APPLICATION FOR DRILLING APPROVAL
PARAMOUNT ET AL LIARD A-01

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November 19, 1998

National Energy Board
5th Floor, 444 – 7 Avenue SW
Calgary, Alberta
T2P 0X8

Attention: Mr. Terry Baker, Chief Conservation Officer

Dear Sir,

Re: Paramount Fort Liard Area Wells

Enclosed please find the revised format of the Application for Drilling Approval for the wells Paramount et al Liard K-46 and Paramount et al Liard A-01 as requested by the National Energy Board. These new applications do not include maps or survey plats.

Should you require additional information on these wells, please contact Shirley Maaskant at 290-3618.

Yours truly,

PARAMOUNT RESOURCES LTD.

Dawn Carrico

Dawn Carrico
Drilling and Completions

SM/dc

PARAMOUNT RESOURCES LTD

APPLICATION FOR DRILLING APPROVAL

FOR

PARAMOUNT ET AL LIARD A-01

Prepared By: S. Maaskant, C.E.T.

Dated: November 12 1998

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Application For Drilling Approval

Paramount et al Liard A-01

SECTION 1 GENERAL WELL DATA & PROGRAM OVERVIEW

Overview:

Paramount Resources Ltd. (Paramount) plans to drill A-01 to evaluate the Chinkeh formation, with the secondary target zones being the Fantasque and Mattson. The total depth is 2350 m KB.

Liard A-01 is located approximately 36 km south of Ft. Liard at a surface elevation of 517.4 m

The drilling is anticipated to start on approximately January 11, 1999 and conclude by February 15, 1999, with a service rig following in soon after to complete the well prior to March 31, 1999.

Operations will include setting conductor, drilling surface hole to a maximum of 500 m KB and running surface casing. From just under the surface casing shoe, we will drill with calcium chloride invert to total depth. The Chinkeh may be drill stem tested on penetration. At total depth, the well will be logged, drill stem tested and casing run if the well is productive.

Working Interest Holdings:

Operator	**EL 381 A-01**
Paramount Resources Ltd. 4000, 350 - 7th Avenue S.W. Calgary, Alberta T2P 3W5	27.5%
Berkley Petroleum Corp. 1250, 202 - 6th Avenue S.W. Calgary, Alberta T2P 2R7	27.5%
Canadian Forest Oil Ltd. Calgary, Alberta	45.0%

SECTION 2 GEOLOGICAL PROGNOSIS & EVALUATION

Geologic Discussion:

Chapter IV of the June 1996 NEB report (ISBN 0-662-24705-1) entitled *A Natural Gas Resource Assessment of Southeast Yukon and Northwest Territories, Canada* contains an excellent overview of the regional geological setting, including a discussion of source rock, hydrocarbon generation, and migration. Sections of it have been included here for reference to the regional geology.

Main Objective: The Lower Cretaceous Chinkeh sand is the main target. It is a sweet gas play which occurs as a valley fill, channel fill or near shore sand deposit that develops on the pre Cretaceous unconfirmity. The seal for the gas reservoir is the organic rich Lower Cretaceous Garbutt Shale. The source for the gas is also the Lower Cretaceous Garbutt Shale as well as the Triassis Toad – Grayling Shales & Silts. In this prospect the Chinkeh is deposited on top of the Triassic Formation and is overlain by the Garbutt Shale. The trap is structural in nature and is displayed in the Chinkeh sand time structure map.

Secondary Objectives: Sweet gas/oil in the Mississippian Mattson Fm. Clastics. The seal for this prospect would be the overlying Permian Fantasque cherts and the fault to the east.

PARAMOUNT RESOURCES LTD.

GEOLOGICAL PROGRAM AND PROGNOSIS

(PRELIMINARY PROGNOSIS)

November 17, 1998

WELL NAME: PARA ET AL LIARD A-1

Estimated GROUND ELEVATION: 518 m

LOCATION: LAT 60o10'N, LONG 123o15'W
SEISMIC LINE: Off-line

Estimated K.B. ELEVATION: 523m

CLASSIFICATION: EXPLORATION

FORMATION TOPS	(S.S) ELEV. (m)	ISOPACH (m)	K.B. DEPTH (m)	COMMENTS A-1
Scatter	-448	136	971	
Garbutt	-584	186	1107	
Chinkeh Sand*	-770	11	1293	HC BEARING
Triassic	-781	137	1304	
Belloy	-918	38	1441	
Fantasque**	-956	116	1479	
Mattson**	-1072	735	1595	TEST POROUS HC ZONE
Flett	-1807	20	2330	ON PENETRATION
TD	-1827		2350	

Primary Zone * Secondary Zone **

GAS DETECTION:

A gas detector unit is to be set up and in working order from **SURFACE to T.D.**

SAMPLES:

1. Bottle one set of samples for Paramount at 5 metre intervals from **SURFACE to T.D.**
2. Catch bagged samples AND 2 SETS OF GLASS VIALS for Chief ConservationOfficer at the N.E.B. **c/o G.S.C. Calgary, Attn: Alan Scott** from **SURFACE** to **T.D.** as per drilling license.

LOGGING PROGRAM: See attached

CORING & TESTING:

1. **3 possible DST's** to be run on penetration of **good porosity sands** and **Hydrocarbon Shows. One** over the Chinkeh Sand interval and **two** in the Mattson Formation . **Test Times** will be **10-60-120-240.**

2. **Two 9m cores** may be taken at this location.One in the Chinkeh Formation and one in the Mattson Formation.

FLUID SAMPLES:

Catch mud sample prior to coring and or testing. Send these samples to **xxxxx in Ft. St. John** for lab analysis with DST samples. Representative fluid samples of all DST's from top, middle and bottom of the fluid column are required for analysis. Provide the logging company with a second set of samples for Rw determinations and have these values recorded on the field logs. **Make sure well name, location, TIME & DATE sample taken, source of sample and temperature are recorded clearly on all samples sent to lab.**

POTENTIAL DRILLING PROBLEMS:

1. Possible excessive filtrate invasion in Mattson SST's due to very slow drilling (2hrs/metre). Drill at or underbalance.

2. Potential gas in Chinkeh, Fantasque and Mattson sands.

3. Mattson formation is **overpressured** relative to hydrostatic

CORES, GAS AND FLUID ANALYSIS:	**xxxxxx,** Ft. St. John, 222-3333, Jim
WELLSITE GEOLOGIST:	xxxxxxxxxx
DRILLING SUPERVISOR:	xxxxxxxxxxx
DRILLING CONTRACTOR:	xxxxxxxx
DAILY GEOLOGICAL REPORTS TO:	**Paul Collens 290-3605 (office)** **220-9766 (home)** **660-1430 (cell)** **Office Fax 266-6032 (reports)**
DIRECTIONS TO RIG LOCATION:	Attached copy of survey plat.

SHALLOW LOGGING REQUIREMENTS
(WESTERN ATLAS)

HDIL-GR(High Definition Induction Log)

1:600
T.D. to intermediate/surface casing
GR 0-150
Resistivity 0-50, 0-500 ohms linear scale
Conductivity 0-200-400mmho/m

1:240
T.D. to 20 m above intermediate/surface casing
GR 0-150
Resistivity 0.2 to 2000 ohm-m logarithmic scale

MAC-GR-CAL(Multipole Array Acoustic Log)

1:600
T.D. to 20 m above intermediate/surface casing
Sonic 100-500 us/m, GR 0-150

1:240
T.D. to 20 m above intermediate/surface casing
Sonic 100-300 us/m, GR 0-150

ZDL-CNL-GR-PE-XY CAL(Compensated Density Log – Compensated Neutron Log)

1:600
T.D. to 20m above intermediate/surface casing
Standard bulk density presentation with delta e and tension indicator.

1:240
T.D. to 20m above intermediate/surface casing
GR 0-150, PE 0-10
Porosity 45 to –15 SST Matrix
Limestone Matrix repeat T.D. to 20 m above Mattson
Dolomite Matrix repeat T.D. to 20 m above Mattson
Display and integrate XY calipers

MRIL-GR-CAL(Magnetic Resonance Imaging Log)

1:240
T.D. to 20 m above intermediate/surface casing
GR 0-150

NOTE:

Run maximum recording thermometers on each logging tool string

Run the repeat section across the Mattson sands using identical porosity scales as main pass. Ensure good log repeatability.

Hole volume calculations will be required using the xy caliper data.

The interval from T.D. to intermediate casing is to be transmitted via satellite to Atlas's Calgary Logstar Center A.S.A.P. . A total of 7 log prints and 4 x 3.5" LAS diskettes are required in Paramount's Calgary Office.

IV. Regional Geological Setting

A full and detailed discussion of the geological setting of the area is beyond the scope of this report. Detailed discussions of the stratigraphy and geological setting of the study area are presented in the following papers[3] listed in the reference section of this report.

The geological setting is summarized in the following text and in the accompanying stratigraphic chart (Figure IV-1). Underlying the sedimentary cover of the study area and forming the effective basement are meta-sedimentary, metamorphic and igneous rocks of Precambrian age. Surface exposures of Devonian and older rocks are confined mainly to the western half of the study area, while Mississippian and Cretaceous rocks are exposed in the eastern half. No Pennsylvanian or Jurassic strata are present within the Yukon and Northwest Territories portions of the study area. Cretaceous rocks lie unconformably upon rocks of Devonian, Mississippian, Permian and Triassic age.

The study area can be divided into two main subregions by the eastern limit of the foothills disturbed belt along the Kledo-Bovie fault zone and the Liard High. The Liard Plateau area, west of the Kledo-Bovie fault zone, is an area associated with foothills type structural traps (fold and thrust belt) of Laramide-age while the Great Slave Plain, an area east of the Kledo-Bovie fault zone, is characterized by typical Western Canadian Sedimentary Basin trapping styles (middle Devonian carbonates, reactivated basement faulting, subcrops, Cretaceous clastics) where the carbonate platform remained generally unstructured with faulting limited to orthogonal patterns of normal faults of small throw, and northeasterly directed wrench faults of Precambrian age involving the underlying craton.

The Liard Plateau is a region where the structural style and trends formed by the convergence and interaction of the structural styles from the Rocky Mountains to the south and the Mackenzie Mountains to the north. This interaction has produced a diverse series of structural features and trends characterized by elongated folds, high angle reverse faults and thrust faults. These faults are often offset by Laramide to post-Laramide-aged northeasterly trending normal faults that formed along pre-existing structural zones of Palaeozoic age. The main reservoir horizon in this area is the Devonian shelf carbonates (Nahanni and Arnica formations) influenced by pre-orogenic hydrothermal dolomitization (Manetoe dolomite). Laramide thrust faulting, folding and fracturing formed large antiformal traps. Reservoirs within Devonian carbonates have low relative porosity (3.5 percent) but excellent fracture permeability (7 mD to 200 mD). Additional potential may exist in shallower horizons in the Devonian fractured shales of the Besa River Formation, within the Mississippian Prophet cherty carbonates and Mattson clastics, within Permian Fantasque fractured cherts and within basal Cretaceous clastics.

In the Liard Plateau region, the following source rock horizons have been identified within the middle Devonian Funeral and Headless Formations, the upper Devonian Muskwa, Besa River, Horn River and Ft Simpson Formations, the Mississippian Exshaw and Etanda Formations, the Triassic Toad-Grayling Formation and the lower Cretaceous Garbutt Formation. The major source rock is the organic rich bituminous shales of the Devonian Muskwa formation and its equivalents. Maturation data indicate that the top of the present oil window is at about 700 metres (within the Permian Fantasque to the Mississippian Mattson) with the base of the oil

3 Meijer Drees, N.C., 1993; Reinson et al 1993; Mossop, G. D. and Shetsen, I, 1994; Yukon Economic Development, 1995.

window at about 1350 metres (within strata of middle to lower Mississippian age).

Maturation models suggest a heating event probably occurring in the late Palaeozoic to early Mesozoic could have resulted in the charging of the Manetoe facies reservoirs with oil derived from the overlying Besa River shales. The oil was cracked into gas when the reservoir entered the gas window at approximately 280 mya (Morrow et al, 1991; Potter et al, 1993). Subsequent generation of gas is likely to have continued throughout the Mesozoic with secondary migration of gas into the existing accumulations occurring during and after Laramide deformation.

Maturation data further suggests that the Carboniferous source rocks of the Exshaw/ Etanda and their equivalent shelf deposits (Yohin, Clausen and Prophet) are currently in the catagenic[4] gas stage. Source rocks within the Mattson and their equivalents are mature for oil and gas, having entered the oil window some 230 mya. The lower Mattson could have potential to generate condensate and wet gas (Potter et al, 1993). Source rocks within the Triassic Toad-Grayling Formations and the lower Cretaceous Garbutt Formation have been identified by Leckie et al, 1991. Most of the Liard area's Cretaceous section is currently in the oil window and is therefore very prospective.

East of the Liard High and the Kledo-Bovie Fault Zone, in the Great Slave Plain, the succession is composed of late Precambrian rift deposits, Lower Palaeozoic miogeoclinal sediments, Devonian platformal carbonates, evaporites and marine shales, Carboniferous marine clastics and carbonates, and Cretaceous foreland basin clastics. This depositional sequence provides multiple opportunities for stacked traps throughout the section.

Extensional tectonics associated with the late Precambrian opening of the proto-Pacific ocean created a series of northeast-southwest trending faults, shear zones and associated horsts and grabens. These early basement features have been re-activated several times throughout the geologic history of the study area (most recently during the Laramide orogeny) and have had a major influence on depositional patterns, subsequent structural development, and provided hydrocarbon traps with enhanced porosity in the otherwise tight platformal Devonian carbonates. The structure within this area is further complicated by gently folded antiforms and synforms that are superimposed on the moderately west southwesterly dipping strata (regional dip at 1 to 5 metres/kilometre).

The major stratigraphic features in the Great Slave Plain that possess reservoir potential are summarized in the following paragraphs. The deepest potential target is formed by lower Paleozoic miogeoclinal basal clastics, deposited as fill in the graben valleys and onto the flanks of Precambrian horst hills.

Deposition of middle Devonian carbonate shelf/bank and basinal shale followed the lowermost Paleozoic carbonate deposition and continued without a major break until upper Devonian time. The Lower Keg River (Lonely Bay) Platform contains a dolomitized zone with good porosity in the Mink Lake I-38 well in the Northwest Territories. Thick reefs that developed on the lower Keg River Platform localized around the Tathlina High (60° 31' to 61° north latitude and 117° to 123° west longitude) and coalesced to form the Presqu'ile carbonate barrier. This carbonate barrier complex forms the main series of stacked reservoir horizons within the Great Slave Plain. Proven reservoirs within this carbonate complex include the Keg River (Pine Point), Sulphur Point, Slave Point and Jean Marie formations. Keg River dolomite

4 Catagenisis describes the transformation of oil into gas as a result of extreme pressures and temperatures.

reservoirs behind the Presqu'ile barrier have an average of four percent vuggy porosity, with effective porosity and permeability enhanced by fractures close to reactivated fault zones.

North of the barrier complex, Horn Plateau isolated pinnacle and patch reefs developed on the Lower Keg River (Lonely Bay) platform. Most are undolomitized and relatively tight, although six percent porosity and permeability is occasionally present, as exemplified by the Mink Lake I-38 well in the Northwest Territories. The Slave Point Presqu'ile barrier edge is a fair gas reservoir with an average porosity of seven percent in patchy, leached and mineralized limestone, as exemplified at Celibeta and Netla. Bank-interior Slave Point, Sulphur Point and Keg River limestones and dolomites have so far proven to be better reservoirs with average porosity of nine percent (maximum 15 percent) and permeabilities of 7 mD (reaching 200 mD). Paramount Resources Ltd. has reported oil flows of 160 bopd from the Slave Point in Cameron M-73 (Daily Oil Bulletin, 17 June 1993). Additional potential reservoirs exist in late Devonian carbonates of the Kakisa, Kotcho and Tetcho formations. These zones show locally enhanced reservoir characteristics over fault zones in the Liard-Celibeta Structured Belt and in regions associated with reactivated basement faulting (especially in the Kakisa/Redknife area).

North of the Presqu'ile Barrier water depths increased into the Horn River Basin where organic rich shale deposition predominated (Horn River/Besa River shales). These shales form the main source rocks and top seal for most of the Devonian gas pools. For Keg River dolomite traps the seal is provided by Muskeg anhydrites. For Sulphur Point accumulations the seal is provided by the Watt Mountain shale.

Within the Great Slave Plain region the top of the present oil window is at about 450 metres (within the Banff formation) with the base of the oil window at about 1900 metres (within the Muskwa/Horn River formations).

In the Carboniferous age, a thick succession of shales (the Etanda formation) were deposited in the western portions of the study area. These shales form the main seals for Carboniferous reservoirs and are associated with sands and silts of the Banff age (the Clausen and Yohin formations) and carbonates of upper Mississippian age (Flett and Prophet formations) in the southern and eastern parts of the study area. The Flett/Prophet carbonates were deposited in the western portions of the study area while laterally equivalent shales were deposited to the south and west of the carbonates. These carbonates form a potential reservoir along the western margin of the study area. During the uppermost Mississippian great quantities of fluvial, deltaic and near shore sands sourced from the north east were deposited over the study area (Mattson formation). These sands show excellent reservoir characteristics and are sealed by Cretaceous shales of the Fort St. John Group. The main exploration risk for these Carboniferous reservoirs is the probability of breaching the seal.

During the Permian and early Triassic ages, the study area was transgressed by a shallow sea within which a thin clastic succession was deposited. During the late Triassic and early Jurassic time, the area was exposed and erosion and non-deposition took place as no strata of this time interval are preserved.

The study area was inundated during Cretaceous time and a thick succession of clastic strata of the Fort St. John Group were deposited. Potential reservoirs include basal clastics that have porosities in excess of 20 percent. Locally, Cretaceous sources may be in the oil window. Lateral and top seal is provided by facies changes to shales. There is a risk that the reservoirs may not have been preserved. Preserved Cretaceous rocks are largely limited to the area south of 61°. Foreland basin deposition continued within the study area through the Cretaceous and into the Tertiary period.

Play Name: Basal Cretaceous Clastics - Arrowhead

Play Definition:

This sweet gas and light to medium gravity oil play was defined to include all pools and prospects within the lower Cretaceous fluvial and shallow marine clastics of the Chinkeh, Scatter and Sikanni Formations of the Fort St. John Group (valley fill, channel, estuarine and shelf sands). The play area is delineated on the west by basinal shales and on the east, north, south by subcrop/outcrop limits. The play encompasses 3,410,000 hectares, of which 40 percent is in the Northwest Territories and the rest is in British Columbia and Alberta (Figure VII-100).

Hydrocarbon Occurrence Model:

The trap is stratigraphic in nature and results from valley fill, channel fill and near shore sands that accumulated on the pre-Cretaceous unconformity. Laramide antiforms and normal, reverse and thrust faults complicate the trap configuration for this play in the western portion of the study area (west of the Kledo-Bovie Fault) and increase the risk of the trap being breached. Seal for the reservoir and the source of the gas is provided by the organic-rich lower Cretaceous Garbutt and Buckinghorse shales that overlie and interfinger with the reservoirs. A possible secondary source would be the Triassic Toad-Grayling. Observed zone porosities range from 5 to 18 percent, permeabilities form 0.5 to 30 md (Figure VII-101).

Discovered Resources:

To date, there is one recognized discovery at Shell Arrowhead B-41 in the NWT (8.7 Bcf; NEB). Gas has also been recovered on a DST test within this zone at Bovie Lake M-05 in the NWT (12 Mbd). In addition, the Arco B-21-K/94-O-14 Maxhamish well in B.C. had an oil show in samples. Additional wells in northern Alberta have produced gas shows within laterally equivalent strata.

Undiscovered Resources:

There are two previously published estimates of the gas resources of the Cretaceous strata within the study area. Both of these studies defined the play outline somewhat differently from that presented here. The 1995 NEB Northeast British Columbia resource assessment estimated the mean remaining marketable gas potential of the Ft. St. John Group in the western portion of the study area within British Columbia to be 313 Bcf. A portion of this estimated amount falls within the play definition of this report while the remainder falls within the estimate of the Laramide Windflower play of this study. The 1993 NEB Liard Plateau study estimated the mean Cretaceous gas resources within the Yukon portion of the Liard plateau to be 1.25 Bcf. This estimate falls within the play definition of the Laramide Windflower play of this study.

This work indicates that there is a 90 percent probability that the range of the remaining undiscovered marketable gas potential is 154 to 905 Bcf with a mean of 445 Bcf within the Great Slave Plains (Figure VII-102). The remaining play potential distribution is shown in Figure VII-103. No estimate of the Bluesky gas potential has been made as there is no evidence of this formation within the Southern Territories.

Figure VII-100
Cretaceous Clastics Arrowhead Play

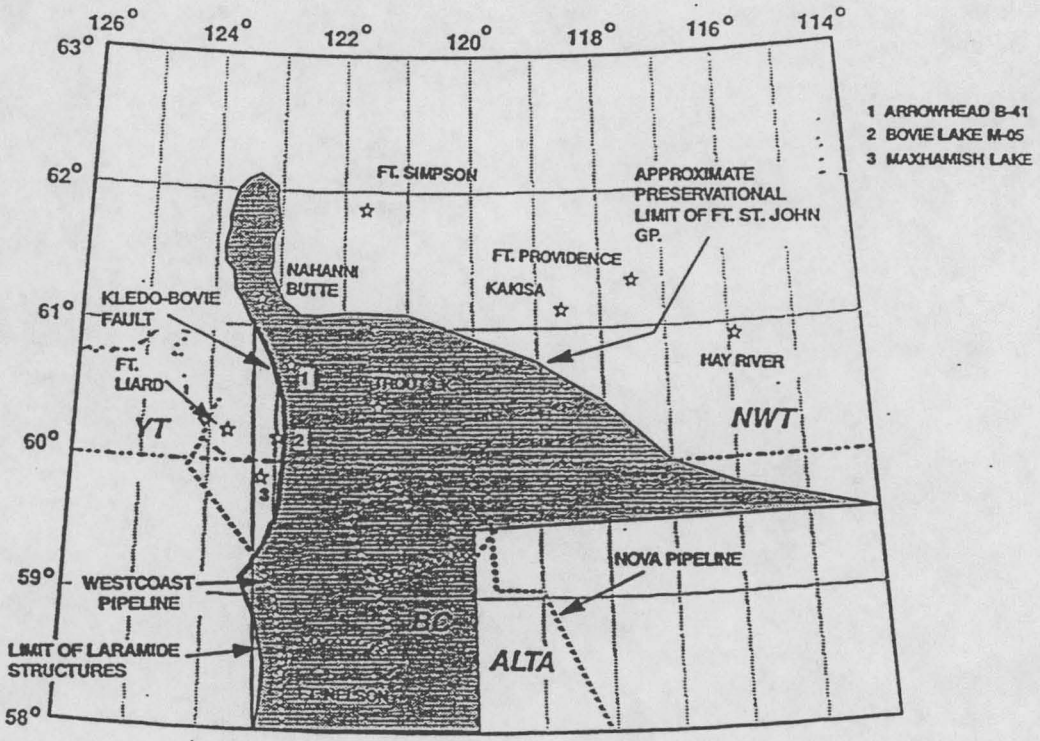


Figure IV-1
Stratigraphic Chart

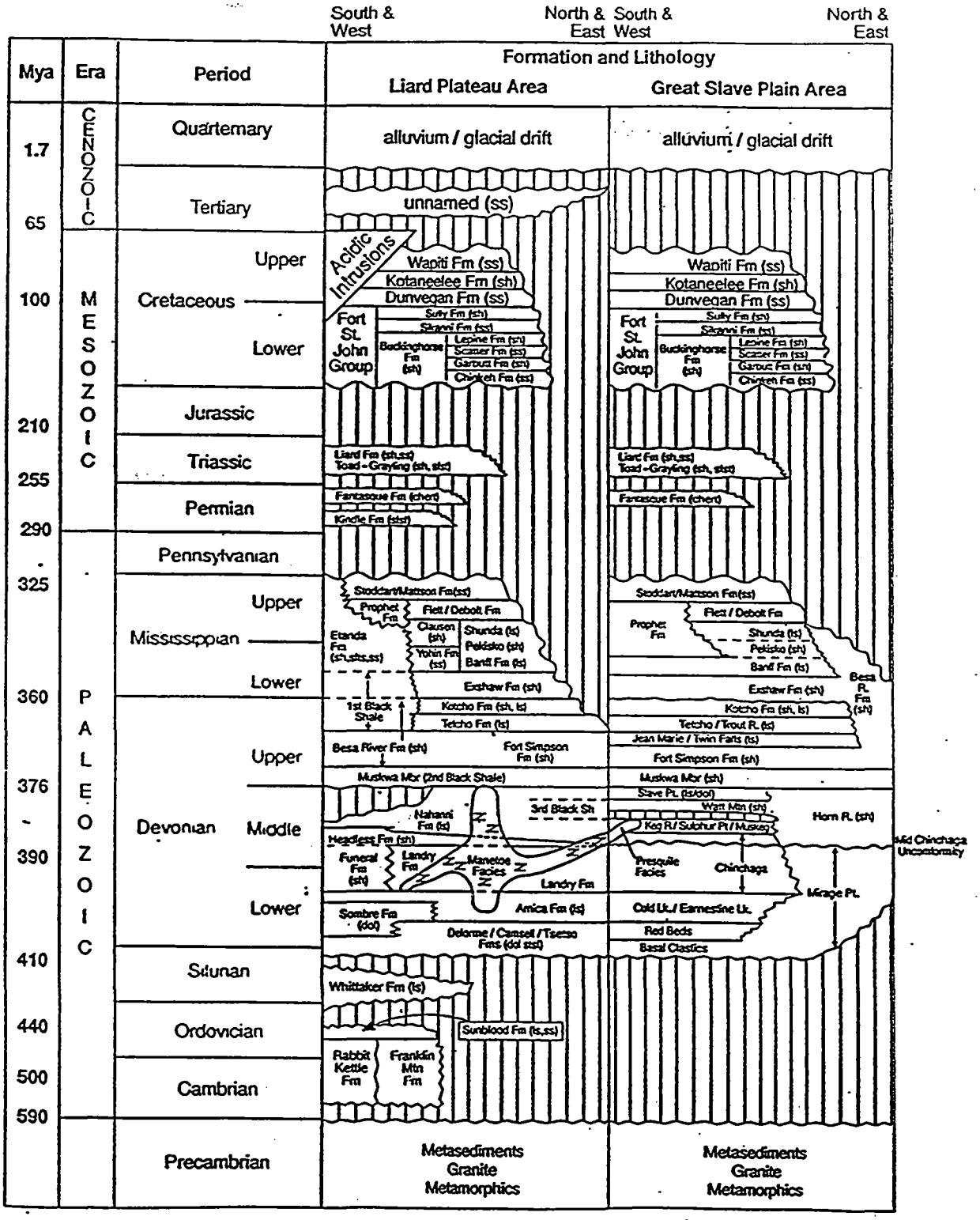


Figure VII-102
Estimate of Undiscovered Resources

	AREA/REGION	Southern NWT			
	PLAY NAME	Basal Cretaceous - Arrowhead			
	ESTIMATOR NAME	Paul R. Price			
	OIL DEPTH	1100	GAS DEPTH	1200	(FEET)
	GAS: RESERVOIR TEMP (oF)	65.2	PRESSURE	501	(PSI)

		MINIMUM	MOST LIKELY	MAXIMUM	MEAN
A	TOTAL PLAY AREA (MM ACRES)	7.5775	8.4195	12.6292	9.542
A'	TESTED PLAY AREA (MM ACRES)	2.425	2.694	2.964	2.694
B	UNTESTED PLAY AREA (MM ACRES)	5.153	5.725	9.656	6.848
C	FRACTION OF B IN TRAP	0.050	0.100	0.200	0.117
D	FRACTION OF C FILLED (AREALLY)	0.700	0.750	0.800	0.750
E	POTENTIAL HC AREA (MM ACRES)				0.599
F	POROSITY	0.060	0.150	0.240	0.150
G	HC SATURATION	0.500	0.650	0.850	0.667
H	OIL RECOVERY FACTOR	0.150	0.200	0.300	0.217
I	GAS RECOVERY FACTOR	0.750	0.800	0.850	0.800
J	AVERAGE NET PAY (FEET)	11.0	20.0	45.0	25.333
K	PROB OF HYDROCARBONS	0.150	0.250	0.350	0.250
L	FRAC OF PORE VOL OIL BEARING	0.005	0.020	0.050	0.025
M	POTENTIAL OIL AREA (MM ACRES)				0.004
N	POTENTIAL GAS AREA (MM ACRES)				0.146
O	GOR (MCF/BBL)	0.105	0.110	0.116	0.110
P	FVF	1.060	1.063	1.066	1.063
Q	GAS COMPRESSIBILITY FACTOR 'Z'	0.844	0.866	0.909	0.873
R	GVF				0.039
S	OIL IN PLACE (BBLS/ACRE-FOOT)				730.0
T	OIL RECOVERY (BBLS/ACRE-FOOT)				158.2
U	GAS IN PLACE (MCF/ACRE-FOOT)				168.8
V	RAW GAS RECOVERY (MCF/AC-FT)				135.0
W	MARKETABLE GAS REC (MCF/AC-FT)				119.8
X	LIQUIDS YIELD (BBLS/MMCF)	12.000	15.000	17.000	14.667
Y	H2S CONTENT (FRAC)	0.000	0.000	0.000	0.000
Z	CO2 CONTENT (FRAC)	0.005	0.013	0.020	0.013
	GAS TO BOE CONVERSION FACTOR (MCF/BOE)		6.000		
	SURFACE LOSS (FUEL GAS, ETC)		0.100		
	MARKETABLE GAS (FRAC. OF RAW)		0.887		

TOTAL FOR PLAY

	OIL MMB	SOL GAS BCF	NA GAS BCF	TOT GAS BCF	LIQS MMB	BOE MMBOE	MKT GAS BCF
IN PLACE	69.26		624.51	624.51		173.34	
RECOVERABLE	15.01	1.65	499.61	501.26	7.33	105.88	444.80

SULPHUR (MMT) 0.00

Figure VII-103
Basal Cretaceous – Arrowhead

Figure VII - 103:

Recovery factor	0.65
Surface loss	0.15

Remaining Play Potential (Bcf)	Cumulative Frequency Greater than
445	Mean
64	100.00
154	95.00
192	90.00
218	85.00
248	80.00
270	75.00
290	70.00
313	65.00
337	60.00
365	55.00
388	50.00
416	45.00
450	40.00
484	35.00
521	30.00
561	25.00
613	20.00
683	15.00
789	10.00
905	5.00
1526	0.00

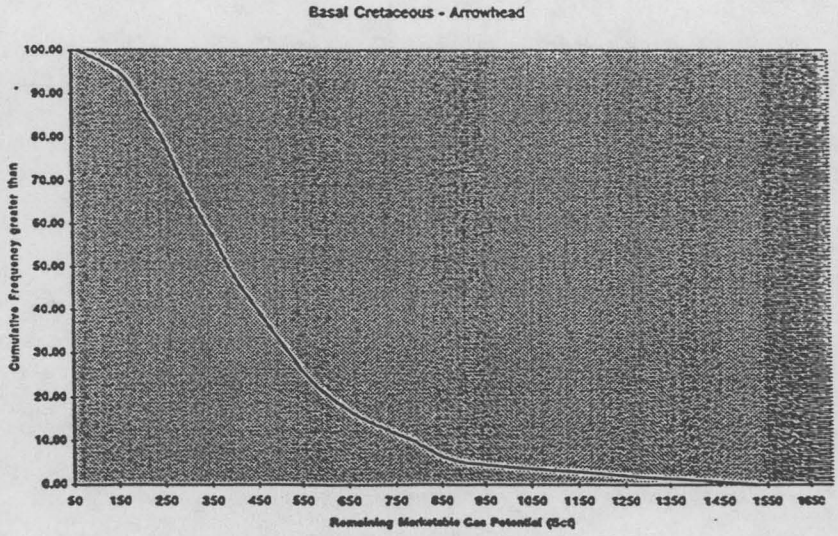
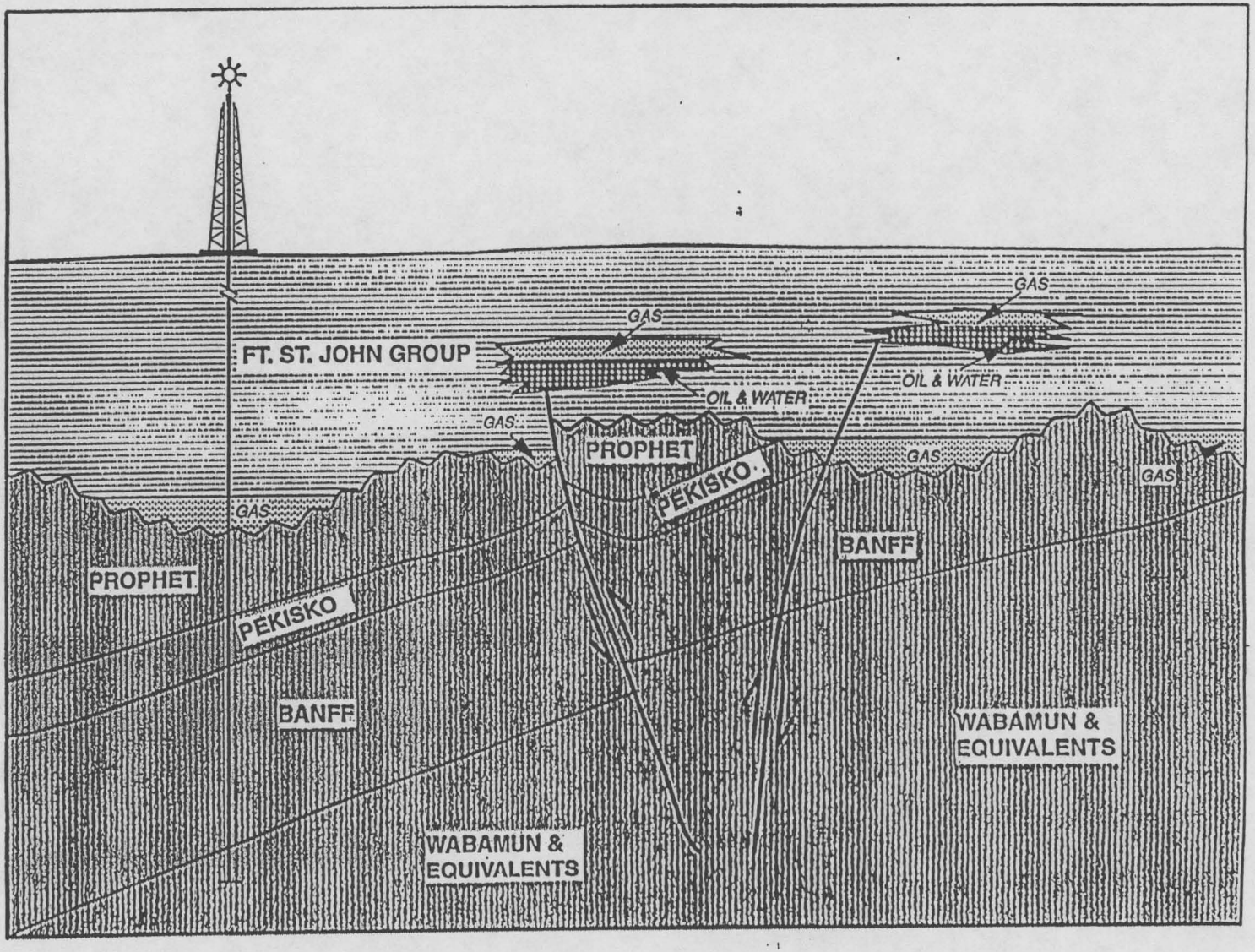
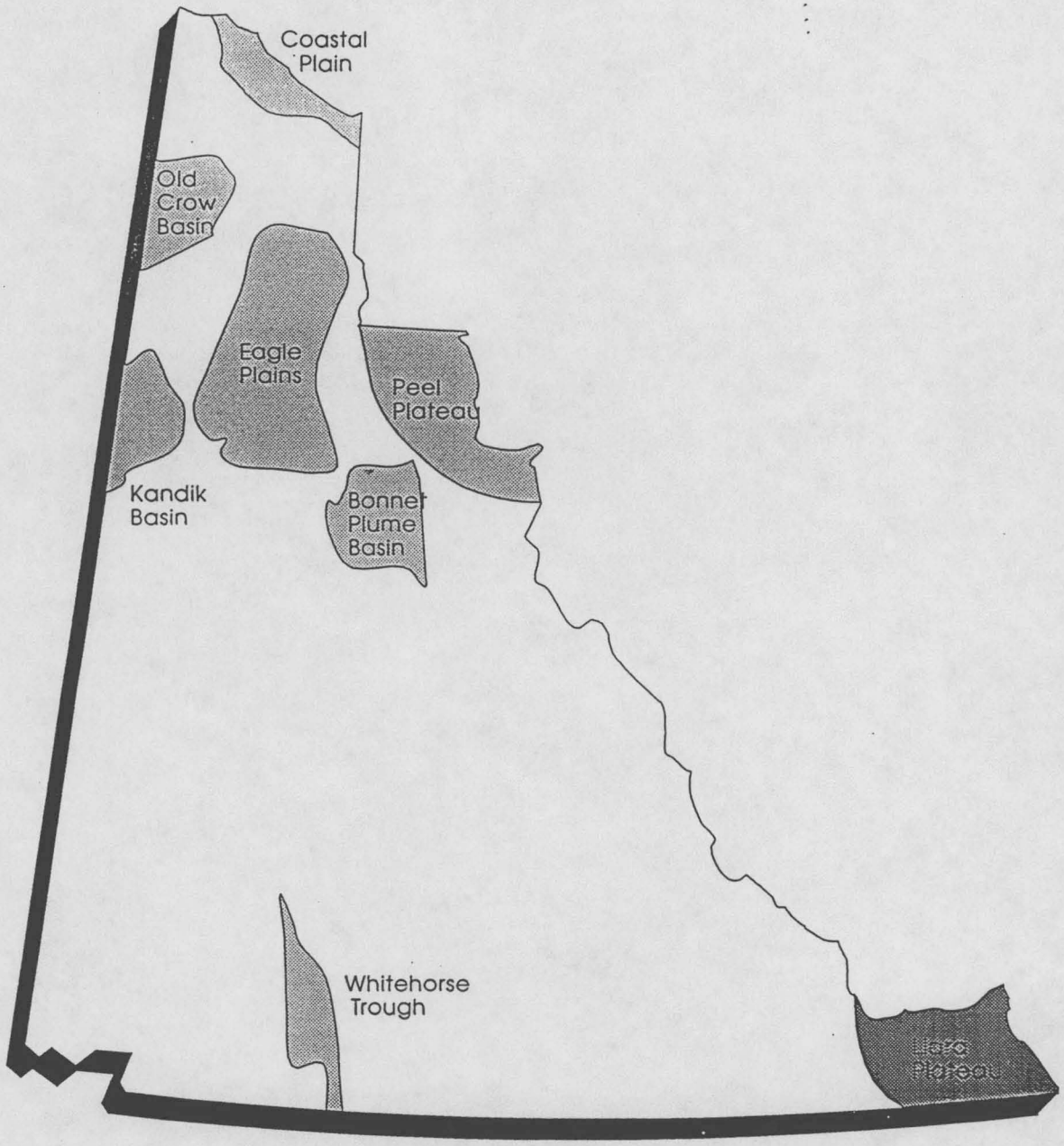


Figure VII-101
Cretaceous Clastics Arrowhead Play



PETROLEUM RESOURCE ASSESSMENT OF THE LIARD PLATEAU, YUKON TERRITORY, CANADA



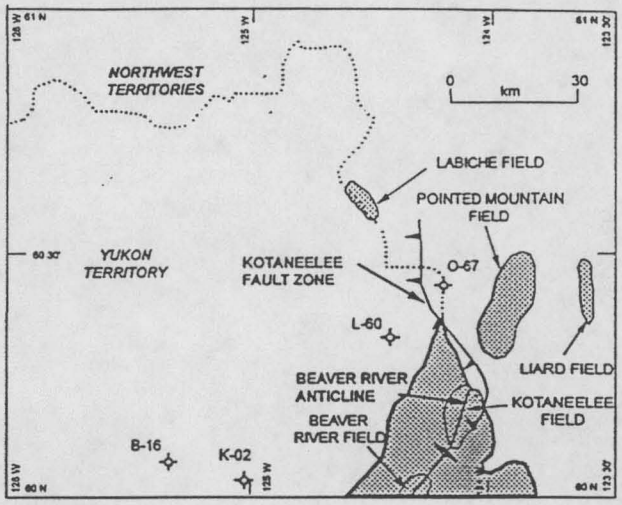
Yukon
Economic Development
Oil and Gas Resources

IMMATURE PLAY

Permo-Carboniferous Mattson Clastics Gas Play

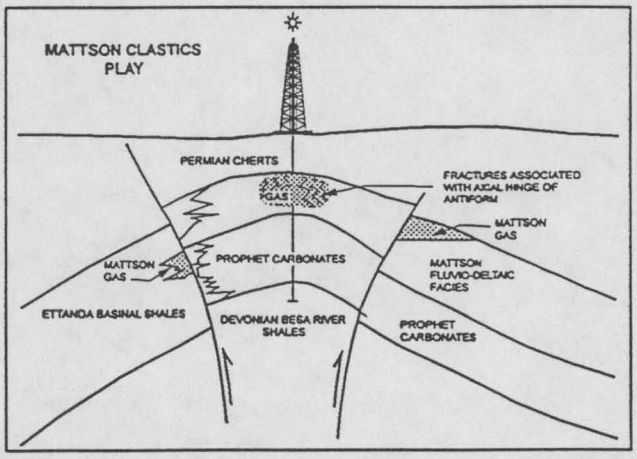
Reservoir Description

The Permo-Carboniferous Mattson clastics gas play is a sweet, slightly acidic, gas play with a possibility of minor condensate or wet gas. It was defined to include all pools and prospects of fluvio-deltaic sandstone reservoirs in structural and structural-stratigraphic traps formed by anticlines, normal and/or thrust faults. The study play area is bordered on the west by the easternmost limit of the Mattson outcrop and the approximate seaward edge of the Mattson deltaic complex, by the outcrop along the Kotaneelee Anticline and on the east, south and north by the study area boundary (border with B. C. and the N.W.T.).



Hydrocarbon Occurrence Model

Pools of this type would have resulted from a combination of stratigraphic traps and structural enhancements. The stratigraphic traps were caused by facies changes within the fluvial deltaic deposits due to the interplay of marine and fluvial processes. Fracturing caused by Laramide folding and faulting (normal, reserve and thrust) produced fault-bound traps. Stratigraphic prospects can be seismically defined and range from 200 to 600 ha. Tight Permian Fantasque cherts provide the top seal for the reservoir, and tighter Mattson facies and basinal Etanda shales provide the lateral seal. The organic-rich Etanda Shale that overlies and interfingers with the reservoir is the source of the gas. DST tests in adjacent areas gave the following results: gas composition mainly methane with a trace of CO_2; no H_2S evident in the gas stream; AOF values should range between 0.5 and 3.0 MMcf/d. Reservoir properties are listed on the assessment input sheet. Most of this play's expected potential lies to the south and east of the study area.



Discovered Resources

To date, there are no discovered Mattson Formation gas resources documented for the study area.

Potential Resources

A search of current literature found no previously published estimates of gas resources for this play. This work indicates that, within a 90% probability range, there is a marketable gas potential of 46 Bcf to 360 Bcf with a mean of 42 Bcf. For a complete listing of the potential resources of this play, see the data and output sheets on the following pages.

Estimate of Potential Resources: Mattson Clastics Gas Play

		Minimum	Most likely	Maximum	Mean
A	Total play area (MM acres)	0.1200	0.1490	0.1800	0.150
A'	Tested play area (MM acres)	0.027	0.030	0.033	0.030
B	Untested play area (MM acres)	0.093	0.119	0.147	0.120
C	Fraction of B in trap	0.150	0.300	0.550	0.333
D	Fraction of C filled (areally)	0.400	0.500	0.900	0.600
E	Potential hydrocarbon area (MM acres)				0.024
F	Porosity	0.080	0.120	0.175	0.125
G	Hydrocarbon saturation	0.550	0.600	0.750	0.633
H	Oil recovery factor	0.000	0.000	0.000	0.000
I	Gas recovery factor	0.450	0.500	0.550	0.500
J	Average net pay (ft.)	50.0	125.0	350.0	175.0
K	Probability of hydrocarbons	0.050	0.100	0.250	0.133
L	Fraction of pore volume oil bearing	0.000	0.000	0.000	0.000
M	Potential oil area (MM acres)				0.000
N	Potential gas area (MM acres)				0.003
O	Gas oil ratio (GOR) (Mcf/bbl)	0.532	0.560	0.588	0.560
P	Formation volume factor (FVF)	1.303	1.319	1.335	1.319
Q	Gas compressibility factor 'Z'	0.882	0.900	0.918	0.900
R	Gas volume factor (GVF)				0.185
S	Oil in place (bbls/acre-foot)				465.6
T	Oil recovery (bbls/acre-foot)				0.0
U	Gas in place (Mcf/acre-foot)				638.2
V	Raw gas recovery (Mcf/acre-foot)				319.1
W	Marketable gas recovery (Mcf/acre-foot)				303.2
X	Liquid yield (bbls/MMcf)	0.0	0.0	0.0	0.0
Y	H_2S content (fraction)	0.000	0.000	0.001	0.000
Z	CO_2 content (fraction)	0.000	0.000	0.000	0.000
	Gas to BOE conversion factor (Mcf/BOE)		6.000		
	Surface loss (fuel gas, etc.)		0.050		
	Marketable gas (fraction of raw)		0.950		

Total for play

	Oil (MMb)	Solution gas (Bcf)	Non associated gas (Bcf)	Total. gas (Bcf)	Liquids (MMb)	Barrels of oil equivalent (MMBOE)	Marketable gas (Bcf)
In place	0.00		356.41	356.41		59.40	
Recoverable	0.00	0.00	178.20	178.20	0.00	29.70	169.29
Sulphur (MMlt)		0.00					

Oil depth: 5,600 ft.; gas depth: 5,600 ft.; gas pressure: 2,851 psi; gas reservoir temperature: 147.56°F.

LIARD PLATEAU, YUKON
MATTSON CLASTICS PLAY

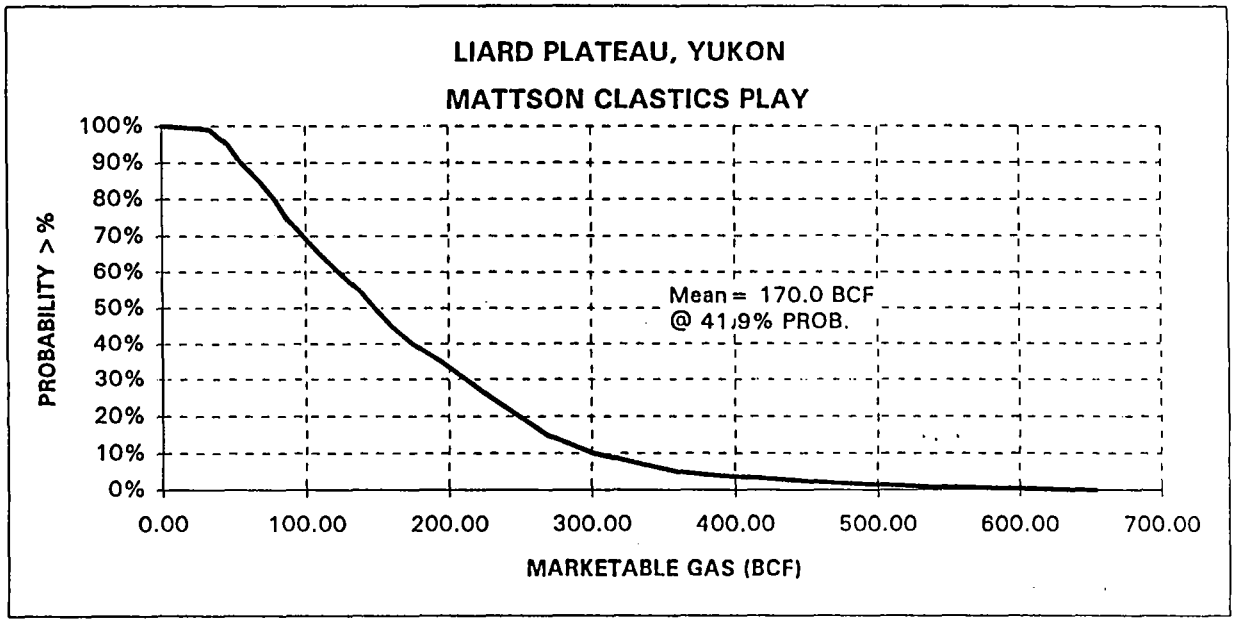
Simulation Statistics
Date: 11/8/94 at 16:39
Iterations: 500
Simulations: 1
Worksheet: MATSN.XLS
Output Range: MARKETABLE GAS (BCF)
Cell: I49

Minimum =	21.2
Maximum =	653.3
Mean =	170.0
Std Deviation =	106.0

Mean = 170.0 BCF
@ 41.9% PROB.

Percentile Values

100%	0.00
95%	46.10
90%	55.41
85%	67.87
80%	78.72
75%	86.85
70%	98.15
65%	110.02
60%	123.15
55%	137.51
50%	148.13
45%	160.10
40%	174.85
35%	194.19
30%	211.82
25%	229.88
20%	249.54
15%	268.59
10%	301.03
5%	359.54
0%	653.32



SECTION 3 OPERATIONS DRILLING

Conductor Casing: Conductor casing will be set to a minimum depth of 20 meters and pressure cemented. A diverter will be installed prior to drilling surface hole.

Detailed Procedures:

(i) Surface Hole:
- Drill 349 mm hole to 500 mKB
- gel caustic mud system
- gravel and boulders are common
- lost circulation is a potential problem
- adequate amounts of lost circulation materials will be on site

(ii) Main Hole:
- Adhere to Canada Oil & Gas Drilling Regulations Paragraph 76 (2) (d) ensuring a reserve volume of mud.
- Drill 222 mm hole to 510 m
- Leak-off test
- Drill with Invert
- DST the Chinkeh upon penetration
- Drill to TD, log, DST
- run 139 mm casing with an option to run 177 mm casing if conditions warrant

Casing Program:

We evaluated the surrounding area and are confident the maximum bottom hole pressure to be encountered in A-01 would be 17100 kPa based on horner pressure from K-02 (refer to the attached summary of pressure information). Based on the gradient of 11.47 and a leak off of 23 kPa/m (F-36 leak-off 23.05 kPa/m and K-02 leak-off 37.92 kPa/m), utilizing the formula recommended by AEUB to calculate required surface casing, we believe 414 m of surface casing will adequately support the maximum anticipated reservoir pressure., however, we are prepared to set 500 m. Paramount requests main hole be drilled to total depth at 2350 m before running main hole casing.

Example: $\frac{11.47 \times 2350 \times (0.5 - 0.0000625 \times 2350}{23}$ **= 414 m of surface casing required**

PARAMOUNT ET AL LIARD A-01

Surface & 139.7 mm Main (Option 2)

		Surface Casing	Production Casing
			1
Depths:	top (m)	0	0
	bottom (m)	500	2350
	length (m)	500	2350
Casing Specifications			
	Size (mm)	244.5	139.7
	Weight (kg/m)	48.07	25.3
	Grade	H40	K55
	Connection	ST&C	LT&C
	Conn. OD (mm)	269.9	153.7
	Inside Dia (mm)	228.6	124.3
	Drift Dia (mm)	224.7	121.1
Connection Torque:			
	Optimum (N.m)	3450	3690
	Minimum (N.m)	2590	2770
	Maximum (N.m)	4320	4620
	Collapse Rtg (kPa)	9450	33850
	Burst Rating (kPa)	15650	36680
	Body Yield (daN)	162400	121400
	Joint Rating (daN)	113000	121000
Design Factors			
Tension:	air (daN)	23578	58325
	bouyed (daN)	20271	50144
	allowable pull (daN)	66652	42933
	S.F. Para	5.57	2.41
	NEB	4.79	2.07
Collapse Pressure:			
	red. Para rating (kPa)		33850
	red. ERCB rating (kPa)		33850
	Para (kPa)	5396	25359
	NEB (kPa)	6000	28200
	S.F. Para	1.75	1.33
	NEB	1.58	1.20
Burst Pressure:			
	Para (kPa)	7870	20048
	NEB (kPa)	11750	25850
	S.F. Para	1.99	1.83
	NEB	1.33	1.42

Design Criteria

Para:

Mud Density (kg/m3) 1100 1100

Gas Gradient (kPa/m) 2.26 2.26

Surface Casing Shoe Fracture Gradient (kPa/m) 18.0

NEB

Collapse (kPa/m) 12.0

Burst 5 X Setting Depth of Next Casing (kPa) (surface)

Burst (kpa/m) 11.0 (production)

BOP & Casing Testing:

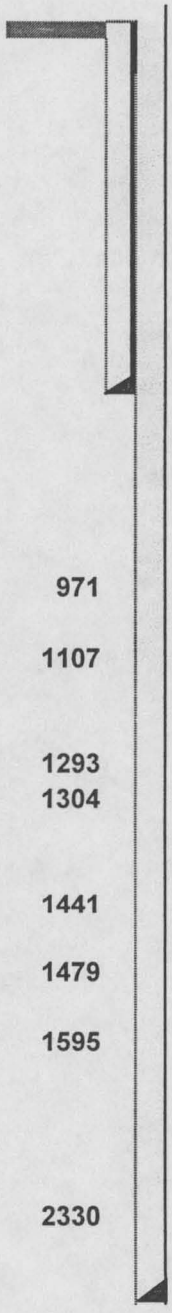
Pressure test surface casing to 80% of burst, hydril to 14 mPa, rams, HCR, manifold, stabbing valve, kelly cock to 1500 and 14000 kPa, kill line to 21 mPa for 10 minutes each. Check motor kills, remove BOP station and accumulator. Maximum allowable pressure drop on low test 0 kPa and high test 300 kPa.

Leak-Off Tests:

Drill out casing not more that 10 meters and perform a leak-off test.

PARAMOUNT ET AL LIARD A-01

Proposed



PROGNOSED TOPS	
SCATTER	971
GARBUTT	1107
CHINKEH SAND *	1293
TRIASSIC	1304
BELLOY	1441
FANTASQUE **	1479
MATTSON **	1595
FLETT	2330

DEPTH	HOLE SIZES	CASING
500	349	244.5 mm, 48.07 kg/m H-40
2350	222 mm	139.7 mm, 25.3 kg/m K55

PRIMARY *
SECONDARY **

BAKER HUGHES INTEQ

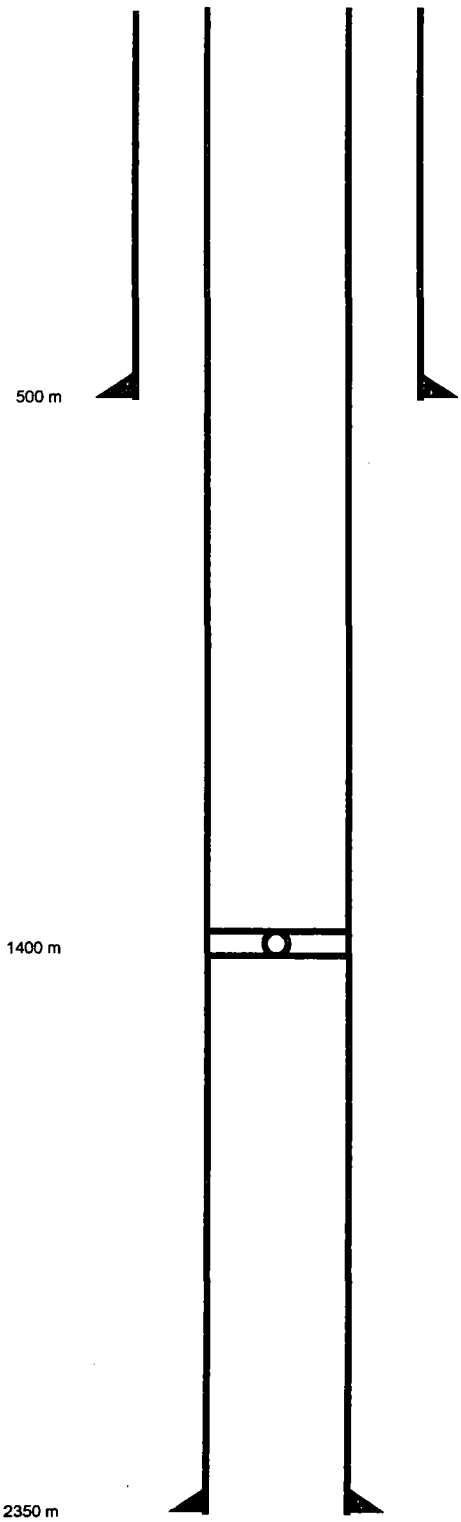
PROPOSED FLUIDS PROGRAM

Paramount et al Liard A-01
Lat: 60° 10' N Long: 123° 15' W

FORMATION	DEPTH	MUD PROGRAM	PROBLEM SUMMARY	COMMENTS / TREATMENTS
Estimated K.B. Elevation	523 m	**SURFACE HOLE** **MILGEL SLURRY**	Possible gravel and boulders on surface hole	Raise viscosity to ensure good hole cleaning if gravel and boulders are drilled.
Estimated Grd. Elevation.	518 m	**349 mm Hole** **244.5 mm Casing**	Mud Rings are possible on surface hole	Add SAPP or Drilling Detergent as required to disperse mud rings.
		Vis: 45 - 60 sec/L		
		Density: < 1100 kg/m^3	Possible Loss of circulation on surface hole	Contingency products for lost circulation should be on location prior to drill out. (Example: Sawdust, Primaseal etc.)
		pH: 8.5 - 9.0		
			Gravel and Boulders may be encountered.	Increase Viscosity as required to properly clean the hole.
Surface Casing	500 m			
		MAIN HOLE **CARBO-TEQ L OIL MUD** **($CaCl_2$)**		L.C.M. ($CaCO_3$, Mil Mica, Soluflake etc.) should be maintained on location as a contingency. DO NOT ADD FIBROUS LCM (SAWDUST, MILSEAL, CELLOPHANE, ETC.) TO THE INVERT as it will cause excessive losses at the shaker.
		222 mm Hole	Water flows have not been indicated on wells in the immediate area.	
Scatter	971 m	Drill out casing, maintaining properties as follows:		If a water flow is encountered, the system should be immediately weighted up and additional emulsifier/oil-wetting agent and $CaCl_2$ should be mixed in order to maintain desired properties.
		Density: Maintain as low as possible.	Excessive seepage losses may be encountered in the Mattson.	
Garbutt	1107 m	**O.B.R.:** 95:5 to 97:3		Maintain all drilling fluid properties in the optimum range to minimize problems.
		HT HP: ≤ 20 cc/30 min NO FREE WATER IN THE FILTRATE		
Chinkeh Sand *	1293 m	Run at 60° C and 500 psi		Add Calcium Carbonate, Soluflake, Milmica etc. to control seepage losses.
Triassic	1304 m	pressure differential initially. Raise the temperature only if bottom hole temperatures are indicated above 60° C.	Paramount Resources does not expect H_2S or CO_2 to be encountered in the formations to be drilled.	Baker Hughes INTEQ TSR will routinely test the invert mud for sulfides using a Garrett Gas Train modified to operate in an invert.
Belloy	1441 m	**$CaCl_2$:** 25 % - brine phase Chlorides in water phase 190,000 - 210,000	Offset DST's indicate a potential. for abnormal pressures in the following formations.	Maintain the Lime content at 10-15 kg/m^3. If H_2S or CO_2 are encountered, maintain the Lime content at 20-25 kg/m^3.
Fantasque **	1479 m	**Electrical Stability:** >700 volts	**Mattson (F-36) (1458 m):** Expected EMD = 1043 kg/m^3 Maximum EMD = 1133 kg/m^3	
		Excess Lime: 10-15 kg/m^3 20 - 25 kg/m^3 if H_2S or CO_2 are		Ensure that enough Milbar (Barite) is on location to weight up active system 100 - 150 kg/m^3.
Mattson **	1595 m	encountered.	**Mattson (K-02) (1301 m):** Expected EMD = 1122 kg/m^3 Maximum EMD = 1167 kg/m^3	
		Rheology: (50° C) P.V.: 8-15 mPa Y.P.: 2-4 Pa Gels: 1-3 / 2-6 Pa	DO NOT ADD WATER TO THIS SYSTEM!	If an increase in the density is required, Carbo-Mul (oil wetter) will need to be added to oil wet the Milbar (Barite).
	2330 m		NOTE: Total system fluid volume must be maintained at 1.5 times the hole volume.	Prior to drilling with the Carbo Tec L Invert, Baker Hughes INTEQ strongly recommends that **ALL** water lines be plugged off to ensure that no water is able to enter the system.
TOTAL DEPTH	2350 m			

Primary Target *
Secondary Target **

PARAMOUNT et al LIARD A-01



SURFACE CASING (0 - 500 m)
244.5 mm, 48.07 kg/m H-40
Cement: 0:1:0 Class G + 1.0% $CaCl_2$

PRODUCTION CASING (0 - 2350 m)
139.7 mm, 25.30 kg/m L-80
Stage Tool @ 1400 m

Stage 1
Preflushes:
3 m^3 diesel
3 m^3 Nowflush 5
3 m^3 scavenger @ 1300 kg/m^3

Cement (2350 - 1400 m):
0:1:0 Class G + 0.8% NFL-2

Stage 2
Preflushes:
3 m^3 diesel
3 m^3 Nowflush 5
3 m^3 scavenger @ 1300 kg/m3

Fill Cement (1100 - 0 m):
1:1:2 + 0.5% T-10

Tail Cement (1400 - 1100 m)
0:1:0 Class G + 0.8% NFL-2 + 1.0% A-11

NOWSCO

AJ INDUSTRIES

Date: 11/16/98

PROPOSED WELLHEAD ASSEMBLY

PARAMOUNT RESOURCES LTD.

LSD # A-01

1. Casing Bowl VGL 11" 3M x 9 5/8" SO c/w 2 - 2 1/16" SSO
2. Casing Slips 11" x 7" or 5 ½"Autos
3. Gate Valve 2 1/16" 3/5M T-36 Trim (2)
4. Companion Flange 2 1/16" 3/5M x 2" LP (2)
5. Bull Plugs 2" XXH Solid (2)
6. R-24 Mild Steel Ring Gaskets (4)
7. Studs & Nuts 7/8" x 6" B7 (4)
8. R-53 Mild Steel Ring Gasket
9. Studs & Nuts 1 3/8" x 9 ½" B7

1. Tubing Head 11" 3M x 7 1/16" 3M c/w 2-2 1/16" SSO
2. Secondary Packoff 11" x 7" or 5 ½"
3. Tubing Hanger 7 1/16" x 2 7/8" EUE c/w Extended Neck Seal Pocket
4. Adaptor Flange 7 1/16" 3M x 2 9/16" SSU c/w Seal Pocket
5. Master Valves 2 9/16" 3/5M T-36 Trim (2)
6. Studded Cross 2 9/16" 3M x 2 1/16"
7. BHTA 2 9/16" 3M x 2 7/8" EUE
8. Wing Valves 2 1/16" 3/5M T-36 Trim (3)
9. Companion Flange 2 1/16" 3/5M x 2" LP (4)
10. Bull Plugs 2" XXH Solid (3)
11. Bull Plug 2" XXH ½" NPT Tapped
12. Needle Valves ½" NPT (2)
13. 0-3000# Pressure Gauges c/w 4" Dial (2)
14. R-45 Mild Steel Ring Gasket
15. Studs & Nuts 1 1/8" x 8" B7
16. R-27 Mild Steel Ring Gaskets (4)
17. Studs & Nuts 1" x 6 ½" B7
18. R-24 Mild Steel Ring Gaskets (7)
19. Studs & Nuts 7/8" x 6" B7 (3)
20. Casing Vent Assembly c/w 2" Valve
21. Assemble Test & Paint (5Hrs)

310-520-5th Avenue S.W. Calgary, Alberta, Canada T2P 3R7 Bus: (403) 262-8000 Fax: (403) 262-9295

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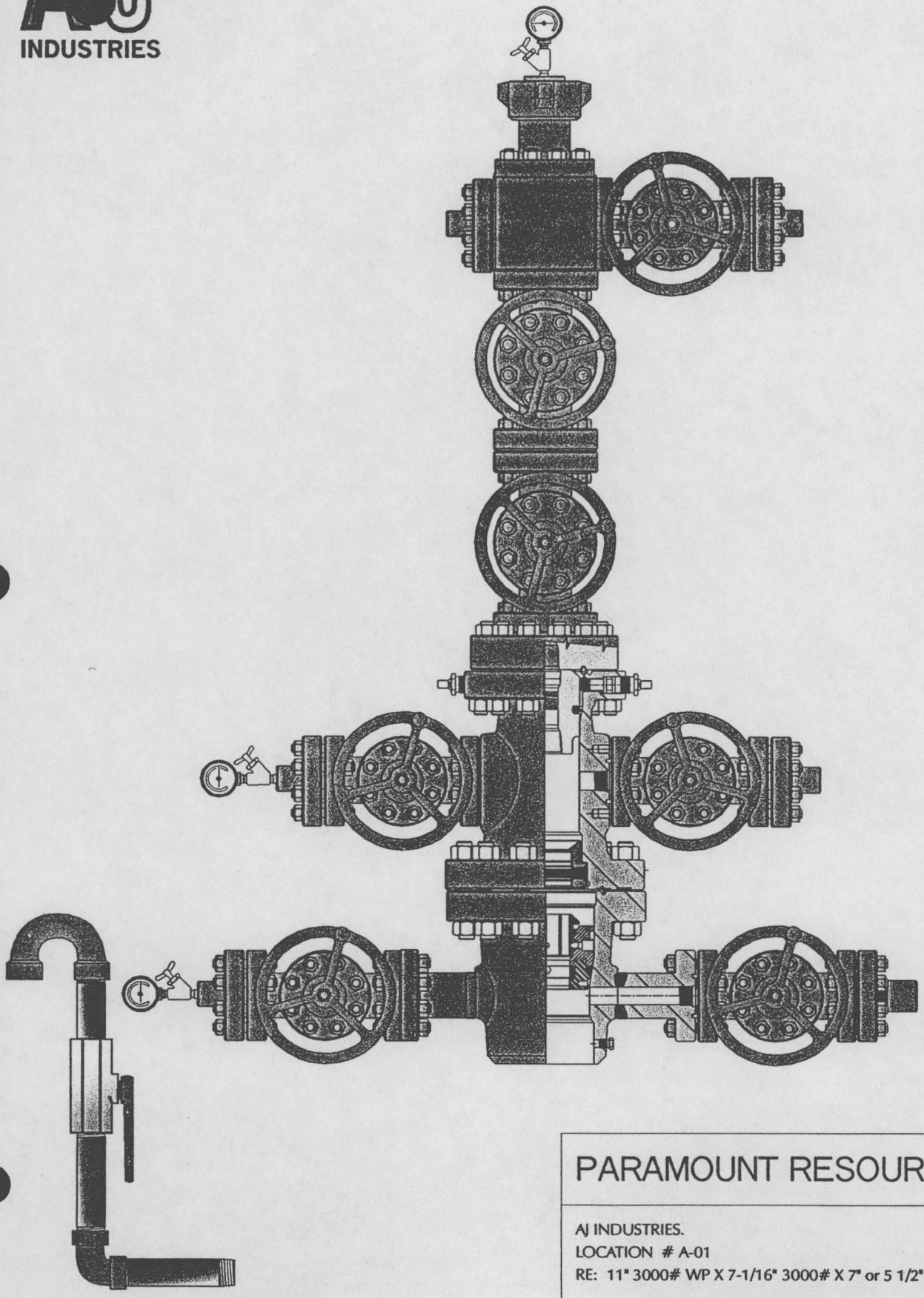


PARAMOUNT RESOURCES

AJ INDUSTRIES.
LOCATION # A-01
RE: 11" 3000# WP X 7-1/16" 3000# X 7" or 5 1/2" x 2 7/8" SWEET

Underbalanced Program:

Equipment

BOP Stack and Choke Manifold

The BOP stack will meet NEB requirements. The BOP stack, annular preventer, choke manifold and casing will be tested with water. Chokes will not be pressure tested. The sections of the stack, manifold and piping that will, or potentially will, come in contact with produced fluids with conform to NACE MR-01-75 specifications. The choke manifold will be filled with antifreeze and isolated under pressure using the outside valve on the bleed-off line. The choke manifold building must contain a fire extinguisher rated not less than 40 BC.

Rotating Flow Diverter

A Rotating Flow Diverter will be installed on top of the annular preventor of the BOP stack. The rotating head has a static pressure rating as required.

Drilling String, Safety Valve and Floats

The drill string, excluding drill collars and tools, will be E or X Grade.

A full opening safety valve will be available at the rig floor for all connections in the drill string.

Drill string floats will be utilized. Two floats will be installed in the BHA and one or more in the drill pipe, as required.

Separator and Piping

The three phase separator (P-tank) will be a horizontal, cylindrical pressure vessel rated to 1400 kPa. The tank will be fed one of three flow streams: the discharge from the rotating head, the lower BOP stack spool or the nitrogen bypass. An emergency shutdown valve (ESD) will be installed between the P-tank and the feed streams. All lines which could potentially contain standing liquid will be heat traced. The P-tank will conform to the CSA B51-M1986 Boiler, Pressure Vessel and Pressure Piping Code. The piping and P-tank will conform to NACE MR-01-75 specifications. The P-tank building must contain a fire extinguisher rated not less than 40 BC.

Flare Stack

The flare stack will be at least 10 meters in height and will be equipped with a liquid propane, continuous ignition system. The gas stream will be analyzed with a gas chromatograph to determine it's composition.

Oil Storage Tanks

Oil production will be routed to a 16 m^3 (100 bbl) storage tank. The storage tank will be fitted with a vapor recovery system. The perimeter of the tank will be bermed of sufficient height to contain at least 16 m^3 of liquid.

Nitrogen Equipment (if required)

Onsite generated nitrogen, with compression, will be used to control the bottom hole pressure during the underbalanced drilling operation. The nitrogen unit will have a capacity range of 20 to 40 m^3/min, producing a gas stream with an oxygen content of five percent or less.

Liquid Pumping Equipment (for drilling with N2 only)

A positive displacement, high pressure – low rate triplex pump will be used to pump liquid downhole. The pump valves and seats will be inspected prior to drill out. (The rig pumps will only be used in a kill operation).

Mud System

The mud system will be a mixture of Invert and nitrogen (if required)

Instrumentation

H2S Monitoring

The drilling rig will have an H_2S monitor everywhere in which produced fluid is exposed to personnel and contained within an enclosed space. These areas will include the rig mud tanks, the substructure, the P-tank, oil storage tanks and the rig floor. The rig will also be equipped with at least one portable, detector tube type, H_2S monitor. If levels at any time reach a concentration of 10 ppm an alarm will sound off to the driller and safety trailer. The alarm will be both audible and visual. Once the alarm sounds, rig personnel will be teamed with another worker and be supplied with a protective breathing apparatus. Once all crew members onsite are equipped with a breathing apparatus one member will monitor all areas of the work site for H_2S concentration. In the area where the alarm has been set-off, several readings will be taken. Following an alarm, frequent inspections of poor ventilated areas will commence while wearing a protective breathing apparatus. Under no circumstances shall the crew remove their breathing apparatus until it has been confirmed that H_2S concentrations are TSTM.

Pressure Monitoring

All instruments used to monitor pressure will be electrical and intrinsically safe. Pressure readings will be taken at the compressor outlet, P-tank inlet, choke manifold and standpipe. Return pressures are controlled by manipulation of injection blends. If required surface choke pressure are excessive, drilling will stop and it may be advisable to shut the well in. All pressure ratings, and safety factors will be honored.

Flow Rate Monitoring

Data will be collected from the compressor outlet, P-tank outlet and liquid pump outlet. Continuous monitoring of injection rates and return rates will be performed. Gas returns will be measured with a differential flow meter and composition analyzed with a gas chromatograph.

Temperature Monitoring

Measurements of temperature will be taken at the stand pipe and the P-tank inlet.

Surface Volume Monitoring

Measurements of wellbore effluent will be taken attempting to confirm an underbalanced condition downhole. Monitoring of returns will be accomplished at the rig tanks, P-tank and storage vessels for oil, gas and / or water. Also recorded, will be any fluid shipped to the sump. Waste management will be of utmost concern.

Safety Equipment

The safety contractor will supply the standard sour well package, which will include:

- Forced Air Supply to Work Stations
- Egress Air Packs
- Rescue Air Packs (Scott)
- H_2S Monitors (fixed and portable)
- Central Alarm System
- Site Communications
- Personnel Tracking System
- Warning Signs

Lease Layout

The equipment will be positioned in accordance with NEB regulations.

Operations

Rig Up

Nipple up drilling spool with a double studded adapter (D.S.A.) between the casing bowl and the BOP's. Install BOP stack and manifold system as per NEB regulations. Install Rotating control head.

Rig up separating facilities including associated piping, including chokes and check valves and flare stack. Also low volume high pressure triplex fluid pump, nitrogen generating facilities (including air compression services) if required.

All equipment with gas/diesel drivers will be located more than twenty five (25) meters from the wellhead. The flare stack and flare pit will be over fifty (50) meters from the wellhead. All storage tank(s) for produced fluid will be located more than fifty (50) meters from the well and will be surrounded by an impermeable dike of sufficient height and strength to contain all the fluid(s) stored in the tank(s).

The main flowline from the well to the P-tank will be equipped with an ESD and remote actuators located at the drilling station, inside the P-tank building, at the tank farm and in front of the command center. During underbalanced drilling operations, flow will not be directed through primary well control equipment. All flow lines, pressure relief valves and choke lines will be made of steel and have an inside diameter of greater than fifty (50) mm. The flow lines will be properly installed and tied down.

Once all injection and production lines have been plumbed in and N_2 required, direct N_2 flow directly to the P-tank and pre-determine the maximum deliverable nitrogen rate as supplied at the site. Note rates and corresponding O_2 concentration (<5%).

NOTE: Where necessary, ensure nitrogen and water injection lines are manifolded in such a way as to by-pass the injection system yet remain running a constant speed.

All working areas will be equipped with adequate lighting. Insulate and steam trace all lines that will contain fluid.

Pressure test as follows with the aid of a pressure test unit:
Conduct a 10 minute pressure test on blind rams and casing through fill line. Test all surface lines from the preventer stack to the P-tank and all nitrogen and fluid injection lines with fluid.

Run in the hole with bottom hole assembly and drill string:

Conduct a 10 minute pressure test on stabbing valve(s), kelly cock, inside BOP, pipe rams and all choke manifold valves. Conduct a 10 minute pressure test on annular preventer.

Conduct a complete BOP drill. Record results on Tour Sheets and Daily Reports. Drillers are to be instructed as to when flow is to be directed through high pressure rig manifold.

Safety Meeting

The safety meeting will be held prior to proceeding with underbalanced drilling. All members of the crew will have to attend the safety meetings. Following crew changes, the new crew will be brought up to speed before operations commence. This meeting will be chaired by the Paramount drilling supervisor. The following agenda will be followed:

Introduction

- Verify Paramount Rig Supervisor is in charge and all orders, changes etc. must go through him.
- Stress that safety is first and foremost and encourage people to ask questions.
- Insure LEL alarm device is installed in sub-structure

Review:

- BOP Drill Procedures
- H_2S Issues
- Location of Pressure Relief Valves
- Safety Equipment (fire retardant coveralls, safety glasses)
- Discuss Dangers of Compressed Fluids
- Designate Evacuation/Safe Area
- Designate Smoking Areas
- Safety Meetings (frequency)
- First Aid Attendant
- Egress from Lease
- Gas Detectors, location, what the alarm means, what to do in case of an alarm
- Discuss on site crew orientation prior to drilling out and blowing down the well
- Duty of everyone to report changes in operating procedures

Underbalanced Drilling:

- Give a general explanation of what underbalanced drilling is and what can be expected for example:
- Sour gas, Condensate or Oil
- Constant Flare Going
- Closed System i.e. normally gas cannot come up under the sub or on the rig floor.
- Flowing Pressures at Surface
- Injection Pressures
- Shut in Pressures

Review specific job components (connections, trips, number and frequency of data readings, operating parameters)

Crew Supervisors:

- Rig supervisor will review equipment, personnel etc.
- Other service companies (Rotating diverter, P-tank, Compressor, Nitrogen, First Aid Attendant) will review equipment, personnel, safety concerns and operating parameters.

Safety Routines and Procedures

Blowout prevention drills will be conducted with all crews prior to drill out and a minimum of once per seven (7) days following drill out. The well will be shut in for as brief a period as possible during the BOP drill. BOP stack and well control equipment will be kept clean and free of ice, heated and visually checked daily for operating efficiency.

A check in point will be established at the entrance to location and manned by safety personnel. Any persons accessing the lease will need to sign in and out.

The Wellsite Supervisor is to personally fill out the Paramount Rig Inspection form prior to drilling out casing. Rig inspections will be carried out once per week after drill out. The rig manager will participate in and co-sign all inspections.

The safety company on side will calibrate all H_2S monitoring equipment prior to drill out and on a weekly basis after drill out.

Fire drills will be held once very two (2) weeks at the drill site.

Fluids Handling

All produced fluids will be directed into a closed separation system (P-tank). The gas will be flared, oil or condensate, if any, will be pumped to holding tanks (fitted with a vapor recovery system) and the water will be placed in the downhole triplex pump's suction tank. Drill cuttings will be placed in the sump.

SECTION 4 RIG BOP CONFIGURATION / DRILLING RIG EQUIPMENT:

Contractor: Precision Drilling, 700, 112 - 4th Avenue S.W., Calgary, Alberta, T2P 0H3, Phone (403)264-4882

Plans and Diagrams: The H_2S release rate using B.C. and Alberta's criteria is less than 0.3 m^3/sec resulting in a Level 1 Sour Well Classification. The rig will be equipped with a 4 channel continuous H_2S monitoring system prior to reaching the first potential H_2S bearing zone. The sensors will be strategically placed in the cellar, on the rig floor, at the shaker and in the mud mixing compartment.

A PVT System will be installed on the mud handling system completed with a flow sensor, tank level monitors and a combustible gas detector. There will be adequate self contained breathing apparatus units on the rig and at the camp.

Qualifications of Personnel: The current crew list and their qualifications will be submitted as soon as they are available.

Safety personnel and equipment will be onsite for drill stem testing. As well, safety meetings will be carried out to review specific operations such as drill stem testing and running casing.

A camp facility is planned to be located a safe distance from the drilling operation. The crew consisting of cooks and assistants will not be exposed to any drilling hazards.

First Aid and Medical Services: A medic with at least B.C. industrial first aid will be onsite with either a portable first aid room or we will make up a hospital room in the camp. Ft. Liard is approximately 50 km away and has a nursing station and aircraft if air lifting is called for.

SCHEDULE 1
DESCRIPTION OF RIG EQUIPMENT PROVIDED BY CONTRACTOR
(ATTACHMENT TO BID AND/OR SPECIFICATION SHEET)

Contractor: Sedco Drilling Rig Number: 373
Depth Capacity of: 2,400 m, with 114 mm Drill Pipe

A. DRAWWORKS

Make: Superior Model: 400 Input Power Rating: 460
Maximum Hoisting Capacity: 100,000 daN (Manufacturers)
Maximum Hoisting Capacity: 100,000 daN (Contractors)
No. Hoisting Speeds: 6
Auxiliary Brake: Type: Hydromatic Make: Parmac
Model: 122
Crown Block Protection: Yes Make: Koomey Model: Crownomatic
Drive Group: Make: Allison Model: 6061 Type: Trans

Wireline: 2500m/2.6mm Slick Line

B. PRIME MOVER

	Engine #1	Engine #2	Engine #3	Engine #4
Make:	Cat	Cat (Pump)		
Model:	3406 NEW	D-379		
Continuous Power (kw)	343	447		
& (RPM)	2,100	1,200		

C. PRIME MOVER (Electric Rigs Only)

	Generator #1	Generator #2	Generator #3	Generator #4
Make:				
Model:				
Power Rating (kw)				
KVA - AC				
KVA - DC				

D. ROTARY TABLE

Make: National Model: 17.5 Maximum Table Opening 444.5 mm
Power Available 343 kw when Operating Main Pump
Static Load Rating 210,000 daN
Rotary Speeds Forward 6 Max. RPM 240 Min. RPM 30
Reverse 1 Max. RPM 75 Min. RPM 30
Drive Group: Make: via DWRK Model: Type:

E. DERRICK

Make: Gee Bee Model: Cantilever Type: Double
Gross Nominal Capacity (Manufacturers) 186,900 (daN)
Maximum Hook Load (Manufacturers) 124,600 daN with 8 lines
Maximum Hook Load (Contractors) 100,000 daN with 8 lines
Racking Capacity of 2,200 metres of 114 mm drill Pipe
Height: 32.0 metres. Hook to Rotary Table Distance w/ Blocks at Crown Stop 27.5 metres
Date of Last Inspection: 02/05/95

F. SUBSTRUCTURE

Make: Gee Bee Model: Two Piece Type: Box by Box
Max. Table Load (Casing Capacity) 89,000 daN with 89,000 daN Max. Setback
KB to Ground 4.3 metres Clear Height for BOP's 3.25 metres

G. TRAVELING EQUIPMENT

	Crown Blks	Travel Blks	Hook	Bails	Elevators	Swivel
Make:	Gee Bee	McKissick	B.J.	G.B.	B.J.	EMSCO
Model:	5 x 36	4 x 30	6150	2-3/4 x 96	RG	LB200
Load Rating (daN)	186,900	133,500	133,500	311,500	155,750	178,000
# of Sheaves	5	4				
API Bearing Rating (daN)						120,150
(@ ___ RPM)						100
Min I.D. (mm)						76
Date of Last Inspection	02/05/95	01/18/95	01/18/95	10/19/94	12/15/95	04/28/94

H. DRILLING LINE

Rope Diameter 25.4 mm Rope Type I.P.S
Core Type IWRC
Nominal Strength 40,006 daN
Slip Interval at ___,___ Mega Joules
Cut at ___,___ Mega Joules

I. DEAD LINE ANCHOR

Make: Gee Bee Model: Drum
Dead Load Rating 23,500 daN Single Line Rating

J. MUD PUMPS

Pump #1 Make: National Model: 7-P-50 Power Rating: 373 kw
Available Power at Pump: 447kw
Stroke: 178 mm
Pulsation Dampner: Make: Hydril Model: K-10-3000 Precharge: 3,500 KPa

Liner Size Available	140 mm	152 mm	___ mm	___ mm
Minimum Strokes/min.	60 spm	___ spm	___ spm	___ spm
Maximum Strokes/min.	120 spm	___ spm	___ spm	___ spm
Max. Manf. Rated Press.	14,400 KPa	11,700 KPa	___ KPa	___ KPa
Max. Cont. Allowable Press.	10,000 KPa	9,500 KPa	___ KPa	___ KPa

Pump #2 Make: ___ Model: ___ Power Rating: ___ kw
Available Power at Pump: ___kw
Stroke: ___ mm
Pulsation Dampner: Make: ___ Model: ___ Precharge: 0 KPa

Liner Size Available	___ mm	___ mm	___ mm	___ mm
Minimum Strokes/min.	___ spm	___ spm	___ spm	___ spm
Maximum Strokes/min.	___ spm	___ spm	___ spm	___ spm
Max. Manf. Rated Press.	___ KPa	___ KPa	___ KPa	___ KPa
Max. Cont. Allowable Press.	___ KPa	___ KPa	___ KPa	___ KPa

K. MUD TANKS

Tank #1: # of Compartments 5 , Height 1.9 m, Useable Capacity 72.0 m3
Tank #2: # of Compartments ___ , Height ___ m, Useable Capacity ___ m3
Tank #3: # of Compartments ___ , Height ___ m, Useable Capacity ___ m3
Trip Tank: Width 0.9 m, Length 3.1 m, Height 1.9 m, Useable Capacity 5.0 m3
Trip Tank Pump Location: Shaker End of Tank
Trip Tank Pump: Make: Fisher Model: 1K Type: Vertical
Pill Tank Volume: 5.0 m3 Agitator Size 3.7 kw
Premix Tank Volume: ___ m3 Agitator Size ___ kw
Total No. of Agitators: 2 Power Rating ___ kw
Mixing Hoppers: No. 1 Type: Low Pressure

L. SCHEMATIC DIAGRAM

Attached (Including All Pertinent Dimensions and Equipment Placement)

M. CENTRIFUGAL PUMPS

	Pump #1	Pump #2	Pump #3	Pump #4	Pump #5
Make:	Mission	Mission			
Model:	Magnum	Magnum			
Size:	6 x 5	6 x 5			
Impeller Size(mm)	279	279			0
(RPM)	1,500	1,500			0
Input Power	37	37			0

Used For:

Pump #1 Desilter/Mixer/LP Roll

Pump #2 Mixer/Desilter/LP Roll

Pump #3

Pump #4

Pump #5

N. SOLIDS CONTROL

	Shale Shaker #1	Shale Shaker #2	Shale Shaker #3
Make:	Swaco		
Model:	Linear Motion		

Contractor Will Supply _____ Mesh Screens. _____ _____

	Desander	Desilter
Make:		Chimo
Model:		6 x 2
Make of Cones:		Chimo
No. of Cones:		12 ,
Size of Cones (mm)		101
Capacity:		2200
Operating Pressure (Metres of Head):		25

Centrifuge: Power Avalible for 37 kw, Volts 440 volts
Breaker Rating 100 Amps, Plug Type _____

Other: _____

O. BLOW OUT PREVENTION EQUIPMENT

	Annular	Ram #1	Ram #2	Ram #3
Make:	Hydril	Shafco	Shafco	
Model:	GK	RS	RS	
Type:	Annular	Singe	Single	
Size (mm):	279	279	279	
Working Pressure (KPa)	21,000	21,000	21,000	
Connection Type:	Flanged	Studded	Studded	
NACE:	Yes	Yes	Yes	
Manual/Hydralic Lock:		Man	Man	
Ram Size (mm)		114	CSO	
Element Type:	Nitrile	Natural	Natural	
Date of Last Shop Inspection:	08/03/95	05/16/93	05/16/93	/ /
Inspected By:	Enterra	Key	Key	

Accumulator: Make: Payne Model: Type 75 Pressure Rating: 14,000 KPa
No. of Bottles 6 at 75 litres each
Precharge Pressure 7,000 KPa
Accumulator Pressure Operated by Contractor 14,000 KPa
Manifold Pressure 10,500 KPa
No. of Stations 5
Master BOP Controls Located at Accumulator
Remote BOP Controls Located at Doghouse Type:
No. of Pressure Regulators 1 Location: Accumulator
No. of N2 Bottles 2 , Size: 44 litres, Min. Press. 15,000 KPa

Pump #1: Make: Cat Model: Electric Type: Triplex
Pressure Rating: 21,000 KPa, Pump Rate 21 lpm
Pump #2: Make: Baker Model: Hyd Type: Hand Pump
Pressure Rating: 21,000 KPa, Pump Rate 1 lpm

HCR Valve: Make: Demco Model: HCR NACE Trim: Yes
No. 1 Size: 76 mm, Pressure Rating: 21,000 KPa

Choke Manifold Valves: Make: Cameron Model: Gate NACE Trim: Yes
No. 11 Size: 76 mm, Pressure Rating: 35,000 KPa

Make: Cameron Model: Gate NACE Trim: Yes
No. Size: mm, Pressure Rating: 0 KPa

Choke #1: Make: Cameron Model: H-2 NACE Trim: Yes
Size: 76 mm, Pressure Rating: 21,000 KPa
Choke #2: Make: Shaffer Model: LA-70 NACE Trim: Yes
Size: 76 mm, Pressure Rating: 21,000 KPa

Upper Kelly Cock: Make: Hydril Model: Kelly Guard NACE Trim: N/A
Size: 6 5/8 Reg mm, Pressure Rating: 35,000 KPa

Lower Kelly Cock: Make: Hydril Model: Kelly Guard NACE Trim: N/A
Size: 4 XH mm, Pressure Rating: 35,000 KPa

Stabbing Valve: Make: Griffith Model: NACE Trim: N/A
No. 1 Size: 114 mm, Pressure Rating: 35,000 KPa

Inside BOP: Make: T1W Model: Flapper NACE Trim: N/A
No. 1 Size: 114 mm, Pressure Rating: 35,000 KPa

Bleed Off Line: No. 1 Size: mm, Pressure Rating: 21,000 KPa
NACE Trim: Yes
Kill Lines: No. 1 Size: 76 mm, Pressure Rating: 21,000 KPa
NACE Trim: Yes
Check Valve: Make: Free Flow Model: Check
No. 1 Size: mm, Pressure Rating: 21,000 KPa

Mud Gas Separator: Type: BPRC PoorBoy Location: Shaker Tank
Vessel OD: 660 mm
Inlet Size: 76 mm
Outlet Size: 203 mm, Line Size to Flarepit 203 mm
Overall Height: 2.5 metres
Distance Above Bottom of Tank 46 cm
Design Level 1 meter

Drilling Degasser: Make: N/A Type: Capacity: lpm

P. DRILL PIPE

No. As Req'd jts, 114 mm, 24.7 kg/m, Grade E-75 , API Class Premium
Connection 4 1/2 XH , Tool Joint OD 152+ mm, ID 83 mm
Hardness Factor:
Tube: Minimum HRC _____ Maximum HRC _____
Tool Joint: Minimum HRC _____ Maximum HRC _____
Date Last Inspected __/__/____ Metres Since Last Inspection _____
Hadrbanding Yes Type: Smooth Flush

No. 0 jts, _____ mm, _____ kg/m, Grade _____ , API Class _____
Connection _____ , Tool Joint OD _____ mm, ID _____ mm
Hardness Factor:
Tube: Minimum HRC _____ Maximum HRC _____
Tool Joint: Minimum HRC _____ Maximum HRC _____
Date Last Inspected __/__/____ Metres Since Last Inspection _____
Hadrbanding _____ Type: _____

Q. HEVIWATE

No. _____jts, _____ mm
Connection _____ , Tool Joint OD _____ mm, ID _____ mm
Hadrbanding _____ Type:
Stress Relief _____
Boreback _____
Date Last Inspected __/__/____ Metres Since Last Inspection _____

R. DRILL COLLARS AND SUBS

No. As Req'd jts, OD 159 mm, ID 64 mm
No. As Req'd jts, OD 202 mm, ID 76 mm
Stress Relief Yes
Boreback Yes
Connection 5 H90 6-5/8 Reg , Normal or Low Torque Normal
Contractor's Minimum OD 152 / mm
Contractor's Maximum ID 64 / 76 mm
Spiral No
Slip Recess No
Elevator Recess No
Date Last Inspected 11/09/94 Operating Days Since Last Inspection _____

Connection: As required to fit Contractor's drill string
Bit Subs: _____ _____ _____
X.O. Subs: _____ _____ _____
Junk Subs: _____ _____ _____
Saver Subs: _____ _____ _____

Date Last Inspected __/__/____ Operating Days Since Last Inspection _____

S. LIGHT PLANTS

Plant #1: D-3406 320 kw, Volts 480
Plant #2: D-3304 75 kw, Volts 480
Power and Outlets to Run 2 Additional Wellsite Units
Power Avalilable to Run Rental Equipment 37 kw
(100 Amps, 440 Volts, 3 phase)

T. GENERAL

Drilling Instrumentation Totco Recorder: Penetration, Weight, Pressure
PVT and Floshow As Per Contract
Automatic Driller Bell
High Pressure Wash Guns Magikist
Electric Sump Circulating Pump As Required
Kelly Spinner Yes
Pipe Spinner Yes
Kelly Hose: Make: Uniroyal Size: 76 Working Pressure: 35,000 KPa
Make Up Tongs: Make: Web Wilson Size: B Jaws Avail: As Required
Break Out Tongs Make: Web Wilson Size: B Jaws Avail: As Required
Matting: No. 7 Size: Various
Fuel Storage: 18.8
Water Storage: 44.3
Water Pump: No. 1 Size: 3 x 2 Output: 2.0 m3

U. BOILER

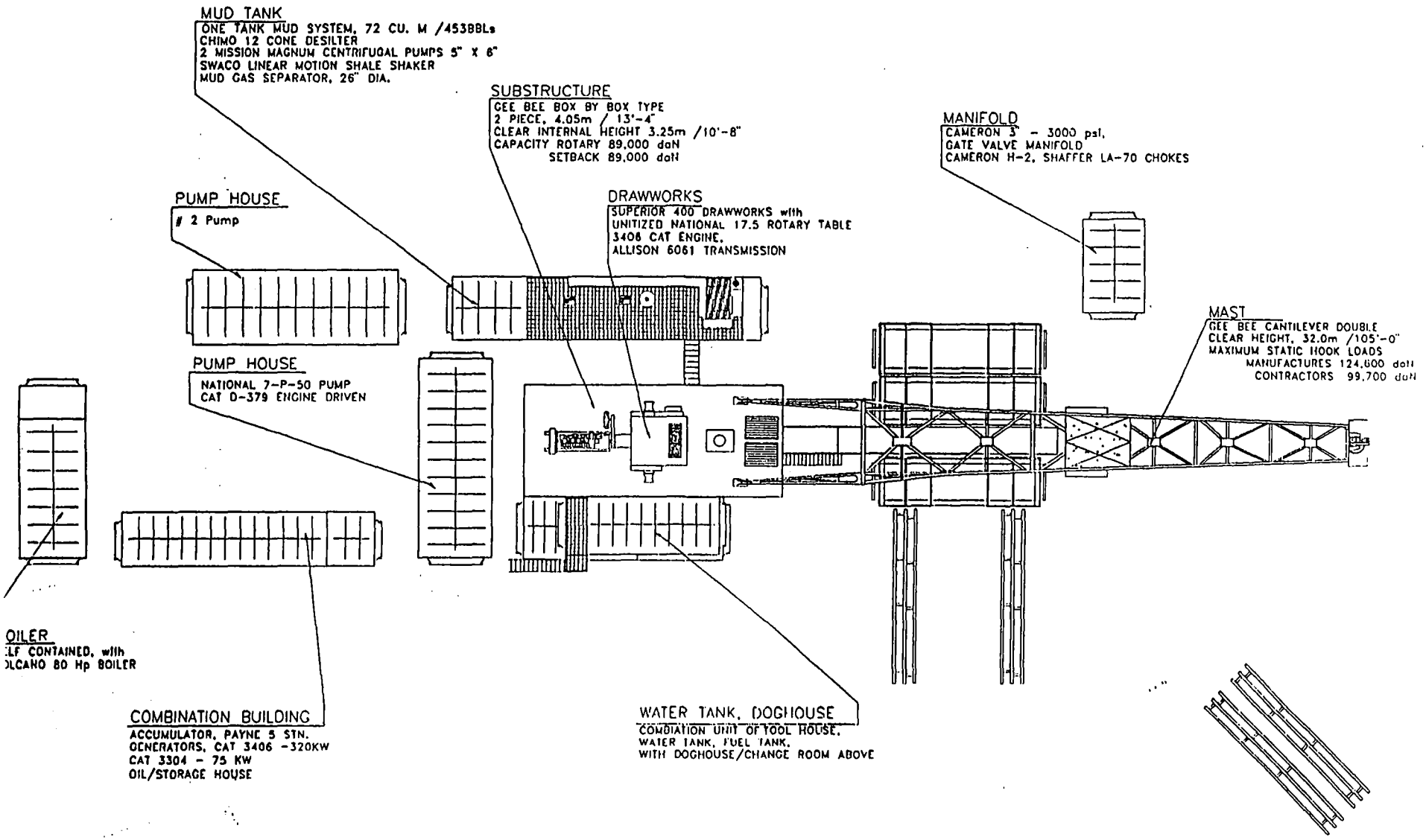
Power Rating: (80hp)
Operating Pressure Rating: 690 kPa
Boiler Certificate (Posted in Boiler House) Date: / /
Date of Last inspection: / /

V. LOADS

Rig 15 , Including 4 Oversize Loads Requiring Permits
Pipe 5
Camp 0

W. OTHER MAJOR PIECES OF EQUIPMENT

Electric Chemical Barrel, Chimo Floor Mats
2" Cement line stand pipe with 2" 55' 3000PSI Hose
Hydraulic Tong Pulls (Catheads)



LOADS

SUMMER - 20
WINTER - 21
SECOND PUMP OPTIONAL

PRECISION DRILLING
RIG# 373

EQUIPMENT LAYOUT

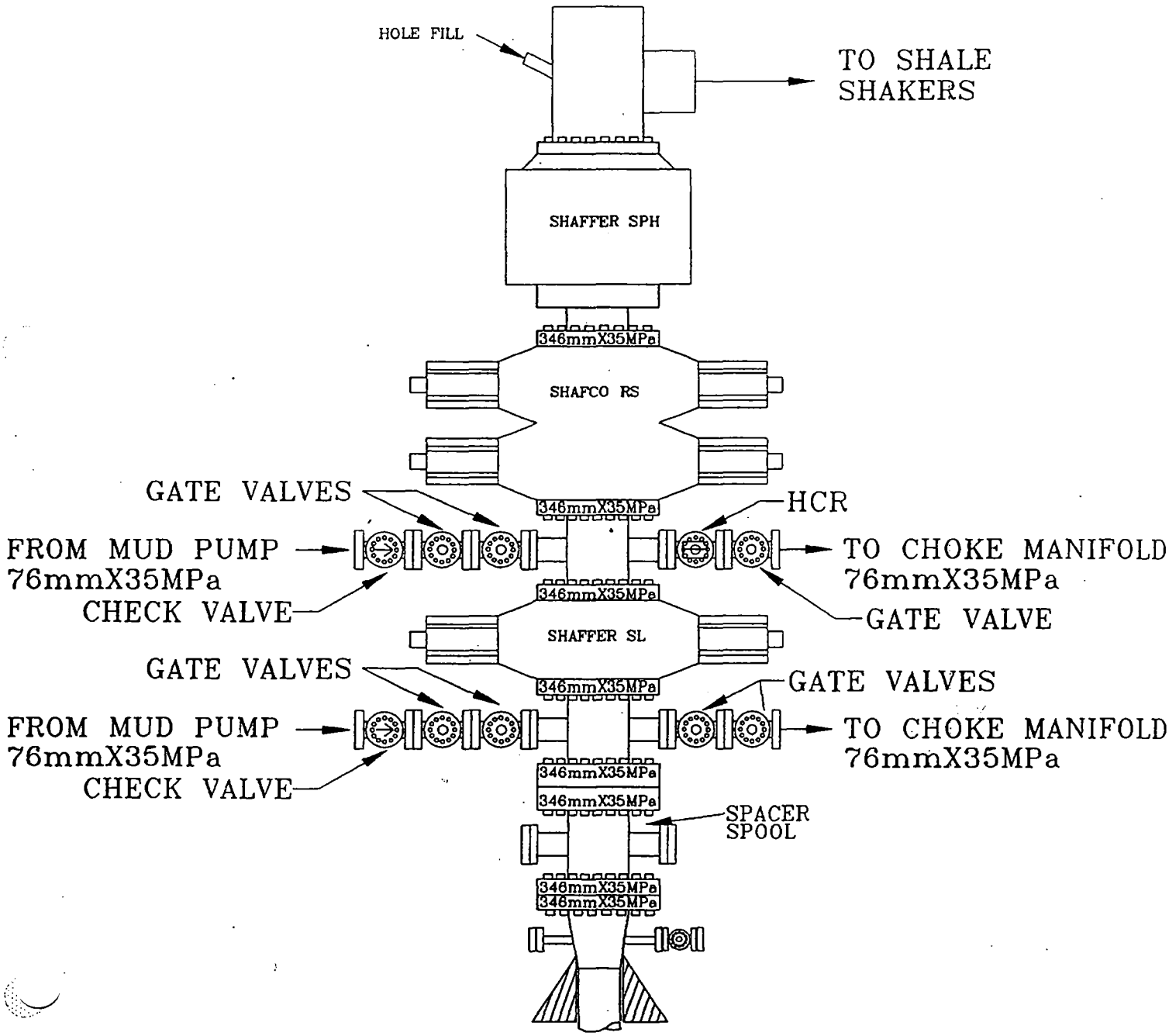
RIG #22E

PARAMOUNT B.O.P. STACK CONVENTIONAL DRILLING

346mm X 35,000kPa and 21,000KPa

Kenting Hi-Tower Drilling

Table Beam Ht.: 200"



FILE NAME:	RIG#22\PARAMTLE.TC
DATE:	Nov. 21, 1996
DRAWN BY:	H.N.

SECTION 5 COMPLETION / TESTING PROGRAM SUSPENSION / ABANDONMENT

The completion/testing program will be submitted under separate cover.

Suspension:

Assuming the wellbore has casing cemented over the pay section which has not been perforated, the well will be inhibited and padlocked.

PARAMOUNT RESOURCES LTD

EMERGENCY RESPONSE PLAN

DRILLING & COMPLETION

1998 - 1999

PARAMOUNT BERKLEY NETLA M-23	60^0 42' 58.402"	123^0 05' 12.126"
PARAMOUNT BERKLEY NETLA P-57	60^0 46' 50.680"	122^0 39' 25.093"
PARAMOUNT BERKLEY ARROWEHAD N-65	60^0 34' 45.897"	122^0 57' 18.623"
PARAMOUNT BERKLEY ARROWEHAD C-02	60^0 31' 12.091"	123^0 01' 10.431"
PARAMOUNT BERKLEY ARROWEHAD 0-15	60^0 24' 53.694"	123^0 02' 31.174"
PARAMOUNT ET AL BOVIE C-76	60^0 15' 14.936"	122^0 59' 21.958"
PARAMOUNT ET AL LIARD K-46	60^0 05' 36.848"	123^0 23' 50.170"
PARAMOUNT ET AL LIARD F-36	60^0 05' 27.535"	123^0 22' 00.564"
PARAMOUNT ET AL LIARD A-01	60^0 00' 04.641"	123^0 15' 04.862"

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INTRODUCTION

Paramount Resources Ltd. intends to drill and complete wells in the Fort Liard area during the winter of 1998 - 1999.

A central base camp will be established at the junction of the Fort Liard Highway and the turn off to Fort Liard and individual camps will be at each rig site.

The manual in intended to provide Operating Personnel with guidelines for project management and to hand emergency situations in accordance with the Canadian Oil and Gas Drilling Regulations.

During the operations of the project, the following precautions must be taken:

1. **Protect the health and safety of all employees and area occupants from hazards.**

2. **Protect the environment.**

PLAN RECEIPT FORM

DATE: _____

TO:

Re: Emergency Response Plan For Fort Liard Project 1998 - 1999 Season

I have received the above mentioned plan. The manual has been reviewed by the undersigned and the contact, phone numbers, and duties appear to be correct. Any changes to this plan will require notification to Paramount Resources Ltd. Attention: Shirley Maaskant (403) 290-3618 or Fax: (403) 266-6032

_____

Plan Holder's Signature

EMERGENCY DEFINITIONS AND PROCEDURES

Three Stages of Alert are discussed in this section:

Stage I Alert

Criteria:

Stage I will include all minor situations where the emergency is confined to the immediate area of the wellsite. No hazard to the workers exists and outside help is not required.

No immediate hazard to people exists but the situation has the potential to escalate to Stage II.

Stage I Includes:

1. Emergency:

   - Fugitive odour complaint from company personnel (H_2S or other contaminant).
   - Well kick but flow is controlled.
   - Problem encountered during operations.

   Action:

   - Alert should be given to individuals in the 550 metre planning radius.
   - Monitoring will be initiated downwind by personnel with portable H_2S detectors.
   - Assemble non-essential wellsite personnel, brief and equip them to block access roads and evacuate camp (if required).

2. Emergency:

   - Severe weather.

   Action:

   - Travel advisory - all persons (Employee or support services) will be required to check in and out to insure no one is stranded.

Stage II Alert

Criteria:

Stage II will include all minor situations which **have** escalated into a potential hazard to the public and outside help is required.

Stage II Includes:

1. Emergency:

   - Failure of control equipment while circulating well kick.
   - Partial control of flow.

   Action:

   - Notify and mobilize company, government, and emergency services.
   - Monitor gas levels downwind and ignite if human safety cannot be assured.

2. Emergency:

   - Minor fire/spill.

   Action:

   - Alert wellsite/camp personnel - head count.
   - Extinguish fire.
   - Commence cleanup operations.
   - Notify company and government personnel.

3. Emergency:

   - Minor injury.

   Action:

   - Arrange for medi-vac (if required).
   - Report incident to company and government (Worker's Compensation, etc.) personnel.

Stage III Alert

Criteria:

Stage III will include all major situations where the emergency cannot be controlled or eliminated with personnel and supplies on-site.

Stage III Includes:

1. Emergency:

   - Serious injury or death.

   Action:

   - Alert medical and safety staff.
   - Arrange for medi-vac.
   - Suspend all operations. However, if failure to resume operations potentially endangers other personnel at the work site, corrective measures should be taken to eliminate the hazard, insuring that all evidence relating to the accident is preserved.
   - Report accident to company, R.C.M.P., and other government personnel.

2. Emergency:

   - Major fire - camp.

   Action:

   - Evacuate camp - head count.
   - Open all window covers - check each room.
   - Contact emergency services.
   - Contain fire/shut-in propane and other flame sources.
   - Notify applicable company and government personnel.

3. Emergency:

   - Major fire - rig (other than blowout).

   Action:

   - All if the applicable above and,
   - Shut in well - contain fire.
   - Evacuate rig - head count.

4. Emergency:

   - Loss or disablement of drilling rig.

   Action:

   - Shut in well.
   - Head count - evacuate rig (if required).
   - Commence remedial actions.
   - Notify applicable company and government personnel.

5. Emergency:

   - Major pollutant spill including fuel truck rollover.

   Action:

   - Alert medical and safety staff.
   - Contain spill (dyke using clay or bags of sawdust).
   - Arrange for fire protection.
   - Commence clean-up and disposal in accordance with federal regulations.
   - Notify company and governing agencies (i.e. Environment Protection Services, etc.).

6. Emergency:

   - Loss of support craft (i.e. aircraft)

   Action:

   - Alert medical and safety staff.
   - Contact emergency support services.
   - Notify Department of Transport and National Defence.
   - Notify company and other governing agencies.

7. Emergency:

   - Uncontrolled flow from well containing H_2S.
   - Concentrations of H_2S in excess of 20 ppm in unevacuated areas.

   Action:

   - Evacuate 550 metres planning radius - account for all persons.
   - Block access roads.
   - Notify company and government personnel.

NOTE: If the emergency has deteriorated and a **major** catastrophe (loss of aircraft) is imminent or has occurred, contact National Defence, Yellowknife.

SUMMARY OF DRILLING EMERGENCY PLAN BY ALERT STAGE AND ZONE

ALERT STAGE	WELL CONDITION OR EMERGENCY	ACTION WITHIN PLANNING ZONE	ADDITIONAL ACTION
0	• No Problem	• Awareness of Activities	
I	• Odour Complaint (H2S)	• Alert Wellsite/Camp Personnel • Prepare to Don Breathing Apparatus	• Investigate Odour Source and Contain
	• Well Kick (Flow Controlled) or other Severe Drilling Problem • Failure of Essential Well Control or Safety Equipment • BOP System • Mud Circulating System Due to: • Pump Failure • Drill Pipe Separation	• Alert Wellsite/Camp Personnel • Block Access Roads (Using Non-Essential Personnel)	• Notify Company Personnel
	• Severe Weather	• Travel Advisory - Check In and Out	• Advise Support Services
II	• Control Equipment Failure while Circulating Kick • Partial Control Flow	• Block Access Roads (Using Non-Essential Personnel)	• Notify and Mobilize Company and Government Personnel • Monitor Gas Levels Downwind and Ignite if Human Safety Cannot be Assured
	• Minor Fire	• Alert Wellsite/Camp Personnel • Extinguish Fire	• Consider Outside Help
	• Minor Pollutant Spill	• Contain Spill (Saw Dust) • Commence Cleanup Operations	• Report Incident to Authorities and Company
	• Minor Injury	• Alert Medical Staff • Preserve Incident Site	• Arrange for Medi-Vac if required • Report Incident to Company and Government Personnel

SUMMARY OF DRILLING EMERGENCY PLAN BY ALERT STAGE AND ZONE - Continued

ALERT STAGE	WELL CONDITION OR EMERGENCY	ACTION WITHIN PLANNING ZONE	ADDITIONAL ACTION
III	• Serious Injury or Death	• Alert Medical and Safety Staff • Eliminate Hazards to Others • Preserve Accident Site • Suspend Operations	• Arrange for Medi-Vac • Report Incident to Company and Government Personnel
	• Major Fire – Camp - Rig, Other than Blowout	• Evacuate Camp - Head Count • Contain Fire • Shut in Well • Evacuate Rig - Head Count • Contain Fire	• Contact Emergency Support Services • Notify Company and Government Personnel • Contact Emergency Support Services • Notify Company and Government Personnel
	• Loss or Disablement of Drilling Rig	• Shut in Well • Evacuate Wellsite - Head Count	• Contact Emergency Support Services • Notify Company and Government Personnel
	• Major Pollutant Spill (Including Fuel Truck Roll Over) • Loss of Support Craft (i.e. Air Craft)	• Arrange for Fire Protection • Contain Spill (Dyke Using Clay or Bags of Sawdust) • Alert Medical and Safety Staff	• Report Incident to Company and Government Personnel • Notify National Defence • Contact Emergency Support Services • Notify Company Government Personnel
	• Uncontrolled Flow from Well • Concentrations of H2S in Excess of 20 ppm in Unevaluated Areas	• Evacuate Wellsite and Camp as Required • Block Access Roads (Using Non-Essential Personnel)	• Initiate Sour Gas Emergency Response Plan • Monitor Downwind Area and Ignite if Human Safety Cannot be Assured

RESPONSIBILITIES OF COMPANY PERSONNEL

a) ***On-Site Consultants***

In the event of an emergency, the On-Site Consultant will become the on-scene commander.

In the event the On-site Consultant is unable to perform his responsibilities, for whatever reasons, the chain of authority will be as follows:

First - Rig Manager
Second - Driller

Immediate Actions:

On-Scene Commander has the responsibility to evaluate the situation, commence with remedial actions, insuring preservation of human life and protection of the environment.

Assess The Situation:

Initiation of notification procedures beginning with an assessment of the situation determining whether emergency is minor or major.

1. Current Situation
   - Area of gas flow - i.e. drill pipe (tubing) or annulus.
   - Status of BOP Equipment - i.e. good, failed, burned, etc.
   - Status of major rig equipment - i.e. pumps, motors, mud systems.
   - Estimate of flow rate.
   - Shut in pressures (if possible).
   - Define status of support equipment - i.e. power, lights, communications.

2. Potential Hazards
   - Gas release.
   - Risk of fire.
   - Risk of explosion.
   - Hazardous materials in vicinity.

3. Weather Conditions
   - Wind speed and direction.
   - Visibility.
   - Air temperature.
   - Rain, snow, sleet.

4. Wellsite & Campsite Evacuation
   - if wind - evacuate upwind.
   - if no wind - evacuate uphill.

On-Scene Commander will notify Safety Personnel to begin immediate evacuation of on-site personnel who may be affected by the hazards (i.e. - H_2S, fire).

On-Scene Commander will then contact the Superintendent on call who will determine further action.

b) ***Superintendent On Call***

The Superintendent on call, will receive a call from the lease. He will discuss the situation with the On-Scene Commander and assess:

1. The severity of the situation.
2. Whether evacuation is required.
3. Additional personnel and services that may be required.
4. Remedial actions.

Superintendent on Call Duties:

1. Call and brief the Off-Duty Supervisor.

The Superintendent will then proceed by the quickest means possible to the emergency area where he will further assess the situation and commence appropriate steps to bring the emergency to an end.

c) ***Off-Duty Supervisor***

The Off-duty Supervisor will contact all company personnel and governing agencies required depending on the type and severity of the emergency.

Stage I Emergency:

- Notify company personnel.
- Notify governing agencies.
- Notify emergency support services.

Stage II Emergency:

- Notify company personnel.
- Notify governing agencies.
- Notify emergency support services.

Stage III Emergency:

- Notify company personnel.
- Notify governing agencies.
- Notify emergency support services.

He will then open communications to receive information from lease representatives, etc.

d) ***Safety Supervisor On-Site***

On-Duty Safety Supervisor:

Is responsible for co-ordinating the following:

- Safety of on-site personnel, insuring all well site personnel have quick access to breathing apparatus.

- After receiving order from On-Site Consultant, ignition of gas plume - follow ignition guidelines.

e) ***Medical Staff***

Each employee will report to the medic prior to commencing the first shift. A well maintained, confidential medical record system is essential to assessing the nature and origin of health problems that arise during employment. Relatively minor injuries can be treated at the site; other, the patient will be stabilized in preparation for medi-vac to the hospital.

- The Medical Staff will be responsible for ground to air communication for all incoming and out-going flights.

- The Medical Staff will prepare a passenger and cargo manifest for all out-going flights (first copy to the pilot, second to the wellsite supervisor, third to keep).

- The Medical Staff will be responsible for issuing a severe weather warning and completing the severe check-in form.

ISOLATION OF THE HAZARD AREA

The wells on the East side of the Fort Liard Highway (M-23, P-57, N-65, C-02, O-15, C-76) will penetrate one section that contains hydrogen sulphide (H_2S) in an amount that may pose a hazard should the well effluent reach surface, it is:

Slave Point to Total Depth @ $\pm$ 2.0% H_2S

The maximum flow rate potential was calculate for the above mentioned section at .104 m^3/sec. The calculations indicate a 538 metre hazard zone. For the purpose of this plan and as an additional safety fact, a 550 metre planning and evacuation radius will be used.

The probability of an uncontrolled H_2S release is very remote; however, should the situation occur, evacuate the 550 metre planning radius and block access roads. (See Map)

Isolation of the Hazardous Area

The hazardous area is the region lying within the 550 metre planning radius. Only authorized Personnel may enter this area and they must take the following precautions:

1. Use the Buddy System.

2. Every individual entering the Hazard Area must be equipped with breathing apparatus.

3. Individuals entering the Hazard Area must continuously monitor Hydrogen Sulphide levels using one of the following:

   a) Sampling tubing, i.e. Drager or Gas Tech.
   b) Electronic Sensor.

   NOTE: THE LEAD ACETATE AMPULE IS NOT ACCEPTABLE.

4. Individuals entering the Hazard Area must keep in contact through the use of two-way radios or mobile telephones with those giving them authorization of entry. This would most likely be the On-Scene Commander (i.e. report in every 10-15 minutes). Anyone in the Hazard Area, other than authorized Emergency Personnel, must be evacuated immediately.

Any roads which may be effected are under Paramount's control and being used only by Paramount and their contractors. Road blocks will initially be set up by off-duty crews and non-essential personnel. Road blocks will be manned, personnel can place their vehicles across the road, blocking access. Signs warning of the hazards and area closure will be posted. Should the area closure be required for long term (i.e. over 12 hours), additional personnel will be contacted to operate the road blocks.

MONITORING

Short Term:

Downwind monitoring will be initiated to monitor and track the H_2S and/or SO_2 gas plume on the first indication of a gas release. Personnel will be dispatched from the wellsite to evacuate area occupants and block access roads. While travelling in the area the planning zone(s), personnel will continuously test for ambient levels of H_2S and SO_2.

Long Term:

A mobile monitoring unit will be dispatched to the emergency area if an uncontrolled gas release occurs.

Protection:

1. Use Buddy System when possible.
2. Breathing apparatus for all personnel.
   - be prepared to don apparatus quickly.

Detection:

1. Multi-gas detector (Draeger c/w SO_2 and H_2S tubes).
2. Record all information.
   a. Concentrations in ppm or ppb.
   b. Location and time of readings.
   c. Wind speed and direction.
   d. Who was evacuated and where they are going

Wind:

Speed and direction of wind may vary, therefore, be prepared to track gas plume.

Communication:

1. Notify On-Scene Commander of events taking place.
2. Notify Road Block Personnel and work crews of hazard area changes.

EQUIPMENT LIST

On-Site Safety Equipment To Be Brought In May Include:

Wellsite:

- Wellsite Trailer
- Service Vehicles
- Mobile & 2-Way Communications
- H_2S Detection Device(s)
- (8) 30 Minute Self-Contained Air Paks
- (1) 0_2 Resuscitator
- (1) Flare Gun
- (1) Electronic H_2S Detector
- (1) Ignition Kit
- Wind Socks
- (1) 350 lb. Wheeled Fire Extinguisher
- (5) Hand Held Radios

Safety Trailer:

- (10) 300 Cu. Ft. Cylinders Air
- (6) 7 Cu. Ft. Airline Paks
- (2) 40 Cu. Ft. Air Paks
- (1) Resuscitator
- 300 Ft. 1/2" Air Hose
- 600 Ft. 1/4" Air Hose
- (2) Air Line Manifolds
- H_2S Warning Signs
- Folding Stretcher
- First Aid Kit

Campsite:

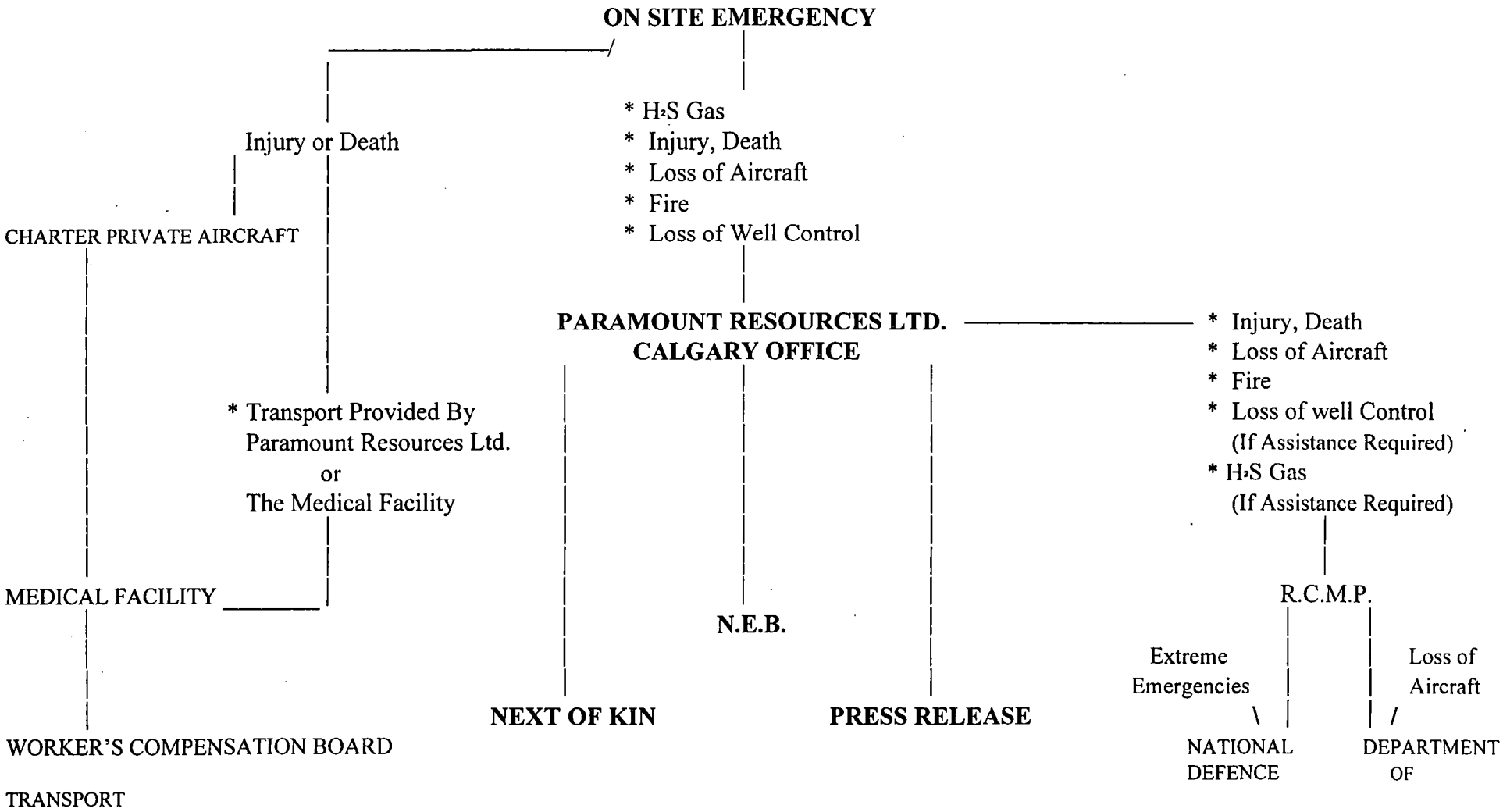
- (6) 30 Minutes Self-Contained Air Paks
- (1) H_2S Detector (Hand-Held)
- (1) 150 lb. Wheeled Fire Extinguisher
- (1) Hand Held Radio (Medical Shack)
- (1) Base Station (Camp)

Emergency Equipment On Standby:

- Road Block Kits (As Necessary)
- Continuous Monitor Unit
- (6) 2-Way Radios - Compatible With Monitor Units
- Additional Electronic H_2S Detector
- Additional Air Paks
- Security Personnel For Road Blocks

COMMUNICATIONS

CONTACT PROCEDURE IN THE EVENT OF AN EMERGENCY

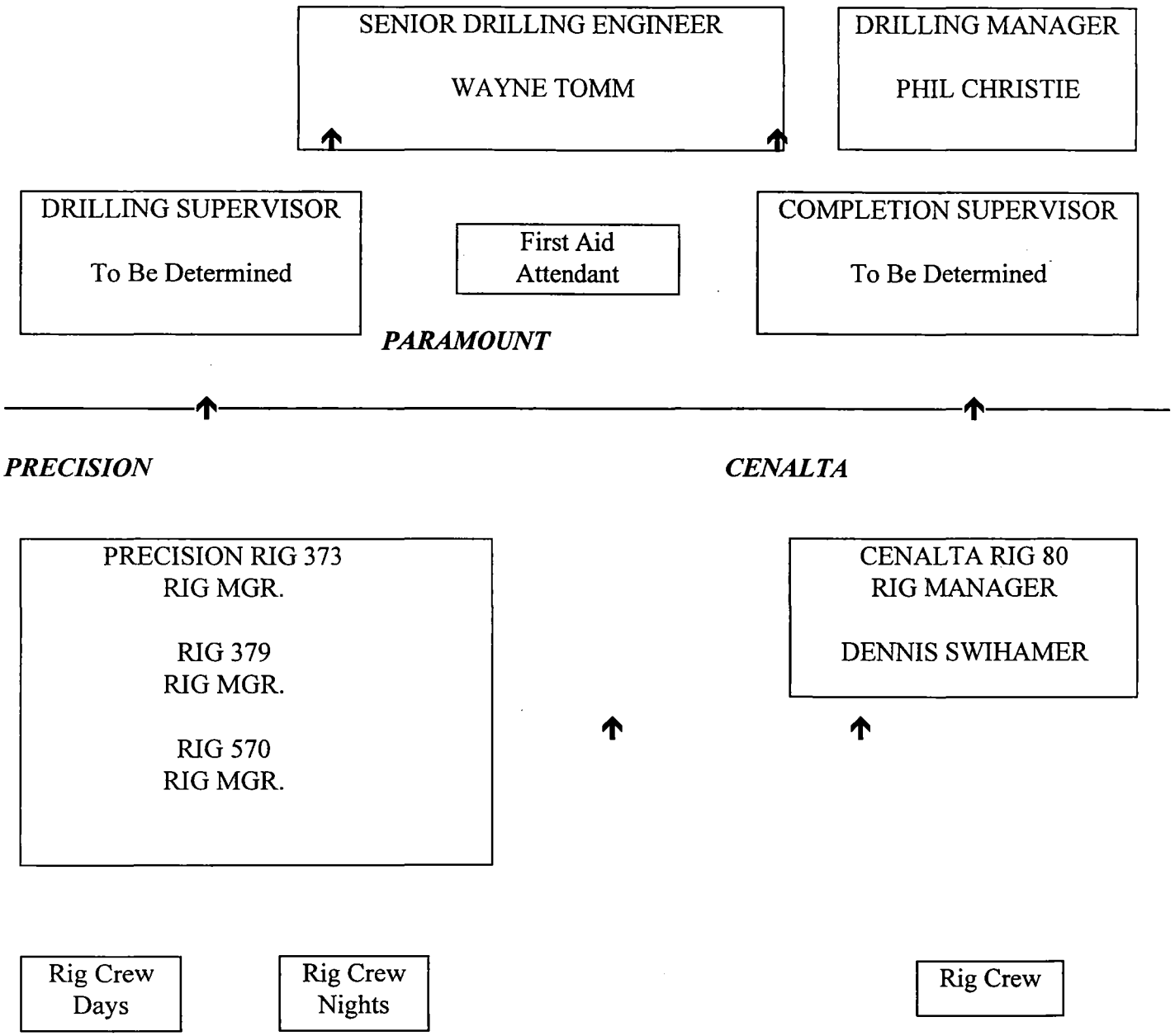


FORT LIARD AREA

DRILLING AND COMPLETION

EMERGENCY RESPONSE PLAN

ORGANIZATION CHART



Emergency Operations Centre:

During all emergency situations it is essential that an individual or group of people be aware of all that is happening in the area at all times. The location from which this takes place is the emergency Operations Centre.

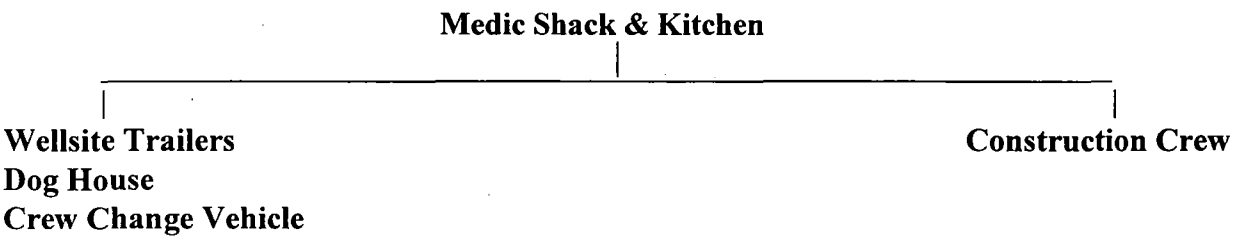
Location: 1. Campsite
2. Road Block

Communication System:

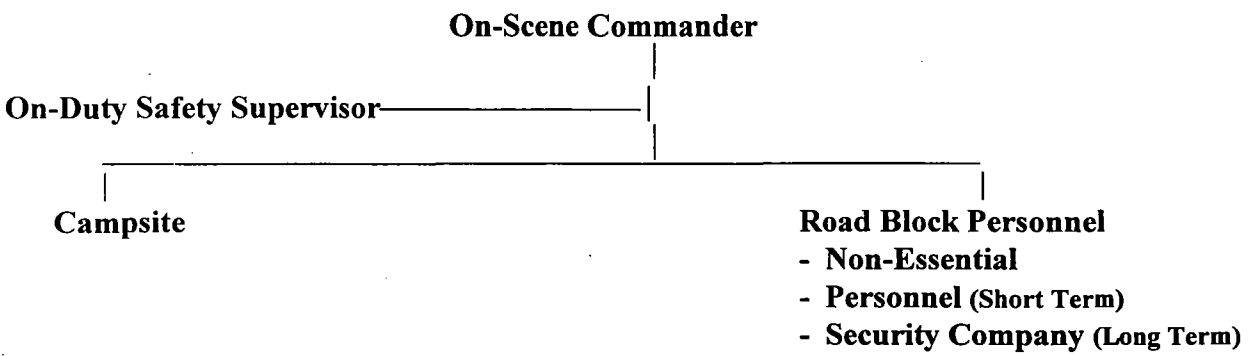
Communications are essential for effective Emergency Response. A system of hand held radios will be on-site prior to penetrating the H_2S bearing formation(s). The radios will be distributed and maintained by the On-duty Safety Supervisor. Additional radios will be provided should the need arise.

The following charts show the radio locations prior and during an emergency:

Non-Emergency



Emergency



TELEPHONE CONTACTS

1. Paramount Resources Ltd.
   4000 First Canadian Centre
   350 - 7th Avenue S.W.
   Calgary, Alberta T2P 3W5
   (403) 290-3600
   Fax (403) 266-6032

2. Cenalta
   1205, 505 - 6th Street S.W.
   Calgary, Alberta T2P 1X5
   (403) 234-9757
   Fax (403) 262-6150

3. Wellsite & Camp

   Drilling & Completion Supervisors - To Be Determined

   Cenalta - Rig Supervisor - Dennis Swihamer
   Precision 373
   Precision 379
   Precision 507

4. Superintendent On-Call

   Paramount - Wayne Tomm
   (403) 290-3626 (Bus.)
   (403) 251-0456 (Home)
   (403) 861-8473 (Cellular)

   Cenalta - Calvin Berg, Station Manager, Ft. St. John
   (250) 785-5096 (Bus)
   (250) 262-1615 (Cellular)

   National Defence
   Yellowknife, N.W.T.
   (403) 873-4011

5. National Energy Board
   5th Flr., 311 - 6th Avenue S.W.
   Calgary, Alberta T2P 3H2

Andy Graw	(403) 299-2790 (Bus.)
	(403) 547-3073 (Home)
Chris Knoechel	(403) 299-3866 (Bus.)
	(403) 241-0047 (Home)
Terry Baker	(403) 299-2792 (Bus.)
	(403) 239-5032 (Home)
John McCarthy	(403) 299-2766 (Bus.)
	(403) 240-2345 (Home)

6. Indian And Northern Affairs
   P.O. Box 1500
   Yellowknife, N.W.T. X1A 2R3
   (403) 669-2671
   Fax (403) 669-2713

7. Emergency Medical Assistance, Hospitals & Transportation

a. Yellowknife, N.W.T.

i. Department of Health	(403) 920-8496 (24 hrs.)

b. Ft. Liard, N.W.T.

i. Nursing Station	(403) 770-4301
ii. RCMP	(403) 770-4221
iii. Protective Services	(403) 770-3388
iv. Department of Transportation	(403) 770-3361
v. Fixed Wing Aircraft	
DEH CHO Air	(403) 770-4103
vi. Band Council	(403) 770-4141

c. Ft. Nelson, B.C.

i. Hospital	(250) 774-6916
ii. RCMP	(250) 774-2777
iii. Ambulance	1-800-461-9911
iv. Helicopter	
Highland	(250) 774-6106
Northern Mountain	(250) 774-6119
Canadian	(250) 774-6171
v. Fixed wing Aircraft	
Villers	(250) 774-2072
North Cariboo (Ft. St. John)	(250) 787-0311

d. Environmental Services

i. Merl Korchinski	(403) 247-2982

e. Firefighting & Blowout

i. Safety Boss	(403) 342-1310
ii. Firemaster	(403) 341-3000

f. Waste Disposal

i. Hazco	1-800-667-0444

F

IGNITION GUIDELINES AND PROCEDURES

IGNITION GUIDELINES

In the event of a major emergency where H_2S is being released and public safety cannot be assured, the Senior On-site Company Representative is responsible for the ignition of the uncontrolled flow. the criteria for the ignition, as set out by the E.U.B. in its Decision Report D 84-28 are:

The Well **must** be ignited **as soon as** all personnel working at the site can be cleared to a safe distance under any of the following conditions:

1. The well is experiencing an uncontrolled flow, the well effluent has reached the surface, and the flow may lead to loss of life.

2. The well is flowing sour gas to surface and public safety cannot be assured because:

   a) Evacuations of residents within the Emergency Planning Zone has not been accomplished, and:

   b) Monitoring data indicate H_2S levels in excess of 20 ppm in unevacuated areas, or:

   c) Monitoring is not taking place due to unforeseen circumstances, such as bad weather, or in the event of communications breakdown and public safety cannot be assured.

NOTE: Uncontrolled flow defined as: Flow to surface that cannot be shut off at operator's discretion.

IGNITION PROCEDURES

1. Take the appropriate mask up and buddy system precautions.

2. Approach the well from the upwind side while monitoring with an explosive meter and an H_2S detector. Ignition should be implemented from the maximum upwind range of the flare-gun. Flare shells should be shot towards the sour gas release point in such a manner that ignition will occur at the farthest outside radius of the explosive gas plume.

3. Approach no further than warranted and make sure that an explosive mixture does not exist in your immediate proximity.

4. Ignite the gas release.

5. If possible, have a radio and vehicle equipped with safety backup team on standby at a safe distance.

6. If possible, remain on standby at the ignited source to re-ignite if required.

EVACUATION

EVACUATION EXPOSURE LEVELS FOR AREA OCCUPANTS

These are the standards adopted to protect Human Health from Emission of H_2S and SO_2 and shall be used as guidelines pending decision by the Board of Health.

Hydrogen Sulphide:

a) If concentrations exceed 5 ppm for 1 hour
   - advise occupants, evacuate the area, and

b) If concentrations exceed 20 ppm (3 minute average)
   - evacuation will be considered mandatory

c) Occupants with health problems will be evacuated at 1 ppm.

Sulphur Dioxide:

a) If concentrations exceed 1 ppm for 2 to 3 hours
   - evacuation will be considered mandatory.

METHOD OF CONTACT

In the event of an emergency resulting from operations, all persons in the exposed area will be contacted by visitation and advised as to the nature of the emergency situation. Occupants in the planning radius will be notified and required to evacuate their premises immediately. Starting with those downwind.

NOTE: USE THE BUDDY SYSTEM IF POSSIBLE.

- Each vehicle must be equipped with breathing apparatus, gas detection equipment and communication system.

Occupants contacted for evacuation will be given the direction to take to exist the affected area. Transportation will be made available for those who do not have a means of leaving the area.

Evacuation, unless under extreme circumstances, should only be required for a short period of time until elimination of the emergency has taken place.

NOTE: RCMP will not enter hazardous areas unless trained on the hazards of H_2S and the use of breathing apparatus.

SUPPLEMENTAL INFORMATION

NEWS RELEASES

Written statements will be released to media by the Office of the President, Paramount Resources Ltd., in Calgary.

NO news releases, written or otherwise, will be released by Company or Contact Personnel.

RETURN TO NORMAL

Once the emergency is over, an orderly return to normal affairs must be initiated. Contact all persons (i.e. occupants, agency, and company personnel) who were informed about the emergency. Ensure that they understand it is over. Provide assistance to these requiring help to return home. Provide instruction for settlement of out-of-pocket expenses or other costs directly caused by the emergency.

EMERGENCY RESPONSE PLAN SUMMARY

1. Have Kick Procedures been followed? _____

2. Are BOP's shut in? _____

   a. What is the sequence:

   Blind Ram _____ How Many? _____

   Pipe Ram _____ How Many? _____

   Hydril _____ How Many? _____

3. Are all motor killed with air shut offs? _____

4. Are all electrical controls shut off? _____

5. Is all personnel account for? _____

   Number Dead _____

   Number Missing _____

   Number Trapped _____

   Number Present _____

6. Is medical aid required by any people? _____

   Name _____ Position _____

   Name _____ Position _____

   Name _____ Position _____

   Name _____ Position _____

   Name _____ Position _____

   Name _____ Position _____

   Name _____ Position _____

   Name _____ Position _____

   Name _____ Position _____

7. Has gas been ignited? _____

8. Where is the gas directed to? _____

EMERGENCY RESPONSE PLAN SUMMARY - Continued

9. In what direction is the wind blowing? _____

10. What is the mud weight? _____

11. What depth are we at? _____

12. What time did this occur? _____

13. What was the status at this time? _____

14. Who has been contacted? _____

_____

_____

_____

_____

_____

_____

_____

15. Is the safety company there? _____

Who is it? _____

Company Representative? _____

16. Is an evacuation required? _____

17. Has it commenced? _____

18. What other steps have been taken? _____

_____

_____

_____

_____

_____

SEVERE WEATHER CHECK-IN FORM

NAME	COMPANY	STARTING POINT PHONE NO.	DEPARTURE TIME	ESTIMATED TRIP TIME	DESTINATION POINT PHONE NO.	ARRIVAL TIME

DISTRIBUTION LIST

COPY NO.	*NAME*	*COMPANY*	*LOCATION*
1		N.E.B.	Calgary
2		N.E.B.	Calgary
3		N.E.B.	Calgary
4		N.E.B.	Calgary
5		Indian & Northern Affairs	Yellowknife
6		Paramount	Calgary
7		Paramount	Calgary
8		Paramount	Calgary
9		R.C.M.P.	Ft. Liard
10		R.C.M.P.	Ft. Nelson
11	Drilling Consultant, Rig 373		Rig Site
12	Drilling Consultant, Rig 379		Rig Site
13	Drilling Consultant, Rig 507		Rig Site
14	Completions Cons. , Rig 80		Rig Site
15	Rig Manager, Rig 373		Rig Site
16	Rig Manager, Rig 379		Rig Site
17	Rig Manager, Rig 507		Rig Site
18	Rig Manager, Rig 80		Rig Site
19	First Aid Attendant		Camp
20	First Aid Attendant		Camp
21	First Aid Attendant		Camp
22	First Aid Attendant		Camp
23	Safety Supervisor		Ft. St. John
24	Project Co-ordinator	Ed Reyven	Ft. Liard

MAP OF AREA

See Attached.

SECTION 7 FINANCIAL LIABILITY

A "Letter Of Credit" will be in place when the drilling program is ready to commence. The amount (not yet determined) in favour of the Receiver General Of Canada.

PARAMOUNT RESOURCES LTD.
4000 - FIRST CANADIAN CENTRE, 350 - 7TH AVENUE S.W.
CALGARY, ALBERTA T2P 3W5
TELEPHONE: (403) 290-3600 FAX: (403) 262-7994

November 16, 1998

National Energy Board
311 - 6th Avenue S.W.
Calgary, Alberta, T2P 3H2

Attention: Terry Baker
Chief Conservation Officer

Dear Sir:

RE: Evidence of Financial Responsibility
Fort Liard Area, NWT.

Paramount Resources Ltd., on behalf of itself and its partners, has or will be shortly requesting approval from the National Energy Board for its Winter 1998-1999 drilling program in the Liard Area, NWT. The following is a list of proposed locations as well as Paramount's current plan for drilling and completing wells in the coming winter:

Proposed Location	Type of Operation
Paramount et al Bovie C-76 60 20' 122 45'	Horizontal Re-entry
Paramount et al Liard F-36 60 10' 123 15'	Drilling Continuation
Paramount et al Liard A-01 60 10' 123 15'	New Drilling
Paramount Berkley Netla M-23 60 50' 123 00'	Drilling Continuation
Paramount Berkley Arrowhead O-15 60 30' 123 00'	Drilling Continuation
Paramount Berkley Arrowhead N-65 60 40' 122 45'	Completion
Paramount Berkley Netla P-57 60 50' 122 30'	New Drilling
Paramount Berkley Arrowhead C-02 60 40' 123 00'	Contingent
Paramount et al Liard K-46 60 10' 123 15'	Contingent

NWT Activity Plan

Approximate Timing	Total Rigs Operating	Service Rig	Drilling Rig 1 (Triple)	Drilling Rig 2 (Triple)	Drilling Rig 3 (Double)
Dec 1/98	4	N-65	O-15	M-23	F-36
Dec 27/98	3-4	|	|	|	C-76
Jan 10/98	2-4	Dependent on success	C-2	P-57	A-01
Feb 15/98	2-4		|	|	K-46

The foregoing is Paramount's best determination at this time of our winter drilling program. O-15, M-23 and F-36 are drilling continuations of wells that Paramount began drilling during the last drilling season and which have been drilled to date without incident. F-36, A-01 and K-46 are all shallow in nature (in comparison to our other locations) with an estimated T.D. of 2000m. C-76 is a horizontal re-entry which is expected not to penetrate any additional formations beyond those that have already been entered.

Of the seven firm wells, one is shallow, three are continuations of existing wells where a portion of the drilling has already been completed and some of the drilling risk thereby already mitigated (one of the continuations is also shallow), one is a horizontal extension and one is a well completion.

Given the nature of the proposed drilling program and our previous track record Paramount proposes to provide the National Energy Board ("the Board") letters of credit, in the amount of $1,500,000.00 for each of the wells drilling at any given time. We do not anticipate there being more then four operations ongoing at any point in time. All of the letters of credit will be in favour of Her Majesty in Right of Canada as represented by the Board. Accordingly there would be four letters of credit which would remain in effect from December 1, 1998 until April 15, 1999 (the end of the drilling season) thereby ensuring that the Board could readily access, if the need were to arise, a maximum of $6,000,000.00.

The foregoing sum of money, would be in addition to any insurance proceeds which would also be recovered in the event an insurance claim were put forward (and for which the Crown is a named insured).

Paramount will provide the Board with the irrevocable letters of credit by December 1, 1998.

Yours truly
PARAMOUNT RESOURCES LTD.

John D. Jackson, P. Land
Area Land Manager

JJ/

cc Clay Riddell
Chuck Morin
Dave Broshko
Shirley Maaskant

SECTION 8 CEAA (CANADIAN ENVIRONMENTAL ASSESSMENT ACT)

Physical Environment: These locations are accessible only during the winter months as they will be accessed entirely by existing seismic lines which have some muskeg sections and/or beaver dams. The two wells sourth of Fort Liard require an ice bridge over the Petitot River. The wells will be drilled with an onsite sump if soil conditions are favourable, if not, a remote sump will be used or the wells will be drilled sumpless. Invert drilling fluid will be held in tanks. If the wells are abandoned, the drill sites will be seeded to grass and any disturbed sections of the access roads will be re-contoured and seeded.

Waste Disposal:

(i) Sewage and Gray Water:

Sewage and gray water will go into a pit adjacent to the camps. The pits will be backfilled when operations at the wells are completed. Kitchen garbage will be incinerated and the ash buried. Any other garbage will be stored in a garbage bin and disposed of at an approved land fill site.

(ii) Waste Engine Oils and Lubricants:

All rig trash will be placed in a garbage bin with a tank for containing oils. The trash will be disposed of at an approved land fill site. The waste oils will be taken to an approved recycling or disposal facility.

(iii) Used Drilling Fluid and Cuttings:

For surface hole, all used drilling fluid and wellbore cuttings will be placed in the rig sump and deep mixed and buried with at least 1 m of cover. The remainder of the well will be drilled with Invert fluid. All cuttings and drilling fluid will be trucked off lease, the fluid being re-used at other wells then sent back to our fluids company and the cuttings transported to an approved disposal site in Alberta. We are presently having discussions with DIAND to determine if there are disposal methods available for the cuttings in the N.W.T.

Golder Associates have been retained by Paramount to conduct an environmental review of this wellsite and access road. As of this data, Nahanni Butte have have refused to give their written approval for this process to begin. Golder's report will be forwarded to the NEB as soon as it has been completed.

SECTION 9 BENEFITS PLAN

PARAMOUNT RESOURCES LTD

LIARD DRILLING PROGRAM

DRAFTS BENEFIT PLAN

Background: **Background on the scope of work to be conducted by Paramount Resources Ltd. (Paramount).**

Approximately three (3) months of work in the area is anticipated; pending weather, regulatory approvals, and rig availability. Timing of the proposed project is anticipated to begin in mid December and continue until the end of March.

Part of the program is in the area opened by the Acho Dene Koe (Fort Liard Band) And; accordingly, this Benefits Plan has been submitted.

Industrial Benefits: Paramount is committed to supporting regional businesses and will support and encourage the development of new regional businesses, providing the goods and services are available on a full, fair and competitive basis. Paramount will ensure that its subcontractors follow these same guidelines.

Plan of Action: In line with these guidelines and to the extent reasonably possible given time constraints, availability of equipment, personnel, etc., Paramount is currently using and proposes to continue to use these and other approved regional businesses:

Beaver Enterprises (Construction) Ltd.:

- Catering and Camp Services
- Road and Lease Construction and Maintenance
- Water Trucks and Loaders

Liard Fuel Centre:

- Fuel Supply and Distribution from Fort Liard

Deh Cho Air:

- Helicopter Requirements

Employment & Training: Paramount has supported the creation of the Employment and Training Officer Position with a contribution of $9,150. Paramount will give first consideration to qualified residents for employment opportunities and whenever possible will identify and support locally sponsored training initiatives. This includes on-the-job training proposed by the Acho Dene Koe in conjunction with Aurora College and/or NWT Community Mobilization.

Consultation: Paramount will provide appropriate information concerning its operations with concerned groups.. Paramount will consult with the local groups, on a timely basis, prior to commencing operations and throughout the course of operations in the area.

Plan of Action: Paramount will engage qualified residents of the area to advise on other land use activity in the area, to liaison with other land users, and to monitor field operations whenever applicable.

Chief Acho Dene Koe,
Fort Liard, N.W.T.

Oct 21/98
(Date)

Paramount Resources Ltd.,
Calgary, Alberta

OCT 19/98
(Date)