9211-P33-4-2 (L-47)
9211-P33-3-1 (C-50)

FLOW TEST PROGRAM

FOR

PARAMOUNT ET AL CAMERON L-47

AND

PARAMOUNT ET AL CAMERON C-50

CAMERON HILLS, N.W.T.

BY

PARAMOUNT RESOURCES LTD.

4100 First Canadian Centre
350 - 7th Avenue S.W.
CALGARY, Alberta
T2P 3W5

OCTOBER 27, 1989

~~EAST~~/NORTH 9211-P33-4-2

PROJECT: 9211-P33-3-1

TITLE: EFT$_5$ - PARAMOUNT et al

WELL : CAMERON C-50+ L-47

ENGINEERING BRANCH:

F.H. LEPINE _____

P.P. SIMARD _____

~~R. LANDRY~~ _____

P. GUENARD/~~P. RAGUSA~~ P.R. _____

~~T. BAKER/B. YOUNG~~ _____

~~R. SMITH/J. NAZARETH~~ _____

~~EAST~~/NORTH 9211-P33-4-Z

PROJECT: 9211-P33-3-1

TITLE: EFT - PARAMOUNT et al

WELL : CAMERON C-508 L-47

ENGINEERING BRANCH:

F.H. LEPINE

P.P. SIMARD

R. LANDRY

P. ~~GUENARD~~/P. RAGUSA

122

R. SMITH/J. NAZARETH

1. RESOURCE EVALUATION BRANCH:

G.R. CAMPBELL

D. SMITH/W. WARD ~~W. J. WARD~~

2

COMMENTS SHEET

9311-P33-3-1

PROJECT/FILE NO.: 9311-P33-4-2

DOCUMENT TITLE: EFT, - Paramount et al CAMERON L-47
+ CAMERON C-50

ENGINEERING BR.

1. RESOURCE EVALUATION BR.

PLS RETURN TO ENG'G.
PR

PARAMOUNT RESOURCES LTD.
4100 - FIRST CANADIAN CENTRE, 350 - 7TH AVENUE S.W.
CALGARY, ALBERTA T2P 3W5
TELEPHONE: (403) 266-2047
FAX: (403) 262-7994

November 1, 1989

Mr. M. D. Thomas
Manager Northern Region
C.O.G.L.A.
Bellance Building
6th Flr., 4914 - 50th Street
Box 1500
YELLOWKNIFE, N.W.T.
X1A 2R3

Dear Mr. Thomas:

Re: Flow Test Program
Paramount et al Cameron L-47 — 9211-P33-4-2
Paramount et al Cameron C-50 — 9211-P33-3-1

Enclosed are two copies of the proposed extended flow test program for the L-47 and C-50 wells. The program includes geology, seismic, drilling, contingency plans, and the extended flow test.

If you require any further information please contact the undersigned at (403) 266-2047.

Yours truly,

PARAMOUNT RESOURCES LTD.

FOR
Lloyd Jeffries
Drilling Manager

LJ/nb
Enclosure
CC: M. Cholach
G. Yungblut, C.O.G.L.A. - Ottawa

TABLE OF CONTENTS

SUMMARY

Paramount Resources Ltd. proposes to flow test the Paramount et al Cameron L-47 and Paramount et al Cameron C-50 wells during the last quarter of 1989, and the first quarter of 1990. This report provides additional background information in regard to geology, seismic, drilling, contingency plans, and flow tests for the L-47 and C-50 wells.

REGIONAL GEOLOGICAL DISCUSSION

The geologic record in the Cameron Hills area can be divided into six lithostratigraphic intervals, each generally bounded by major transgressive or regressive events. These intervals are:

1. Lower Elk Point Group
2. Upper Elk Point Group
3. Beaverhill Lake Group
4. Woodbend Group
5. Winterburn Group
6. Wabamun Group

and are illustrated in the Table Of Formations.

Lower Elk Point Group

This group includes the interval from the basal Devonian sands to the base of the Keg River Formation (see Table Of Formations). The evaporites of the Chinchaga Formation and silici-clastics of the Basal Granite Wash were deposited within a shallow restricted epicontinental seaway. These deposits onlap the Pre-Devonian surface and range in thickness from zero over the prominent Tathlina and Peace River Archs to nearly 300 metres within the interarch basins.

Upper Elk Point Group

A major transgression resulted in the deposition of organic rich open marine carbonates of the Lower Keg River Formation. This crinoid/brachiopod rich carbonate platform ranges in thickness from 15 to 50 metres.

Continued marine transgression and subsidence led to the formation of an extensive Upper Keg River Barrier Reef Complex (Shekelie-Presquile Barrier Complex) which enclosed the Elk Point Basin on its northern and western sides. Southeast of this barrier, isolated pinnacle reefs, low energy reef mounds and shelf deposits of the Upper Keg River Formation were deposited. Generally the Upper Keg River is deposited conformably upon Lower Keg River platform carbonates, but in areas of high Pre-Devonian topography, these rocks are deposited unconformably upon the Pre-Devonian surface (eg. A-5, B-08, and L-47 wells). Porosity and permability in these areas tends to be enhanced due to the effects of shallow water shoaling.

Relatively open marine conditions existed through to the end of the Keg River time with normal salinity maintained by marine water entering the basin from both the northwest and northeast. During the Early Givetian stage the Tathlina land mass elevated resulting in the restriction of the Elk Point Basin with normal marine conditions restricted to the Shekelie

Barrier Complex. Southeast of the barrier complex, the increasingly evaporitic conditions resulted in deposition of interbedded anhydrites and dolomites of the Muskeg Formation.

Toward the end of Upper Elk Point time subsidence of the barrier complex allowed normal marine conditions to return to the northern end of the Elk Point Basin resulting in deposition of the regional extensive Sulphur Point dolomites and limestones. Detailed correlations of the Sulphur Point carbonates with adjacent anhydrite/dolomite cycles of the uppermost Muskeg Formation indicated a facies relationship exists between these two formations.

Upper Elk Point deposition was terminated by a pronounced regression, resulting in widespread deposition of shallow marine and continental shales and silty sandstone of the Watt Mountain Formation.

Beaverhill Lake Group

Beaverhill Lake Group sedimentation began with gradual marine transgression over a relatvely flat surface of Watt Mountain clastics. The initial deposits comprised of the peritidal and shallow restricted shelf carbonates of the Fort Vermilion Formation. Continued transgression created more open marine conditions and the shallow shelf carbonates of the Slave Point were deposited.

Further marine transgression over the Slave Point surface resulted in deposition of a sequence of basin filling argillaceous limestones and calcareous shales of the Waterways formation.

Woodbend Group

In northern Alberta the transition from the shallow marine Waterways formation to the deeper water Woodbend Group is conformable. This transgressive pulse produced the most extensive Devonian marine incursion into the Alberta Basin and is represented by euxinic "deep" water organic rich shales of the Muskwa/Duvernay Formation. These shales are overlain by thick accumulations of upper Woodbend Group shales of the Fort Simpson Formation and carbonates of the Twin Falls (Grosmont) Formation.

Winterburn Group

The regressive sedimentation patterns developed during infilling of the Woodbend Basin continued with shallow water carbonate shelf deposits prograding out over basin filling clastics. In northern Alberta a regressive pulse allowed the argillaceous carbonates of the basal Nisku Formation to give way to cleaner shallow water shelf carbonates of the Calmar Formation and Blueridge Member of the Graminia Formation. A second major regressive pulse occurred at the close of Winterburn time resulting in the deposition of terrigenous clastics of the Graminia Silt Unit.

Wabamun Group

The Wabamun Group carbonate ramp sequence conformably overlies the Winterburn Group. These are largely lime mud rich, burrowed pelletoidal limestones, grading locally to lime grainstones, which were deposited in response to six major eustatic sea level rises and accentuated by local subsidence patterns.

TABLE OF FORMATIONS

AGE	FORMATION		LITHOLOGY
LATE DEVONIAN		Wabamun	Limestone crypto to micro crystalline
		Winterburn	Limestone crypto-micro crystalline, argillaceous
	Woodbend Group	Twin Falls (Grosmont)	Limestone crypto-micro
		Fort Simpson	shales
		Muskwa	organic rich shales
	Beaverhill Lake	Waterways	shales (basinal)
		Slave Point	Limestone
		Ft. Vermilion	Limestone
MIDDLE DEVONIAN	Upper Elk Pt.	Watt Mountain	shales - bituminous
		Sulphur Point	Limestone & Dolomite
		Muskeg	anhydrite & dolomite / Dolomite
		Upper Keg River	
		Lower Keg River	organic rich limestone & dolomite
EARLY DEVONIAN	Lower Elk Point	Chinchaga	anhydrite
		Granite Wash	sands
PRE DEVONIAN			Metamorphic Complex

SEISMIC

Paramount Resources Ltd. attempted to map the Mid-Devonian Carbonates using four maps. Each of these maps has the following limitations:

Wabamun To Slave Point Isochron

These are the two best and most reliable seismic reflectors at Cameron Hills. "Thins" from these intervals are inferred to be highs in the Slave Point. A major difficulty in the Wabamun event is that it is erosional in this area. If the Wabamun is eroded, then thins could result which are not highs at the Slave Point. Regionally, section is added from east to west in this interval with a west dipping structural component at both the Wabamun and Slave Point levels, thus further complicating the map.

Slave Point to Chinchaga / Basement Isochron

The Slave Point Event is a good reflector in this area, however, the Chinchaga / Basement Event is only relative where the Chinchaga is present over the Pre-Devonian Basement. Where the Chinchaga is absent over the paleo highs, one cannot see the event making it difficult to determine the amount of Keg River Section preserved over these highs. Also, within this interval is the known Watt Mountain unconformity over which a fairly uniform Slave Point - Fort Vermilion section has been deposited. Drape of the Slave Point over highs in this unconformity as well as over Pre-Devonion highs further complicate this map.

Muskeg - Chinchaga / Basement Isochron

Both of these events are difficult to follow. They are constructed as a backup or confirmation map to the Slave Point - Chinchaga map.

Chinchaga Basement Event Dim Out

Where the Chinchaga evaporates are absent, there is no velocity contrast between the Keg River carbonates and the Pre-Devonian. These dim outs are inferred to represent paleo highs during Keg River time over which porosity and permeability were enhanced. These highs also serve as the nucleus over which the Keg River carbonates drape to create structural closure.

DRILLING 1989-1990

The same drilling rig, Sierra #2, which was used during the first quarter of 1989, will be used for the 1989-1990 season. This is a top drive single capable of drilling to 2,200 m. The same drilling engineer, Michael Cholach, M.Sc., will be on site, who will be responsible for all on site, and area activities including land use, construction, safety, etc.

The air and soap drilling technique will again be used from the base of the surface casing to 20 m above the Slave Point where mud-up will take place utilizing a gel-chem mud system. The air-mud systems have reduced mud volumes, reduced clean-up costs, and minimize environmental damage.

CONTINGENCY PLANS

As in previous years, all well sites will be prepared with an alternate or emergency exit. Safety meetings will be held weekly, and conducted by the on site engineer and toolpush. Safety meetings will be held prior to commencement of new activities such as logging, testing, running casing, etc. Complete inspections of the rig will be made prior to spudding and weekly thereafter. B.O.P. drills will be called at random, and the times recorded, plus weekly B.O.P. inspections which include a close check of all moving parts.

H_2S detectors with alarm systems will be located at the shale shaker, cellar, rig floor, and booey line. A continuous pH monitor will be placed in the first receiving mud tank to measure pH changes and calculate H_2S risk factors. A P.V.T. system will be installed on the mud tanks and suction pit.

Fireproof coveralls are supplied by Paramount Resources for all people working on site. These coveralls will be worn during air drilling, drill stem testing and other operations where there is a risk of fire.

Paramount Resources will be installing an Infosat Dish for direct phone line communications, with 3 to 4 remote unit receivers that will have access to the direct line. General mobile in the area is not dependable.

We are also installing a lighted runway approximately 1300 m long with a radio beacon and light beacon. We also plan to install a heated shop near the airstrip. These facilities were planned in the event of an emergency, hopefully, giving us access with a fixed wing aircraft at night or in marginal weather conditions.

EXTENDED FLOW TEST

The Keg River Formation in the Cameron Hills contains the northern most potentially commercial oil in Western Canadian Sedimentary Basin. The nearest analogous type of Keg River production is from the Senex - Kidney areas of Alberta some 370 kilometres to the southeast.

Oil reserves in the Paramount et al Cameron L-47 well are structurally trapped within the upper Keg River Formation dolomites. These dolomites were deposited over Pre-Devonian highs under shoaling conditions which resulted in enhanced porosity and permeability over large areas. These paleo highs also served as a nucleus for drape of the reservoir unit creating structural closure.

Porosity in the Keg River ranges from one percent to 11.5 percent. Applying a three percent porosity cut-off for net pay, there are 13.4 metres of net pay within the Keg River.

Since no core was taken over this productive interval, the presence or absence of fractures in the pool can only be determined by a slow methodical production test (e.g. a vertical fracture which may be in contact with a water leg).

An extended flow test of a 100 days or 100,000 bbl is requested in order to properly establish the characteristics of the pool. The test would commence at about 300 BOPD, increasing by 100 bbls per day every four days until a maximum sustainable flow rate can be established. Bottom hole pressure surveys and samples would be taken at the beginning of the test, and then at 32, 60, and 92 day intervals. During the test, daily gas charts would be used for GOR calculations, pressures would be recorded daily, and B S & W cuts would be taken four times per day. The production rate would be cut back immediately if an increase in B S & W was observed.

EXTENDED FLOW TESTS FOR PARAMOUNT et al CAMERON L-47 AND PARAMOUNT et al CAMERON C-50