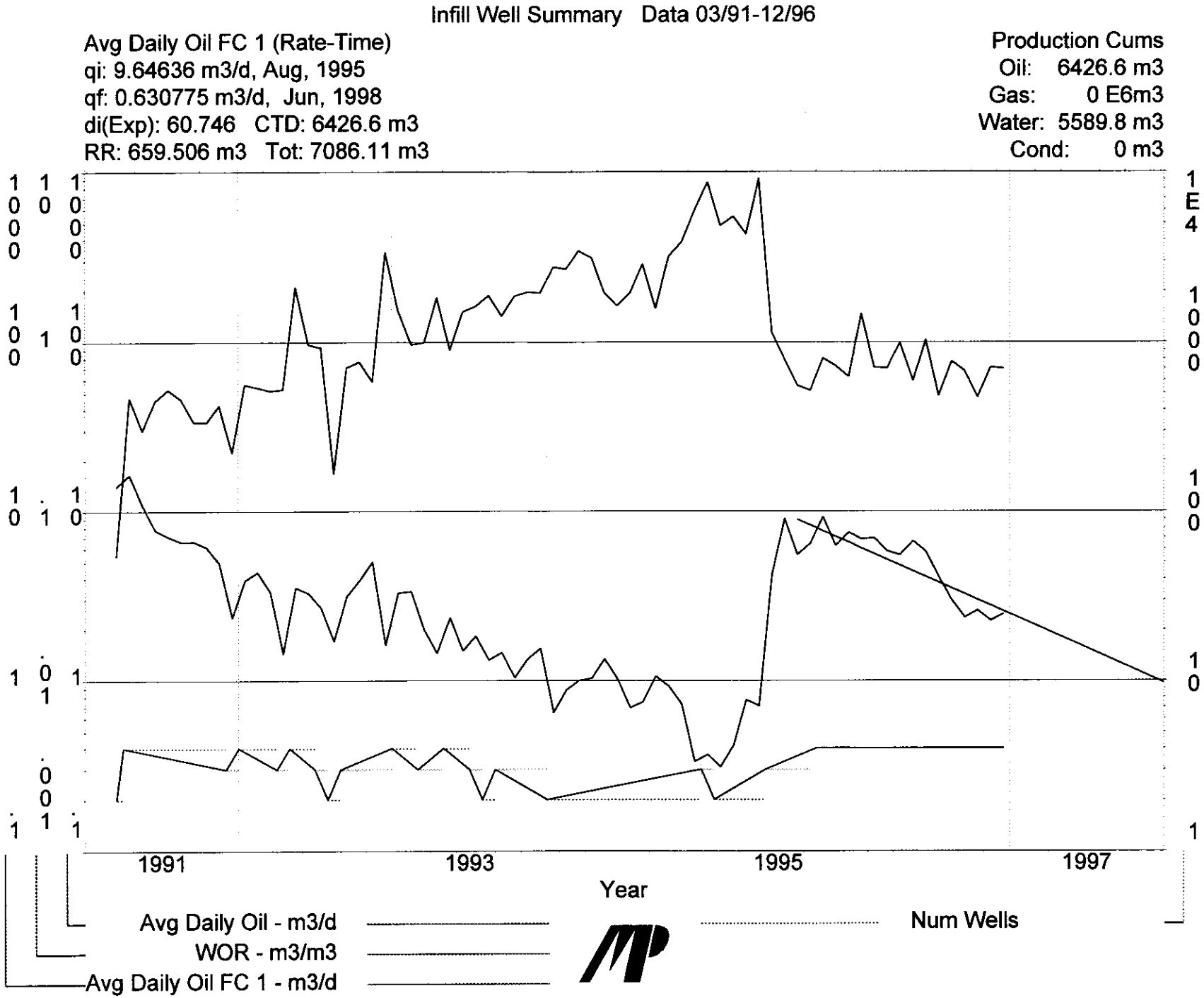

Infill Well Summary Data 03/91-12/96
Avg Daily Oil FC 1 (Rate-Time)
qi: 9.64636 m3/d, Aug, 1995
qf: 0.630775 m3/d, Jun, 1998
di(Exp): 60.746 CTD: 6426.6 m3
RR: 659.506 m3 Tot: 7086.11 m3
Production Cums
Oil: 6426.6 m3
Gas: 0 E6m3
Water: 5589.8 m3
Cond: 0 m3
1991
1993
1995
1997
Year
Avg Daily Oil - m3/d
WOR - m3/m3
Avg Daily Oil FC 1 - m3/d
Num Wells

FIG. 2

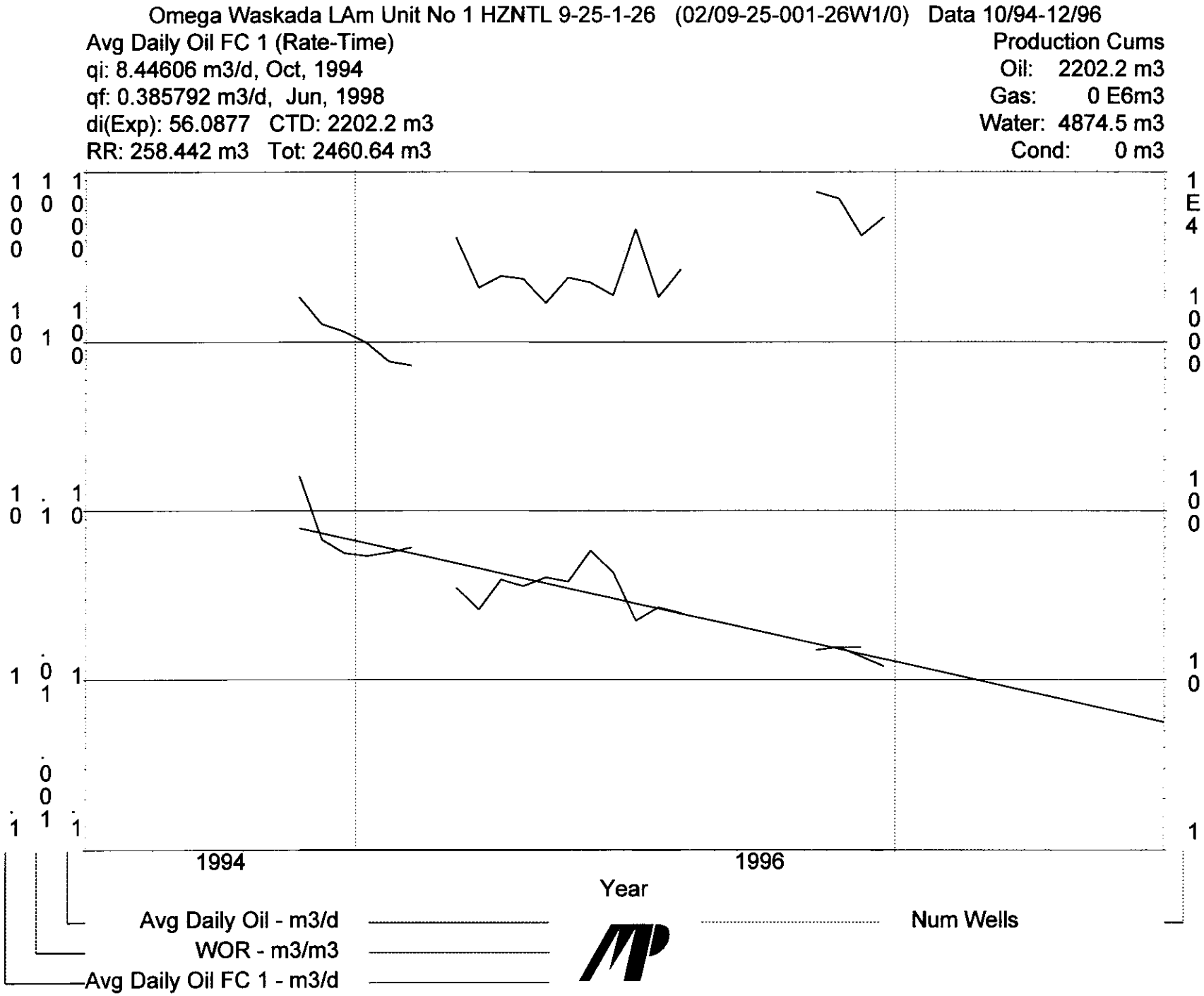

Omega Waskada LAm Unit No 1 HZNTL 9-25-1-26 (02/09-25-001-26W1/0) Data 10/94-12/96
Avg Daily Oil FC 1 (Rate-Time)
qi: 8.44606 m3/d, Oct, 1994
qf: 0.385792 m3/d, Jun, 1998
di(Exp): 56.0877 CTD: 2202.2 m3
RR: 258.442 m3 Tot: 2460.64 m3
Production Cums
Oil: 2202.2 m3
Gas: 0 E6m3
Water: 4874.5 m3
Cond: 0 m3
1994
1996
Year
Avg Daily Oil - m3/d
WOR - m3/m3
Avg Daily Oil FC 1 - m3/d
Num Wells

FIG. 3

ATTACHMENT 1

Memorandum

January 15, 1991

Mr. John N. Fox
Chief Petroleum Engineer
Petroleum Branch
555 - 330 Graham Ave.

From
Serge Scrafield
Acting Director
Provincial Planning
Rural Development
Telephone 405 - 800 Portage

Subject **WASKADA UNIT NO. 4**
~~**REDUCED SPACING PILOT PROJECT**~~

Thank you for sending to us a copy of Omega's application and additional information filed in support of their application.

Our Department's Field Office in Deloraine has reviewed the material and discussed the project proposal with the Reeve of the R.M. of Arthur and with your Department's inspector in Waskada.

The following concerns were raised:

- That there be proper set backs from municipal roads;
- That the results of the Pilot Project be made available to the municipality;
- That the company make every effort to reach satisfactory lease arrangements with the landowners involved; and
- That the company undertake effective and prompt remedial actions should there be any spills.

Should you receive, at anytime, a report on the Pilot Project from the company, we and the municipality would appreciate a copy.

Thank you very much for your attention.

for Serge Scrafield

SS\SP

c.c. Mr. G. D. Forrest
Mr. D. Johns
Mr. N. Carroll
Mr. T. Brown
Mr. D. Partridge

ATTACHMENT 2

toba

Memorandum

December 21, 1990

To John Fox
Chief Petroleum Eng.
Petroleum Branch
555-330 Graham Ave.

From J.R.D. Partridge, Chief
Land Utilization Section
Manitoba Agriculture
908 - 401 York Ave.
Winnipeg, MB.

Subject Reduced Spacing Pilot
Waskada Unit 4

Telephone 945-3837

First | Fold

We have reviewed the proposed reduced spacing project for four pilot wells on SE23 & SW24-1-26W, and in view of the proposed alignment of the new wells with existing wells, feel they will have much less adverse impact on farming operations than if they were sited on the L.S.D. corners as some previous proposals have been.

J.R.D. Partridge

oba

Memorandum

December 21, 1990

To John N. Fox
Chief Petroleum Engineer
Petroleum Branch
555- 330 Graham Avenue

From Floyd Phillips
Chief, Terrestrial
Quality Management

Telephone 945-7003

Subject Omega Hydrocarbons Reduced Spacing
Pilot Project

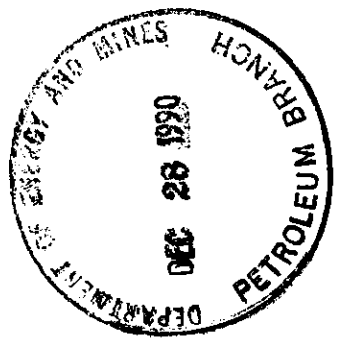
The Terrestrial Quality Section of Manitoba Environment is not concerned about the impacts of this reduced spacing pilot project.

Manitoba Environment is concerned about the potential loss of agricultural land and natural habitat which could result if reduced spacing proves to be viable and is expanded in the future. We realize that it is really up to the land owner to decide whether economic benefits adequately compensate for the loss of productive land and the inconvenience of more obstructions in the fields. Nevertheless we would want the proponent to make every effort to avoid positioning wells in agricultural fields or within the high water zone of potholes or creeks. The company should also avoid locations within natural bush or grassland habitat as much as possible. Wells should be located at the edge of fields, preferably along property boundaries and fence lines or at the edge of natural grassland or bush areas.

Thank you for giving us the opportunity of commenting on this proposal.

S. Floyd Phillips.

S. Floyd Phillips



Manitoba

Action/Route Slip

DATE: September 30, 1997

TO: Bob Dubreuil

FROM: John Fox

Telephone: 945-6574

SUBJECT: Reduced Spacing Application - Waskada Unit No.'s 1, 4 & 8

NCE Resources Group has applied for reduced spacing for a single well in each of Waskada Unit No.'s 1, 4 & 8. NCE has secured a rig to drill the infill wells starting in mid-October.

Recommendation

Notice of the application has been sent to the Departments of Rural Development, Environment and Agriculture for their comments.

In order to expedite disposition of the application, NCE has been requested to obtain the consent of the surface owners for the infill locations. Provided all affected surface owners consent to the infill locations, it is recommended that

(a) public notice of the application be waived; and

(b) Ministerial Spacing Order No. 13 (attached) be issued approving special spacing units in the Waskada Field.

It is also recommended that well siting conditions, identical to those prescribed for Omega's 1991 infill program be included as part of the approval. Any additional comments and concerns from the other departments will be incorporated into the infill well siting conditions. NCE should also be required to submit a detailed evaluation of the infill wells and comment on additional infill drilling and waterflood modifications in its 1997 waterflood progress report.

Discussion

NCE has applied to drill three infill wells as outlined on Figure 1. The 2B-24-1-26 location in Waskada Unit No. 4 and the 6B-25-1-26 location in Waskada Unit No. 1 are located on 8 ha spacing. The 11A-8-2-25 location in Waskada Unit No. 8 is located on 4 ha spacing. NCE has indicated the infill locations are in areas where the existing wells are approaching their economic limit, and ultimate recovery from the Lower Amaranth is low. The company estimates the infill wells will recover an additional 1.2-3.0% of the OOIP in the infill project area. NCE's OOIP, current production, ultimate and incremental recovery predictions are listed on Table 1. NCE also indicated it may convert additional wells in the infill project areas to injection to create a line-drive versus the current 9-spot injection pattern (see Fig. 1). The Branch agrees with NCE's estimate of remaining recoverable reserves for the infill project areas. However, it is difficult to determine from the information provided, whether there is unswept oil at the proposed infill locations.

Omega drilled four infill wells on 4 ha spacing in Waskada Unit No. 4 in 1991. The company estimated the infill wells would have initial productivity of 2 m^3/d per well and recover an additional 3.3% OOIP or 4000 m^3 per well. Figure 2 is a combined production plot for the four 1991 infill wells. Initial production was 2.3 m^3/d per well but declined rapidly. Current daily production from the wells is 2.4 m^3/d. The ultimate recoverable reserves for the infill wells is 7100 m^3, less than 1/2 the original estimate.

NCE's infill project has targeted areas of low recovery. However, there is a large discrepancies between NCE's and Omega's estimates of OOIP for the 2B-24 infill project area. NCE estimates OOIP of 426.4 10^3m^3, compared to Omega's 1991 estimate of 183.8 10^3m^3, almost 57% less. Using Omega's OOIP estimate the ultimate recovery for the infill project area is 24% OOIP, not 10.4% OOIP as NCE predicted.

There are other factors that may affect the success of NCE's infill project that have not been addressed in the application. In 1991, the average reservoir pressure at the infill wells was only 4220 kPa, just slightly above the bubble point. A review of the proposed infill wells indicates some of the offsetting injectors are shut-in (see Fig. 1) and the infill project areas may not be receiving adequate pressure support. NCE has not provided any reservoir pressure or voidage replacement data in support of the infill locations, nor has the company outlined a depletion strategy.

NCE has not commented on the merits of using horizontal wells as an alternative to infill drilling. There is only one horizontal well drilled into the Lower Amaranth in the Waskada Field. The 9-25-1-26 horizontal well, just south of the proposed 16B-25 infill location was disappointing. The initial productivity of the 9-25 horizontal well was 6.6 m^3/d with recoverable reserves of 2460 m^3 (see Fig. 3).

It is suggested that the Branch treat NCE's infill drilling application as a pilot project and request the company provide an evaluation of the infill wells in its 1997 waterflood progress report that includes the following information:

(1) the current reservoir pressure and VVR data in the infill project areas;

(2) a depletion strategy for maximizing recovery from the Lower Amaranth and Mission Canyon formations including proposed waterflood modifications and injection targets; and

(3) potential for expanding infill drilling including comments on the merits of horizontal drilling.

A copy of the application has been forwarded to the Departments of Rural Development, Environment and Agricultural for their comments. The departments have been asked to comment by October 3, 1997 to accommodate NCE's drilling window. The proposed infill wells are located on agricultural land. The other department's comments on Omega's 1991 infill drilling are attached . Any additional comments and concerns from the other departments will be incorporated into the infill well siting conditions. It is proposed that the following well siting conditions, identical to those prescribed for Omega's 1991 infill program, be included as part of the approval:

(1) locating wells on existing access roads where feasible;

(2) minimizing the actively used portion of the well site;

(3) using non built-up roads; and

(4) installing underground hydro and running flowlines.

Normally applications for reduced spacing are advertised. It is suggested in this case, if NCE obtains the written consent of the surface owners, that notice of the application can be waived.

Provided the surface owners consent to the infill locations, it is recommended that Ministerial Spacing Order No. 13 (attached) be issued approving special spacing units in the Waskada Field.

SPACING ORDER NO. 13

Pertaining to Special Spacing Units for the Amaranth and Mission Canyon Formations in the Waskada Field

1. Schedules A and B outline special spacing units in the Waskada Field, for the purpose of producing oil from the Amaranth and Mission Canyon formations.

2. The target area of each special spacing unit shall be as outlined on Schedules A and B.

3. Board Order No. SU 7 dated January 23, 1991 is hereby rescinded.

_____ Date

_____
Director of Petroleum for
Minister of Energy and Mines

	Table 1										
	Reservoir, Production and Recovery Data										
	Project Area					Infill Location					
											Project Area
Unit	OOIP	Current	Cumulative	Remaining	Ultimate	Infill	Reduced	OOIP	Incremental	Recovery	Incremental
		Production	Production	Recoverable	Recovery	Location	Spacing Unit		Recoverable	Factor	Recovery
				Reserves	Factor				Reserves		Factor
	m^3	m^3/d	m^3	m^3	%		ha	m^3	m^3	%	%
Waskada Unit No.1	450549	3.1	27586	1924	6.5	16B-25-1-26	8	56386	6400-12800	12.0-24.1	1.5-3.0
Waskada Unit No. 4	426356	2.3	43247	906	10.4	2B-24-1-26	8	53607	6800-13500	12.6-25.2	1.5-3.0
Waskada Unit No. 8	547851	4.3	48351	8824	10.4	11A-8-2-25	4	23296	6600-13700	28.3-58.8	1.2-2.5

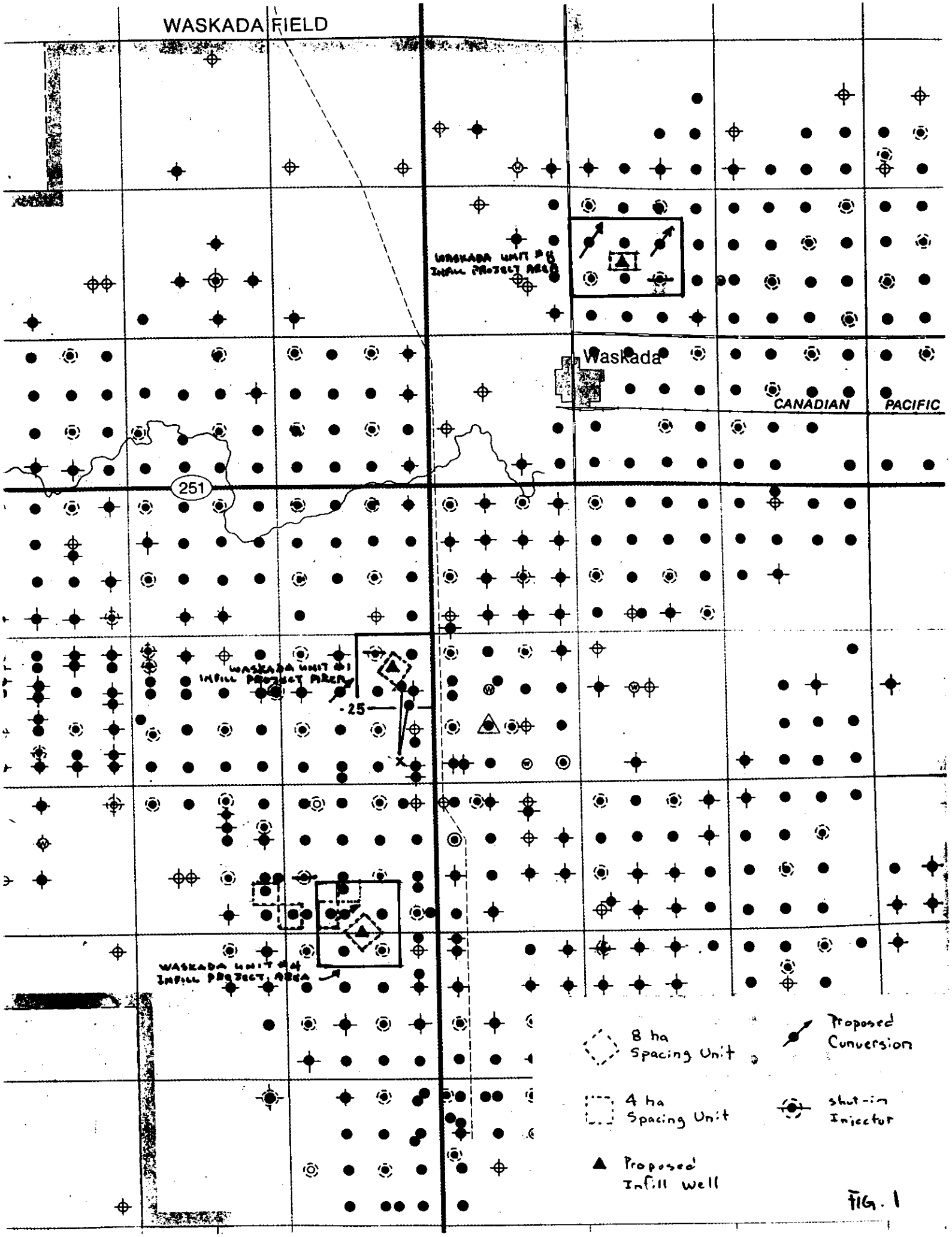

WASKADA FIELD
WASKADA UNIT #1
INFILL PROJECT AREA
Waskada
CANADIAN PACIFIC
251
-25
WASKADA UNIT #1
INFILL PROJECT AREA
8 ha
Spacing Unit
4 ha
Spacing Unit
Proposed
Infill Well
Proposed
Conversion
shut-in
Injector

FIG. 1

Infill Well Summary Data 03/91-12/96

Avg Daily Oil FC 1 (Rate-Time)
qi: 9.64636 m3/d, Aug, 1995
qf: 0.630775 m3/d, Jun, 1998
di(Exp): 60.746 CTD: 6426.6 m3
RR: 659.506 m3 Tot: 7086.11 m3

Production Cums
Oil: 6426.6 m3
Gas: 0 E6m3
Water: 5589.8 m3
Cond: 0 m3

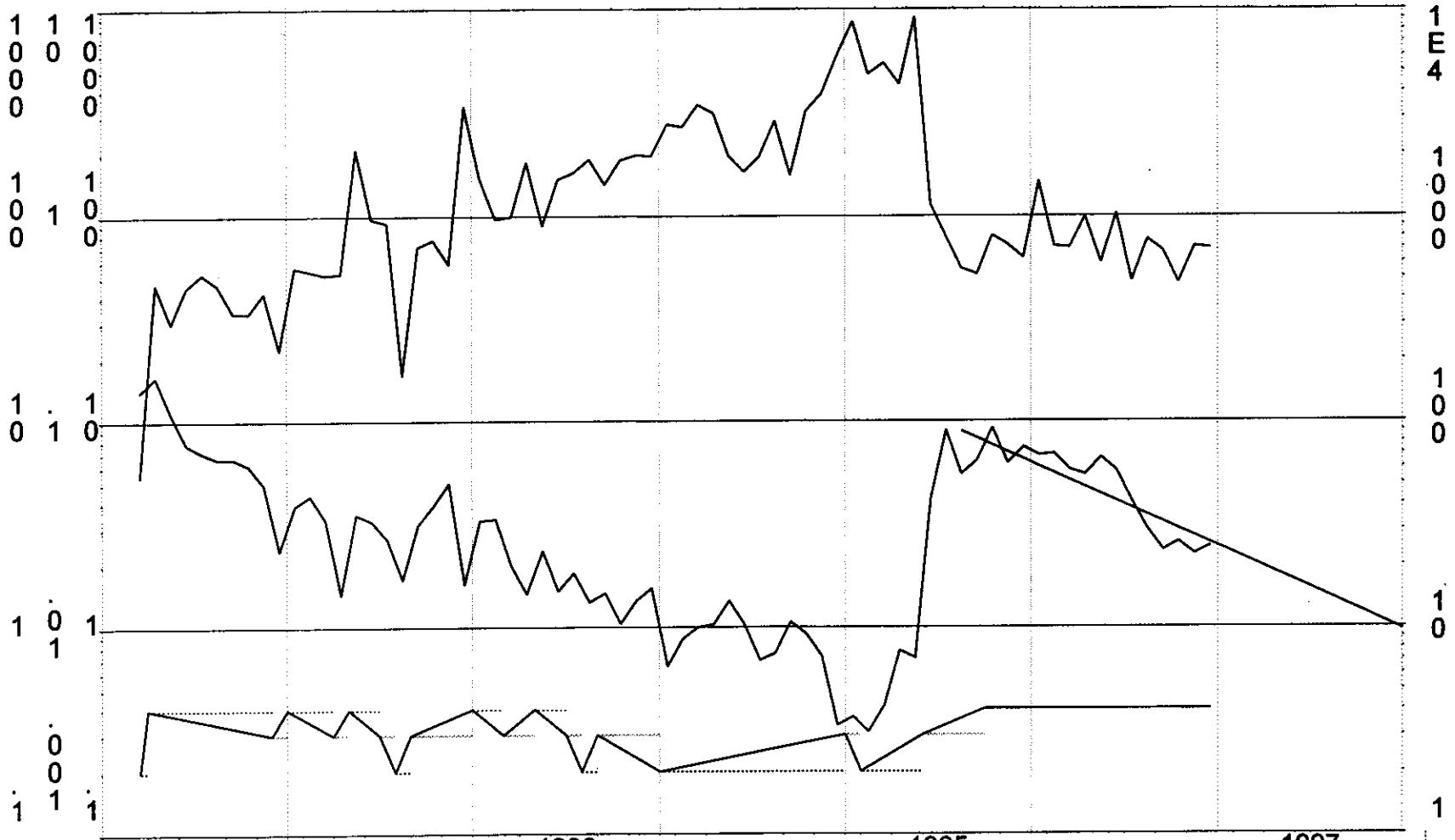


FIG. 2

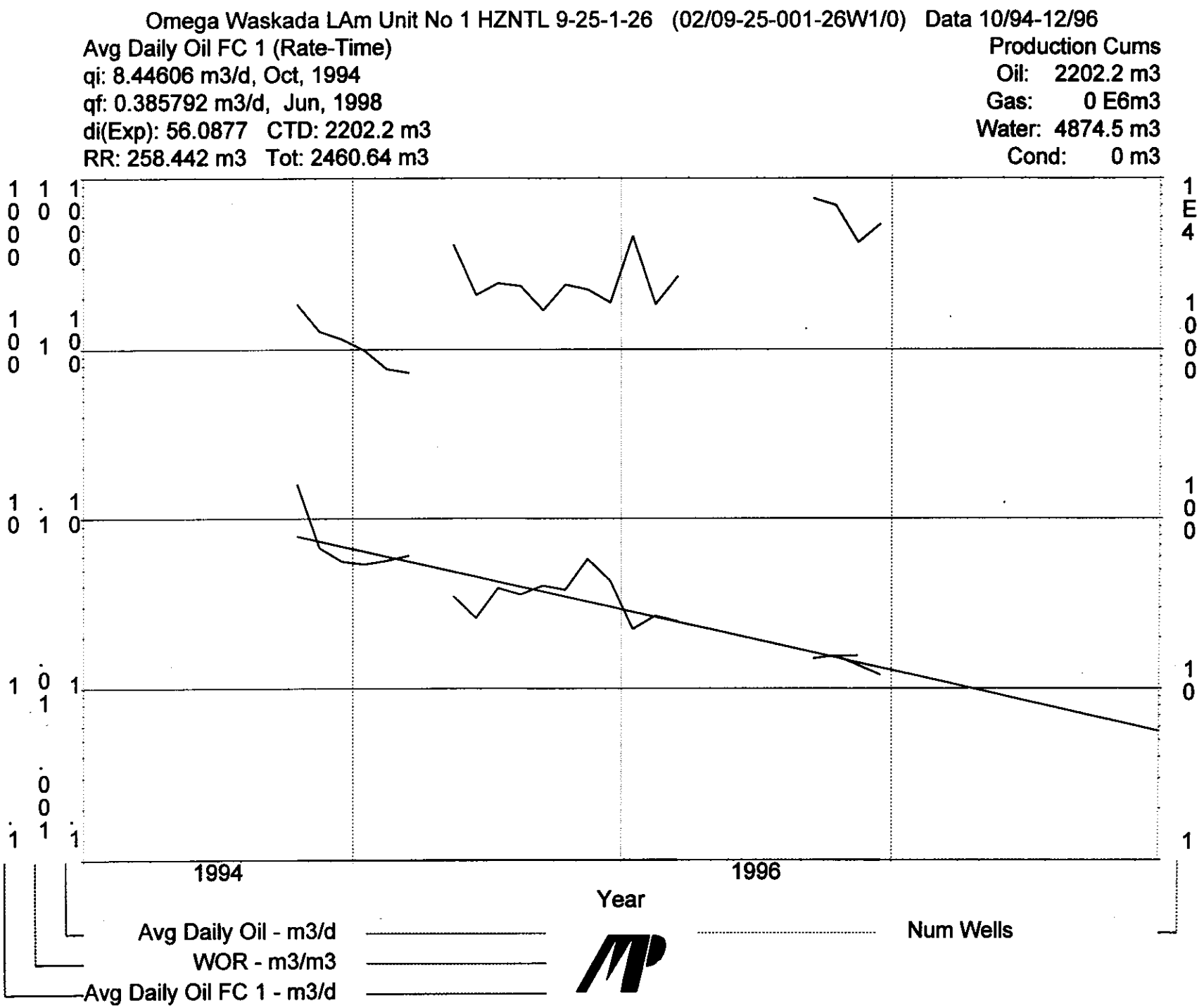

Omega Waskada LAm Unit No 1 HZNTL 9-25-1-26 (02/09-25-001-26W1/0) Data 10/94-12/96
Avg Daily Oil FC 1 (Rate-Time)
qi: 8.44606 m3/d, Oct, 1994
qf: 0.385792 m3/d, Jun, 1998
di(Exp): 56.0877 CTD: 2202.2 m3
RR: 258.442 m3 Tot: 2460.64 m3
Production Cums
Oil: 2202.2 m3
Gas: 0 E6m3
Water: 4874.5 m3
Cond: 0 m3
1994
1996
Year
Avg Daily Oil - m3/d
WOR - m3/m3
Avg Daily Oil FC 1 - m3/d
Num Wells

FIG. 3

ATTACHMENT 1

Memorandum

January 15, 1991

Mr. John N. Fox
Chief Petroleum Engineer
Petroleum Branch
555 - 330 Graham Ave.

From
Serge Scrafield
Acting Director
Provincial Planning
Rural Development
Telephone 945 - 800 Portage

Subject **WASKADA UNIT NO. 4**
~~**REDUCED SPACING PILOT PROJECT**~~

Thank you for sending to us a copy of Omega's application and additional information filed in support of their application.

Our Department's Field Office in Deloraine has reviewed the material and discussed the project proposal with the Reeve of the R.M. of Arthur and with your Department's inspector in Waskada.

The following concerns were raised:

- That there be proper set backs from municipal roads;
- That the results of the Pilot Project be made available to the municipality;
- That the company make every effort to reach satisfactory lease arrangements with the landowners involved; and
- That the company undertake effective and prompt remedial actions should there be any spills.

Should you receive, at anytime, a report on the Pilot Project from the company, we and the municipality would appreciate a copy.

Thank you very much for your attention.

for Serge Scrafield

SS\SP

c.c. Mr. G. D. Forrest
Mr. D. Johns
Mr. N. Carroll
Mr. T. Brown
Mr. D. Partridge

ATTACHMENT 2

...toba

Memorandum

Date: December 21, 1990

To: John Fox
Chief Petroleum Eng.
Petroleum Branch
555-330 Graham Ave.

From: J.R.D. Partridge, Chief
Land Utilization Section
Manitoba Agriculture
908 - 401 York Ave.
Winnipeg, MB.

Subject: Reduced Spacing Pilot
Waskada Unit 4

Telephone: 945-3837

First | Fold

We have reviewed the proposed reduced spacing project for four pilot wells on SE23 & SW24-1-26W, and in view of the proposed alignment of the new wells with existing wells, feel they will have much less adverse impact on farming operations than if they were sited on the L.S.D. corners as some previous proposals have been.

J.R.D. Partridge

PS-f-25 894-01-00271

oba

Memorandum

December 21, 1990

To John N. Fox
Chief Petroleum Engineer
Petroleum Branch
555- 330 Graham Avenue

From Floyd Phillips
Chief, Terrestrial
Quality Management

Telephone 945-7003

Subject Omega Hydrocarbons Reduced Spacing
Pilot Project

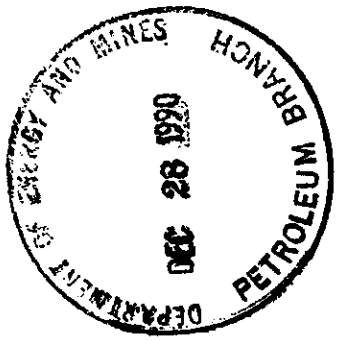
The Terrestrial Quality Section of Manitoba Environment is not concerned about the impacts of this reduced spacing pilot project.

Manitoba Environment is concerned about the potential loss of agricultural land and natural habitat which could result if reduced spacing proves to be viable and is expanded in the future. We realize that it is really up to the land owner to decide whether economic benefits adequately compensate for the loss of productive land and the inconvenience of more obstructions in the fields. Nevertheless we would want the proponent to make every effort to avoid positioning wells in agricultural fields or within the high water zone of potholes or creeks. The company should also avoid locations within natural bush or grassland habitat as much as possible. Wells should be located at the edge of fields, preferably along property boundaries and fence lines or at the edge of natural grassland or bush areas.

Thank you for giving us the opportunity of commenting on this proposal.

S. Floyd Phillips.

S. Floyd Phillips



Manitoba

Memorandum

Date: September 30, 1997

To: **John N. Fox**
Petroleum Engineer
Petroleum Branch
555-330 Graham Avenue

From: Floyd Phillips
Manager, Terrestrial Quality Mgmnt
Manitoba Environment
Bldg. 2, 139 Tuxedo Avenue
Winnipeg MB R3N 0H6

Telephone: (204) 945-7003

Subject **NCE Resources Group reduced spacing proposal - Waskada Field**

I have reviewed the proposal for the three infill wells and would like to be provided with additional information. Although there is a general statement that land use in the area is 80% agriculture, there is no site specific information on what the land use is at the proposed well sites. If the land use is cultivated fields, I do not have a concern. Although I am cognizant of the loss the agricultural land base in the area, I feel that the incremental loss of the land to three additional wells is not significant. If the land is naturally vegetated, there may be loss of habitat considerations. Since it appears that most of the land has been converted to agricultural uses, there must be a high priority on protection of natural lands for wildlife habitat. If the well site(s) are in natural areas, the company should investigate options to relocate the site to the edge of the natural area and away from any wetlands or natural drains.

Could you please provide me with site specific land use information for the proposed well locations and advise if any relocation is contemplated.

Floyd Phillips.

- SEND COPY OF SURVEY PLATS.

FAX MEMO

SCOTT
LAND & LEASE LTD

100, 10585 - 111TH Street
Edmonton, Alberta
T5H 3E8

2906 - 50 Avenue
Lloydminster, AB
T9V 0K1

#203 - 845 Broad Street
Regina, Saskatchewan
S4R 8G9

6 Falcon Crescent
Brandon, Manitoba
R7B 3Y7

	Calgary	Edmonton	Lloydminster	Regina	Manitoba
Telephone:	(403) 261-1000	(403) 428-2212	(403) 875-7201	(306)359-9000	(204) 727-1511
Fax:	(403) 263-5263	(403) 425-5263	(403) 875-4813	(306)359-9015	(204) 728-1622

FAX NO: 1-204-945-0586 TO: Manitoba Energy + Mines

NO. OF PAGES: 1 OF 9 ATTN: John Fox

DATE: Sept 29, 97 FROM: Blaine Parker

SUBJECT: Consents FILE NO. NCE 66, 67, 68

MESSAGE: Hi John: Here's Consents signed by owners + Surrounding land owners regarding reduced spacing applications. The locations are: 16B-25-1-26-W1, 2B-24-1-26-W1 and 11A-8-2-25-W1. If you have any Questions please call 727-1511

728-1622 South Brandon

Best Regards

Blaine.

IF YOU HAVE ANY DIFFICULTIES READING THIS FAX TRANSMISSION PLEASE CALL:

HEAD OFFICE

NCE Petrofund Corp.
Suite 2300
421 - 7th Ave. S. W.
Calgary, Alberta
T2P 4K9

September 18, 1997

Manitoba Energy & Mines
Minerals Resources Division
975 Century Street
Winnipeg, Mb.
R3H 0W4

Gentleman:

RE: Proposed Reduced Spacing Application
Waskada Area, Manitoba
NCE File: 68

Please be advised that I have no objection to NCE Petrofund Corp. making an application for the use of reduced drilling spacing units on the following described land.

Land: NW 8-2-25 WPM

Witness

Jean Lucelle Hannah

Box 7
Waskada, Manitoba
R0M 2E0
Telephone: (204) 673-2644

NCE Petrofund Corp.
Suite 2300
421 - 7th Ave. S. W.
Calgary, Alberta
T2P 4K9

September 18, 1997

Manitoba Energy & Mines
Minerals Resources Division
975 Century Street
Winnipeg, Mb.
R3H 0W4

Gentleman:

RE: Proposed Reduced Spacing Application
Waskada Area, Manitoba
NCE File: 68

Please be advised that I have no objection to NCE Petrofund Corp. making an application for the use of reduced drilling spacing units on the following described land.

Land: NW 8-2-25 WPM

Witness

Douglas Wayne Wright

Box 65
Waskada, Manitoba
R0M 2E0
Telephone: (204) 673-2684

NCE Petrofund Corp.
Suite 2300
421 - 7th Ave. S. W.
Calgary, Alberta
T2P 4K9

September 18, 1997

Manitoba Energy & Mines
Minerals Resources Division
975 Century Street
Winnipeg, Mb.
R3H 0W4

Gentleman:

RE: Proposed Reduced Spacing Application
Waskada Area, Manitoba
NCE File: 68

Please be advised that I have no objection to NCE Petrofund Corp. making an application for the use of reduced drilling spacing units on the following described land.

Land: NW 8-2-25 WPM

Witness

Donald R. Temple

Box
Waskada, Manitoba
R0M 2E0
Telephone: (204) 673-2615

NCE Petrofund Corp.
Suite 2300
421 - 7th Avenue S.W.
Calgary AB T2P 4K9

September 26, 1997

Manitoba Energy & Mines
Minerals Resources Division
975 Century Street
Winnipeg MB R3H 0W4

Gentlemen:

RE: PROPOSED REDUCED SPACING APPLICATION
Waskada Area, Manitoba
NCE File: #67

Please be advised that I have no objection to NCE Petrofund Corp., making an application for the use of reduced drilling spacing units on the following described land.

SE 24-1-26 WPM

Witness

D. E McGregor

DON McGREGOR
BOX 33
WASKADA MB R0M 2E0
Telephone: (204)673-2516

NCE Petrofund Corp.
Suite 2300
421 - 7th Ave. S. W.
Calgary, Alberta
T2P 4K9

September 18, 1997

Manitoba Energy & Mines
Minerals Resources Division
975 Century Street
Winnipeg, Mb.
R3H 0W4

Gentleman:

RE: Proposed Reduced Spacing Application
Waskada Area, Manitoba
NCE File: 67

Please be advised that I have no objection to NCE Petrofund Corp. making an application for the use of reduced drilling spacing units on the following described land.

Land: SE 24-1-26 WPM

Witness

Robert Donald McGregor

Box 34
Waskada, Manitoba
R0M 2E0
Telephone: (204) 673-2457

NCE Petrofund Corp.
Suite 2300
421 - 7th Ave. S. W.
Calgary, Alberta
T2P 4K9

September 18, 1997

Manitoba Energy & Mines
Minerals Resources Division
975 Century Street
Winnipeg, Mb.
R3H 0W4

Gentleman:

RE: Proposed Reduced Spacing Application
Waskada Area, Manitoba
NCE File: 67

Please be advised that I have no objection to NCE Petrofund Corp. making an application for the use of reduced drilling spacing units on the following described land.

Land: SE 24-1-26 WPM
LSD - 2

Witness

Jack George McGregor

Linda Darlene McGregor

Box 26
Waskada, Manitoba
R0M 2E0
Telephone: (204) 673-2618

NCE Petrofund Corp.
Suite 2300
421 - 7th Avenue S.W.
Calgary AB T2P 4K9

September 26, 1997

Manitoba Energy & Mines
Minerals Resources Division
975 Century Street
Winnipeg MB R3H 0W4

Gentlemen:

RE: PROPOSED REDUCED SPACING APPLICATION
Waskada Area, Manitoba
NCE File: #66

Please be advised that I have no objection to NCE Petrofund Corp., making an application for the use of reduced drilling spacing units on the following described land.

NE 25-1-26 WPM

Witness

JAMES FORBES TREWIN
BOX 52
WASKADA MB R0M 2E0
Telephone: (204)673-2617

NCE Petrofund Corp.
Suite 2300
421 - 7th Ave. S. W.
Calgary, Alberta
T2P 4K9

September 18, 1997

Manitoba Energy & Mines
Minerals Resources Division
975 Century Street
Winnipeg, Mb.
R3H 0W4

Gentleman:

RE: Proposed Reduced Spacing Application
Waskada Area, Manitoba
NCE File: 66

Please be advised that I have no objection to NCE Petrofund Corp. making an application for the use of reduced drilling spacing units on the following described land.

Land: NE 25-1-26 WPM

Witness

Murray Gibson Hannah

Box 7
Waskada, Manitoba
R0M 2E0
Telephone: (204) 673-2644

FAX

Date 26 SEP-97

Number of pages including cover sheet ~~20~~ 2

TO: ED SAWATSY - RURAL DEVELOPMENT
FLOYD PHILLIPS - ENVIRONMENT 5059
KEN McGILL - AGRICULTURE 5229
745-2299

Phone

Fax Phone

CC:

FROM: *John Fox, P.Eng.*
Manitoba Energy & Mines
Petroleum & Energy Branch
360, 1395 Ellice Avenue
Winnipeg MB R3G 2P3

Phone *945-6574*
Fax Phone *945-0586*
e-mail *jfox@em.gov.mb.ca*

REMARKS: ☐ *Urgent* ☐ *For your review* ☐ *Reply ASAP* ☐ *Please Comment*

APPLICATION FOR REDUCED WELL SPACING IN THE WASKADA OILFIELD. ANY QUESTIONS PLEASE CALL ME.

ED - I'M NOT SURE YOU GOT THE 1ST PG.

** TX CONFIRMATION REPORT ** AS OF SEP 26 '97 14:29 PAGE.1

MB ENERGY AND MINES

COMMAND #171

	DATE	TIME	TO/FROM	MODE	MIN/SEC	PGS	STATUS
001	9/26	14:28	204 945 5059	EC--S	00"34	002	OK

FAX

Date 26-Sep-97

Number of pages including cover sheet ~~2~~ 2

TO: ED SAWATSY - RURAL DEVELOPMENT
FLOYD PHILLIPS - ENVIRONMENT
KEN McGILL - AGRICULTURE

Phone

Fax Phone

FROM:

John Fox, P.Eng.
Manitoba Energy & Mines
Petroleum & Energy Branch
360, 1395 Ellice Avenue
Winnipeg MB R3G 2P3

** TX CONFIRMATION REPORT ** AS OF SEP 26 '97 14:28 PAGE.1

MB ENERGY AND MINES

COMMAND #170

	DATE	TIME	TO/FROM	MODE	MIN/SEC	PGS	STATUS
001	9/26	14:15	204 745 2299	G3--S	12"36	020	OK

FAX

Date 26-Sep-97

Number of pages including cover sheet 20

TO: ED SAWATSY - RURAL DEVELOPMENT
FLOYD PHILLIPS - ENVIRONMENT
KEN McGILL - AGRICULTURE

Phone

Fax Phone

FROM:

John Fox, P.Eng.
Manitoba Energy & Mines
Petroleum & Energy Branch
360, 1395 Ellice Avenue
Winnipeg MB R3G 2P3

** TX CONFIRMATION REPORT ** AS OF SEP 26 '97 14:10 PAGE.1

MB ENERGY AND MINES

COMMAND #168

	DATE	TIME	TO/FROM	MODE	MIN/SEC	PGS	STATUS
001	9/26	14:03	204 945 5059	EC--S	06"14	019	OK

FAX

Date 26-Sep-97

Number of pages including cover sheet 20

TO: ED SAWATSY - RURAL DEVELOPMENT
FLOYD PHILLIPS - ENVIRONMENT
KEN McGILL - AGRICULTURE

Phone

Fax Phone

FROM:

John Fox, P.Eng.
Manitoba Energy & Mines
Petroleum & Energy Branch
360, 1395 Ellice Avenue
Winnipeg MB R3G 2P3

** TX CONFIRMATION REPORT ** AS OF SEP 26 '97 14:15 PAGE.1

MB ENERGY AND MINES

COMMAND #169

	DATE	TIME	TO/FROM	MODE	MIN/SEC	PGS	STATUS
001	9/26	14:10	MB.ENV.-APPROVALS	UF--S	04"45	020	OK

FAX

Date 26-Sep-97

Number of pages including cover sheet 20

TO: ED SAWATSY - RURAL DEVELOPMENT
FLOYD PHILLIPS - ENVIRONMENT
KEN McGILL - AGRICULTURE

Phone

Fax Phone

FROM:

John Fox, P.Eng.
Manitoba Energy & Mines
Petroleum & Energy Branch
360, 1395 Ellice Avenue
Winnipeg MB R3G 2P3

Manitoba

Memorandum

Date: September 26, 1997

To: Ed Sawatsky
Manager, Land Department
Corporate Planning & Business Development
Rural Development

From: John Fox
Chief Petroleum Engineer
Petroleum & Energy
Manitoba Energy & Mines

Telephone: 945-6574

Subject: **Reduced Spacing Application - Waskada Field**

First | Fold

NCE Resources Group has applied to drill three wells on special reduced spacing units in the Waskada Field. A copy of the application is attached for your reference. The Petroleum and Energy Branch circulates copies of reduced spacing applications to Rural Development, Environment and Agriculture for comment. In 1991, four wells were drilled on reduced spacing in the Waskada Field, a copy of your department's comments at that time, are attached for your reference.

NCE has requested a quick turnaround on this application because drilling rigs are in short supply and it has been lucky enough to contract a rig to start drilling in mid-October. The Branch proposes to incorporate into our approval, the following well siting conditions, which address each department's previously noted concerns:

1) locating wells on existing access roads where feasible;

2) minimizing the actively used portion of the well site;

3) using non built-up roads; and

4) installing underground hydro and running flowlines.

Please provide me with your comments on NCE's application by October 3, 1997.

cc. Floyd Phillips, Manitoba Environment
Manager, Terrestrial Quality Management

Ken McGill, Chief, Soil Resources Section
Manitoba Agriculture

NCE RESOURCES GROUP

2300 CANADA TRUST TOWER, 421-7th AVE. S.W.,CALGARY,ALBERTA,CANADA T2P 4K9 TELEPHONE (403) 218-8625 FAX (403) 269-5858

September 19, 1997

Manitoba Energy and Mines
Petroleum & Energy Branch
#360, 1395 Ellice Avenue
Winnipeg, MB R3G ~~2P3~~ 3P2

Attention: Mr. John Fox, P. Eng.
Chief Petroleum Engineer

Dear Sir;

Re: Reduced Spacing Application - Fall 1997 Drilling Program
SE/4-24-1-26 W1M, Unit #4
NE/4-25-1-26 W1M, Unit #1
NW/4- 8-2-25 W1M, Unit #8
Waskada Field, Manitoba

In accordance with Section 102 of the Manitoba Energy and Mines - Oil and Gas Act, please accept this letter as a formal application by NCE Resources Group Inc. for reduced spacing in each of the above three units, in the Waskada field. The purpose of reduced spacing is to allow for infill drilling of one well in each of the three units, to increase ultimate recoverable reserves by capturing unswept oil from the Lower Amaranth formation. The location of these infill wells will also allow for the future strategy of implementing a "line drive" water injection scheme, to evaluate the effectiveness on secondary recoveries. Should this program be successful, then reduced spacing may be considered for other suitable areas of this field.

The following information has been prepared in support of this application:

Area of Application

Attachments #1 and #2 show the area of application together with the boundaries of each proposed spacing unit.

Mineral Ownership

Common mineral ownership exists for all proposed infill locations as they are within existing unit boundaries.

Description of Proposed Spacing Units

Units #4 & #1: The size and orientation of the proposed spacing units are 8 Ha "diamonds" (see attach. #1), with target areas being 65 m inside each of the four sides. The formations to which the application applies are the Lower Amaranth and Mission Canyon.

Unit #8: The size and orientation of the proposed spacing unit is a 4 Ha "square" (see attach. #2), with the target area being 50 m inside each of the four sides. The formations to which the application applies are the Lower Amaranth and Mission Canyon.

Geological Summary

The primary zone of interest is the Triassic aged Spearfish (ie. Lower Amaranth) at an approximate depth of 890 meters, with secondary potential in the Mississippian aged Mission Canyon (MC) at an approximate depth of 910 meters. The Spearfish and MC are separated by up to 10 meters of tight cap rock. Thin interbedded cycles of sandstone and siltstone characterize the Spearfish, which was deposited in a shallow marine tidal environment. The MC zone is easily identified on logs due to separation from the Triassic by the Mississippian unconformity surface. The top of the MC is typically dominated by evaporitic sediments before the porous limestone and dolomitic limestone facies are encountered. Stratigraphic correlations are straight forward due to the erosional nature of the contacts and the interbedded nature of the rock.

The Spearfish is composed of several pulses of sand, silt, and shale. In general the zone is more sand rich at the base, fining upwards into predominantly shale. Porosity averages 13% with an average permeability of 5 md. Capillary pressure data conducted on 10 core plugs indicated an average connate water saturation of 38%; however, 44% is the accepted value, to reflect the fine grained nature of the sand. Net pay averages 10 meters over the majority of the field.

The Mississippian section has an average porosity of 13%, an average permeability of 30 md., 2.5 meters of net pay, and a water saturation of 40%. Pay quality is directly proportional to the thickness of caprock and diagenetic alteration which can severely downgrade the reservoir quality.

Trapping in the Spearfish is stratigraphic in nature. Porosity and permeability can be destroyed due to diagenetic cementation of the pore space. Stratigraphic facies changes provide the lateral seal. For the MC, trapping is primarily structural, however variations in the thickness of caprock can provide localized stratigraphic traps.

The following geological maps have been included for this application:

1) Lower Amaranth Net Pay Maps, Attachments #3 and #4,
2) Mississippian Unconformity Structure, Attachment #5
3) Mississippian Erosional Surface Structure Map, Attachment #6

Engineering Summary

A) Unit #4, (Twp 1 - Rge 26 - W1M)

A review of the six wells in the offsetting spacing units to 2B - 24 (see attachments #7 and #8), reveals a total current oil rate of 2.32 m^3opd (14.6 bopd), with cumulative production to Mar/97 of 43247 m^3. Ultimate recoverable reserves have been estimated at 44154 m^3, based on extrapolation of each well's production decline to an economic limit of 0.32 m^3opd (2.0 bopd). Therefore, only 906 m^3 of reserves remain to be recovered, and this portion of the reservoir is

quickly approaching it's economic limit. The recovery factor to Mar/97 has been calculated at 10.1%, with the ultimate recovery factor expected to be only marginally higher at 10.4%. Both recovery factors are well below the anticipated recovery factor range of 15-25% for a waterflood scheme in the Lower Amaranth formation. (ie. recovery factors published in the paper "Waskada Lower Amaranth, an Overview", by M. Rodgers and B. Dubreuil, dated Jan 1/85, Manitoba Energy and Mines, Petroleum Branch, indicate a 5% recovery on primary production and 15-25% for secondary recovery, depending on observation of pressure maintenance response)

By locating a well in 2B - 24, we are attempting to encounter reserves that otherwise would not be recovered due to the fact that 14-13 is now producing below the economic limit, and consequently is soon to be shut-in, and 3-24 is close to watering out (i.e. 90% WC) with only 477 m^3 remaining prior to being shut-in. When 3-24 becomes uneconomic, it will be considered for conversion to water injection to create a line-drive injection mechanism, which will offset withdrawals from 2B - 24. Estimated recoverable reserves from reduced spacing are difficult to predict due to the uncertain proximity of the waterflood front and the unknown effectiveness of line-drive injection; however, we anticipate an incremental recovery factor of 1.5-3.0%, which equates to ± 6400-12800 m^3 of oil, for this location.

B) Unit #1 (Twp 1 - Rge 26 - W1M)

A review of the four wells in the offsetting spacing units to 16B - 25 (see attachments #7 and #8), reveals a total current oil rate of 3.15 m^3opd (19.8 bopd) with cumulative production to Mar/97 of 27586 m^3. Ultimate recoverable reserves have been estimated at 29510 m^3, based on extrapolation of each well's production decline to an economic limit of 0.32 m^3opd (2.0 bopd). Therefore, only 1924 m^3 of reserves remain to be recovered, and this portion of the reservoir is also in the final stages of production. The recovery factor to Mar/97 has been calculated at 6.1%, with the ultimate recovery factor expected to be only marginally higher at 6.5%. Both recovery factors are well below the anticipated recovery factor range of 15-25% for a waterflood scheme in the Lower Amaranth formation.

By locating a well in 16B - 25, we are attempting to encounter reserves that otherwise would not be recovered due to the fact that 9-25 has been abandoned, and 16-25 is close to it's economic limits with only 477 m^3 remaining prior to being shut-in. The well in 11-25 is close to being uneconomic at 0.47 m^3opd (3.0 bopd) and it will be considered for conversion to water injection to create a line-drive injection mechanism, which will offset withdrawals from the new location in 16B - 25. Estimated recoverable reserves are difficult to predict, as discussed above; however, assuming a similar 1.5-3.0% incremental recovery factor, this equates to ± 6800-13500 m^3 of oil for this location.

C) Unit #8 (Twp 1 - Rge 26 - W1M)

A review of the six wells in the offsetting spacing units to 11A - 8 (see attachments #8 and #9), reveals a total current oil rate of 4.32 m^3opd (27.2 bopd), with cumulative production to Mar/97 of 48351 m^3. Ultimate recoverable reserves have been estimated at 57176 m^3, based on extrapolation of each well's production decline to an economic limit of 0.32 m^3opd (2.0 bopd). The recovery factor to Mar/97 has been calculated at 8.8%, with the ultimate recovery factor expected to be 10.4%. By locating a well in 11A - 8, and implementing a line-drive injection mechanism (i.e. with conversion of 10-8, which has now watered out, and/or 12-8), we anticipate an increase in ultimate recoveries by 1.2-2.5%, which equates to ± 6600-13700 m^3 of oil, as a result of a more effective sweep efficiency.

Correlative Rights

Correlative rights of offsetting mineral owners will not be affected as the proposed locations are all inside existing unit boundaries where tract factors have been previously assigned. Mineral

rights of owners adjacent to the units will not be affected as the proposed locations are adequately located greater than 100m inside the unit boundaries.

Land Owners and Occupants

Attachment #10 illustrates a map of the surface land owners in the immediate area, while attachment #11 indicates their names and addresses. Consent is currently being obtained and I will notify you upon it's completion.

Current Land Use

Current land use in the area is primarily agricultural, with approximately 80% cultivated for the purpose of growing crops and 20% being used for pasture.

Reduced Spacing Impact on Land Use

The impact on land use will be kept at a minimum as a result of performing the following:

1) Using existing access roads where possible.
2) Using non built-up roads.
3) Running underground electrical power, where economically feasible.
4) Building flowlines to wells, where economical, to minimize the actively used lease area.

Should you have any questions related to the above application, please contact the undersigned at (403) 218-8715. Thanking you in advance for your early attention to this application.

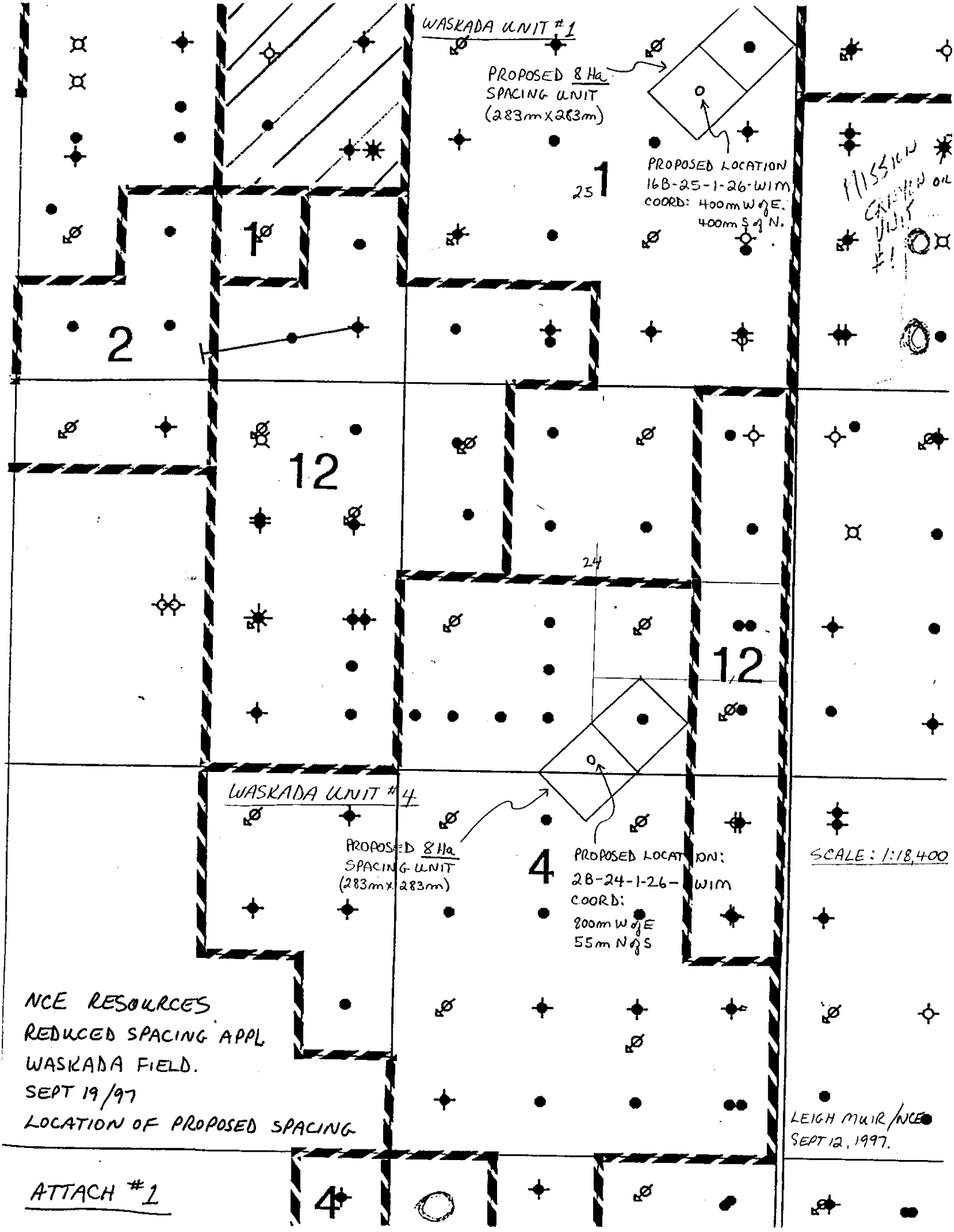
Yours truly,
NCE RESOURCES GROUP INC.

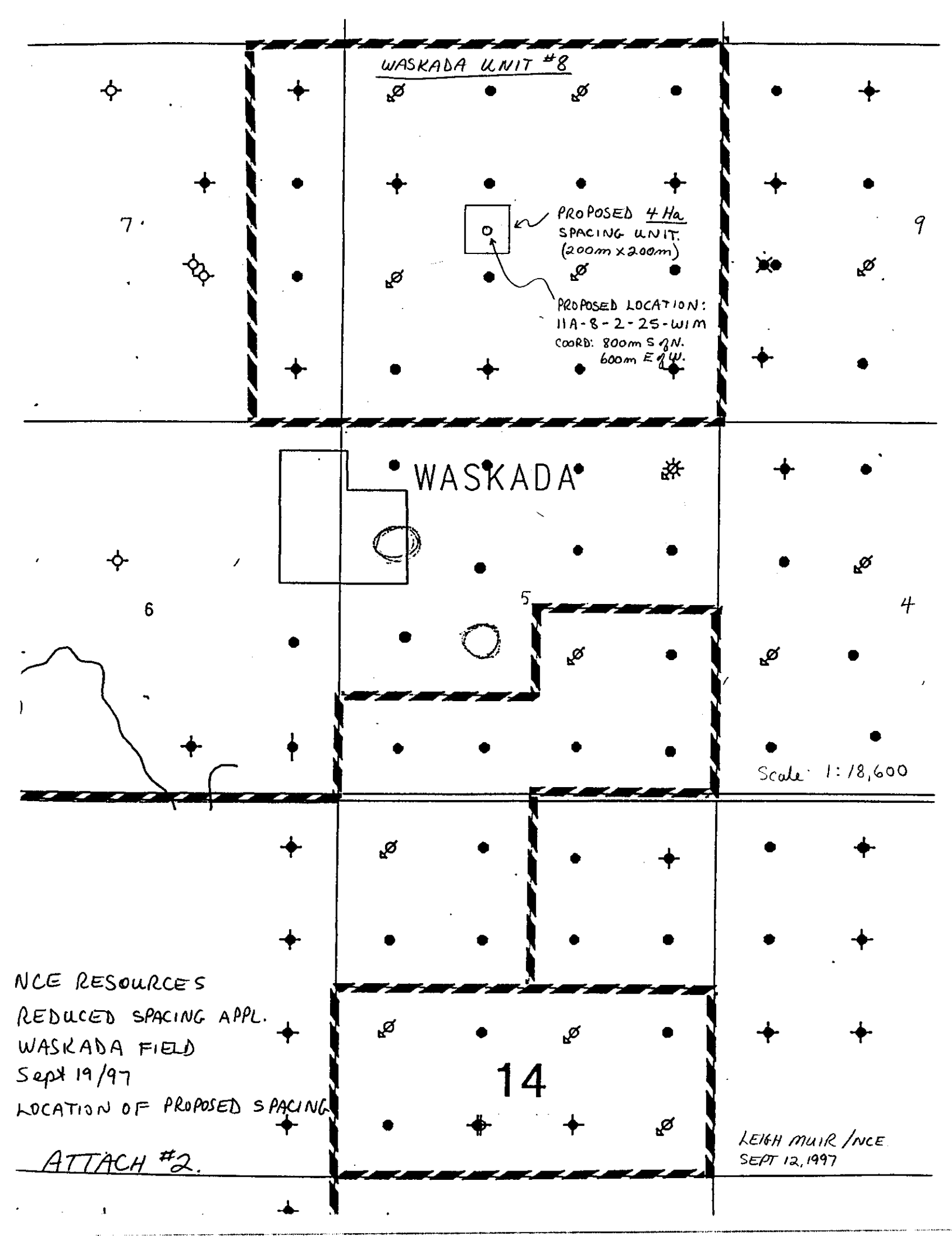
Leigh Muir

Leigh Muir, P. Eng.
Petroleum Engineer

LM/gsc

Attach.

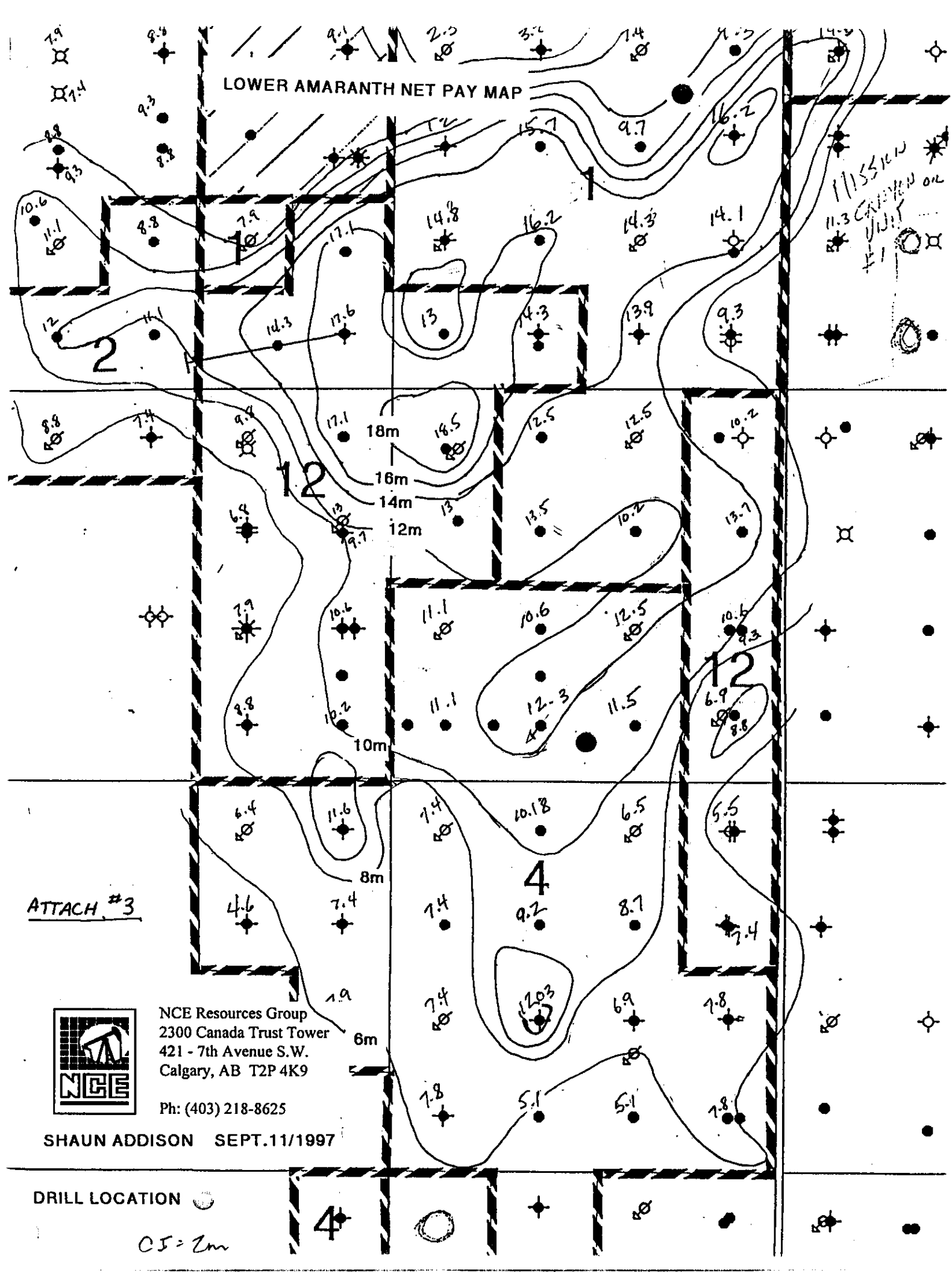

WASKADA UNIT #1
PROPOSED 8 Ha SPACING UNIT (283m x 283m)
PROPOSED LOCATION 16B-25-1-26-W1M COORD: 400m W of E. 400m S of N.
MISSION CANCELLED ON VISIT #1
25
1
2
1
12
24
12
WASKADA UNIT #4
PROPOSED 8 Ha SPACING UNIT (283m x 283m)
4
PROPOSED LOCATION: 2B-24-1-26-W1M COORD: 800m W of E 55m N of S
SCALE: 1:18,400
NCE RESOURCES
REDUCED SPACING APPL
WASKADA FIELD.
SEPT 19/97
LOCATION OF PROPOSED SPACING
LEIGH MUIR/NCE
SEPT 12, 1997.
ATTACH #1
4

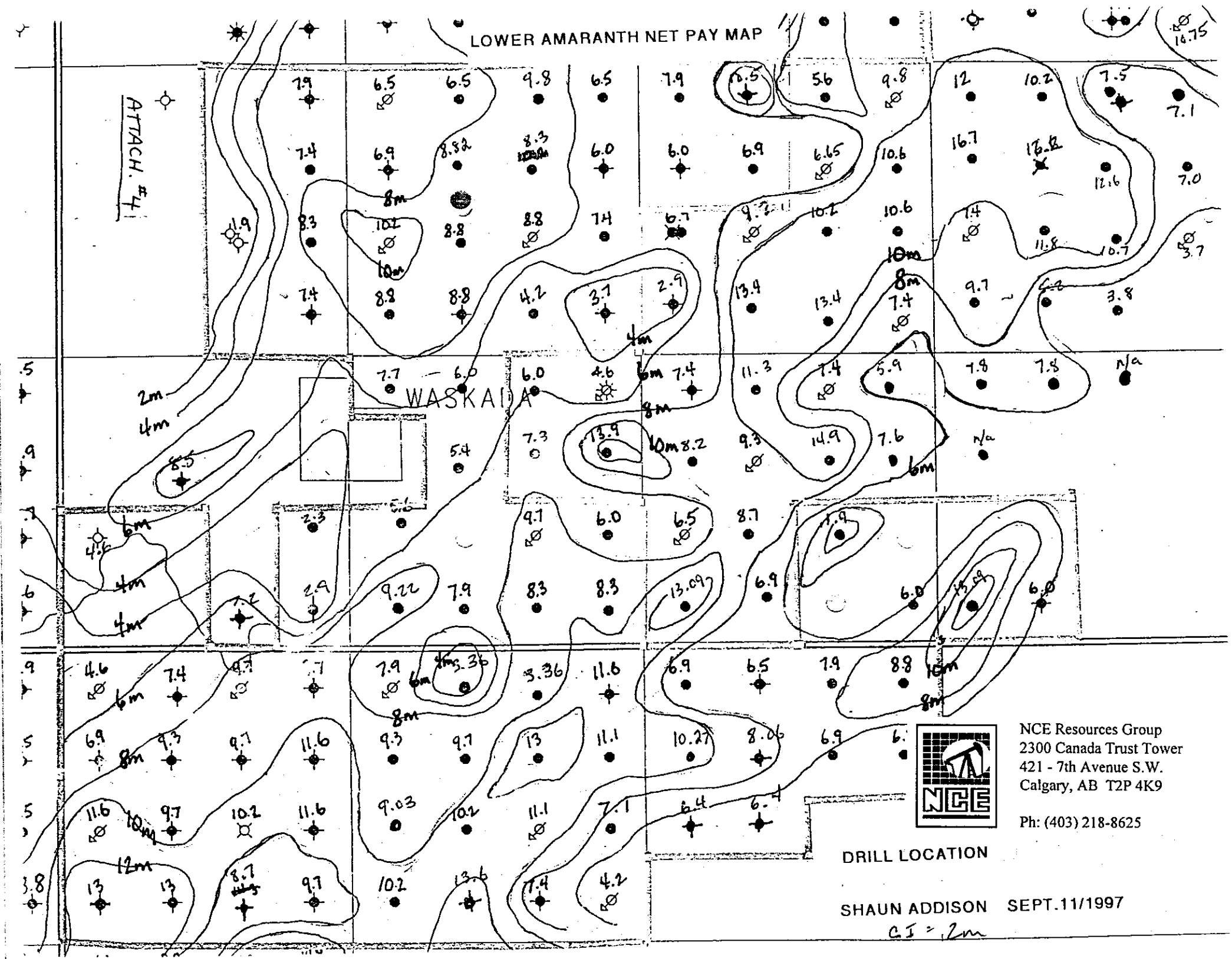


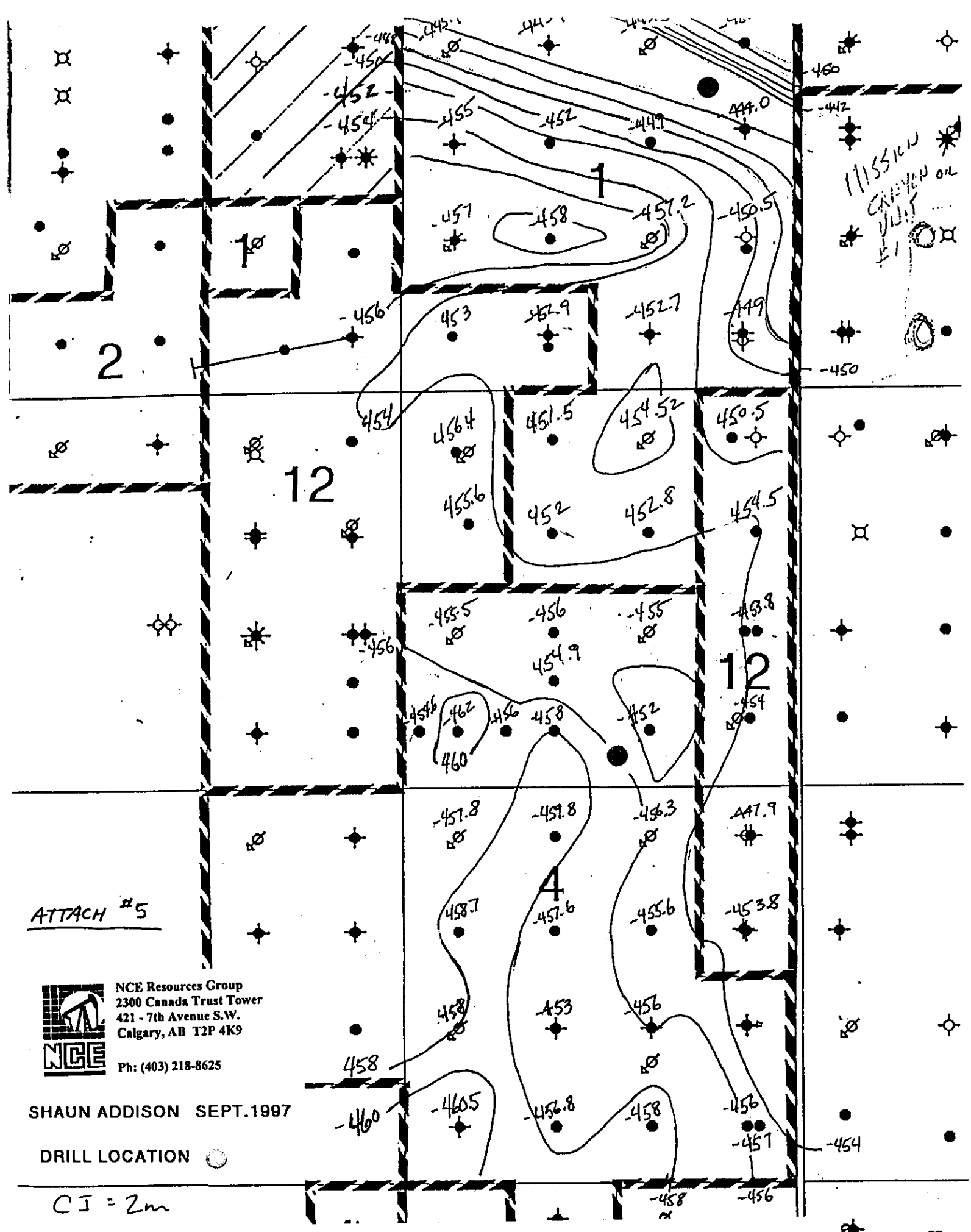
NCE RESOURCES
REDUCED SPACING APPL.
WASKADA FIELD
Sept 19/97
LOCATION OF PROPOSED SPACING

ATTACH #2.

LEIGH MUIR / NCE
SEPT 12, 1997


LOWER AMARANTH NET PAY MAP
18m
16m
14m
12m
10m
8m
6m
ATTACH #3
NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9
Ph: (403) 218-8625
SHAUN ADDISON SEPT.11/1997
DRILL LOCATION
CI = 2m


LOWER AMARANTH NET PAY MAP
ATTACH. #4
WASKADA
2m
4m
6m
8m
10m
12m
DRILL LOCATION
NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9
Ph: (403) 218-8625
SHAUN ADDISON SEPT.11/1997
CI = 2m



ATTACH #5

NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9

Ph: (403) 218-8625

SHAUN ADDISON SEPT.1997

DRILL LOCATION

CI = 2m

MISSISSIPPIAN UNCONFORMITY STRUCTURE

MISSISSIPPIAN EROSIONAL SUFACE STRUCTURE MAP

WASKADA

NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9

Ph: (403) 218-8625

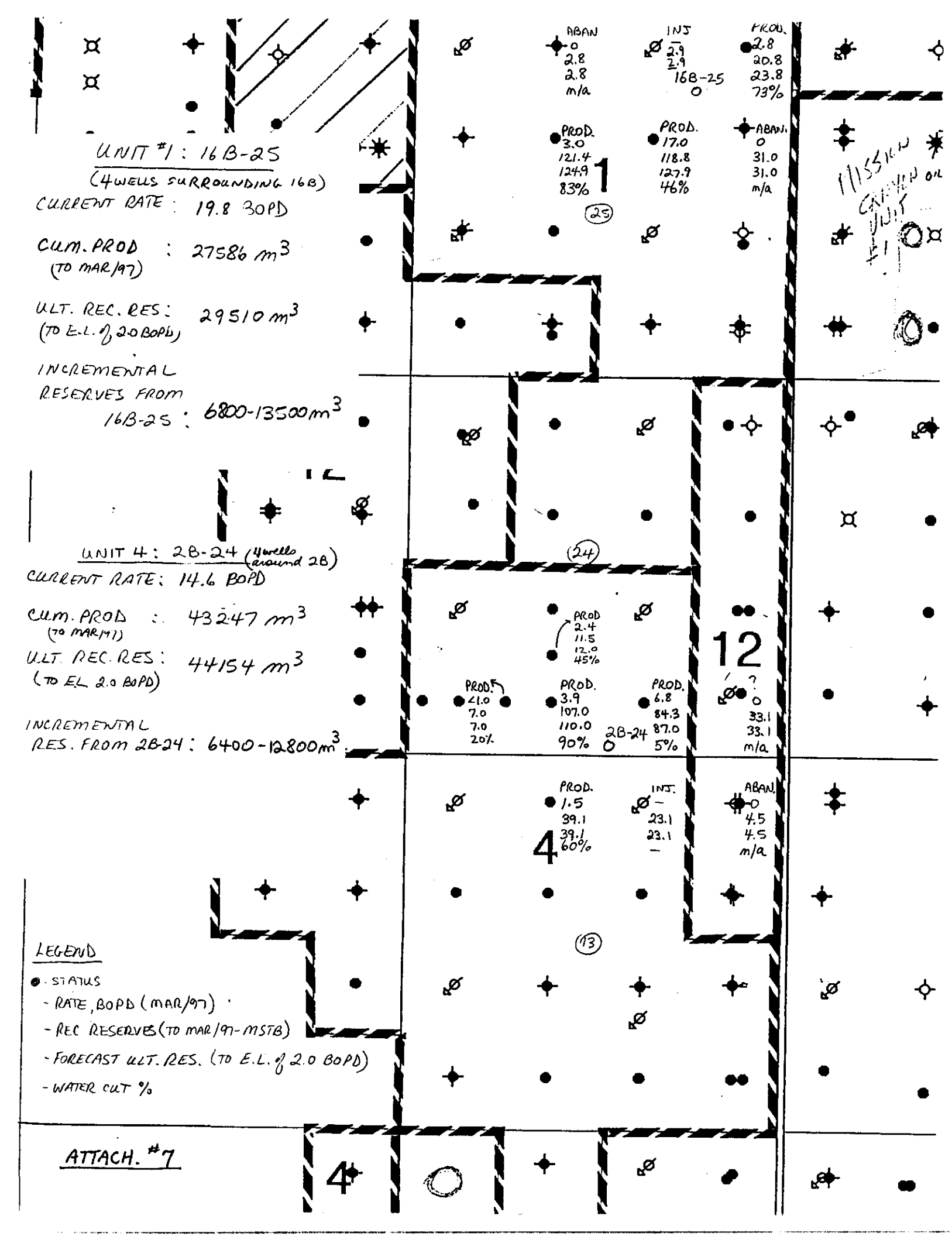
SHAUN ADDISON

SEPT. 1997

DRIILLING LOCATION

CI = 2m

ATTACH. #6


UNIT #1 : 16B-25
(4 WELLS SURROUNDING 16B)
CURRENT RATE : 19.8 BOPD
CUM. PROD (TO MAR/97) : 27586 m3
ULT. REC. RES: (TO E.L. @ 2.0 BOPD) 29510 m3
INCREMENTAL RESERVES FROM 16B-25 : 6800-13500 m3
UNIT 4 : 2B-24 (4 wells around 2B)
CURRENT RATE: 14.6 BOPD
CUM. PROD (TO MAR/97) : 43247 m3
ULT. REC. RES: (TO EL 2.0 BOPD) 44154 m3
INCREMENTAL RES. FROM 2B-24 : 6400-12800 m3
ABAN 0 2.8 2.8 m/a
INJ 2.9 2.9 16B-25 0
PROD. 2.8 20.8 23.8 73%
PROD. 3.0 121.4 124.9 83%
PROD. 17.0 118.8 127.9 46%
ABAN. 0 31.0 31.0 m/a
1
25
24
PROD 2.4 11.5 12.0 45%
PROD. 21.0 7.0 7.0 20%
PROD. 3.9 107.0 110.0 90%
PROD. 6.8 84.3 87.0 5%
2B-24
12
? 0 33.1 33.1 m/a
PROD. 1.5 39.1 39.1 60%
INJ. — 23.1 23.1 —
ABAN. 0 4.5 4.5 m/a
4
13
LEGEND
- STATUS
- RATE, BOPD (MAR/97)
- REC RESERVES (TO MAR/97 - MSTB)
- FORECAST ULT. RES. (TO E.L. @ 2.0 BOPD)
- WATER CUT %
ATTACH. #7
4

NCE Resources Group Inc.
Waskada Field, MB.
Recovery Factor Analysis

A) Unit #4: (Twp 1 - Rge 26 - W1M)

Well	Area	Alloc.	Net Pay	OOIP	Prod. to Mar-97		Forecast to E.L.		Rec Fact.	Ultimate R.F.	Remain. Reserves	Current Oil Rate
Locn	Ha	Factor	m	m^3	m^3	Mbbl	m^3	Mbbl	to Mar/97	to E.L.	m^3	bopd
3-24	12	1.0	12.3	97566	17013	107.0	17490	110	17.4	17.9	477	3.9
3c-24	4	0.5	11.7	15468	1113	7.0	1113	7	3.6	3.6	0	0.0
6a-24	4	0.5	11.4	15071	1828	11.5	1828	11.5	6.1	6.1	0	2.4
2-24	16	1.0	11.5	121627	13404	84.3	13833	87	11.0	11.4	429	6.8
14-13	16	1.0	10.2	107878	6217	39.1	6217	39.1	5.8	5.8	0	1.5
15-13 (inj)	16	1.0	6.5	68746	3673	23.1	3673	23.1	5.3	5.3	0	0.0
		Totals:		426356	43247	272.0	44154	277.7	10.1	10.4	906	14.6

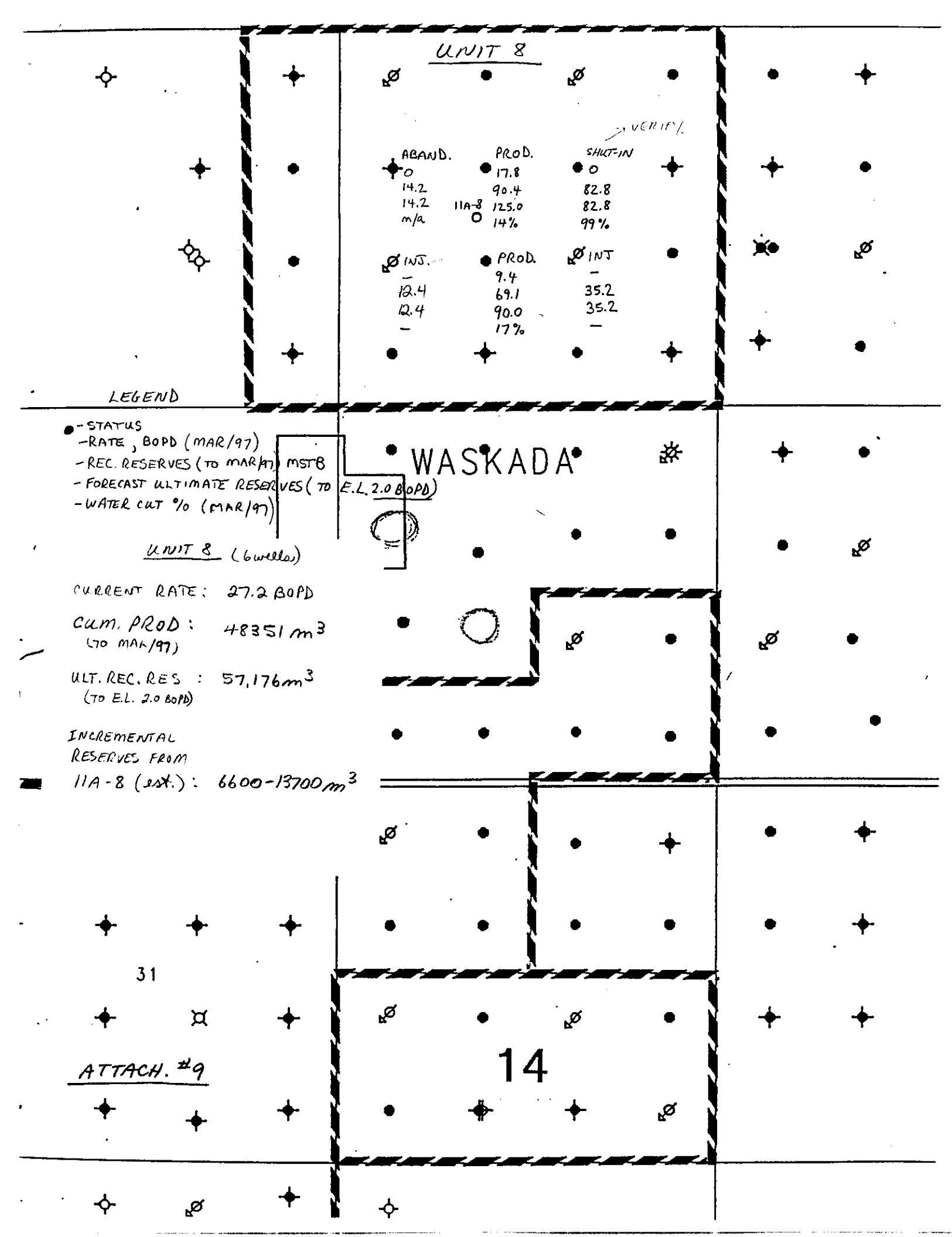
B) Unit #1: (Twp 1 - Rge 26 - W1M)

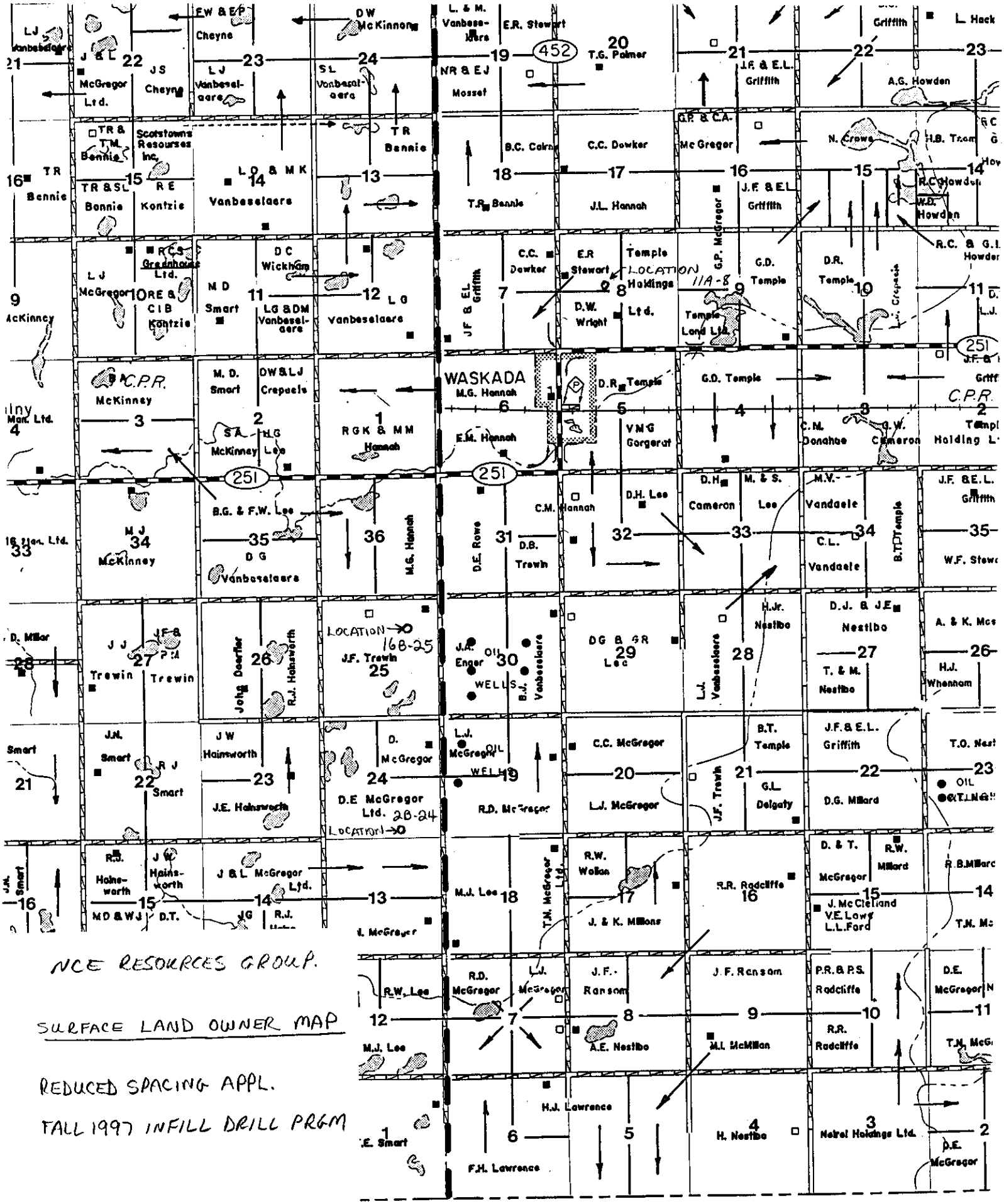
Well	Area	Alloc.	Net Pay	OOIP	Prod. to Mar-97		Forecast to E.L.		Rec Fact.	Ultimate R.F	Remain. Reserves	Current Oil Rate
Locn	Ha	Factor	m	m^3	m^3	Mbbl	m^3	Mbbl	to Mar/97	to E.L.	m^3	bopd
9-25	16	1.0	16.2	171336	4929	31.0	4929	31	2.9	2.9	0	0.0
10-25	16	1.0	9.7	102590	18889	118.8	20336	127.9	18.4	19.8	1447	17.0
15-25 (inj)	16	1.0	7.4	78264	461	2.9	461	2.9	0.6	0.6	0	0.0
16-25	16	1.0	9.3	98359	3307	20.8	3784	23.8	3.4	3.8	477	2.8
		Totals:		450549	27586	173.5	29510	185.6	6.1	6.5	1924	19.8

C) Unit #8: (Twp 2 - Rge 25 - W1M)

Well	Area	Alloc.	Net Pay	OOIP	Prod. to Mar-97		Forecast to E.L.		Rec Fact.	Ultimate R.F.	Remain. Reserves	Current Oil Rate
Locn	Ha	Factor	m	m^3	m^3	Mbbl	m^3	Mbbl	to Mar/97	to E.L.	m^3	bopd
5-8 (inj)	16	1.0	10.2	107878	1972	12.4	1972	12.4	1.8	1.8	0	0
6-8	16	1.0	8.8	93071	10987	69.1	14310	90.0	11.8	15.4	3323	9.4
7-8 (inj)	16	1.0	8.8	93071	5597	35.2	5597	35.2	6.0	6.0	0	0
10-8	16	1.0	8.3	87783	13165	82.8	13165	82.8	15.0	15.0	0	0
11-8	16	1.0	8.8	93071	14373	90.4	19875	125.0	15.4	21.4	5501	17.8
12-8	16	1.0	6.9	72976	2258	14.2	2258	14.2	3.1	3.1	0	0
		Totals:		547851	48351	304	57176	359.6	8.8	10.4	8824	27.2

Attachment #8


UNIT 8
VERIFY
ABAND. PROD. SHUT-IN
0 17.8 0
14.2 90.4 82.8
14.2 11A-8 125.0 82.8
m/a 0 14% 99%
INJ. PROD. INT
— 9.4 —
12.4 69.1 35.2
12.4 90.0 35.2
— 17% —
LEGEND
● - STATUS
- RATE, BOPD (MAR/97)
- REC. RESERVES (TO MAR/97) MSTB
- FORECAST ULTIMATE RESERVES (TO E.L. 2.0 BOPD)
- WATER CUT % (MAR/97)
WASKADA
UNIT 8 (6 wells)
CURRENT RATE: 27.2 BOPD
CUM. PROD: 48351 m3
(TO MAR/97)
ULT. REC. RES: 57,176 m3
(TO E.L. 2.0 BOPD)
INCREMENTAL
RESERVES FROM
11A-8 (est.): 6600-13700 m3
31
14
ATTACH. #9


WASKADA
M.G. Hannah
LOCATION
11A-8
Temple Holdings Ltd.
LOCATION
16B-25
LOCATION
2B-24
D.E McGregor Ltd. 2B-24
OIL WELLS
J.A. Enger
B.J. Vanbeselaere
L.J. McGregor
R.D. McGregor
J.F. Trewin
D.E. Rowe
D.B. Trewin
C.M. Hannah
E.M. Hannah
M.G. Hannah
D.H. Lee
D.R. Temple
G.D. Temple
VMG Gorgerat
Temple Land Ltd.
D.W. Wright Ltd.
C.C. Dowker
E.R Stewart
G.P. McGregor
J.F. & E.L. Griffith
J.L. Hannah
B.C. Cairns
T.R. Bennie
T.G. Palmer
NR & EJ Mosset
L. & M. Vanbeselaere
E.R. Stewart
C.P.R.
McKinney
Mar. Ltd.
M.D. Smart
D.W. & L.J. Crepeau
S.A. McKinney
H.G. Lee
RGK & MM Hannah
B.G. & F.W. Lee
M.J. McKinney
D.G. Vanbeselaere
J.J. Trewin
J.F. & P.M. Trewin
John Deerfar
R.J. Hainsworth
J.N. Smart
J.W. Hainsworth
J.E. Hainsworth
D. McGregor
J.& L. McGregor Ltd.
M.D. & W.J.
D.T.
J.G.
R.J.
L. McGregor
M.J. Lee
T.N. McGregor Ltd.
R.W. Wallan
J. & K. Millons
R.R. Radcliffe
J.F. Ransom
A.E. Nestibo
M.L. McMillan
H.J. Lawrence
F.H. Lawrence
H. Nestibo
Natrol Holdings Ltd.
D.E. McGregor
C.C. McGregor
L.J. McGregor
B.T. Temple
G.L. Delgaty
J.F. Trewin
D.G. Millard
D.J. & J.E. Nestibo
T. & M. Nestibo
H.J. Whennam
H.Jr. Nestibo
D.G & G.R. Lee
L.J. Vanbeselaere
C.L. Vandaele
M.V. Vandaele
D.H. Cameron
M. & S. Lee
B.T. Temple
J.F. & E.L. Griffith
W.F. Stewart
C.M. Donahue
C.W. Cameron
Holding L.
R.C. & G.I. Howden
W.D. Howden
R.C. Howden
H.B. Tromm
N. Crowe
A.G. Howden
L. Hack
Griffith
J.F. & E.L. Griffith
G.P. & C.A. McGregor
Scotstowns Resourses Inc.
TR & TM Bennie
TR & SL Bennie
R.E. Kontzie
TR Bennie
L.D. & M.K. Vanbeselaeres
L.J. McGregor
R.C.S. Greenhouse Ltd.
D.C. Wickham
M.D. Smart
L.G. & D.M. Vanbeselaeres
L.G. Vanbeselaeres
ORE & CIB Kontzie
L.J. Vanbeselaeres
S.L. Vanbeselaeres
Cheyne
J & L McGregor Ltd.
J.S. Cheyne
E.W. & E.P.
D.W. McKinnon
452
251
NCE RESOURCES GROUP.
SURFACE LAND OWNER MAP
REDUCED SPACING APPL.
FALL 1997 INFILL DRILL PRGM
ATTACH. #10
R. 25 W
"RESPECT THE LANDO

NCE Resources Group Inc.
Reduced Spacing Application
Fall 1997 Drilling Program
Waskada Field, Manitoba
Surface Land Owner / Occupant List

	Well Location	Owner/Address	Occupant	Consent
1)	Unit #4:			
	2B-24-1-26-W1M	Don E. McGregor Box 33 Waskada, MB R0M 2E0	none	in progress
2)	Unit #1:			
	16B-25-1-26-W1M	James Forbes Trewin Box 52 Waskada, MB R0M 2E0	none	in progress
3)	Unit #8:			
	11A-8-2-25-W1M	Ernest Roy Stewart Box 204 Waskada, MB R0M 2E0	none	in progress

Attachment #11

NCE RESOURCES GROUP

2300 CANADA TRUST TOWER, 421-7th AVE. S.W.,CALGARY,ALBERTA,CANADA T2P 4K9 TELEPHONE (403) 218-8625 FAX (403) 269-5858

September 19, 1997

Manitoba Energy and Mines
Petroleum & Energy Branch
#360, 1395 Ellice Avenue
Winnipeg, MB R3G ~~2P3~~ 3P2

Attention: Mr. John Fox, P. Eng.
Chief Petroleum Engineer

Dear Sir;

Re: Reduced Spacing Application - Fall 1997 Drilling Program
SE/4-24-1-26 W1M, Unit #4
NE/4-25-1-26 W1M, Unit #1
NW/4- 8-2-25 W1M, Unit #8
Waskada Field, Manitoba

In accordance with Section 102 of the Manitoba Energy and Mines - Oil and Gas Act, please accept this letter as a formal application by NCE Resources Group Inc. for reduced spacing in each of the above three units, in the Waskada field. The purpose of reduced spacing is to allow for infill drilling of one well in each of the three units, to increase ultimate recoverable reserves by capturing unswept oil from the Lower Amaranth formation. The location of these infill wells will also allow for the future strategy of implementing a "line drive" water injection scheme, to evaluate the effectiveness on secondary recoveries. Should this program be successful, then reduced spacing may be considered for other suitable areas of this field.

The following information has been prepared in support of this application:

Area of Application

Attachments #1 and #2 show the area of application together with the boundaries of each proposed spacing unit.

Mineral Ownership

Common mineral ownership exists for all proposed infill locations as they are within existing unit boundaries.

Description of Proposed Spacing Units

Units #4 & #1: The size and orientation of the proposed spacing units are 8 Ha "diamonds" (see attach. #1), with target areas being 65 m inside each of the four sides. The formations to which the application applies are the Lower Amaranth and Mission Canyon.

quickly approaching it's economic limit. The recovery factor to Mar/97 has been calculated at 10.1%, with the ultimate recovery factor expected to be only marginally higher at 10.4%. Both recovery factors are well below the anticipated recovery factor range of 15-25% for a waterflood scheme in the Lower Amaranth formation. (ie. recovery factors published in the paper "Waskada Lower Amaranth, an Overview", by M. Rodgers and B. Dubreuil, dated Jan 1/85, Manitoba Energy and Mines, Petroleum Branch, indicate a 5% recovery on primary production and 15-25% for secondary recovery, depending on observation of pressure maintenance response)

By locating a well in 2B - 24, we are attempting to encounter reserves that otherwise would not be recovered due to the fact that 14-13 is now producing below the economic limit, and consequently is soon to be shut-in, and 3-24 is close to watering out (i.e. 90% WC) with only 477 m^3 remaining prior to being shut-in. When 3-24 becomes uneconomic, it will be considered for conversion to water injection to create a line-drive injection mechanism, which will offset withdrawals from 2B - 24. Estimated recoverable reserves from reduced spacing are difficult to predict due to the uncertain proximity of the waterflood front and the unknown effectiveness of line-drive injection; however, we anticipate an incremental recovery factor of 1.5-3.0%, which equates to ± 6400-12800 m^3 of oil, for this location.

B) Unit #1 (Twp 1 - Rge 26 - W1M)

A review of the four wells in the offsetting spacing units to 16B - 25 (see attachments #7 and #8), reveals a total current oil rate of 3.15 m^3opd (19.8 bopd) with cumulative production to Mar/97 of 27586 m^3. Ultimate recoverable reserves have been estimated at 29510 m^3, based on extrapolation of each well's production decline to an economic limit of 0.32 m^3opd (2.0 bopd). Therefore, only 1924 m^3 of reserves remain to be recovered, and this portion of the reservoir is also in the final stages of production. The recovery factor to Mar/97 has been calculated at 6.1%, with the ultimate recovery factor expected to be only marginally higher at 6.5%. Both recovery factors are well below the anticipated recovery factor range of 15-25% for a waterflood scheme in the Lower Amaranth formation.

By locating a well in 16B - 25, we are attempting to encounter reserves that otherwise would not be recovered due to the fact that 9-25 has been abandoned, and 16-25 is close to it's economic limits with only 477 m^3 remaining prior to being shut-in. The well in 11-25 is close to being uneconomic at 0.47 m^3opd (3.0 bopd) and it will be considered for conversion to water injection to create a line-drive injection mechanism, which will offset withdrawals from the new location in 16B - 25. Estimated recoverable reserves are difficult to predict, as discussed above; however, assuming a similar 1.5-3.0% incremental recovery factor, this equates to ± 6800-13500 m^3 of oil for this location.

C) Unit #8 (Twp 1 - Rge 26 - W1M)

A review of the six wells in the offsetting spacing units to 11A - 8 (see attachments #8 and #9), reveals a total current oil rate of 4.32 m^3opd (27.2 bopd), with cumulative production to Mar/97 of 48351 m^3. Ultimate recoverable reserves have been estimated at 57176 m^3, based on extrapolation of each well's production decline to an economic limit of 0.32 m^3opd (2.0 bopd). The recovery factor to Mar/97 has been calculated at 8.8%, with the ultimate recovery factor expected to be 10.4%. By locating a well in 11A - 8, and implementing a line-drive injection mechanism (i.e. with conversion of 10-8, which has now watered out, and/or 12-8), we anticipate an increase in ultimate recoveries by 1.2-2.5%, which equates to ± 6600-13700 m^3 of oil, as a result of a more effective sweep efficiency.

Correlative Rights

Correlative rights of offsetting mineral owners will not be affected as the proposed locations are all inside existing unit boundaries where tract factors have been previously assigned. Mineral

Unit #8: The size and orientation of the proposed spacing unit is a 4 Ha "square" (see attach. #2), with the target area being 50 m inside each of the four sides. The formations to which the application applies are the Lower Amaranth and Mission Canyon.

Geological Summary

The primary zone of interest is the Triassic aged Spearfish (ie. Lower Amaranth) at an approximate depth of 890 meters, with secondary potential in the Mississippian aged Mission Canyon (MC) at an approximate depth of 910 meters. The Spearfish and MC are separated by up to 10 meters of tight cap rock. Thin interbedded cycles of sandstone and siltstone characterize the Spearfish, which was deposited in a shallow marine tidal environment. The MC zone is easily identified on logs due to separation from the Triassic by the Mississippian unconformity surface. The top of the MC is typically dominated by evaporitic sediments before the porous limestone and dolomitic limestone facies are encountered. Stratigraphic correlations are straight forward due to the erosional nature of the contacts and the interbedded nature of the rock.

The Spearfish is composed of several pulses of sand, silt, and shale. In general the zone is more sand rich at the base, fining upwards into predominantly shale. Porosity averages 13% with an average permeability of 5 md. Capillary pressure data conducted on 10 core plugs indicated an average connate water saturation of 38%; however, 44% is the accepted value, to reflect the fine grained nature of the sand. Net pay averages 10 meters over the majority of the field.

The Mississippian section has an average porosity of 13%, an average permeability of 30 md., 2.5 meters of net pay, and a water saturation of 40%. Pay quality is directly proportional to the thickness of caprock and diagenetic alteration which can severely downgrade the reservoir quality.

Trapping in the Spearfish is stratigraphic in nature. Porosity and permeability can be destroyed due to diagenetic cementation of the pore space. Stratigraphic facies changes provide the lateral seal. For the MC, trapping is primarily structural, however variations in the thickness of caprock can provide localized stratigraphic traps.

The following geological maps have been included for this application:

1) Lower Amaranth Net Pay Maps, Attachments #3 and #4,
2) Mississippian Unconformity Structure, Attachment #5
3) Mississippian Erosional Surface Structure Map, Attachment #6

Engineering Summary

A) Unit #4, (Twp 1 - Rge 26 - W1M)

A review of the six wells in the offsetting spacing units to 2B - 24 (see attachments #7 and #8), reveals a total current oil rate of 2.32 m^3opd (14.6 bopd), with cumulative production to Mar/97 of 43247 m^3. Ultimate recoverable reserves have been estimated at 44154 m^3, based on extrapolation of each well's production decline to an economic limit of 0.32 m^3opd (2.0 bopd). Therefore, only 906 m^3 of reserves remain to be recovered, and this portion of the reservoir is

rights of owners adjacent to the units will not be affected as the proposed locations are adequately located greater than 100m inside the unit boundaries.

Land Owners and Occupants

Attachment #10 illustrates a map of the surface land owners in the immediate area, while attachment #11 indicates their names and addresses. Consent is currently being obtained and I will notify you upon it's completion.

Current Land Use

Current land use in the area is primarily agricultural, with approximately 80% cultivated for the purpose of growing crops and 20% being used for pasture.

Reduced Spacing Impact on Land Use

The impact on land use will be kept at a minimum as a result of performing the following:

1) Using existing access roads where possible.
2) Using non built-up roads.
3) Running underground electrical power, where economically feasible.
4) Building flowlines to wells, where economical, to minimize the actively used lease area.

Should you have any questions related to the above application, please contact the undersigned at (403) 218-8715. Thanking you in advance for your early attention to this application.

Yours truly,
NCE RESOURCES GROUP INC.

Leigh Muir

Leigh Muir, P. Eng.
Petroleum Engineer

LM/gsc

Attach.

NCE Resources Group Inc.
Waskada Field, MB
Recovery Factor Analysis

A) Unit #4: (Twp 1 - Rge 26 - W1M)

Well Locn	Area Ha	Alloc. Factor	Net Pay m	OOIP m³	Prod. to Mar-97 m³	Prod. to Mar-97 Mbbl	Forecast to E.L. m³	Forecast to E.L. Mbbl	Rec Fact. to Mar/97	Ultimate R.F. to E.L.	Remain. Reserves m³	Current Oil Rate bopd
3-24	12	1.0	12.3	97566	17013	107.0	17490	110	17.4	17.9	477	3.9
3c-24	4	0.5	11.7	15468	1113	7.0	1113	7	3.6	3.6	0	0.0
6a-24	4	0.5	11.4	15071	1828	11.5	1828	11.5	6.1	6.1	0	2.4
2-24	16	1.0	11.5	121627	13404	84.3	13833	87	11.0	11.4	429	6.8
14-13	16	1.0	10.2	107878	6217	39.1	6217	39.1	5.8	5.8	0	1.5
15-13 (inj)	16	1.0	6.5	68746	3673	23.1	3673	23.1	5.3	5.3	0	0.0
		Totals:		426356	43247	272.0	44154	277.7	10.1	10.4	906	14.6

Branch 4467.5 m³

B) Unit #1: (Twp 1 - Rge 26 - W1M)

Well Locn	Area Ha	Alloc. Factor	Net Pay m	OOIP m³	Prod. to Mar-97 m³	Prod. to Mar-97 Mbbl	Forecast to E.L. m³	Forecast to E.L. Mbbl	Rec Fact. to Mar/97	Ultimate R.F. to E.L.	Remain. Reserves m³	Current Oil Rate bopd
9-25	16	1.0	16.2	171336	4929	31.0	4929	31	2.9	2.9	0	0.0
10-25	16	1.0	9.7	102590	18889	118.8	20336	127.9	18.4	19.8	1447	17.0
15-25 (inj)	16	1.0	7.4	78264	461	2.9	461	2.9	0.6	0.6	0	0.0
16-25	16	1.0	9.3	98359	3307	20.8	3784	23.8	3.4	3.8	477	2.8
		Totals:		450549	27586	173.5	29510	185.6	6.1	6.5	1924	19.8

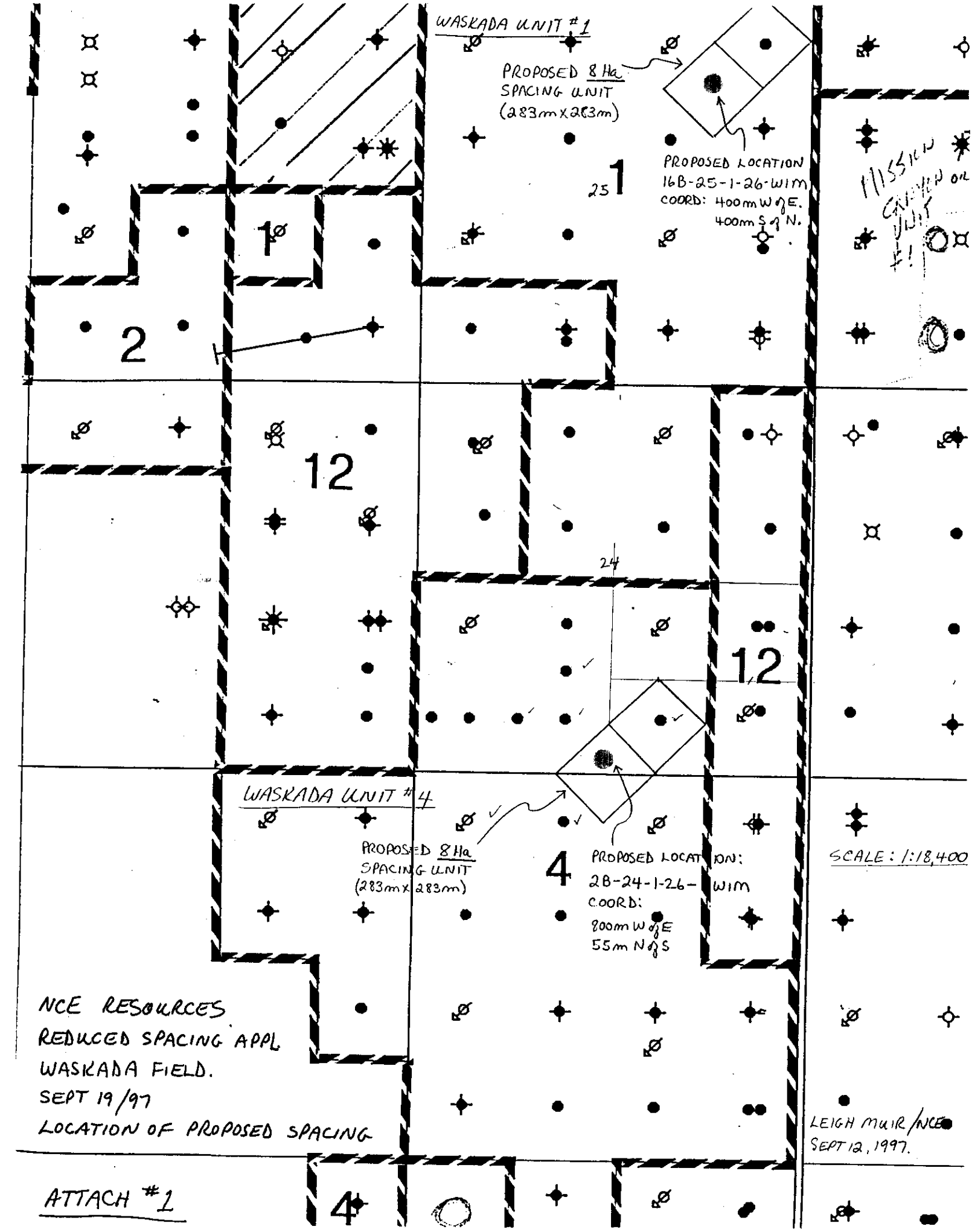
Branch 3043.1 m³

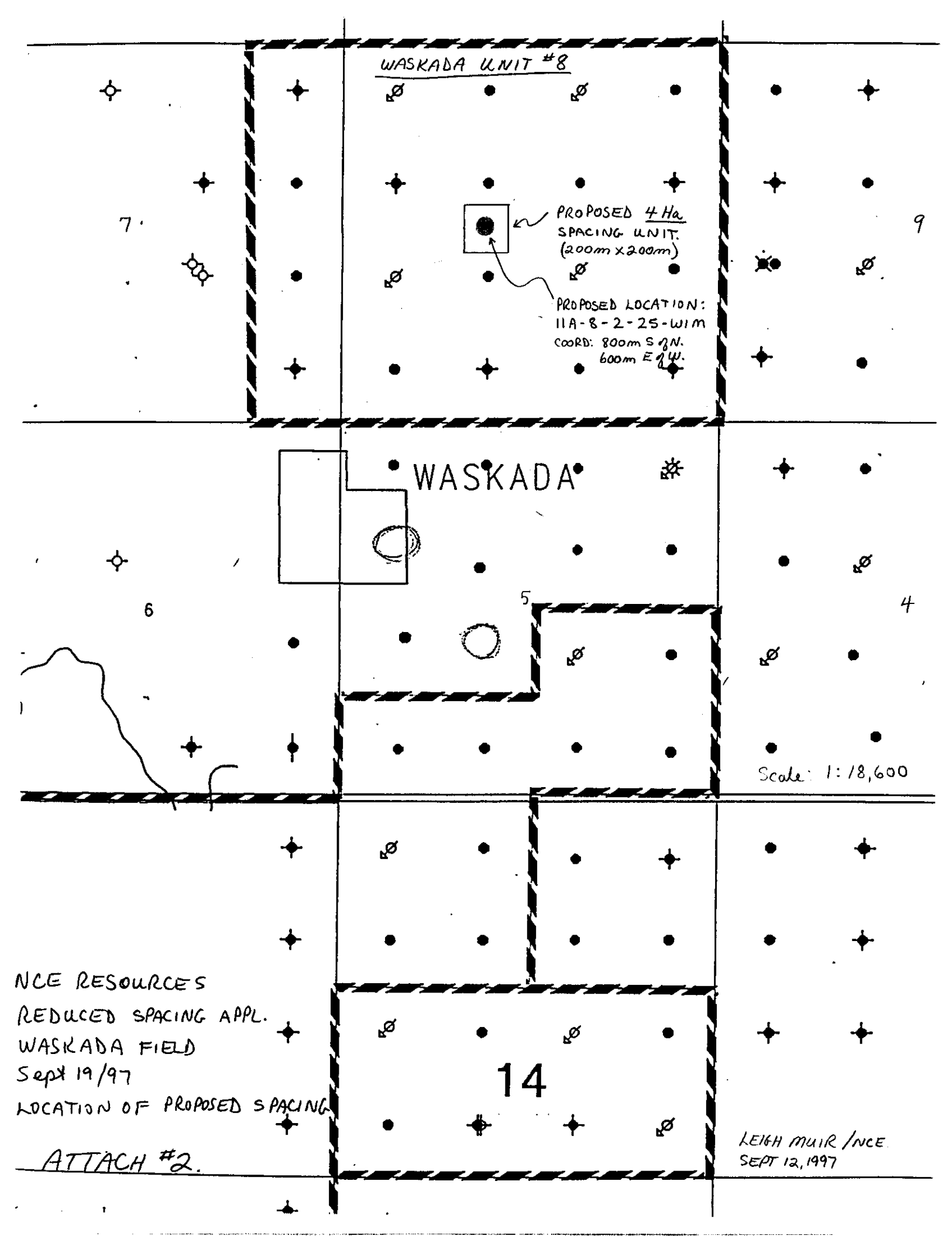
C) Unit #8: (Twp 2 - Rge 25 - W1M)

Well Locn	Area Ha	Alloc. Factor	Net Pay m	OOIP m³	Prod. to Mar-97 m³	Prod. to Mar-97 Mbbl	Forecast to E.L. m³	Forecast to E.L. Mbbl	Rec Fact. to Mar/97	Ultimate R.F. to E.L.	Remain. Reserves m³	Current Oil Rate bopd
5-8 (inj)	16	1.0	10.2	107878	1972	12.4	1972	12.4	1.8	1.8	0	0
6-8	16	1.0	8.8	93071	10987	69.1	14310	90.0	11.8	15.4	3323	9.4
7-8 (inj)	16	1.0	8.8	93071	5597	35.2	5597	35.2	6.0	6.0	0	0
10-8	16	1.0	8.3	87783	13165	82.8	13165	82.8	15.0	15.0	0	0
11-8	16	1.0	8.8	93071	14373	90.4	19875	125.0	15.4	21.4	5501	17.8
12-8	16	1.0	6.9	72976	2258	14.2	2258	14.2	3.1	3.1	0	0
		Totals:		547851	48351	304	57176	359.6	8.8	10.4	8824	27.2

Branch 5992.2

Attachment #8

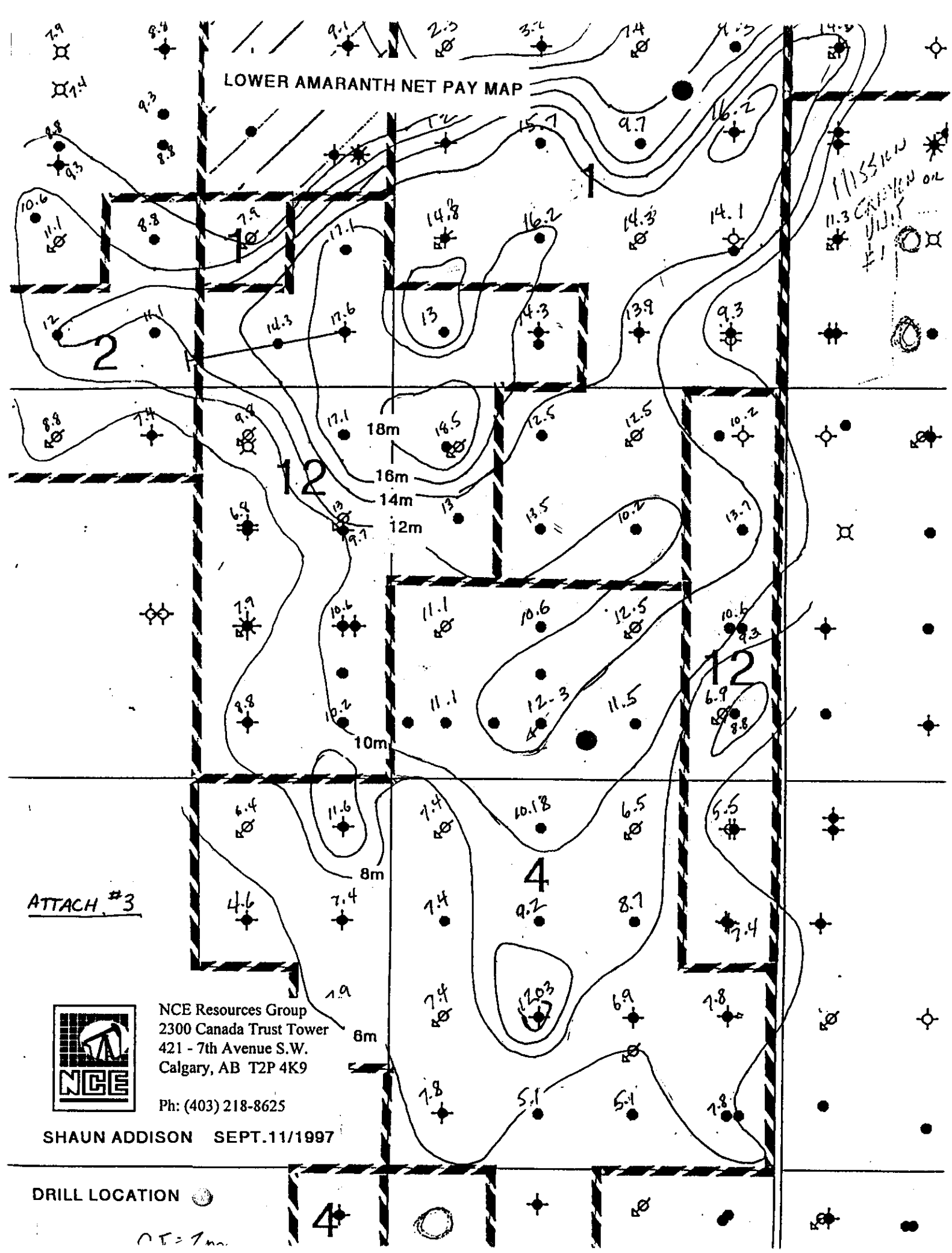

WASKADA UNIT #1
PROPOSED 8 Ha SPACING UNIT (283m x 283m)
PROPOSED LOCATION 16B-25-1-26-W1M COORD: 400m W of E. 400m S of N.
25
1
2
12
24
12
WASKADA UNIT #4
PROPOSED 8 Ha SPACING UNIT (283m x 283m)
4
PROPOSED LOCATION: 2B-24-1-26-W1M COORD: 900m W of E 55m N of S
SCALE: 1:18,400
NCE RESOURCES
REDUCED SPACING APPL
WASKADA FIELD.
SEPT 19/97
LOCATION OF PROPOSED SPACING
LEIGH MUIR/NCE
SEPT 12, 1997.
ATTACH #1
4

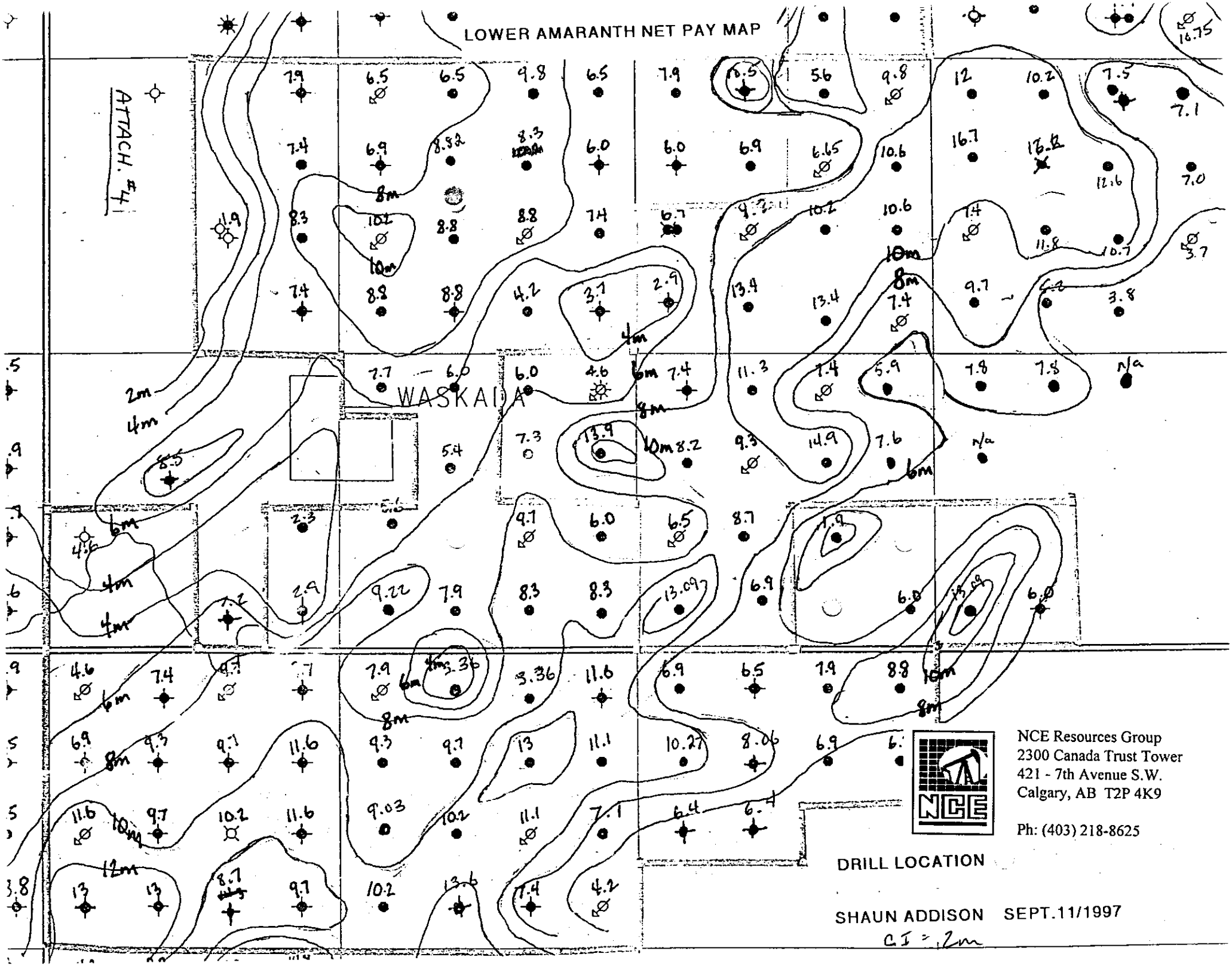


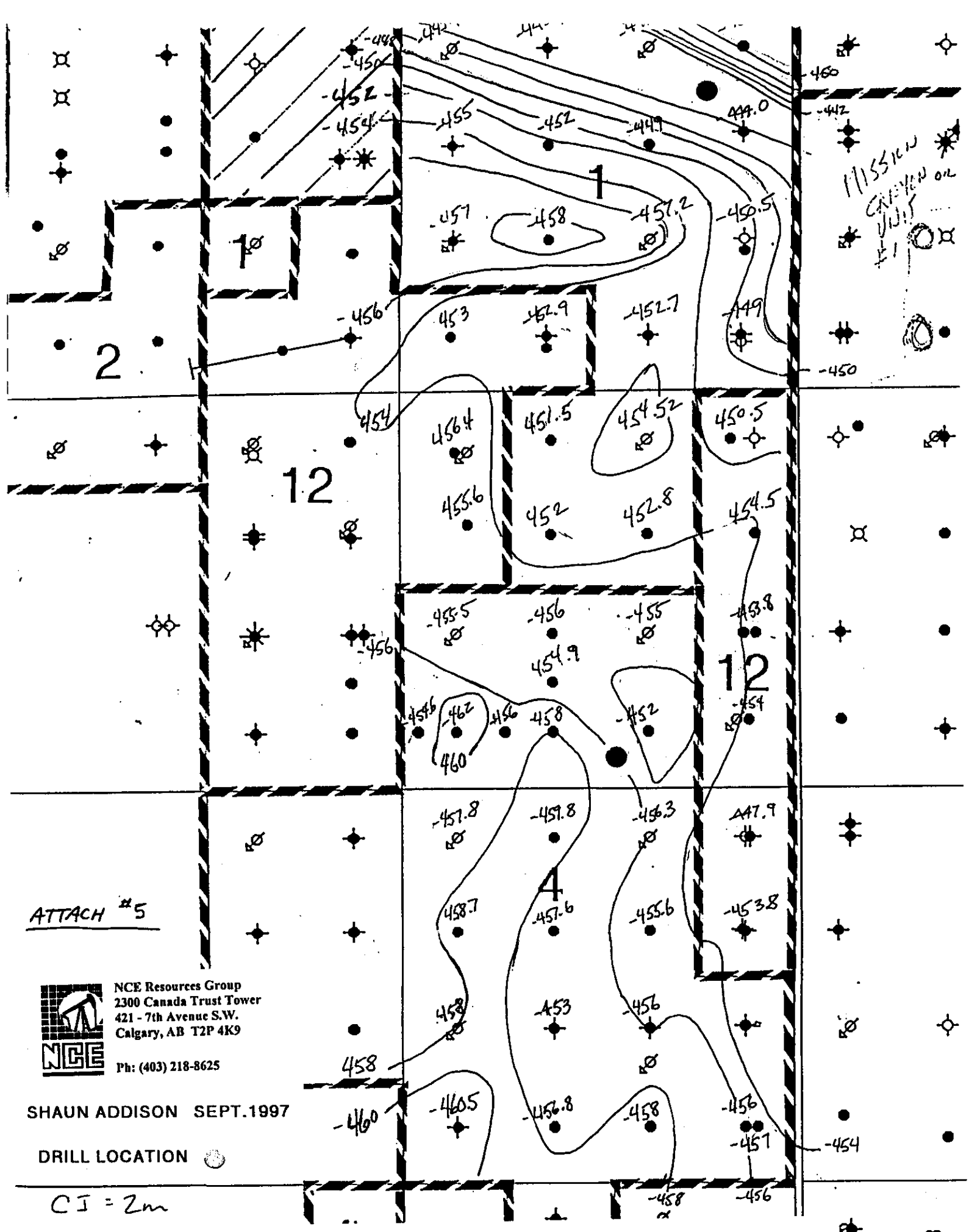
NCE RESOURCES
REDUCED SPACING APPL.
WASKADA FIELD
Sept 19/97
LOCATION OF PROPOSED SPACING

ATTACH #2.

LEIGH MUIR / NCE
SEPT 12, 1997


LOWER AMARANTH NET PAY MAP
18m
16m
14m
12m
10m
8m
6m
ATTACH #3
NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9
Ph: (403) 218-8625
SHAUN ADDISON SEPT.11/1997
DRILL LOCATION


LOWER AMARANTH NET PAY MAP
ATTACH. #4
WASKADA
2m
4m
6m
8m
10m
12m
DRILL LOCATION
SHAUN ADDISON SEPT.11/1997
CI = 2m
NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9
Ph: (403) 218-8625



ATTACH #5

NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9

Ph: (403) 218-8625

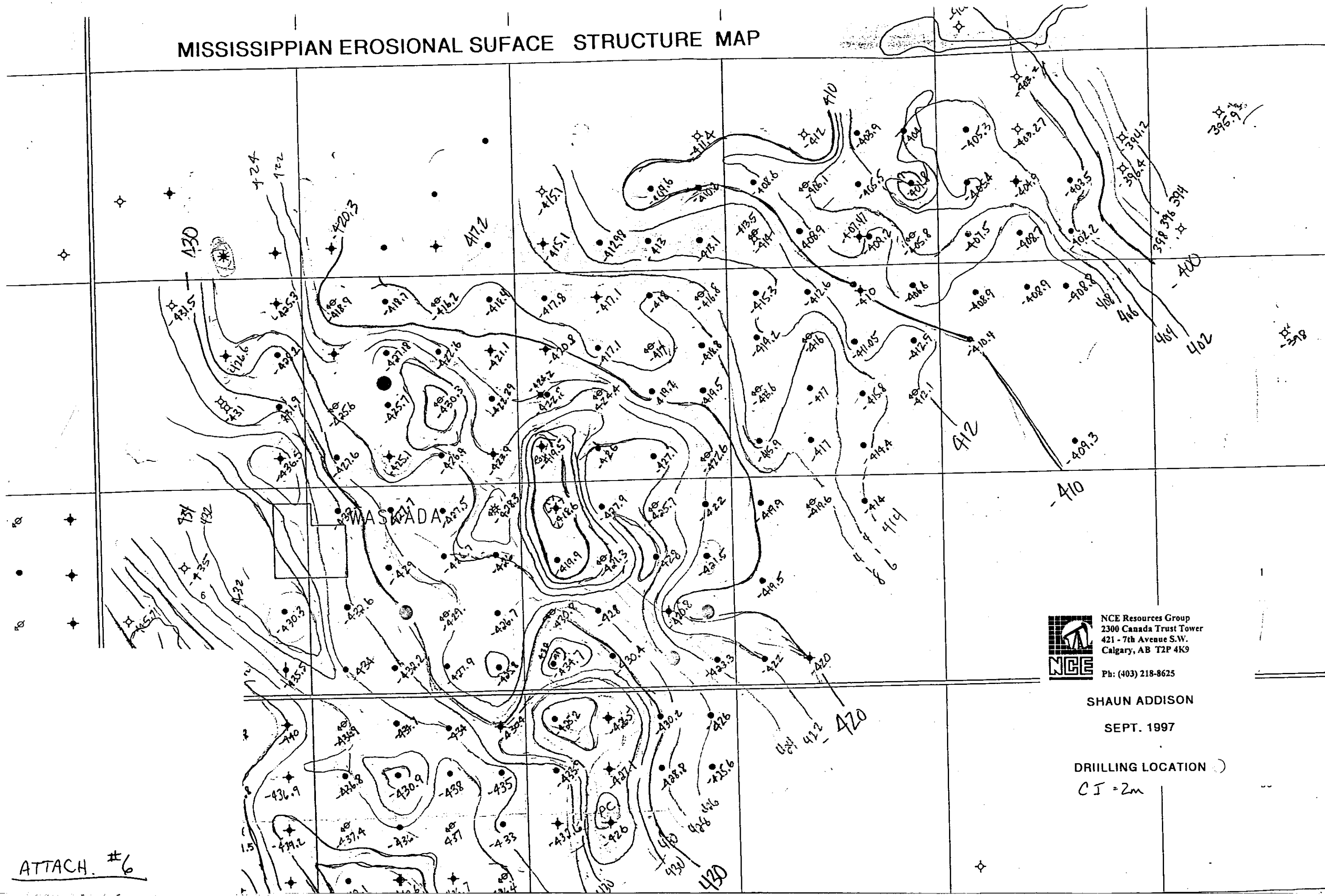
SHAUN ADDISON SEPT.1997

DRILL LOCATION

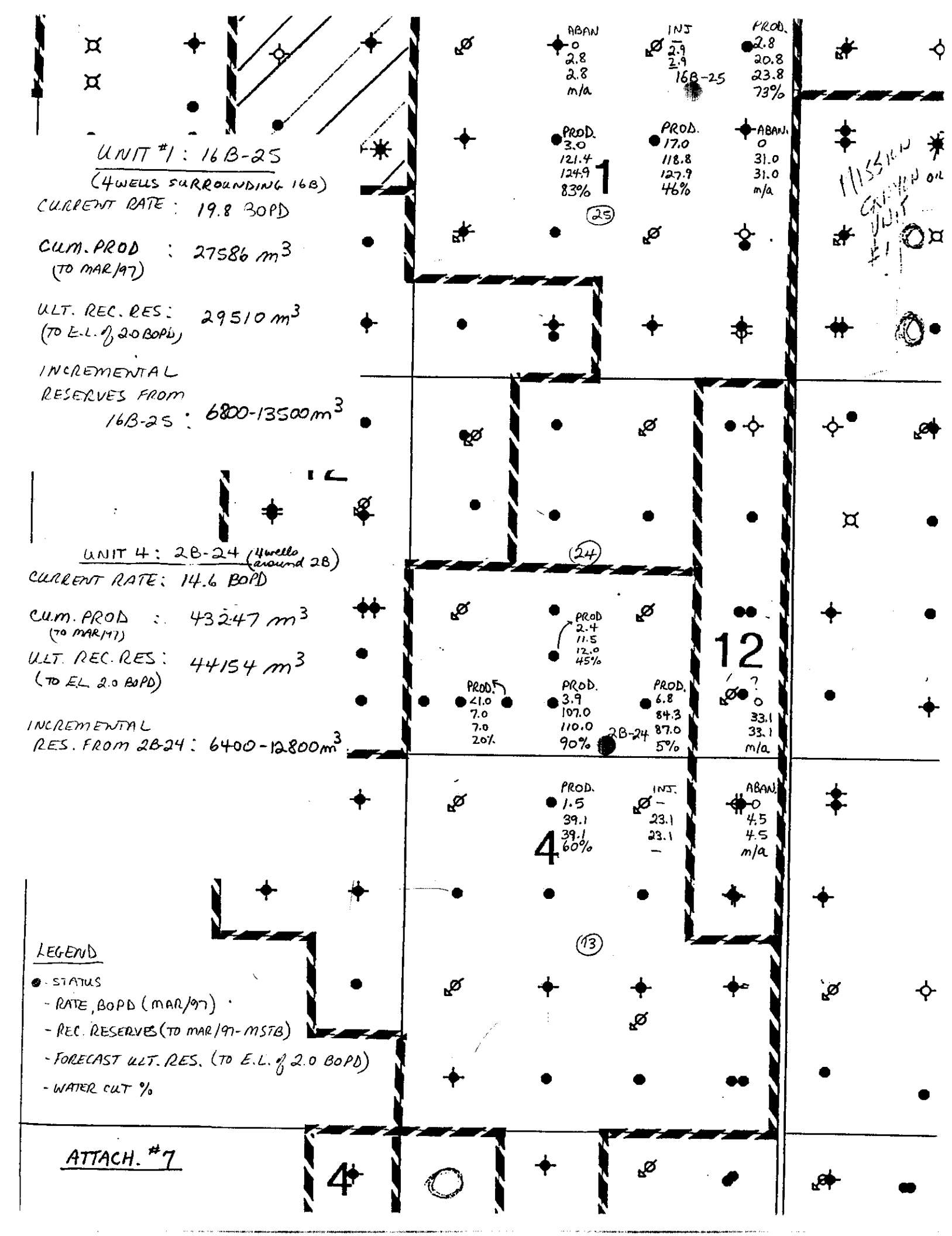
CI = 2m

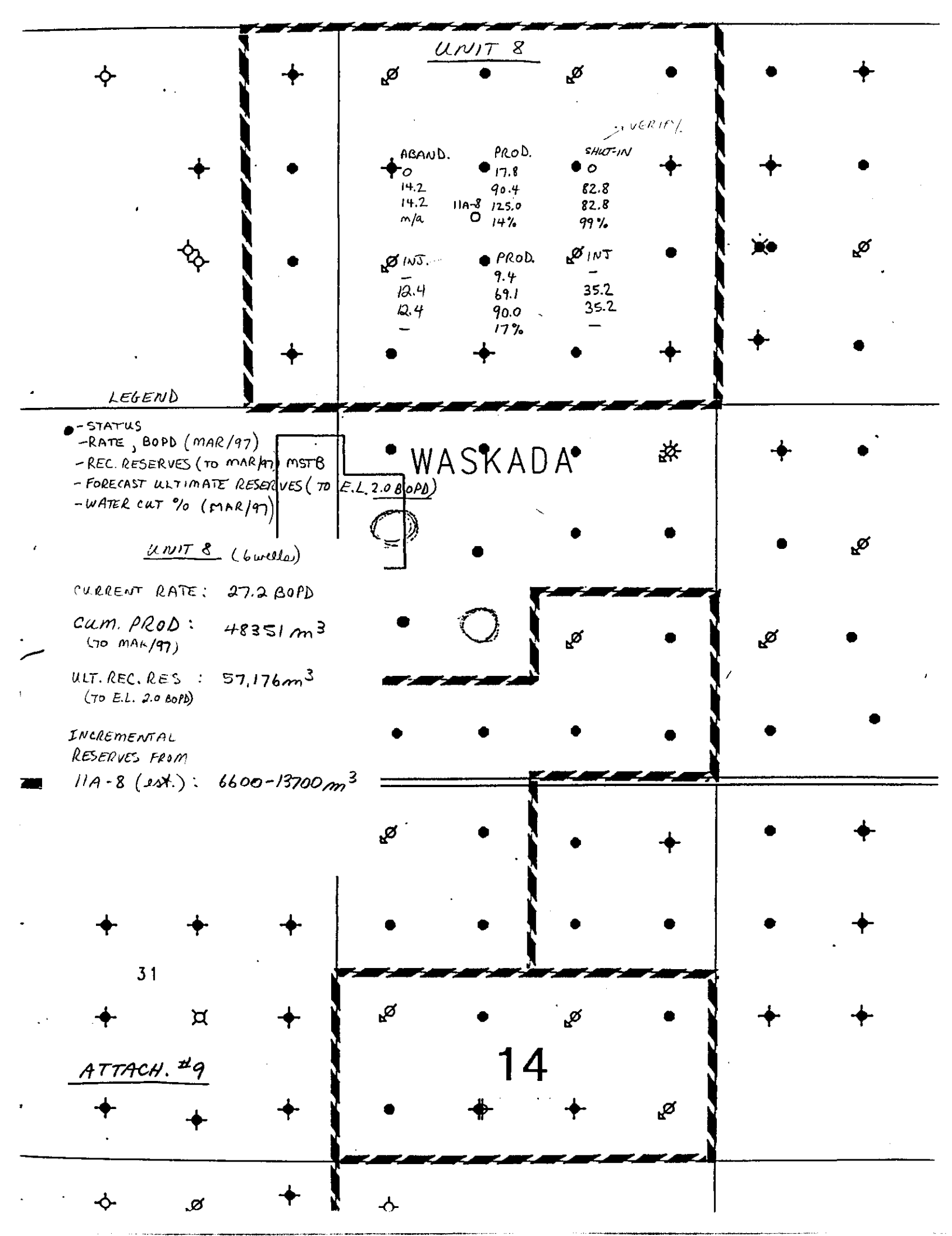
MISSISSIPPIAN UNCONFORMITY STRUCTURE

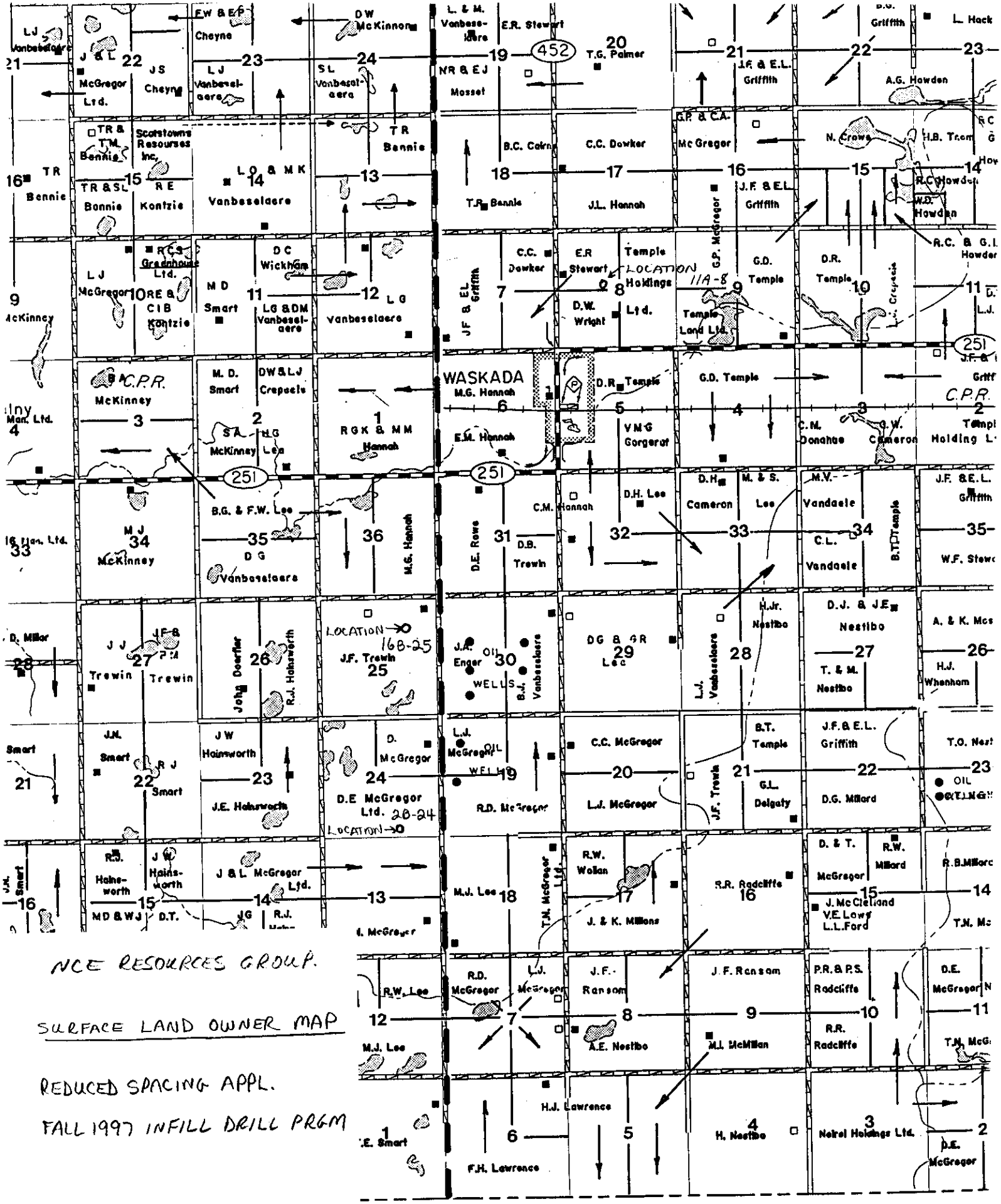
MISSISSIPPIAN EROSIONAL SUFACE STRUCTURE MAP



ATTACH. #6


ABAN
0
2.8
2.8
m/a
INJ
2.9
2.9
16B-25
PROD.
2.8
20.8
23.8
73%
PROD.
3.0
121.4
124.9
83%
1
PROD.
17.0
118.8
127.9
46%
ABAN.
0
31.0
31.0
m/a
25
UNIT #1 : 16B-25
(4 WELLS SURROUNDING 16B)
CURRENT RATE : 19.8 BOPD
CUM. PROD (TO MAR/97) : 27586 m3
ULT. REC. RES: (TO E.L. @ 2.0 BOPD) 29510 m3
INCREMENTAL RESERVES FROM 16B-25 : 6800-13500 m3
UNIT 4 : 2B-24 (4 wells around 2B)
CURRENT RATE: 14.6 BOPD
CUM. PROD (TO MAR/97) : 43247 m3
ULT. REC. RES: (TO EL 2.0 BOPD) 44154 m3
INCREMENTAL RES. FROM 2B-24 : 6400-12800 m3
24
PROD
2.4
11.5
12.0
45%
12
PROD.
41.0
7.0
7.0
20%
PROD.
3.9
107.0
110.0
90%
2B-24
PROD.
6.8
84.3
87.0
5%
?
0
33.1
33.1
m/a
PROD.
1.5
39.1
39.1
60%
4
INJ.
–
23.1
23.1
–
ABAN.
0
4.5
4.5
m/a
13
LEGEND
STATUS
- RATE, BOPD (MAR/97)
- REC. RESERVES (TO MAR/97 - MSTB)
- FORECAST ULT. RES. (TO E.L. @ 2.0 BOPD)
- WATER CUT %
ATTACH. #7
4


UNIT 8
VERIFY
ABAND.
PROD.
SHUT-IN
0
17.8
0
14.2
90.4
82.8
14.2
11A-8
125.0
82.8
n/a
0
14%
99%
INJ.
PROD.
INT
—
9.4
—
12.4
69.1
35.2
12.4
90.0
35.2
—
17%
—
LEGEND
● - STATUS
- RATE, BOPD (MAR/97)
- REC. RESERVES (TO MAR/97) MSTB
- FORECAST ULTIMATE RESERVES (TO E.L. 2.0 BOPD)
- WATER CUT % (MAR/97)
WASKADA
UNIT 8 (6 wells)
CURRENT RATE: 27.2 BOPD
CUM. PROD: 48351 m3
(TO MAR/97)
ULT. REC. RES: 57,176 m3
(TO E.L. 2.0 BOPD)
INCREMENTAL
RESERVES FROM
11A-8 (est.): 6600-13700 m3
31
14
ATTACH. #9



NCE RESOURCES GROUP.

SURFACE LAND OWNER MAP

REDUCED SPACING APPL.

FALL 1997 INFILL DRILL PRGM

ATTACH. #10

"RESPECT THE LANDO

NCE Resources Group Inc.
Reduced Spacing Application
Fall 1997 Drilling Program
Waskada Field, Manitoba
Surface Land Owner / Occupant List

	Well Location	Owner/Address	Occupant	Consent
1)	Unit #4:			
	2B-24-1-26-W1M	Don E. McGregor Box 33 Waskada, MB R0M 2E0	none	in progress
2)	Unit #1:			
	16B-25-1-26-W1M	James Forbes Trewin Box 52 Waskada, MB R0M 2E0	none	in progress
3)	Unit #8:			
	11A-8-2-25-W1M	Ernest Roy Stewart Box 204 Waskada, MB R0M 2E0	none	in progress

Attachment #11

NCE RESOURCES GROUP

2300 CANADA TRUST TOWER, 421-7th AVE. S.W.,CALGARY,ALBERTA,CANADA T2P 4K9 TELEPHONE (403) 218-8625 FAX (403) 269-5858

September 19, 1997

Manitoba Energy and Mines
Petroleum & Energy Branch
#360, 1395 Ellice Avenue
Winnipeg, MB R3G ~~2P3~~ 3P2

Attention: Mr. John Fox, P. Eng.
Chief Petroleum Engineer

Dear Sir;

Re: Reduced Spacing Application - Fall 1997 Drilling Program
SE/4-24-1-26 W1M, Unit #4
NE/4-25-1-26 W1M, Unit #1
NW/4- 8-2-25 W1M, Unit #8
Waskada Field, Manitoba

In accordance with Section 102 of the Manitoba Energy and Mines - Oil and Gas Act, please accept this letter as a formal application by NCE Resources Group Inc. for reduced spacing in each of the above three units, in the Waskada field. The purpose of reduced spacing is to allow for infill drilling of one well in each of the three units, to increase ultimate recoverable reserves by capturing unswept oil from the Lower Amaranth formation. The location of these infill wells will also allow for the future strategy of implementing a "line drive" water injection scheme, to evaluate the effectiveness on secondary recoveries. Should this program be successful, then reduced spacing may be considered for other suitable areas of this field.

The following information has been prepared in support of this application:

Area of Application

Attachments #1 and #2 show the area of application together with the boundaries of each proposed spacing unit.

Mineral Ownership

Common mineral ownership exists for all proposed infill locations as they are within existing unit boundaries.

Description of Proposed Spacing Units

Units #4 & #1: The size and orientation of the proposed spacing units are 8 Ha "diamonds" (see attach. #1), with target areas being 65 m inside each of the four sides. The formations to which the application applies are the Lower Amaranth and Mission Canyon.

Unit #8: The size and orientation of the proposed spacing unit is a 4 Ha "square" (see attach. #2), with the target area being 50 m inside each of the four sides. The formations to which the application applies are the Lower Amaranth and Mission Canyon.

Geological Summary

The primary zone of interest is the Triassic aged Spearfish (ie. Lower Amaranth) at an approximate depth of 890 meters, with secondary potential in the Mississippian aged Mission Canyon (MC) at an approximate depth of 910 meters. The Spearfish and MC are separated by up to 10 meters of tight cap rock. Thin interbedded cycles of sandstone and siltstone characterize the Spearfish, which was deposited in a shallow marine tidal environment. The MC zone is easily identified on logs due to separation from the Triassic by the Mississippian unconformity surface. The top of the MC is typically dominated by evaporitic sediments before the porous limestone and dolomitic limestone facies are encountered. Stratigraphic correlations are straight forward due to the erosional nature of the contacts and the interbedded nature of the rock.

The Spearfish is composed of several pulses of sand, silt, and shale. In general the zone is more sand rich at the base, fining upwards into predominantly shale. Porosity averages 13% with an average permeability of 5 md. Capillary pressure data conducted on 10 core plugs indicated an average connate water saturation of 38%; however, 44% is the accepted value, to reflect the fine grained nature of the sand. Net pay averages 10 meters over the majority of the field.

The Mississippian section has an average porosity of 13%, an average permeability of 30 md., 2.5 meters of net pay, and a water saturation of 40%. Pay quality is directly proportional to the thickness of caprock and diagenetic alteration which can severely downgrade the reservoir quality.

Trapping in the Spearfish is stratigraphic in nature. Porosity and permeability can be destroyed due to diagenetic cementation of the pore space. Stratigraphic facies changes provide the lateral seal. For the MC, trapping is primarily structural, however variations in the thickness of caprock can provide localized stratigraphic traps.

The following geological maps have been included for this application:

1) Lower Amaranth Net Pay Maps, Attachments #3 and #4,
2) Mississippian Unconformity Structure, Attachment #5
3) Mississippian Erosional Surface Structure Map, Attachment #6

Engineering Summary

A) Unit #4, (Twp 1 - Rge 26 - W1M)

A review of the six wells in the offsetting spacing units to 2B - 24 (see attachments #7 and #8), reveals a total current oil rate of 2.32 m^3opd (14.6 bopd), with cumulative production to Mar/97 of 43247 m^3. Ultimate recoverable reserves have been estimated at 44154 m^3, based on extrapolation of each well's production decline to an economic limit of 0.32 m^3opd (2.0 bopd). Therefore, only 906 m^3 of reserves remain to be recovered, and this portion of the reservoir is

quickly approaching it's economic limit. The recovery factor to Mar/97 has been calculated at 10.1%, with the ultimate recovery factor expected to be only marginally higher at 10.4%. Both recovery factors are well below the anticipated recovery factor range of 15-25% for a waterflood scheme in the Lower Amaranth formation. (ie. recovery factors published in the paper "Waskada Lower Amaranth, an Overview", by M. Rodgers and B. Dubreuil, dated Jan 1/85, Manitoba Energy and Mines, Petroleum Branch, indicate a 5% recovery on primary production and 15-25% for secondary recovery, depending on observation of pressure maintenance response)

By locating a well in 2B - 24, we are attempting to encounter reserves that otherwise would not be recovered due to the fact that 14-13 is now producing below the economic limit, and consequently is soon to be shut-in, and 3-24 is close to watering out (i.e. 90% WC) with only 477 m^3 remaining prior to being shut-in. When 3-24 becomes uneconomic, it will be considered for conversion to water injection to create a line-drive injection mechanism, which will offset withdrawals from 2B - 24. Estimated recoverable reserves from reduced spacing are difficult to predict due to the uncertain proximity of the waterflood front and the unknown effectiveness of line-drive injection; however, we anticipate an incremental recovery factor of 1.5-3.0%, which equates to ± 6400-12800 m^3 of oil, for this location.

B) Unit #1 (Twp 1 - Rge 26 - W1M)

A review of the four wells in the offsetting spacing units to 16B - 25 (see attachments #7 and #8), reveals a total current oil rate of 3.15 m^3opd (19.8 bopd) with cumulative production to Mar/97 of 27586 m^3. Ultimate recoverable reserves have been estimated at 29510 m^3, based on extrapolation of each well's production decline to an economic limit of 0.32 m^3opd (2.0 bopd). Therefore, only 1924 m^3 of reserves remain to be recovered, and this portion of the reservoir is also in the final stages of production. The recovery factor to Mar/97 has been calculated at 6.1%, with the ultimate recovery factor expected to be only marginally higher at 6.5%. Both recovery factors are well below the anticipated recovery factor range of 15-25% for a waterflood scheme in the Lower Amaranth formation.

By locating a well in 16B - 25, we are attempting to encounter reserves that otherwise would not be recovered due to the fact that 9-25 has been abandoned, and 16-25 is close to it's economic limits with only 477 m^3 remaining prior to being shut-in. The well in 11-25 is close to being uneconomic at 0.47 m^3opd (3.0 bopd) and it will be considered for conversion to water injection to create a line-drive injection mechanism, which will offset withdrawals from the new location in 16B - 25. Estimated recoverable reserves are difficult to predict, as discussed above; however, assuming a similar 1.5-3.0% incremental recovery factor, this equates to ± 6800-13500 m^3 of oil for this location.

C) Unit #8 (Twp 1 - Rge 26 - W1M)

A review of the six wells in the offsetting spacing units to 11A - 8 (see attachments #8 and #9), reveals a total current oil rate of 4.32 m^3opd (27.2 bopd), with cumulative production to Mar/97 of 48351 m^3. Ultimate recoverable reserves have been estimated at 57176 m^3, based on extrapolation of each well's production decline to an economic limit of 0.32 m^3opd (2.0 bopd). The recovery factor to Mar/97 has been calculated at 8.8%, with the ultimate recovery factor expected to be 10.4%. By locating a well in 11A - 8, and implementing a line-drive injection mechanism (i.e. with conversion of 10-8, which has now watered out, and/or 12-8), we anticipate an increase in ultimate recoveries by 1.2-2.5%, which equates to ± 6600-13700 m^3 of oil, as a result of a more effective sweep efficiency.

Correlative Rights

Correlative rights of offsetting mineral owners will not be affected as the proposed locations are all inside existing unit boundaries where tract factors have been previously assigned. Mineral

rights of owners adjacent to the units will not be affected as the proposed locations are adequately located greater than 100m inside the unit boundaries.

Land Owners and Occupants

Attachment #10 illustrates a map of the surface land owners in the immediate area, while attachment #11 indicates their names and addresses. Consent is currently being obtained and I will notify you upon it's completion.

Current Land Use

Current land use in the area is primarily agricultural, with approximately 80% cultivated for the purpose of growing crops and 20% being used for pasture.

Reduced Spacing Impact on Land Use

The impact on land use will be kept at a minimum as a result of performing the following:

1) Using existing access roads where possible.
2) Using non built-up roads.
3) Running underground electrical power, where economically feasible.
4) Building flowlines to wells, where economical, to minimize the actively used lease area.

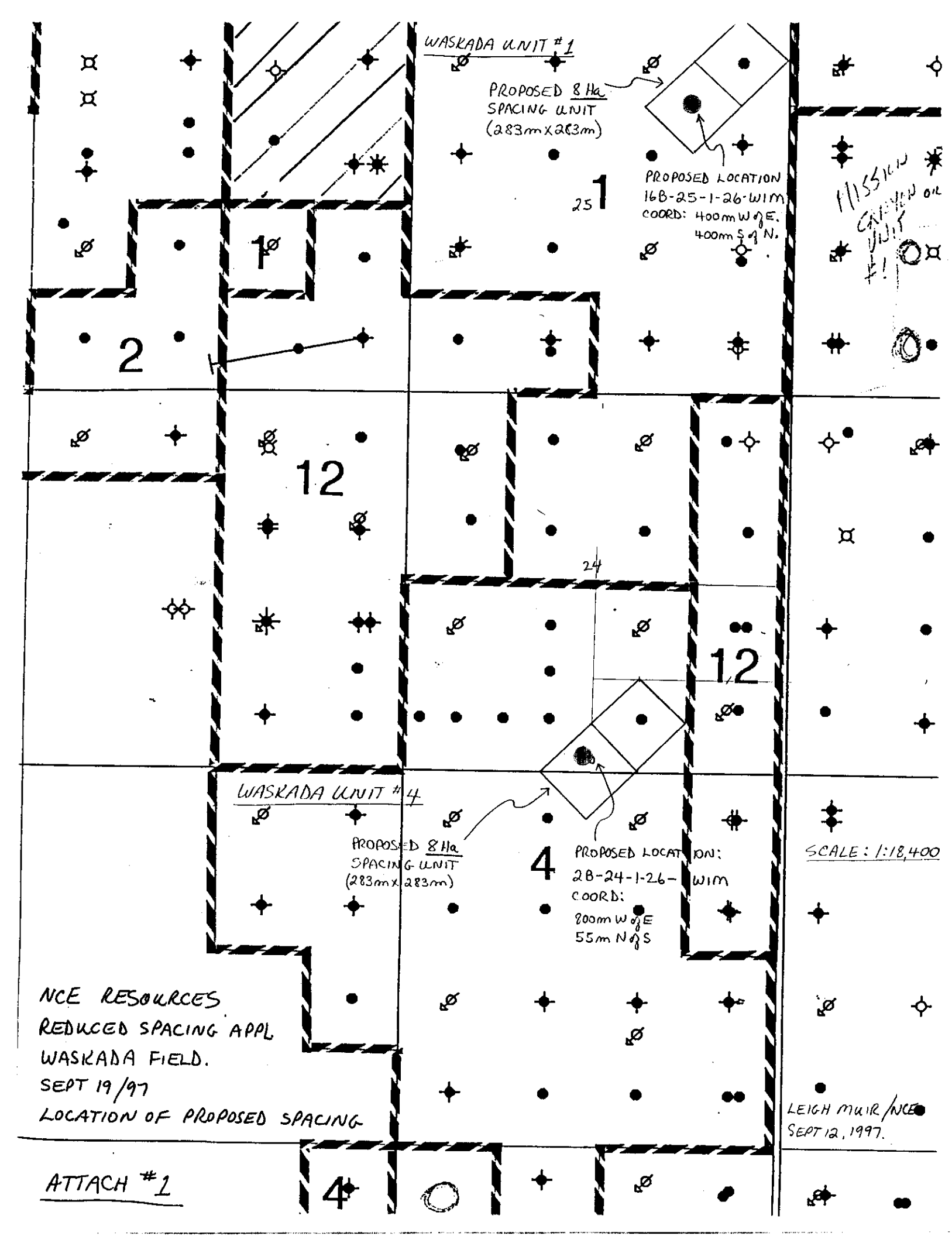
Should you have any questions related to the above application, please contact the undersigned at (403) 218-8715. Thanking you in advance for your early attention to this application.

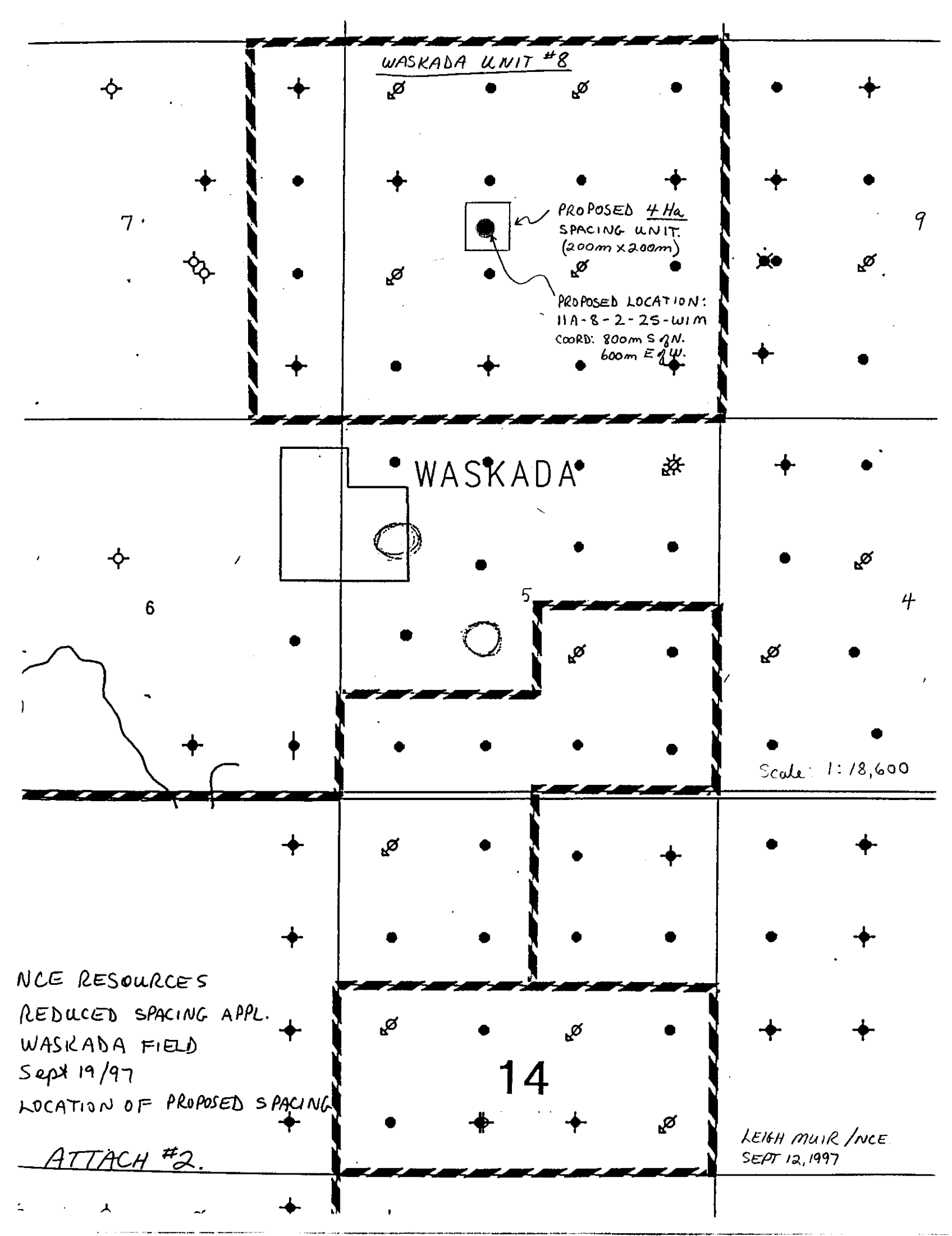
Yours truly,
NCE RESOURCES GROUP INC.

Leigh Muir, P. Eng.
Petroleum Engineer

LM/gsc

Attach.

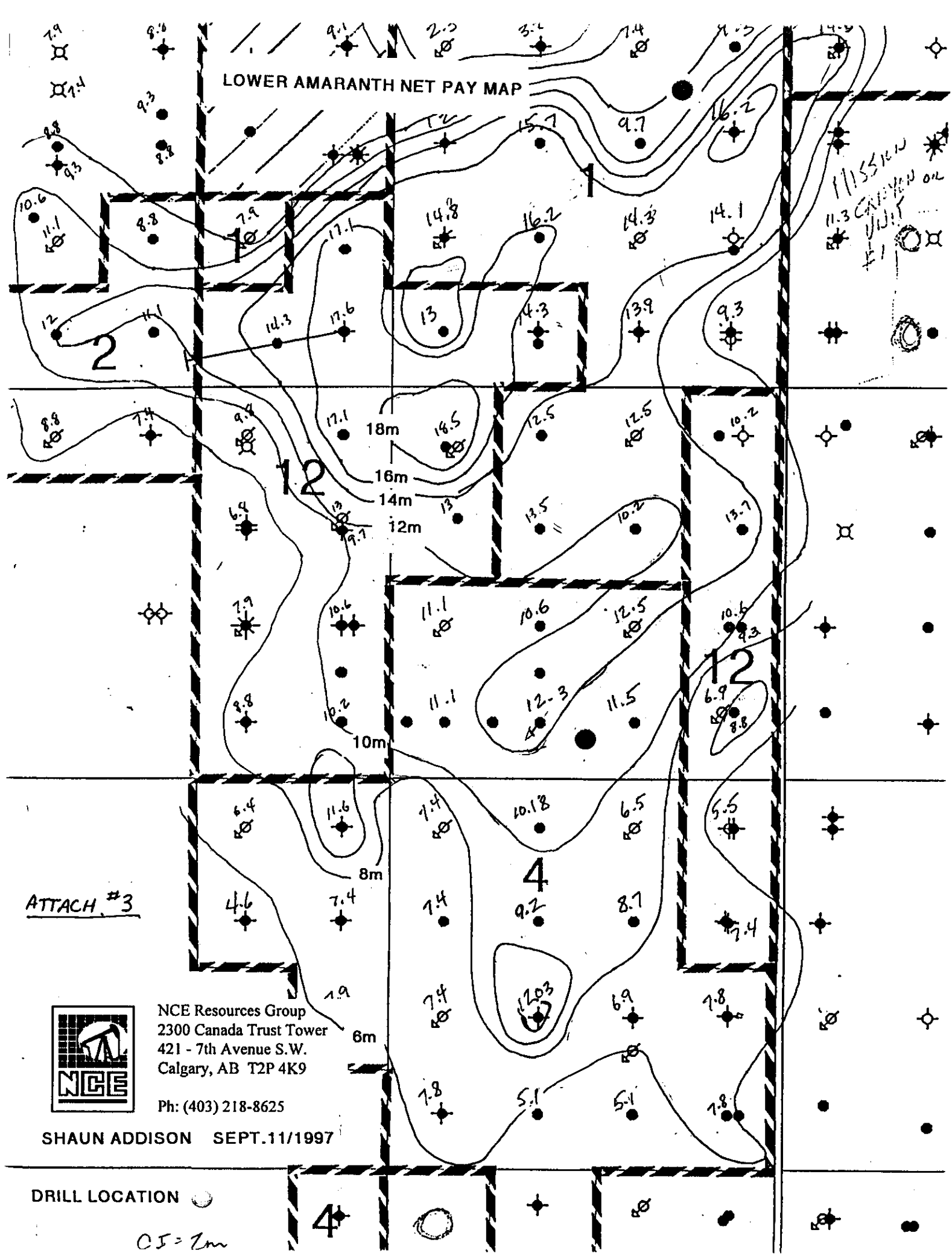

WASKADA UNIT #1
PROPOSED 8 Ha SPACING UNIT (283m x 283m)
PROPOSED LOCATION 16B-25-1-26-W1M COORD: 400m W of E. 400m S of N.
25
1
2
12
24
12
WASKADA UNIT #4
PROPOSED 8 Ha SPACING UNIT (283m x 283m)
4
PROPOSED LOCATION: 2B-24-1-26-W1M COORD: 800m W of E 55m N of S
SCALE: 1:18,400
NCE RESOURCES
REDUCED SPACING APPL
WASKADA FIELD.
SEPT 19/97
LOCATION OF PROPOSED SPACING
LEIGH MUIR/NCE
SEPT 12, 1997.
ATTACH #1
4

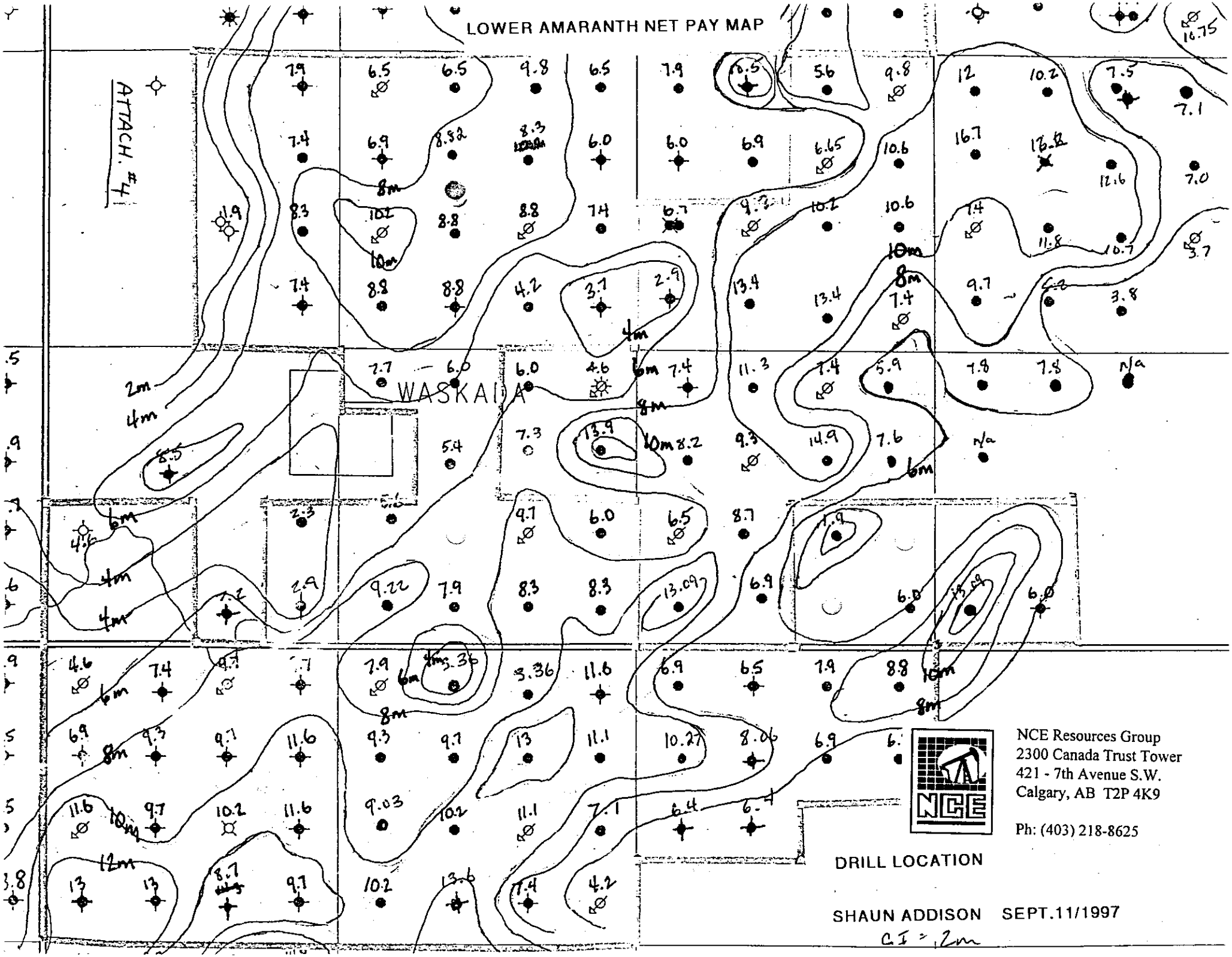


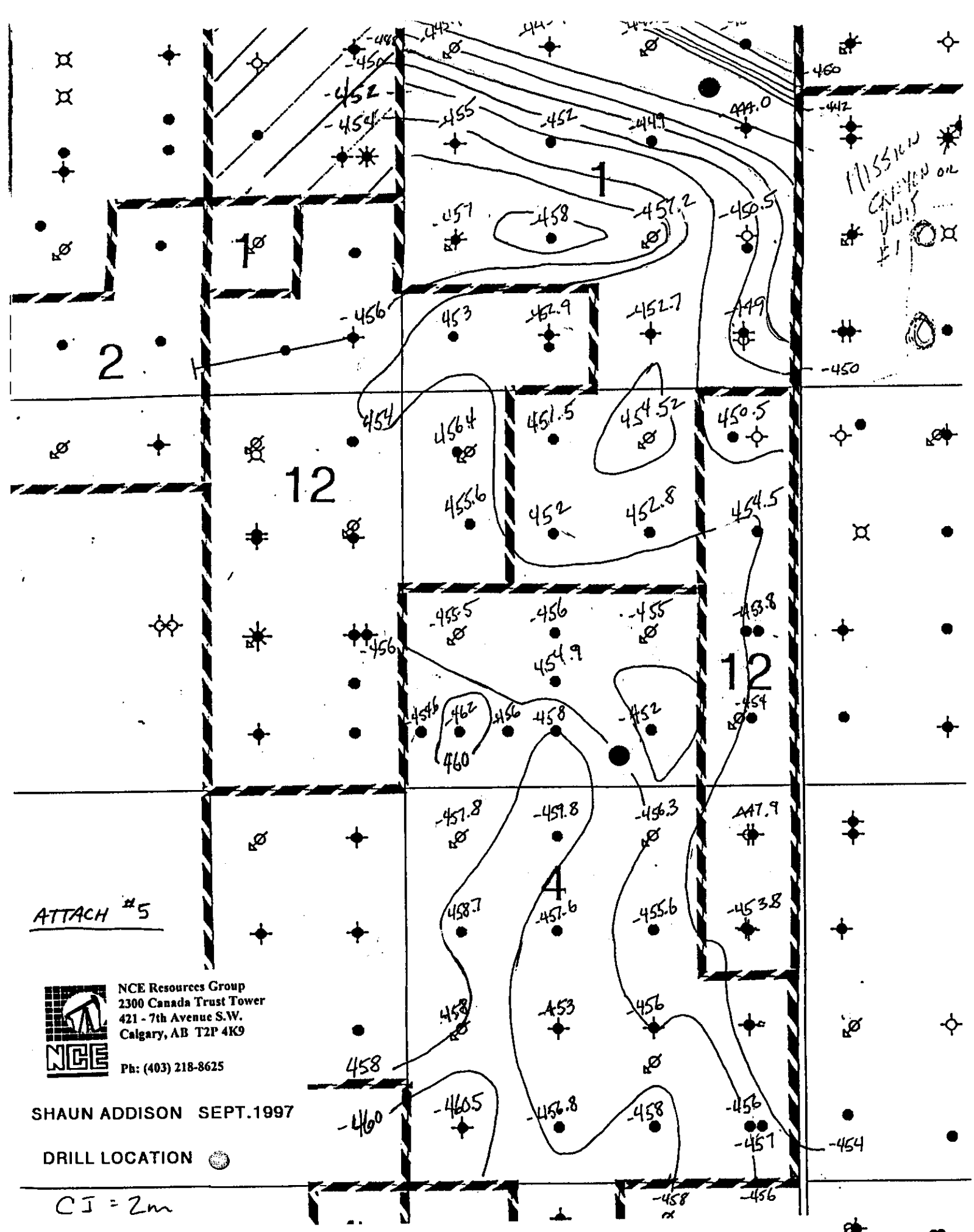
NCE RESOURCES
REDUCED SPACING APPL.
WASKADA FIELD
Sept 19/97
LOCATION OF PROPOSED SPACING

ATTACH #2.

LEIGH MUIR / NCE
SEPT 12, 1997


LOWER AMARANTH NET PAY MAP
18m
16m
14m
12m
10m
8m
6m
ATTACH #3
NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9
Ph: (403) 218-8625
SHAUN ADDISON SEPT.11/1997
DRILL LOCATION
CI = 2m


LOWER AMARANTH NET PAY MAP
ATTACH. #4
WASKADA
2m
4m
6m
8m
10m
12m
DRILL LOCATION
SHAUN ADDISON SEPT.11/1997
CI = 2m
NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9
Ph: (403) 218-8625


ATTACH #5
NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9
Ph: (403) 218-8625
SHAUN ADDISON SEPT.1997
DRILL LOCATION
CI = 2m
MISSISSIPPIAN UNCONFORMITY STRUCTURE

MISSISSIPPIAN EROSIONAL SUFACE STRUCTURE MAP

WASKADA

NCE Resources Group
2300 Canada Trust Tower
421 - 7th Avenue S.W.
Calgary, AB T2P 4K9

Ph: (403) 218-8625

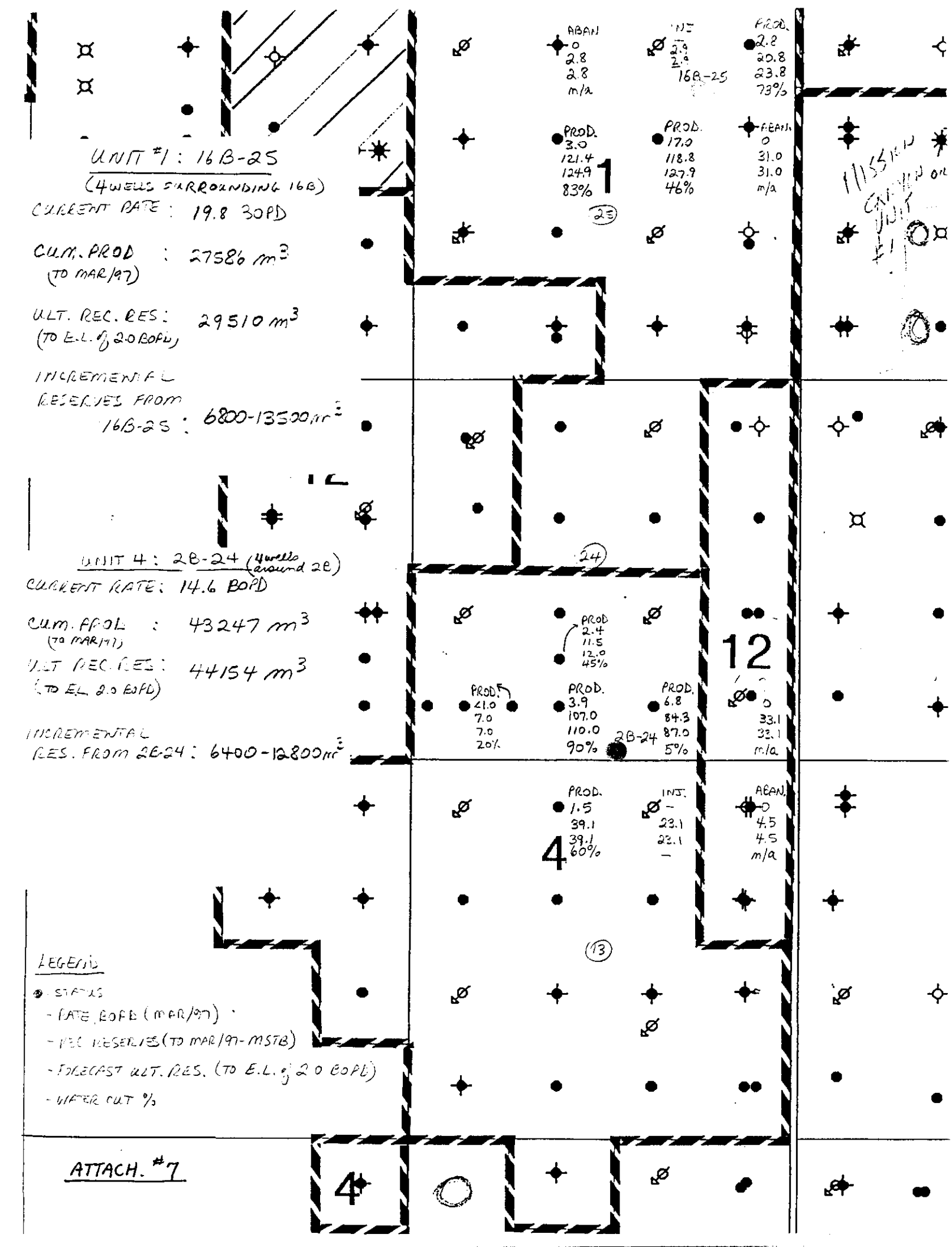
SHAUN ADDISON

SEPT. 1997

DRIILLING LOCATION

CI = 2m

ATTACH. #6


UNIT #1 : 16B-25
(4 WELLS SURROUNDING 16B)
CURRENT RATE : 19.8 BOPD
CUM. PROD : 27586 m3
(TO MAR/97)
ULT. REC. RES: 29510 m3
(TO E.L. of 2.0 BOPD)
INCREMENTAL RESERVES FROM 16B-25 : 6800-13500 m3
UNIT 4 : 2B-24 (4 wells around 2B)
CURRENT RATE: 14.6 BOPD
CUM. PROD : 43247 m3
(TO MAR/97)
ULT REC. RES: 44154 m3
(TO EL 2.0 BOPD)
INCREMENTAL RES. FROM 2B-24 : 6400-12800 m3
LEGEND
- STATUS
- RATE, BOPD (MAR/97)
- REC RESERVES (TO MAR/97 - MSTB)
- FORECAST ULT. RES. (TO E.L. of 2.0 BOPD)
- WATER CUT %
ATTACH. #7
ABAN
0
2.8
2.8
m/a
INJ
2.9
2.9
16B-25
PROD.
2.8
20.8
23.8
73%
PROD.
3.0
121.4
124.9
83%
1
PROD.
17.0
118.8
127.9
46%
ABAN.
0
31.0
31.0
m/a
23
24
PROD
2.4
11.5
12.0
45%
12
PROD.
<1.0
7.0
7.0
20%
PROD.
3.9
107.0
110.0
90%
2B-24
PROD.
6.8
84.3
87.0
5%
0
33.1
33.1
m/a
PROD.
1.5
39.1
39.1
60%
4
INJ.
–
23.1
23.1
–
ABAN.
0
4.5
4.5
m/a
13
4

NCE Resources Group Inc.
Waskada Field: MB.
Recovery Factor Analysis

A) Unit #4: (Twp 1 - Rge 26 - W1M)

Well	Area	Alloc.	Net Pay	OOIP	Prod. to Mar-97		Forecast to E.L.		Rec Fact.	Ultimate R.F.	Remain. Reserves	Current Oil Rate
Locn	Ha	Factor	m	m^3	m^3	Mbbl	m^3	Mbbl	to Mar/97	to E.L.	m^3	bopd
3-24	12	1.0	12.3	97566	17013	107.0	17490	110	17.4	17.9	477	3.9
3c-24	4	0.5	11.7	15468	1113	7.0	1113	7	3.6	3.6	0	0.0
6a-24	4	0.5	11.4	15071	1828	11.5	1828	11.5	6.1	6.1	0	2.4
2-24	16	1.0	11.5	121627	13404	84.3	13833	87	11.0	11.4	429	6.8
14-13	16	1.0	10.2	107878	6217	39.1	6217	39.1	5.8	5.8	0	1.5
15-13 (inj)	16	1.0	6.5	68746	3673	23.1	3673	23.1	5.3	5.3	0	0.0
		Totals:		426356	43247	272.0	44154	277.7	10.1	10.4	906	14.6

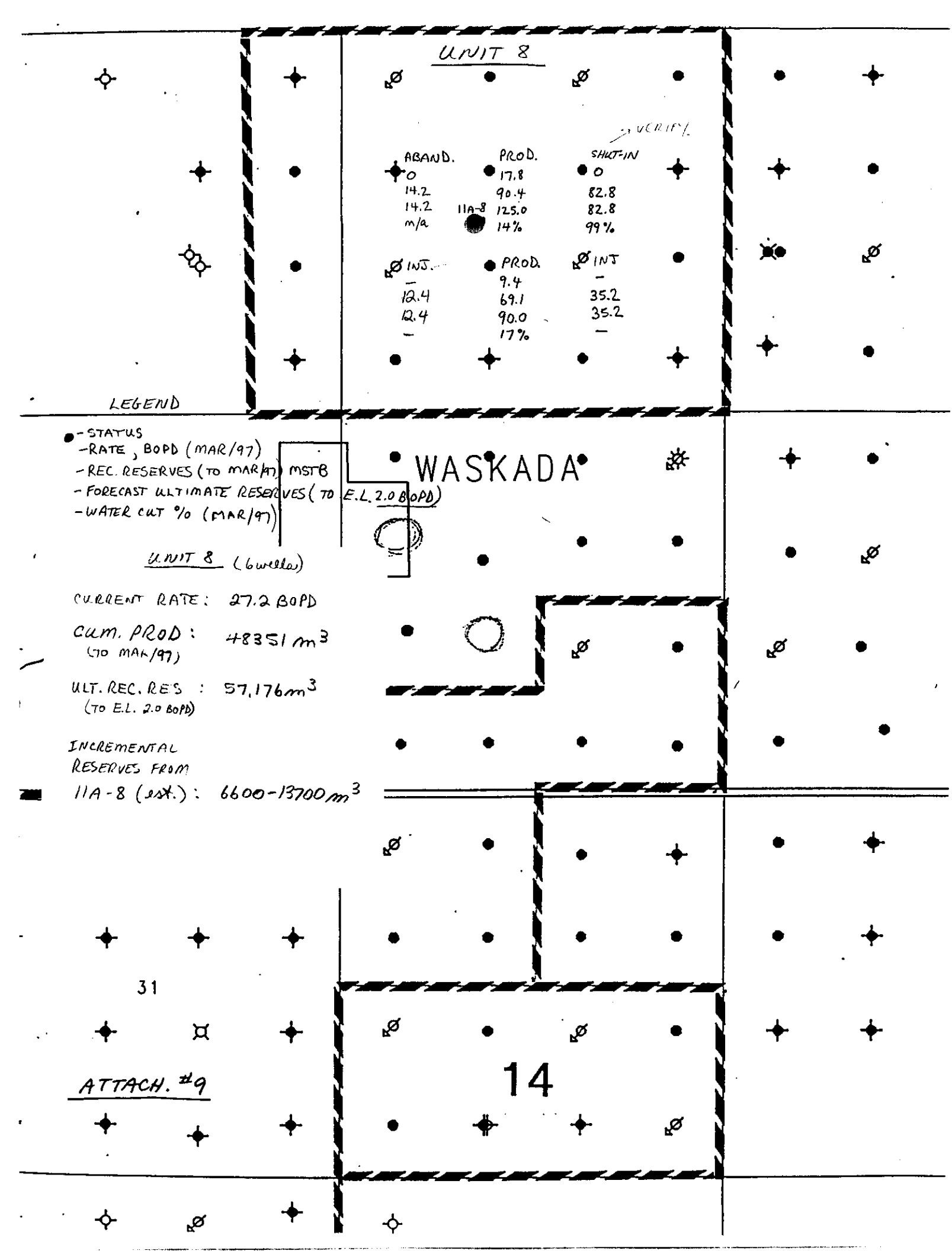
B) Unit #1: (Twp 1 - Rge 26 - W1M)

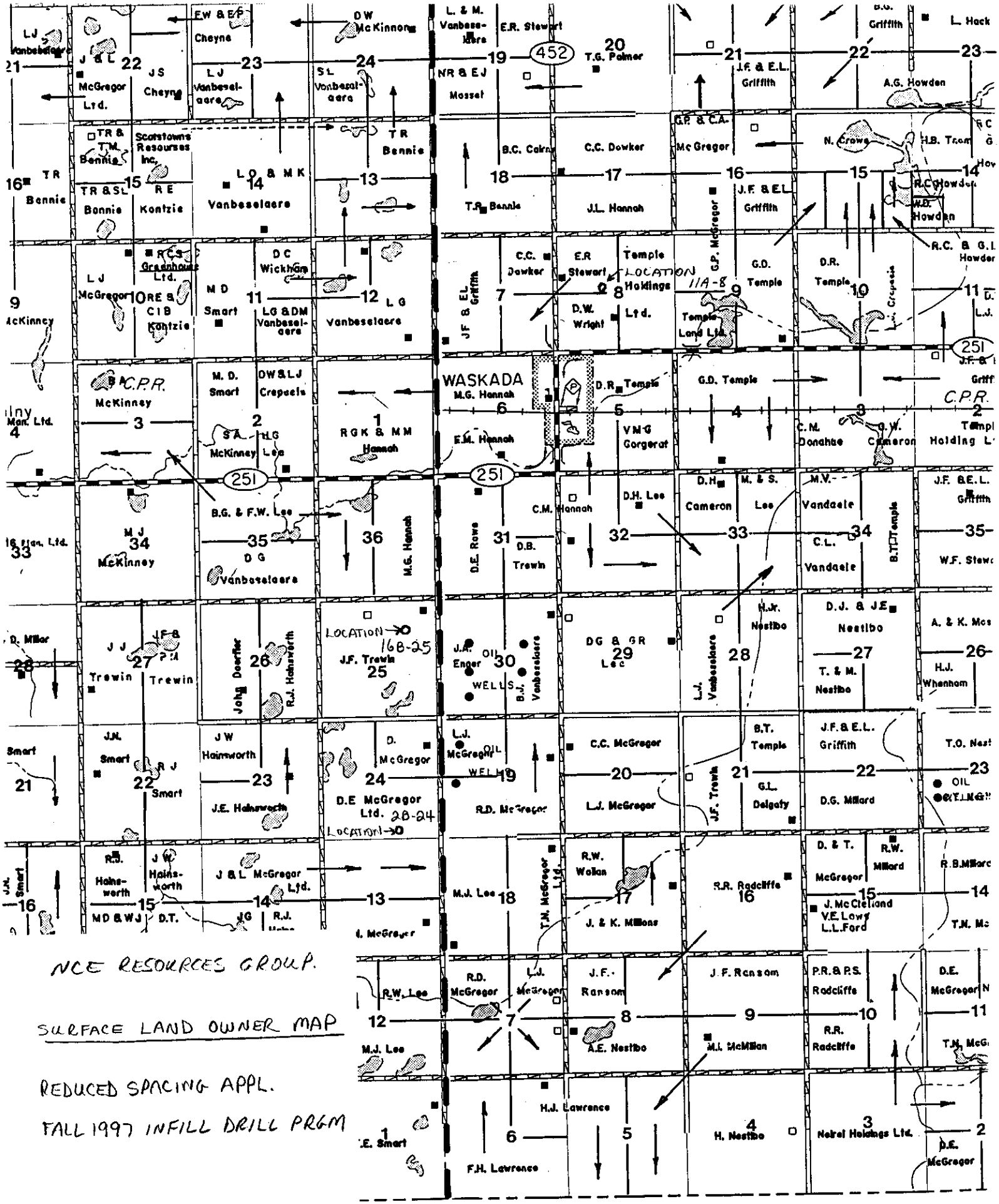
Well	Area	Alloc.	Net Pay	OOIP	Prod. to Mar-97		Forecast to E.L.		Rec Fact.	Ultimate R.F.	Remain. Reserves	Current Oil Rate
Locn	Ha	Factor	m	m^3	m^3	Mbbl	m^3	Mbbl	to Mar/97	to E.L.	m^3	bopd
9-25	16	1.0	16.2	171336	4929	31.0	4929	31	2.9	2.9	0	0.0
10-25	16	1.0	9.7	102590	18889	118.8	20336	127.9	18.4	19.8	1447	17.0
15-25 (inj)	16	1.0	7.4	78264	461	2.9	461	2.9	0.6	0.6	0	0.0
16-25	16	1.0	9.3	98359	3307	20.8	3784	23.8	3.4	3.8	477	2.8
		Totals:		450549	27586	173.5	29510	185.6	6.1	6.5	1924	19.8

C) Unit #8: (Twp 2 - Rge 25 - W1M)

Well	Area	Alloc.	Net Pay	OOIP	Prod. to Mar-97		Forecast to E.L.		Rec Fact.	Ultimate R.F.	Remain. Reserves	Current Oil Rate
Locn	Ha	Factor	m	m^3	m^3	Mbbl	m^3	Mbbl	to Mar/97	to E.L.	m^3	bopd
5-8 (inj)	16	1.0	10.2	107878	1972	12.4	1972	12.4	1.8	1.8	0	0
6-8	16	1.0	8.8	93071	10987	69.1	14310	90.0	11.8	15.4	3323	9.4
7-8 (inj)	16	1.0	8.8	93071	5597	35.2	5597	35.2	6.0	6.0	0	0
10-8	16	1.0	8.3	87783	13165	82.8	13165	82.8	15.0	15.0	0	0
11-8	16	1.0	8.8	93071	14373	90.4	19875	125.0	15.4	21.4	5501	17.8
12-8	16	1.0	6.9	72976	2258	14.2	2258	14.2	3.1	3.1	0	0
		Totals:		547851	48351	304	57176	359.6	8.8	10.4	8824	27.2

Attachment #8


UNIT 8
ABAND.
PROD.
SHUT-IN
0
17.8
0
14.2
90.4
82.8
14.2
11A-8
125.0
82.8
n/a
14%
99%
INJ.
PROD.
INT
—
9.4
—
12.4
69.1
35.2
12.4
90.0
35.2
—
17%
—
LEGEND
● - STATUS
- RATE, BOPD (MAR/97)
- REC. RESERVES (TO MAR/97) MSTB
- FORECAST ULTIMATE RESERVES (TO E.L. 2.0 BOPD)
- WATER CUT % (MAR/97)
WASKADA
UNIT 8 (6 wells)
CURRENT RATE: 27.2 BOPD
CUM. PROD: 48351 m3
(TO MAR/97)
ULT. REC. RES: 57,176 m3
(TO E.L. 2.0 BOPD)
INCREMENTAL
RESERVES FROM
11A-8 (est.): 6600-13700 m3
31
14
ATTACH. #9



NCE RESOURCES GROUP.

SURFACE LAND OWNER MAP

REDUCED SPACING APPL.

FALL 1997 INFILL DRILL PRGM

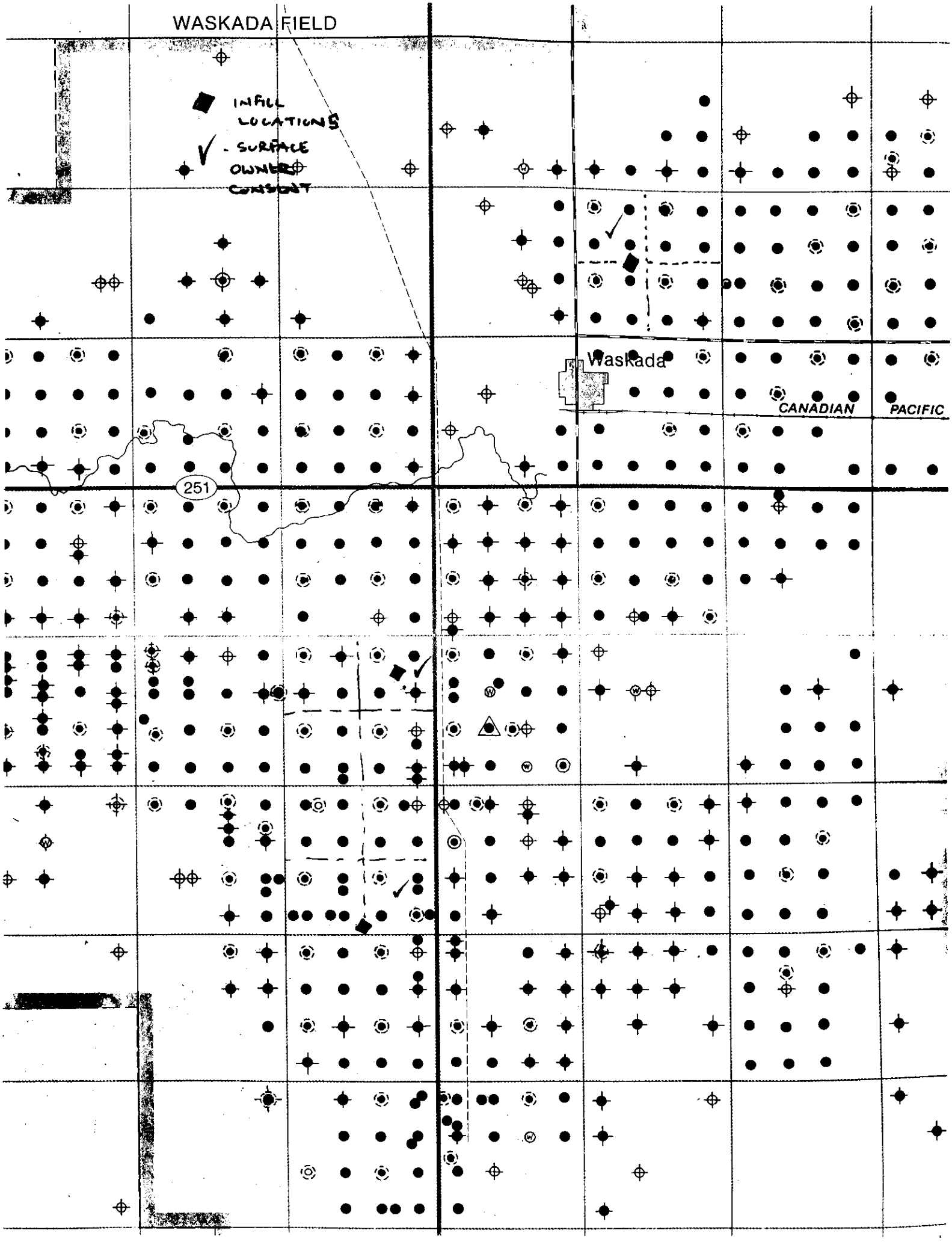
ATTACH. #10

"RESPECT THE LANDO

NCE Resources Group Inc.
Reduced Spacing Application
Fall 1997 Drilling Program
Waskada Field, Manitoba
Surface Land Owner / Occupant List

	Well Location	Owner/Address	Occupant	Consent
1)	Unit #4:			
	2B-24-1-26-W1M	Don E. McGregor Box 33 Waskada, MB R0M 2E0	none	in progress
2)	Unit #1:			
	16B-25-1-26-W1M	James Forbes Trewin Box 52 Waskada, MB R0M 2E0	none	in progress
3)	Unit #8:			
	11A-8-2-25-W1M	Ernest Roy Stewart Box 204 Waskada, MB R0M 2E0	none	in progress

Attachment #11

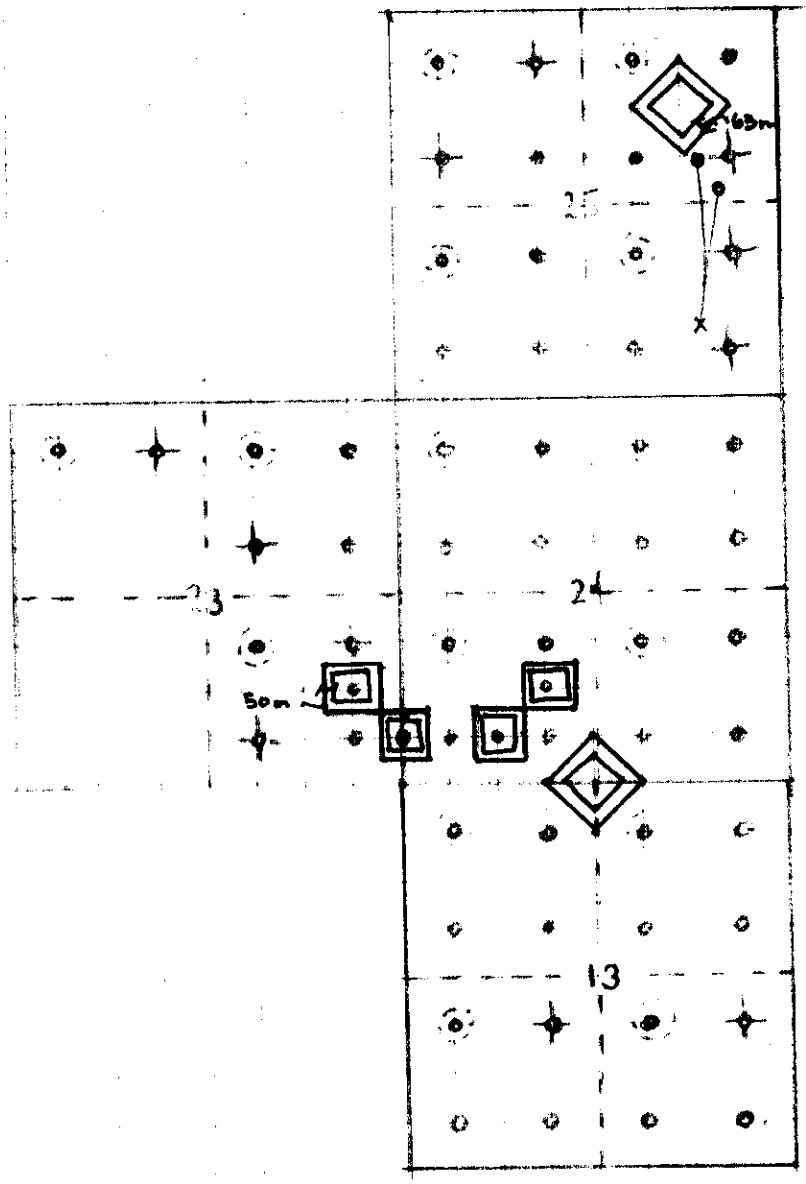

WASKADA FIELD
INFILL LOCATIONS
✓ - SURFACE OWNER CONSENT
Waskada
CANADIAN PACIFIC
251

SCHEDULE A

WASKADA FIELD

SPECIAL SPACING UNITS

RGE 26



TWP 1

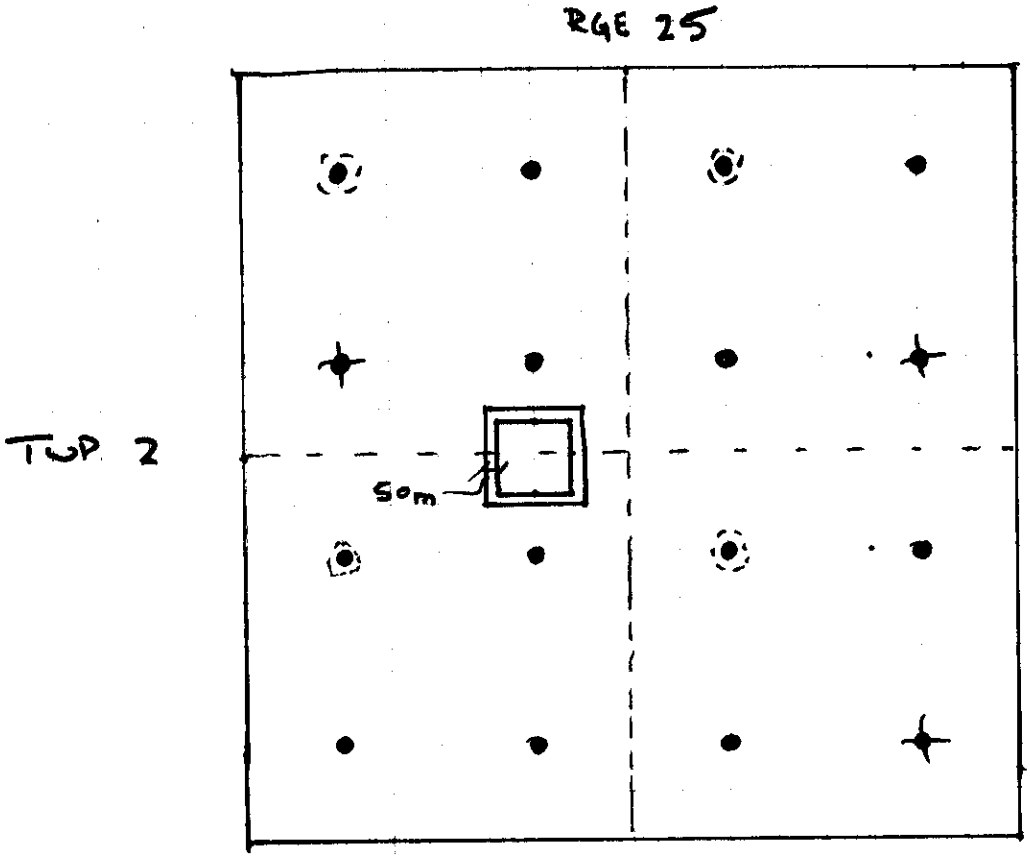
RAJ

- we'll need to make final drawing bigger
- highlight target areas.
- note description of 4 ha spacing units (see Board order No. SU 7)
- include well type legend
- more exact position of horizontal well desired
- check with Paul for most recent well status

SCHEDULE B

WASKADA FIELD

SPECIAL SPACING UNITS

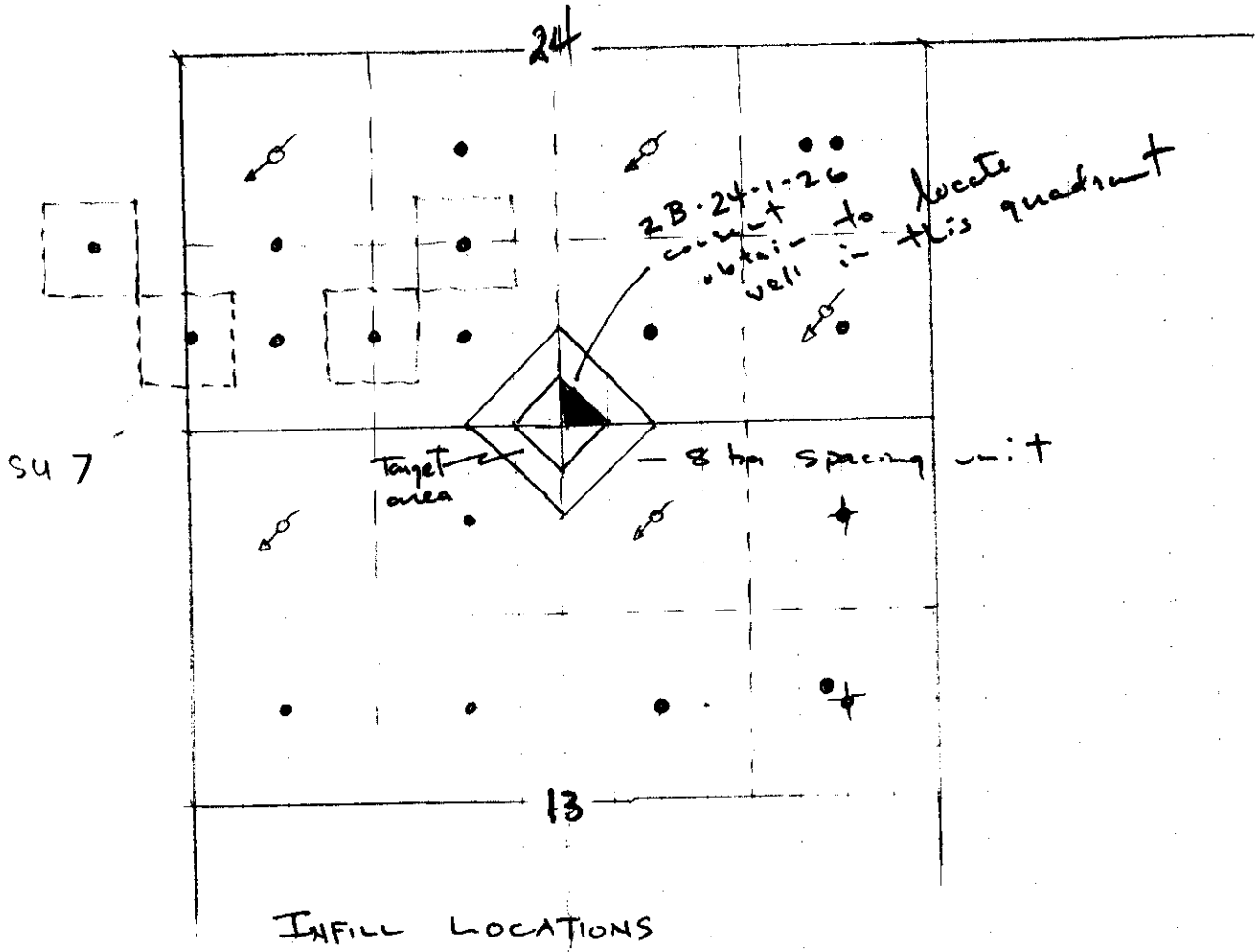


To: BLAINE
SCOTT LAND & LEASE

728-1622

WASKADA UNIT
No. 4

FM: JOHN
E&P.
ANY QUESTIONS.
PHONE
945-6574.



SU 7

INFILL LOCATIONS

16B-25-1-26 UNIT #1
2B-24-1-26 UNIT #4
6D-8-2-25 UNIT #8 (line drive N-S injection)

16ha LOCATION (UNDRILLED)

2-4-2-25
8-4-2-25
6-5-2-25
7-6-2-25 (contingent)

12-5-2-25


WASKADA FIELD
Waskada
CANADIAN
PACIFIC
251

Production Report

Group	:	Waskada Infill Wells	Date	:	9/24/97 9:40:15 am
Well	:	Infill Well Summary	User	:	Ludwig
	:	000000219			
Hist.Data	:	03/91-12/96	On Prod	:	02/09
Operator	:		Status	:	Unknown
Field	:		Zone	:	

Production Data from March, 1991 to December, 1997

Year	Num Wells	Monthly Oil m3	Avg Daily Oil m3/d	Avg Daily Oil FC 1 m3/d	Cum Oil m3	WOR m3/m3
Mar., 1991	2	132.9	13.9895		132.9	0.0541761
Apr., 1991	4	337.1	16.4439		470	0.466924
May., 1991	4	264.4	10.9031		734.4	0.301059
Jun., 1991	4	226.9	7.75727		961.3	0.449978
Jul., 1991	4	209.2	7.09153		1170.5	0.524379
Aug., 1991	4	184.9	6.60357		1355.4	0.462412
Sep., 1991	4	180.4	6.62018		1535.8	0.338137
Oct., 1991	4	184	6.13333		1719.8	0.33587
Nov., 1991	4	108.6	4.93636		1828.4	0.422652
Dec., 1991	3	47.8	2.35082		1876.2	0.221757
Jan., 1992	4	88.7	3.8989		1964.9	0.561443
Feb., 1992	4	96	4.36364		2060.9	0.540625
Mar., 1992	4	73.4	3.33636		2134.3	0.517711
Apr., 1992	3	40.3	1.43929		2174.6	0.526055
May., 1992	4	101.6	3.53391		2276.2	2.10827
Jun., 1992	4	72.1	3.27727		2348.3	0.969487
Jul., 1992	3	67.1	2.684		2415.4	0.928465
Aug., 1992	2	47.8	1.70714		2463.2	0.167364
Sep., 1992	3	81.9	3.15		2545.1	0.709402
Oct., 1992	3	107.8	3.89639		2652.9	0.765306
Nov., 1992	3	127.4	5.02895		2780.3	0.584772
Dec., 1992	3	27.5	1.61765		2807.8	3.39636
Jan., 1993	4	56	3.29412		2863.8	1.53571
Feb., 1993	4	74.6	3.35281		2938.4	0.970509
Mar., 1993	3	48.4	1.98904		2986.8	0.993802
Apr., 1993	3	36.7	1.44868		3023.5	1.83106
May., 1993	4	57.6	2.35102		3081.1	0.901042
Jun., 1993	4	32.6	1.49885		3113.7	1.5092
Jul., 1993	3	39.6	1.82769		3153.3	1.62374
Aug., 1993	2	33.1	1.324		3186.4	1.88218
Sep., 1993	3	27.8	1.46316		3214.2	1.42446
Oct., 1993	3	27	1.03846		3241.2	1.86667
Nov., 1993	3	31.3	1.34143		3272.5	1.97125
Dec., 1993	3	32.5	1.54762		3305	1.95077
Jan., 1994	2	12.9	0.645		3317.9	2.77519
Feb., 1994	2	12.3	0.878571		3330.2	2.69106
Mar., 1994	2	27.4	0.996364		3357.6	3.43796
Apr., 1994	2	26.8	1.03077		3384.4	3.1306
May., 1994	2	32.1	1.3375		3416.5	1.95639
Jun., 1994	2	24.6	1.025		3441.1	1.63415
Jul., 1994	2	16.9	0.689796		3458	1.94083
Aug., 1994	2	22	0.745763		3480	2.87727
Sep., 1994	2	27	1.05882		3507	1.57407
Oct., 1994	2	25.4	0.923636		3532.4	3.19291

Production Report

Group : Waskada Infill Wells
Well : Infill Well Summary
: 000000219

Date : 9/24/97 9:40:15 am
User : Ludwig

Production Data from March, 1991 to December, 1997 (cont.)

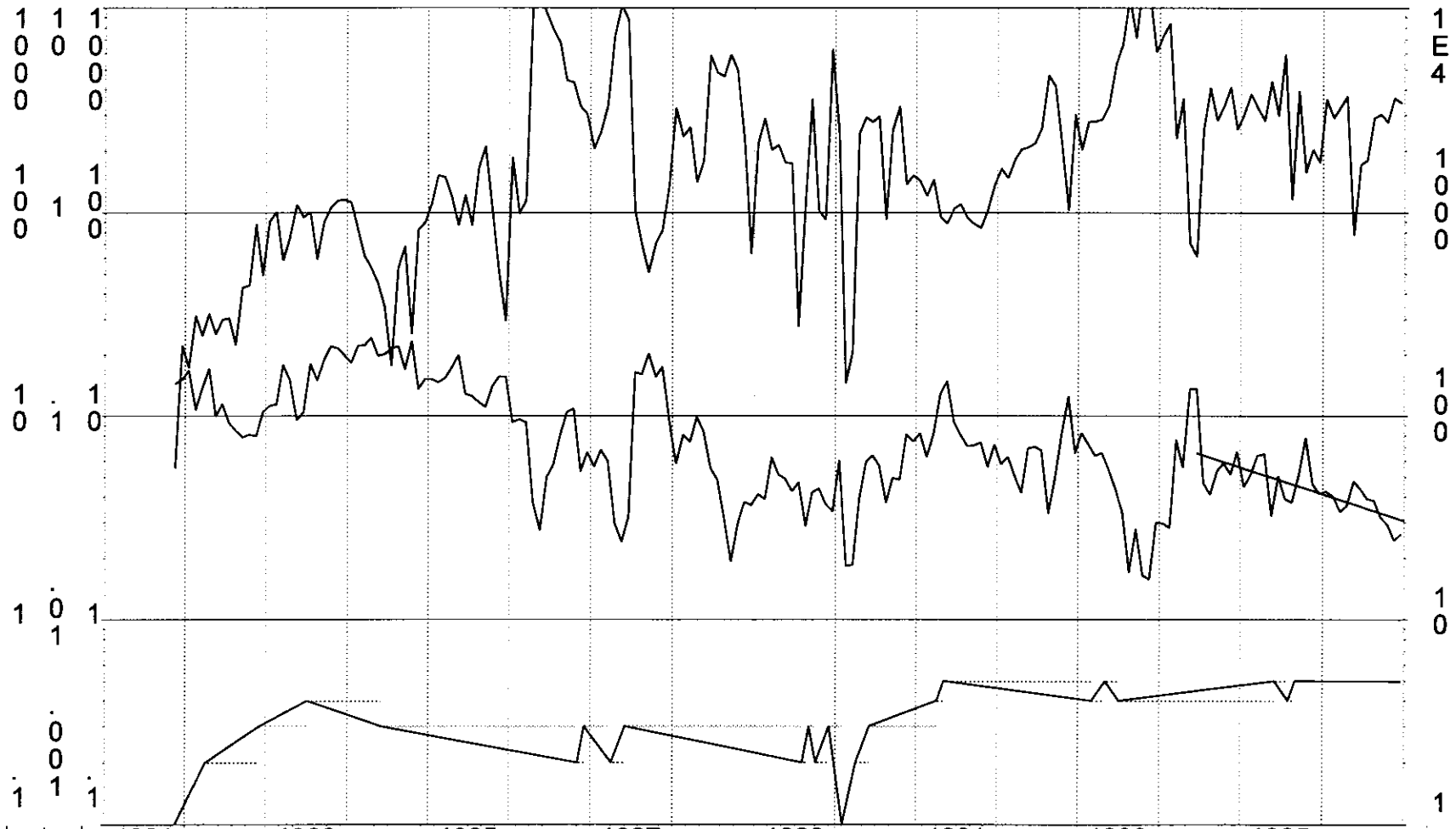
Year	Num Wells	Monthly Oil m3	Avg Daily Oil m3/d	Avg Daily Oil FC 1 m3/d	Cum Oil m3	WOR m3/m3
Nov., 1994	2	20.9	0.72069		3553.3	3.87081
Dec., 1994	2	10	0.333333		3563.3	5.92
Jan., 1995	3	11	0.366667		3574.3	8.67273
Feb., 1995	2	6.5	0.309524		3580.8	4.83077
Mar., 1995	2	11.2	0.414815		3592	5.45536
Apr., 1995	2	17.7	0.769565		3609.7	4.31073
May., 1995	2	20.2	0.708772		3629.9	9.10891
Jun., 1995	3	90.6	4.18154		3720.5	1.13355
Jul., 1995	3	228.9	9.03553		3949.4	0.788991
Aug., 1995	3	140.1	5.53026	8.92353	4089.5	0.553176
Sep., 1995	3	162.9	6.43026	8.25456	4252.4	0.516882
Oct., 1995	4	259	9.25	7.63574	4511.4	0.800386
Nov., 1995	4	182.1	6.22564	7.0633	4693.5	0.722131
Dec., 1995	4	225.5	7.45455	6.53379	4919	0.623503
Jan., 1996	4	206.7	6.83306	6.02745	5125.7	1.46541
Feb., 1996	4	190.9	6.94182	5.57559	5316.6	0.708748
Mar., 1996	4	166.5	5.7913	5.1576	5483.1	0.700901
Apr., 1996	4	127.6	5.48817	4.77095	5610.7	0.991379
May., 1996	4	177.9	6.65047	4.41328	5788.6	0.590219
Jun., 1996	4	160.9	5.74643	4.08243	5949.5	1.02735
Jul., 1996	4	123.5	4.08264	3.77638	6073	0.480162
Aug., 1996	4	78	2.97143	3.49327	6151	0.767949
Sep., 1996	4	68.3	2.35517	3.23139	6219.3	0.674963
Oct., 1996	4	70.5	2.58716	2.98914	6289.8	0.470922
Nov., 1996	4	63.6	2.25133	2.76505	6353.4	0.709119
Dec., 1996	4	73.2	2.4605	2.55777	6426.6	0.696721
Jan., 1997				2.3725	6498.37	
Feb., 1997				2.19464	6556.64	
Mar., 1997				2.03011	6615.01	
Apr., 1997				1.87792	6658.67	
May., 1997				1.73714	6705.14	
Jun., 1997				1.60691	6750.13	
Jul., 1997				1.48644	6795.09	
Aug., 1997				1.37501	6830.56	
Sep., 1997				1.27193	6865.11	
Oct., 1997				1.17657	6897.61	
Nov., 1997				1.08837	6928.9	
Dec., 1997				1.00678	6959.11	

Project Area Summary Data 11/81-12/96

Operator:
Field:
Zone:
Type: Unknown
Group: NCE Reduced Spacing Waskada #4

Avg Daily Oil FC 1 (Rate-Time)
qi: 6.72122 m3/d, Jun, 1994
qf: 1.57292 m3/d, Mar, 1999
di(Exp): 25.9538 CTD: 42993.7 m3
RR: 1681.32 m3 Tot: 44675 m3

Production Cums
Oil: 42993.7 m3
Gas: 0 E6m3
Water: 71673.9 m3
Cond: 0 m3



Production Report

Group	:	NCE Reduced Spacing Waskada #4	Date	:	9/24/97 9:50:05 am
Well	:	Project Area Summary	User	:	Ludwig
	:	000000220			
Hist.Data	:	11/81-12/96	On Prod	:	02/09
Operator	:		Status	:	Unknown
Field	:		Zone	:	

Production Data from January, 1994 to December, 1997

Year	Num Wells	Monthly Oil m3	Avg Daily Oil m3/d	Avg Daily Oil FC 1 m3/d	Cum Oil m3	WOR m3/m3
Jan., 1994	4	80	2.96296		37924	7.26
Feb., 1994	4	66.2	2.81702		37990.2	8.39879
Mar., 1994	4	226.8	7.62353		38217	2.29586
Apr., 1994	4	158.9	5.57544		38375.9	3.61737
May., 1994	4	405.2	13.5067		38781.1	0.706318
Jun., 1994	4	389.5	13.5478	6.55493	39170.6	0.607959
Jul., 1994	4	138.4	4.6521	6.39284	39309	2.55708
Aug., 1994	4	125.8	4.09106	6.23475	39434.8	4.07552
Sep., 1994	4	154.5	5.32759	6.08057	39589.3	2.81683
Oct., 1994	4	178.8	5.86229	5.9302	39768.1	3.30537
Nov., 1994	4	151.4	5.1322	5.78355	39919.5	4.10502
Dec., 1994	4	201.3	6.65454	5.64053	40120.8	2.55042
Jan., 1995	4	135.3	4.47273	5.50104	40256.1	3.02956
Feb., 1995	4	139.5	5.11927	5.36501	40395.6	3.79713
Mar., 1995	4	178	6.35714	5.23233	40573.6	3.24832
Apr., 1995	4	183.4	6.49204	5.10294	40757	2.81461
May., 1995	4	87.8	3.22202	4.97675	40844.8	4.36902
Jun., 1995	5	130.6	5.06365	4.85368	40975.4	2.96937
Jul., 1995	5	113.7	3.89829	4.73365	41089.1	5.93668
Aug., 1995	4	94.5	3.74257	4.61659	41183.6	1.1619
Sep., 1995	5	141.9	5.14441	4.50243	41325.5	3.92389
Oct., 1995	5	226.2	7.8	4.39109	41551.7	1.5756
Nov., 1995	5	135.6	4.61617	4.2825	41687.3	2.03245
Dec., 1995	5	124.4	4.14667	4.1766	41811.7	1.75965
Jan., 1996	5	124.8	4.24851	4.06218	41936.5	3.58093
Feb., 1996	5	106.2	3.99498	3.96173	42042.7	2.9049
Mar., 1996	5	100.5	3.37343	3.86376	42143.2	3.26567
Apr., 1996	5	83.6	3.60863	3.76821	42226.8	3.70335
May., 1996	5	102.8	4.76293	3.67503	42329.6	0.77821
Jun., 1996	5	119.3	4.35799	3.58415	42448.9	1.71752
Jul., 1996	5	117.5	3.91667	3.49551	42566.4	1.7966
Aug., 1996	5	107.1	3.825	3.40907	42673.5	2.90383
Sep., 1996	5	92.3	3.16457	3.32477	42765.8	3.02925
Oct., 1996	5	84.9	2.92759	3.24255	42850.7	2.77032
Nov., 1996	5	70.3	2.44168	3.16237	42921	3.63442
Dec., 1996	5	72.7	2.61589	3.08416	42993.7	3.43604
Jan., 1997				3.01613	43083.6	
Feb., 1997				2.94155	43161.4	
Mar., 1997				2.86881	43244.3	
Apr., 1997				2.79786	43316.3	
May., 1997				2.72867	43382.9	
Jun., 1997				2.6612	43455.6	
Jul., 1997				2.59539	43532.5	
Aug., 1997				2.53121	43603.4	

Production Report

Group : NCE Reduced Spacing Waskada #4
Well : Project Area Summary
: 000000220

Date : 9/24/97 9:50:05 am
User : Ludwig

Production Data from January, 1994 to December, 1997 (cont.)

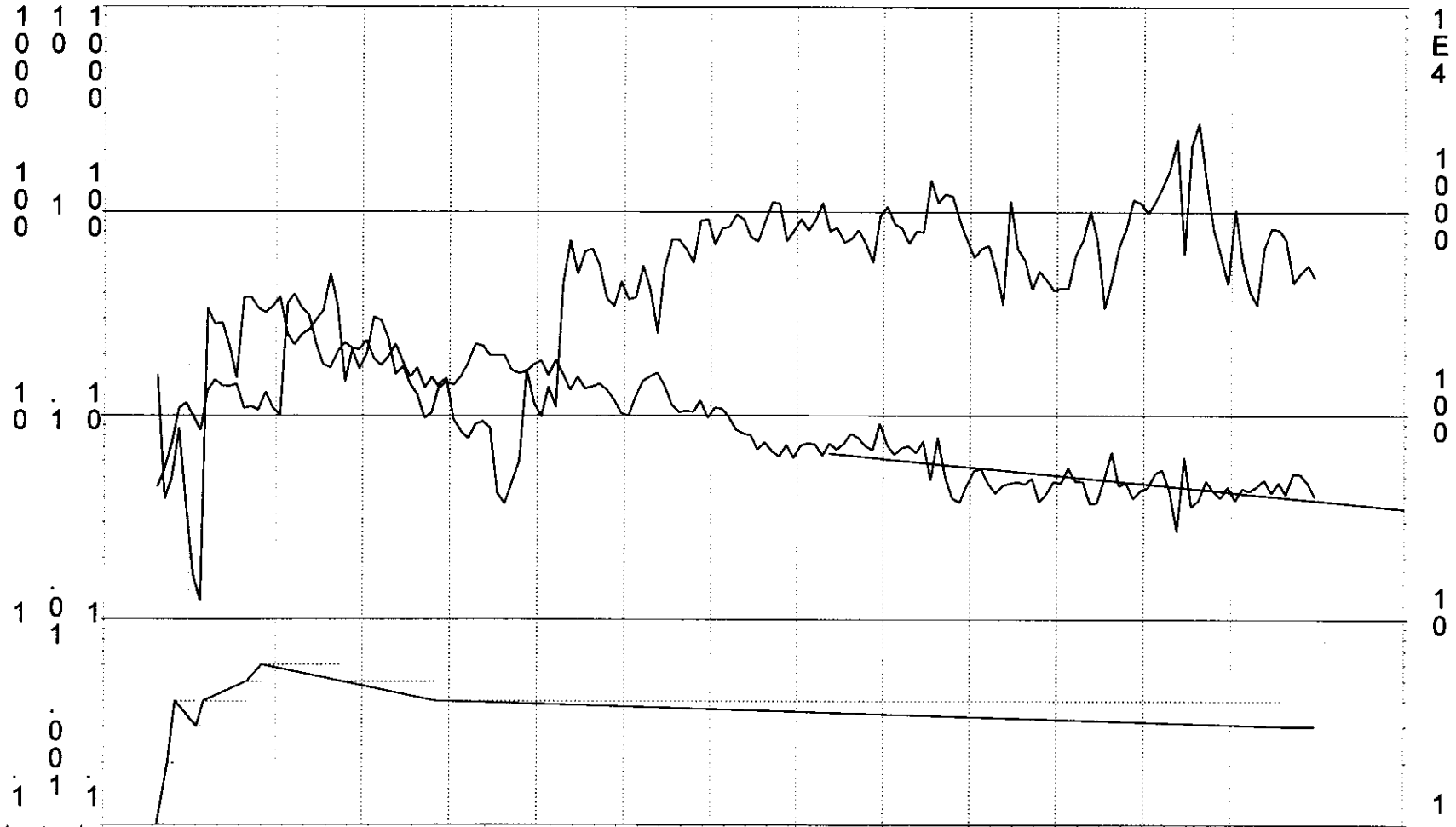
Year	Num Wells	Monthly Oil m3	Avg Daily Oil m3/d	Avg Daily Oil FC 1 m3/d	Cum Oil m3	WOR m3/m3
Sep., 1997				2.46861	43673.9	
Oct., 1997				2.40756	43744.9	
Nov., 1997				2.34803	43813.6	
Dec., 1997				2.28996	43880.8	

Project Area Summary Well Data 08/83-12/96

Operator:
Field:
Zone:
Type: Unknown
Group: NCE Reduced Spacing Waskada #8

Avg Daily Oil FC 1 (Rate-Time)
qi: 6.5508 m3/d, May, 1991
qf: 0.636612 m3/d, Dec, 2015
di(Exp): 9.01791 CTD: 47958.3 m3
RR: 11846.5 m3 Tot: 59804.8 m3

Production Cums
Oil: 47958.3 m3
Gas: 0 E6m3
Water: 20362.2 m3
Cond: 0 m3



Production Report

Group	:	NCE Reduced Spacing Waskada #8	Date	:	9/24/97 9:55:03 am
Well	:	Project Area Summary Well	User	:	Ludwig
	:	000000222			
Hist.Data	:	08/83-12/96	On Prod	:	02/09
Operator	:		Status	:	Unknown
Field	:		Zone	:	

Production Data from January, 1994 to December, 1997

Year	Num Wells	Monthly Oil m3	Avg Daily Oil m3/d	Avg Daily Oil FC 1 m3/d	Cum Oil m3	WOR m3/m3
Jan., 1994	4	143.9	4.64194	5.05155	43331.4	0.423211
Feb., 1994	4	154.8	5.52857	5.01192	43486.2	0.423127
Mar., 1994	4	142.6	4.75333	4.97261	43628.8	0.612202
Apr., 1994	4	142.5	4.75	4.9336	43771.3	0.724912
May., 1994	4	114.2	3.68387	4.8949	43885.5	1.00876
Jun., 1994	4	112.1	3.73667	4.8565	43997.6	0.730598
Jul., 1994	4	149.9	4.91475	4.8184	44147.5	0.336891
Aug., 1994	4	194.6	6.59661	4.7806	44342.1	0.46814
Sep., 1994	4	135.1	4.50333	4.7431	44477.2	0.675796
Oct., 1994	4	145.4	4.69032	4.70589	44622.6	0.830812
Nov., 1994	4	117.3	3.91	4.66897	44739.9	1.14578
Dec., 1994	4	125.5	4.2906	4.63235	44865.4	1.1012
Jan., 1995	4	134.7	4.41639	4.59601	45000.1	0.986637
Feb., 1995	4	132.1	5.18039	4.55995	45132.2	1.12263
Mar., 1995	4	167.6	5.40645	4.52418	45299.8	1.32339
Apr., 1995	4	105.6	4.26667	4.48869	45405.4	1.60606
May., 1995	4	65.5	2.70103	4.45348	45470.9	2.27328
Jun., 1995	4	166.6	6.22804	4.41854	45637.5	0.62365
Jul., 1995	4	100.6	3.56106	4.38388	45738.1	2.1004
Aug., 1995	4	111.2	3.83448	4.34949	45849.3	2.71763
Sep., 1995	4	141.5	4.7563	4.31537	45990.8	1.41201
Oct., 1995	4	132.2	4.26452	4.28152	46123	0.822239
Nov., 1995	4	118.1	3.93667	4.24793	46241.1	0.612193
Dec., 1995	4	138.3	4.46129	4.21461	46379.4	0.441793
Jan., 1996	4	117.7	3.82764	4.17012	46497.1	1.02209
Feb., 1996	4	122.4	4.37143	4.13741	46619.5	0.564542
Mar., 1996	4	131.5	4.24194	4.10495	46751	0.408365
Apr., 1996	4	125.3	4.475	4.07275	46876.3	0.348763
May., 1996	4	139.6	4.81379	4.0408	47015.9	0.666189
Jun., 1996	4	124.8	4.16	4.0091	47140.7	0.827724
Jul., 1996	4	114.3	4.66531	3.97765	47255	0.817148
Aug., 1996	3	126.5	4.08065	3.94644	47381.5	0.728854
Sep., 1996	3	154.9	5.16333	3.91549	47536.4	0.448031
Oct., 1996	3	159.2	5.13548	3.88477	47695.6	0.501884
Nov., 1996	3	139.4	4.64667	3.8543	47835	0.546628
Dec., 1996	3	123.3	3.97742	3.82406	47958.3	0.47283
Jan., 1997				3.80446	48070.9	
Feb., 1997				3.77461	48173.4	
Mar., 1997				3.745	48288.8	
Apr., 1997				3.71562	48390.8	
May., 1997				3.68647	48499.7	
Jun., 1997				3.65755	48605.4	
Jul., 1997				3.62886	48711.7	
Aug., 1997				3.60039	48817.9	

Production Report

Group : NCE Reduced Spacing Waskada #8
Well : Project Area Summary Well
: 000000222

Date : 9/24/97 9:55:04 am
User : Ludwig

Production Data from January, 1994 to December, 1997 (cont.)

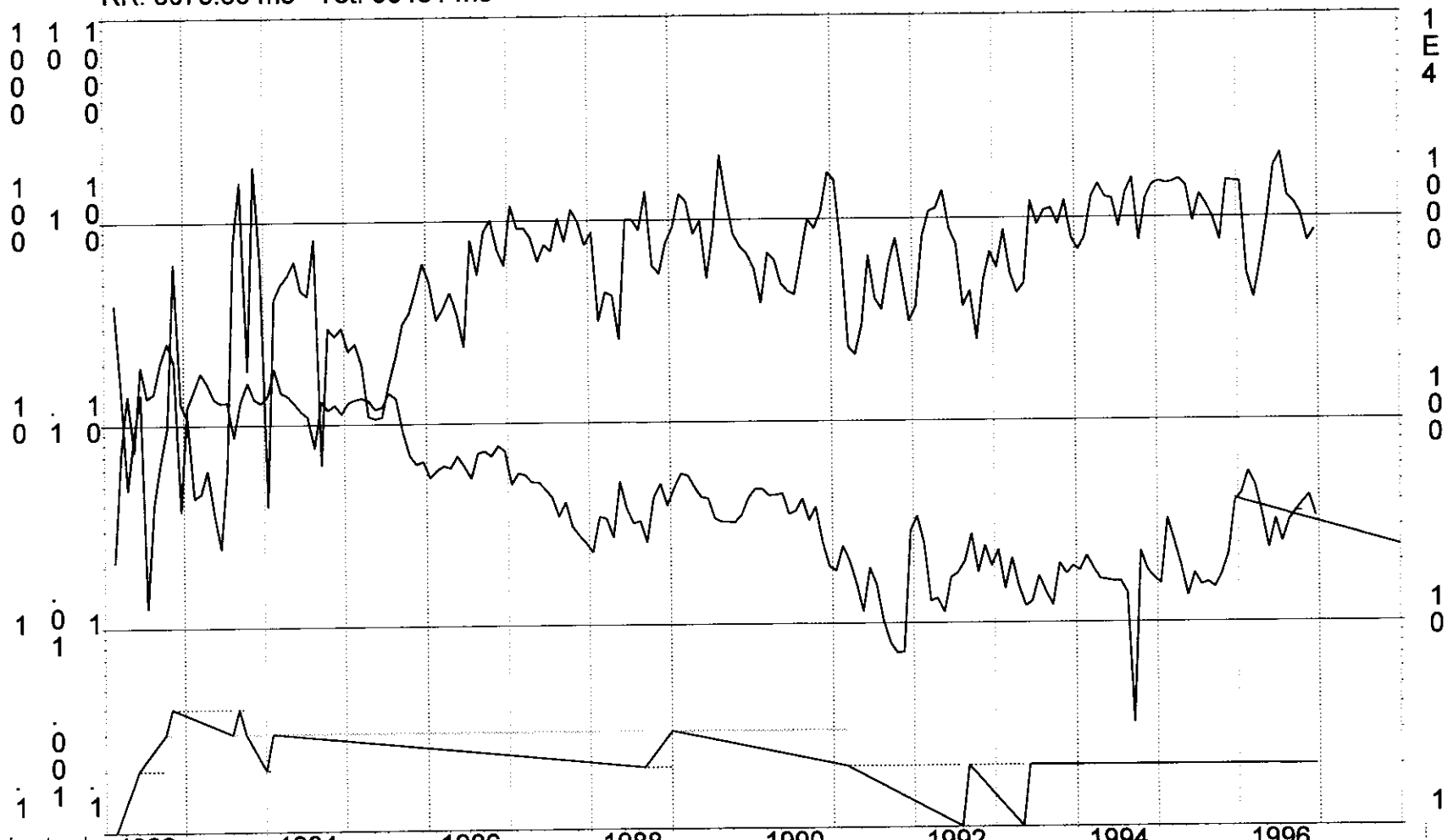
Year	Num Wells	Monthly Oil m3	Avg Daily Oil m3/d	Avg Daily Oil FC 1 m3/d	Cum Oil m3	WOR m3/m3
Sep., 1997				3.57215	48923.2	
Oct., 1997				3.54413	49032.4	
Nov., 1997				3.51633	49136	
Dec., 1997				3.48874	49239.2	

Project Area Summary Well Data 02/82-12/96

WAGADA UNIT NO. 1

Avg Daily Oil FC 1 (Rate-Time)
qi: 4.12911 m3/d, Dec, 1995
qf: 0.639534 m3/d, Dec, 2002
di(Exp): 23.1491 CTD: 27355.4 m3
RR: 3075.55 m3 Tot: 30431 m3

Production Cums
Oil: 27355.4 m3
Gas: 0 E6m3
Water: 13977 m3
Cond: 0 m3



Production Report

Group	:	NCE Reduced Spacing Waskada #1	Date	:	9/24/97 9:21:43 am
Well	:	Project Area Summary Well	User	:	Ludwig
	:	000000221			
Hist.Data	:	02/82-12/96	On Prod	:	02/09
Operator	:		Status	:	Unknown
Field	:		Zone	:	

Production Data from January, 1994 to December, 1997

Year	Num Wells	Monthly Oil m3	Avg Daily Oil m3/d	Avg Daily Oil FC 1 m3/d	Cum Oil m3	WOR m3/m3
Jan., 1994	2	55.7	1.79677		24930.3	0.691203
Feb., 1994	2	56.2	2.12075		24986.5	0.802491
Mar., 1994	2	57	1.83871		25043.5	1.25614
Apr., 1994	2	43.1	1.62642		25086.6	1.46172
May., 1994	2	49.7	1.62951		25136.3	1.25352
Jun., 1994	2	45.1	1.58246		25181.4	1.23282
Jul., 1994	2	47.7	1.59		25229.1	0.893082
Aug., 1994	2	42.9	1.38387		25272	1.31469
Sep., 1994	2	9.6	0.32		25281.6	1.55208
Oct., 1994	2	69.3	2.23548		25350.9	0.764791
Nov., 1994	2	54	1.8		25404.9	1.23148
Dec., 1994	2	50.2	1.6459		25455.1	1.44422
Jan., 1995	2	34.7	1.54222		25489.8	1.49856
Feb., 1995	2	87.3	3.23333		25577.1	1.45934
Mar., 1995	2	77.2	2.49032		25654.3	1.47668
Apr., 1995	2	56.7	1.89		25711	1.53263
May., 1995	2	41.5	1.33871		25752.5	1.4241
Jun., 1995	2	52	1.73333		25804.5	0.948077
Jul., 1995	2	45.6	1.52		25850.1	1.29167
Aug., 1995	2	40.6	1.56154		25890.7	1.14778
Sep., 1995	2	44.2	1.47333		25934.9	0.9819
Oct., 1995	2	43.6	1.7098		25978.5	0.763761
Nov., 1995	2	57	2.15094		26035.5	1.50702
Dec., 1995	2	105.2	3.8963	4.03945	26140.7	1.49335
Jan., 1996	2	113.7	4.29057	3.94099	26254.4	1.47845
Feb., 1996	2	140.1	5.49412	3.85546	26394.5	0.523911
Mar., 1996	2	145.9	4.70645	3.77178	26540.4	0.397533
Apr., 1996	2	88.4	3.4	3.68992	26628.8	0.599547
May., 1996	2	51.5	2.28889	3.60984	26680.3	0.984466
Jun., 1996	2	89.5	3.19643	3.5315	26769.8	1.77095
Jul., 1996	2	76.4	2.46452	3.45485	26846.2	2.05236
Aug., 1996	2	83	3.13208	3.37987	26929.2	1.25904
Sep., 1996	2	101.1	3.48621	3.30652	27030.3	1.16815
Oct., 1996	2	107.8	3.47742	3.23476	27138.1	1.02319
Nov., 1996	2	118.9	4.17193	3.16455	27257	0.752733
Dec., 1996	2	98.4	3.28	3.09587	27355.4	0.852642
Jan., 1997				3.03698	27435.9	
Feb., 1997				2.97107	27509	
Mar., 1997				2.90659	27599.1	
Apr., 1997				2.84351	27673.1	
May., 1997				2.78179	27735.7	
Jun., 1997				2.72142	27811.9	
Jul., 1997				2.66236	27894.4	
Aug., 1997				2.60458	27963.4	

Production Report

Group : NCE Reduced Spacing Waskada #1
Well : Project Area Summary Well
: 000000221

Date : 9/24/97 9:21:43 am
User : Ludwig

Production Data from January, 1994 to December, 1997 (cont.)

Year	Num Wells	Monthly Oil m3	Avg Daily Oil m3/d	Avg Daily Oil FC 1 m3/d	Cum Oil m3	WOR m3/m3
Sep., 1997				2.54805	28037.3	
Oct., 1997				2.49275	28114.6	
Nov., 1997				2.43865	28184.1	
Dec., 1997				2.38572	28252.1	

Production Report

Group	:	NCE Reduced Spacing Waskada #1	Date	:	September 24, 1997 10:03:41 am
Well	:	Omega Waskada WIW 15-25-01-26W1	User	:	Ludwig
	:	00/15-25-001-26W1/0			
Hist.Data	:	11/82-11/96	On Prod	:	01/00
Operator	:		Status	:	Unknown
Field	:	3	Zone	:	29A

Production Data from December, 1994 to December, 1996

Year	Month Water Inj STB	Cum Water Inj STB
Dec., 1994	59.7559	190723
Jan., 1995	115.109	190838
Feb., 1995	122.028	190960
Mar., 1995	152.22	191112
Apr., 1995	152.22	191264
May., 1995	91.2064	191356
Jun., 1995	134.608	191490
Jul., 1995		
Aug., 1995	1007.04	192497
Sep., 1995	42.7727	192540
Oct., 1995	74.2232	192614
Nov., 1995	124.544	192739
Dec., 1995	55.9819	192795
Jan., 1996	203.17	192998
Feb., 1996	416.405	193414
Mar., 1996	20.1283	193434
Apr., 1996	6.2901	193441
May., 1996	10.0642	193451
Jun., 1996		
Jul., 1996	20.7573	193472
Aug., 1996		
Sep., 1996		
Oct., 1996		
Nov., 1996	8.80614	193480
Dec., 1996		

Production Report

Group	:	NCE Reduced Spacing Waskada #4	Date	:	September 24, 1997 10:02:30 am
Well	:	Omega Waskada WIW 15-13-01-26W1	User	:	Ludwig
	:	00/15-13-001-26W1/0			
Hist.Data	:	11/81-12/96	On Prod	:	01/00
Operator	:		Status	:	Unknown
Field	:	3	Zone	:	29A

Production Data from December, 1994 to December, 1996

Year	Month Water Inj STB	Cum Water Inj STB
Dec., 1994		
Jan., 1995		
Feb., 1995		
Mar., 1995		
Apr., 1995	2736.19	354764
May., 1995	2521.7	357285
Jun., 1995	2213.49	359499
Jul., 1995	2340.55	361839
Aug., 1995		
Sep., 1995		
Oct., 1995	1242.92	363082
Nov., 1995	2276.39	365359
Dec., 1995	3520.57	368879
Jan., 1996		
Feb., 1996	2448.74	371328
Mar., 1996	2338.03	373666
Apr., 1996	1635.43	375301
May., 1996	1163.04	376464
Jun., 1996	2016.61	378481
Jul., 1996	1958.11	380439
Aug., 1996	1056.11	381495
Sep., 1996		
Oct., 1996	766.134	382261
Nov., 1996	1413.39	383675
Dec., 1996	1943.64	385618

Production Report

Group	:	NCE Reduced Spacing Waskada #8	Date	:	September 24, 1997 10:00:57 am
Well	:	Omega Waskada WIW 05-08-02-25W1	User	:	Ludwig
	:	00/05-08-002-25W1/0			
Hist.Data	:	11/83-12/96	On Prod	:	01/00
Operator	:		Status	:	Unknown
Field	:	3	Zone	:	29A

Production Data from December, 1994 to December, 1996

Year	Month Water Inj STB	Cum Water Inj STB
Dec., 1994	3346.33	441216
Jan., 1995	2517.93	443734
Feb., 1995	1808.4	445542
Mar., 1995	2798.47	448341
Apr., 1995	2726.13	451067
May., 1995	2610.39	453677
Jun., 1995	1973.2	455650
Jul., 1995	2666.37	458317
Aug., 1995	5868.66	464186
Sep., 1995	3224.93	467410
Oct., 1995	1763.11	469174
Nov., 1995	3342.56	472516
Dec., 1995	3429.99	475946
Jan., 1996	4436.41	480383
Feb., 1996	3630.65	484013
Mar., 1996	3844.51	487858
Apr., 1996	3507.99	491366
May., 1996	3908.04	495274
Jun., 1996	2999.75	498273
Jul., 1996	3099.13	501373
Aug., 1996	2491.51	503864
Sep., 1996	1656.18	505520
Oct., 1996	3865.27	509386
Nov., 1996	2697.19	512083
Dec., 1996	2946.91	515030

Production Report

Group	:	Waskada 29A	Date	:	September 24, 1997 11:06:16 am
Well	:	Omega Waskada Prov. WIW 07-24-01-26W1	User	:	Ludwig
	:	00/07-24-001-26W1/0			
Hist.Data	:	11/81-12/96	On Prod	:	01/00
Operator	:		Status	:	Unknown
Field	:	3	Zone	:	29A

Production Data from January, 1994 to December, 1996

Year	Month Water Inj m3	Cum Water Inj m3
Jan., 1994	772.7	90856.5
Feb., 1994	781.5	91638
Mar., 1994	1317.9	92955.9
Apr., 1994	1491.2	94447.1
May., 1994	848.3	95295.4
Jun., 1994	452.1	95747.5
Jul., 1994	375.8	96123.3
Aug., 1994	764.9	96888.2
Sep., 1994	540	97428.2
Oct., 1994	413.6	97841.8
Nov., 1994	561.9	98403.7
Dec., 1994	754.2	99157.9
Jan., 1995	535.1	99693
Feb., 1995	411	100104
Mar., 1995	637.3	100741
Apr., 1995	785.8	101527
May., 1995	832.7	102360
Jun., 1995	643.5	103003
Jul., 1995	783.9	103787
Aug., 1995	81	103868
Sep., 1995		
Oct., 1995		
Nov., 1995		
Dec., 1995	1057.8	104926
Jan., 1996	742.8	105669
Feb., 1996	725	106394
Mar., 1996	193.4	106587
Apr., 1996		
May., 1996	929.6	107517
Jun., 1996	757.8	108275
Jul., 1996	783.1	109058
Aug., 1996	958.7	110016
Sep., 1996	435.9	110452
Oct., 1996	1070.6	111523
Nov., 1996		
Dec., 1996	775.9	112299

Production Report

Group	:	Waskada 29A	Date	:	September 24, 1997 11:05:22 am
Well	:	Omega Waskada WIW 13-13-01-26W1	User	:	Ludwig
	:	00/13-13-001-26W1/0			
Hist.Data	:	07/82-12/96	On Prod	:	01/00
Operator	:		Status	:	Unknown
Field	:	3	Zone	:	29A

Production Data from December, 1994 to December, 1996

Year	Month Water Inj m3	Cum Water Inj m3
Dec., 1994	846.4	63303
Jan., 1995	568	63871
Feb., 1995	402.1	64273.1
Mar., 1995	681.5	64954.6
Apr., 1995		
May., 1995		
Jun., 1995		
Jul., 1995		
Aug., 1995		
Sep., 1995		
Oct., 1995	186.7	65141.3
Nov., 1995	361.7	65503
Dec., 1995	429.2	65932.2
Jan., 1996	1000.7	66932.9
Feb., 1996	381.9	67314.8
Mar., 1996	388.5	67703.3
Apr., 1996	333.7	68037
May., 1996	398.7	68435.7
Jun., 1996	230.6	68666.3
Jul., 1996	314.5	68980.8
Aug., 1996	394.1	69374.9
Sep., 1996	160	69534.9
Oct., 1996	401.9	69936.8
Nov., 1996	285.8	70222.6
Dec., 1996	326.5	70549.1

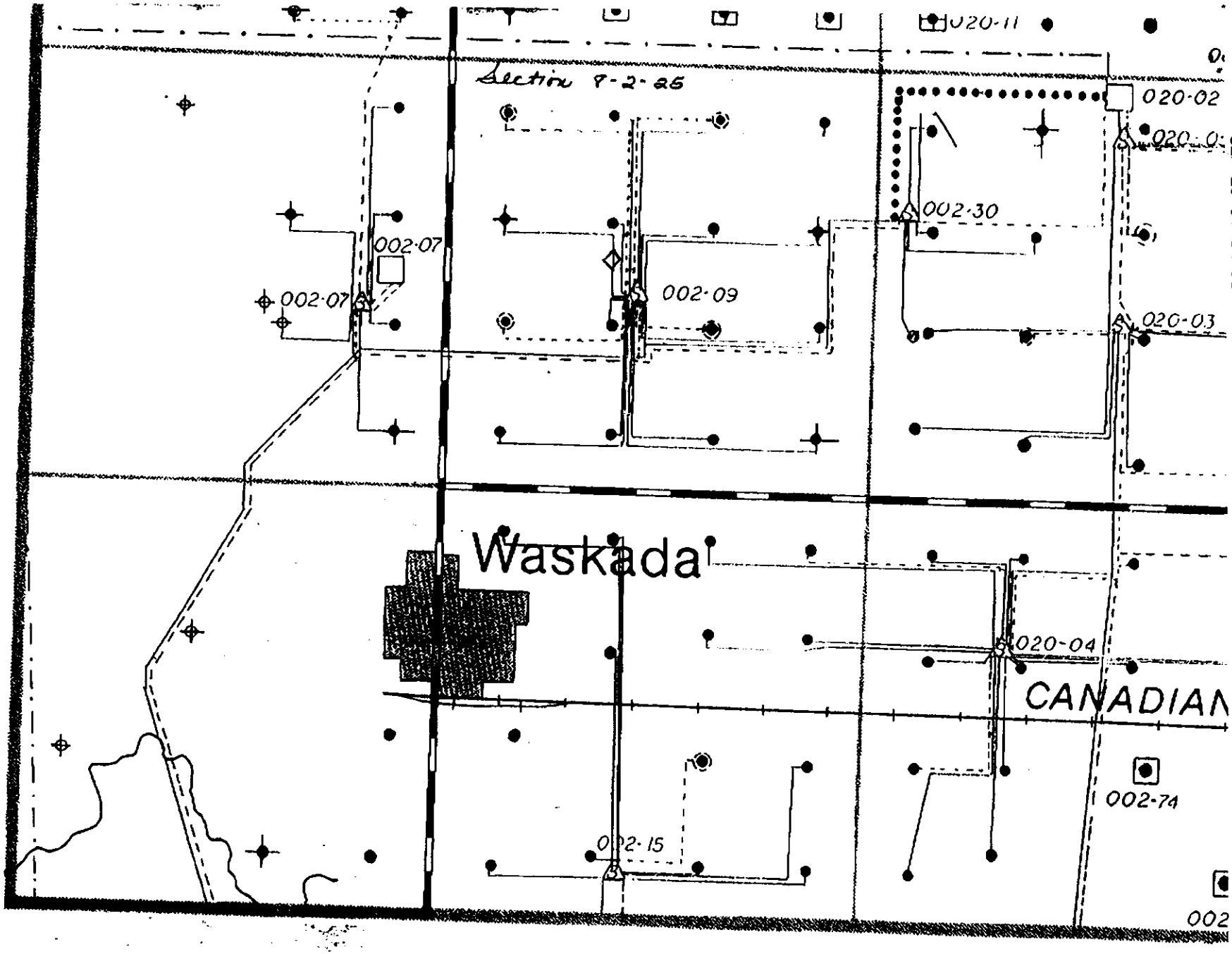
Production Report

Group	:	Waskada 29A	Date	:	September 24, 1997 11:03:59 am
Well	:	Omega Waskada WIW 05-24-01-26W1	User	:	Ludwig
	:	00/05-24-001-26W1/0			
Hist.Data	:	07/83-04/93	On Prod	:	01/00
Operator	:		Status	:	Unknown
Field	:	3	Zone	:	29A

Production Data from January, 1994 to December, 1996

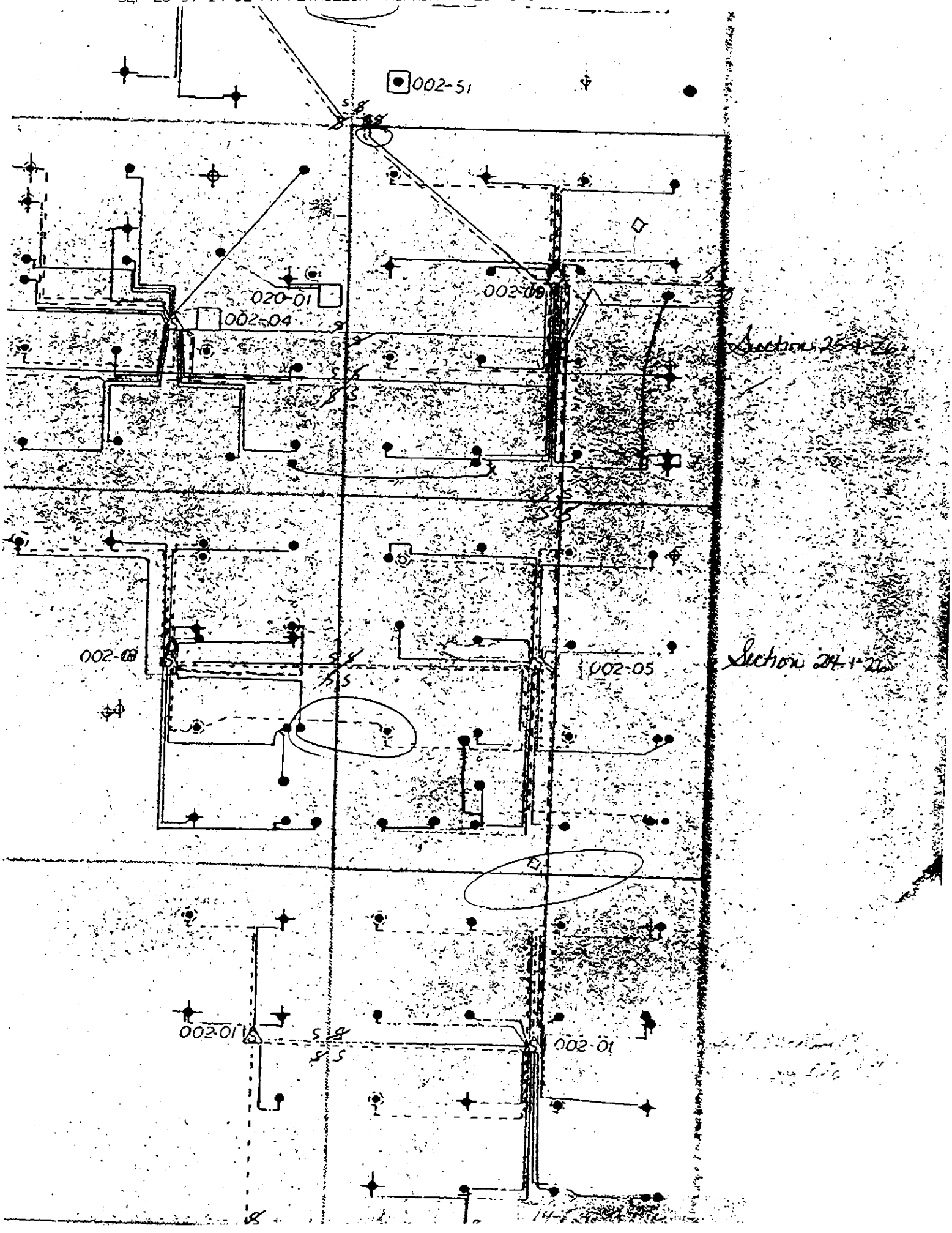
Year	Month Water Inj m3	Cum Water Inj m3
Jan., 1994		
Feb., 1994		
Mar., 1994		
Apr., 1994		
May., 1994		
Jun., 1994		
Jul., 1994		
Aug., 1994		
Sep., 1994		
Oct., 1994		
Nov., 1994		
Dec., 1994		
Jan., 1995		
Feb., 1995		
Mar., 1995		
Apr., 1995		
May., 1995		
Jun., 1995		
Jul., 1995		
Aug., 1995		
Sep., 1995		
Oct., 1995		
Nov., 1995		
Dec., 1995		
Jan., 1996		
Feb., 1996		
Mar., 1996		
Apr., 1996		
May., 1996		
Jun., 1996		
Jul., 1996		
Aug., 1996		
Sep., 1996		
Oct., 1996		
Nov., 1996		
Dec., 1996		

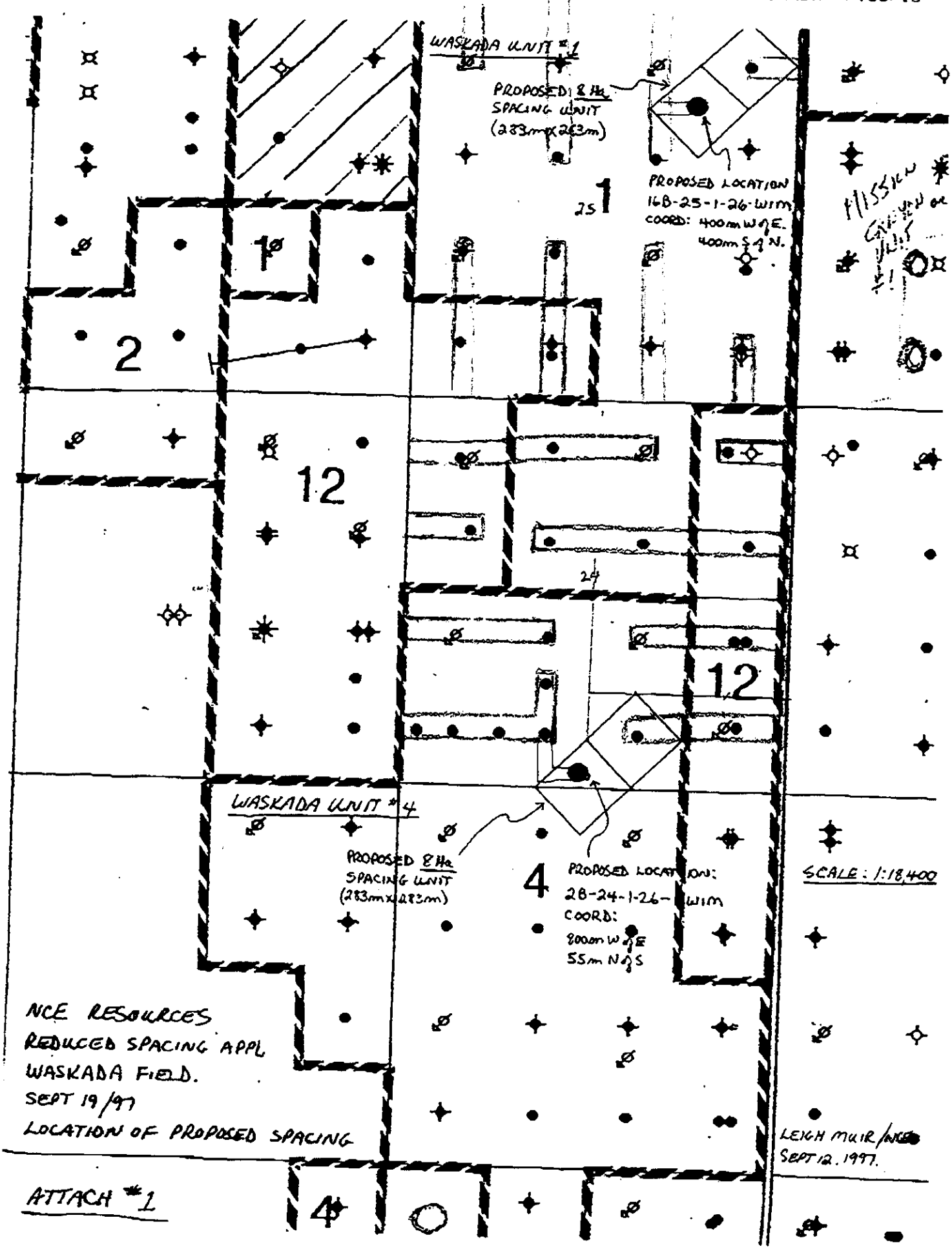
si APR/93.

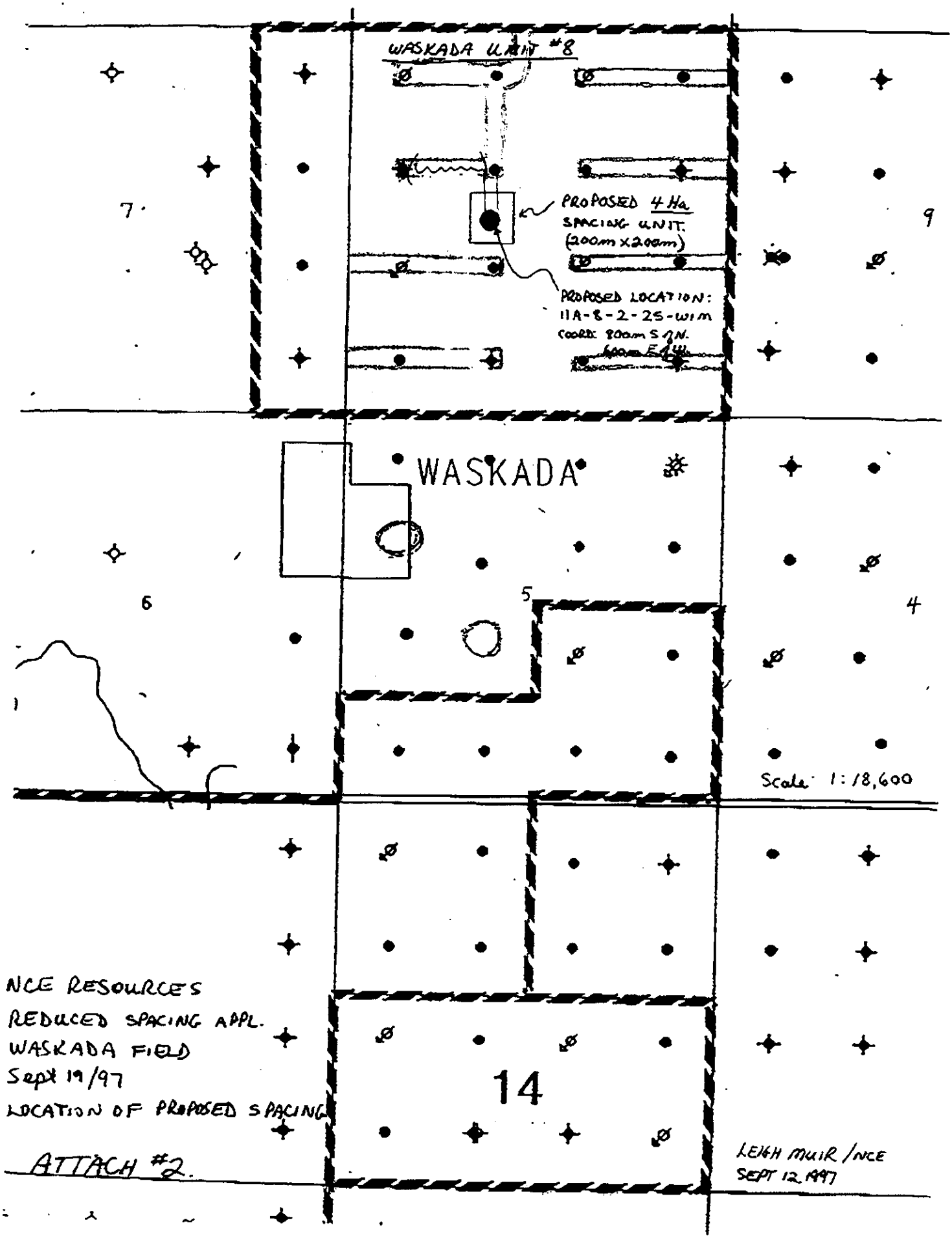


GAS
EMULSION
SALT WATER
PRODUCT

LEGEND


002-51
020-01
002-04
002-09
Section 25-26
002-08
002-05
Section 24-26
002-01
002-01


WASKADA UNIT #1
PROPOSED 8 Ha SPACING UNIT (283m x 283m)
PROPOSED LOCATION 16B-25-1-26-W1M COORD: 400m W of E. 400m S of N.
25
1
2
12
24
12
WASKADA UNIT #4
PROPOSED 8 Ha SPACING UNIT (283m x 283m)
4
PROPOSED LOCATION: 2B-24-1-26-W1M COORD: 800m W of E 55m N of S
SCALE: 1:18,400
NCE RESOURCES
REDUCED SPACING APPL
WASKADA FIELD.
SEPT 19/97
LOCATION OF PROPOSED SPACING
LEIGH MUIR/NCE
SEPT 12. 1997.
ATTACH #1
4



NCE RESOURCES
REDUCED SPACING APPL.
WASKADA FIELD
Sept 19/97
LOCATION OF PROPOSED SPACING

ATTACH #2.

LEIGH MUIR / NCE
SEPT 12, 1997