

GEOLOGICAL INFORMATION

Yukon Eagle Plain Call for Bids #2

Call for Bids Background:

In 1999, for the first time in 20 years, oil and gas rights were issued in the Yukon Territory. Two permits were issued to Anderson Resources Ltd. for parcels in the Eagle Plain region.

The Government of Yukon intends to issue annual Call for Nominations. In the summer of 2000, therefore, the government issued a Call for Nominations for the Eagle Plain and Peel Plateau region. The Call resulted in one parcel being nominated in an area adjacent to the permits issued in 1999. During November 2000, the nominated area was subject to a public review process to determine any environmental, socio-economic, or surface access concerns.

The current Call for Bids, which takes the concerns expressed into account, closes on March 14, 2001. The Call for Bids package is available from the Oil and Gas Resources web site at www.yukonoilandgas.com. It is also available in hard copy by phoning, faxing, writing or visiting the Branch as follows:

Oil and Gas Resources Branch
Yukon Department of Economic Development
Suite 209, 212 Main Street
Whitehorse, Yukon, Y1A 2B1
Tel: (867) 667-3427
Fax: (867) 393-6262

The following documentation is designed to assist exploration companies by providing basic exploration information and directions on how to obtain further geological data.

Geographic Description

Figure 1 shows the location of the nominated parcel relative to existing dispositions, oil and gas wells and settled land claims. The parcel occupies an area near 66° North latitude and 137° West longitude just south of the Arctic Circle, and is located about 300 kilometres north of Dawson City. The area consists of 99 sections (26,000 hectares). Physical access is by the Dempster Highway. Historically, there has been no drilling on the nominated parcel although there are adjacent wells (Figure 2). Seismic exploration occurred in this area from 1961 to 1984. The labeled seismic lines are shown in Figure 2.

Regional Geology

The Eagle Plain Basin is an intermontane basin with preserved sediments ranging from Cambrian to Cretaceous in age (Figure 3). The basin is bounded on the west, south and east by tectonically uplifted outcrops of subsurface zones. The parcels occupy an area of subdued rolling topography in the southern portion of Eagle Plain. Laramide-aged structural influences have resulted in the formation of a number of long linear anticlines which have been the historic focus of oil and gas exploration.

A resource assessment of the entire Eagle Plain Basin was completed in 1994 by the National Energy Board, identifying the potential for 83.7 Bcf of gas and 11.1 million barrels of oil (NEB, 1994).

Historic Activity

Since the discovery of oil and gas in the Chance M-08 well in 1960, 22 wells have been drilled in the region surrounding the nominated parcel. Most wells have been drilled on surface anticlines, further delineated by seismic exploration. Figure 3 shows a chronological list of wells and stratigraphic units encountered. Potential producing zones and cored intervals are also illustrated.

There are three federally issued Significant Discovery Licences (SDL's) in the Eagle Plain area (Figure 1). Interests in these SDL's are held by Northern Cross (Yukon) Ltd. and Chevron Canada Ltd. From east to west, they are:

Disposition	Proving Well	Oil/Gas Recoveries
SDL 020: Birch	B-34	Gas: Chance Member, Tuttle Formation
SDL 021: Blackie	M-59	Gas: Jungle Creek Formation, Canoe River Member
SDL 022: Chance	M-08	Oil: Fishing Branch, Canoe River Member, Tuttle Formation
	G-08	Oil: Fishing Branch
	J-19	Gas: Canoe River Member

The M-59 (Blackie) suspended gas well is the nearest discovery to the nominated parcel (Figure 2). Significant gas accumulations were identified in the Jungle Creek Formation (Permian) and the Canoe River Member of the Hart River Formation (Mississippian). Table 1 depicts oil and gas shows and estimated resources from the Eagle Plain Resource Assessment (NEB, 1994). The zone associated with each discovery is also listed.

Reservoirs, Traps and Source

Figure 4 is a schematic representation of reservoirs and traps in the bowl-shaped southern basin (from Hamblin, 1990 and Indian and Northern Affairs, 1995). Some trap types may involve Laramide structural culminations. The Devonian and younger Paleozoic succession dips southward so that progressively older rocks subcrop beneath sub-Cretaceous and sub-Permian unconformities. These trend northward, giving rise to the potential for various unconformity traps. Lateral facies changes within these zones provide other possibilities for stratigraphic traps.

Near the Call for Bids parcel, drilling depths to proven oil and gas zones in the upper Devonian and Carboniferous average approximately 1600 metres. Deeper in the section, potential reservoirs in the lower Paleozoic (Ogilvie Formation, for example) have not been tested extensively.

Potential source rocks are identified in the Canol, Imperial, Ford Lake, Blackie, Jungle Creek and Albian shale formations. Varying thermal maturities are reported (Link and Bustin, 1989).

Data Sources

- **Base Maps:** available from Natural Resources Canada's Centre for Topographic Information <http://www.cits.rncan.gc.ca>
- **Geological Information:** the Geological Survey of Canada has produced a CD-ROM in conjunction with the Yukon Government with 1:250,000 scale data. \$60. Contact the Whitehorse Mining Recorder: Phone (867) 667-3190.
- **Yukon Petroleum Resource Assessments:** available from the Oil and Gas Resources Branch, Government of Yukon <http://www.yukonoilandgas.com>
- **Well Information:** available in Yukon from the Government of Yukon (Oil and Gas Resources Branch) and in Calgary from the National Energy Board. Wells are named following the federal grid system.

Operator	Block Name	Unit letter	Section Number	Latitude	Longitude
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For Example: Socony Mobil Westmin Blackie M-59-66-00-137-00

- Socony Mobil Westmin are the operators
- Blackie is the block name
- M is the unit Letter
- 59 is the section number
- 66°N and 137°W is the north-east corner the grid area

See Figure 5 for a graphic definition of grid areas, sections and units.

- **Well Logs:** Whitehorse: Oil and Gas Resources Branch, Government of Yukon (867) 667-3427; Calgary: Geological Survey of Canada (Calgary) Core Facility, National Energy Board, M.J. Systems and International Datashare Corporation.
- **Cores:** stored at the Geological Survey of Canada (Calgary) Core Facility. Phone: (403) 292-7000.
- **Seismic Information:** available from the National Energy Board in fiche form. See Figure 2 for a map of seismic lines for projects conducted between 1961 and 1984. Commercial vendors also maintain data sets:
 - **SEG-Y (seismic) Data** – available from Lynx Canada Information Systems. Phone: (403) 269-7255 or email: lynxcanada@home.com

Key Publications

Graham, A.P., 1990, Carboniferous and Permian Stratigraphy, Southern Eagle Plain, Yukon Territory, Canada in *Symposium on Geology of the Canadian Arctic*. Aitken, J.D. and Glass, D.J. (Eds.), Geological Association of Canada and Canadian Society of Petroleum Geologists, pp.159-180

Hamblin, A.P., 1990, Upper Paleozoic Petroleum Geology and Potential, Southern Eagle Plain, Yukon Territory, Geological Survey of Canada Open File Report 2286.

Lane, L.V., 1998, Latest Cretaceous – Tertiary Tectonic Evolution of Northern Yukon and Adjacent Arctic Alaska, AAPG Bulletin, v.82/7, pp.1353-1371.

Link, C.M. and Bustin, R.M., 1989, Petroleum Source Potential and Depositional Setting of Phanerozoic Strata in Northern in Northern Yukon and Northwestern District of Mackenzie, Bulletin of Canadian Petroleum Geology, v.37, pp.293-315.

Morrow, D.W., 1999, Lower Paleozoic of Eagle Plain and Surrounding Areas – Northern Yukon and Northwest District of Mackenzie, Geological Survey of Canada, Bulletin 538, 401 p.

National Energy Board, 1994, Petroleum resource assessment of the Eagle Plain Basin, Yukon Territory, Canada, Yukon Department of Economic Development, Energy Resources Branch, 74 p.

Northern Oil and Gas Directorate, 1995, Petroleum Exploration in Northern Canada. A Guide to Oil and Gas Exploration and Potential, Indian and Northern Affairs Canada, pp.39-44

also

The Geology, Mineral and Hydrocarbon Potential of Northern Yukon Territory and Northwestern District of Mackenzie, Norris, D.K. (ed), Geological Survey of Canada Bulletin 422. Especially:

- Norris, A.W., 1996. Devonian, pp.163-200.
- Richards, B.C., Bamber, E.W. and Utting, J., 1996. Upper Devonian to Permian, pp.201-251.
- Dixon, J., 1996. Cretaceous and Tertiary, pp.301-317.
- Norris, D.K. and Hughes, O.L., 1996. Mineral and Hydrocarbon Potential, pp.369-394.

Figures


- Figure 1 Location Map
- Figure 2 Eagle Plain Seismic Lines (1961-1984)
- Figure 3 Well List and Stratigraphy
- Figure 4 Diagrammatic Cross-Section – Southern Eagle Plain Basin
- Figure 5 Yukon Well Location Scheme

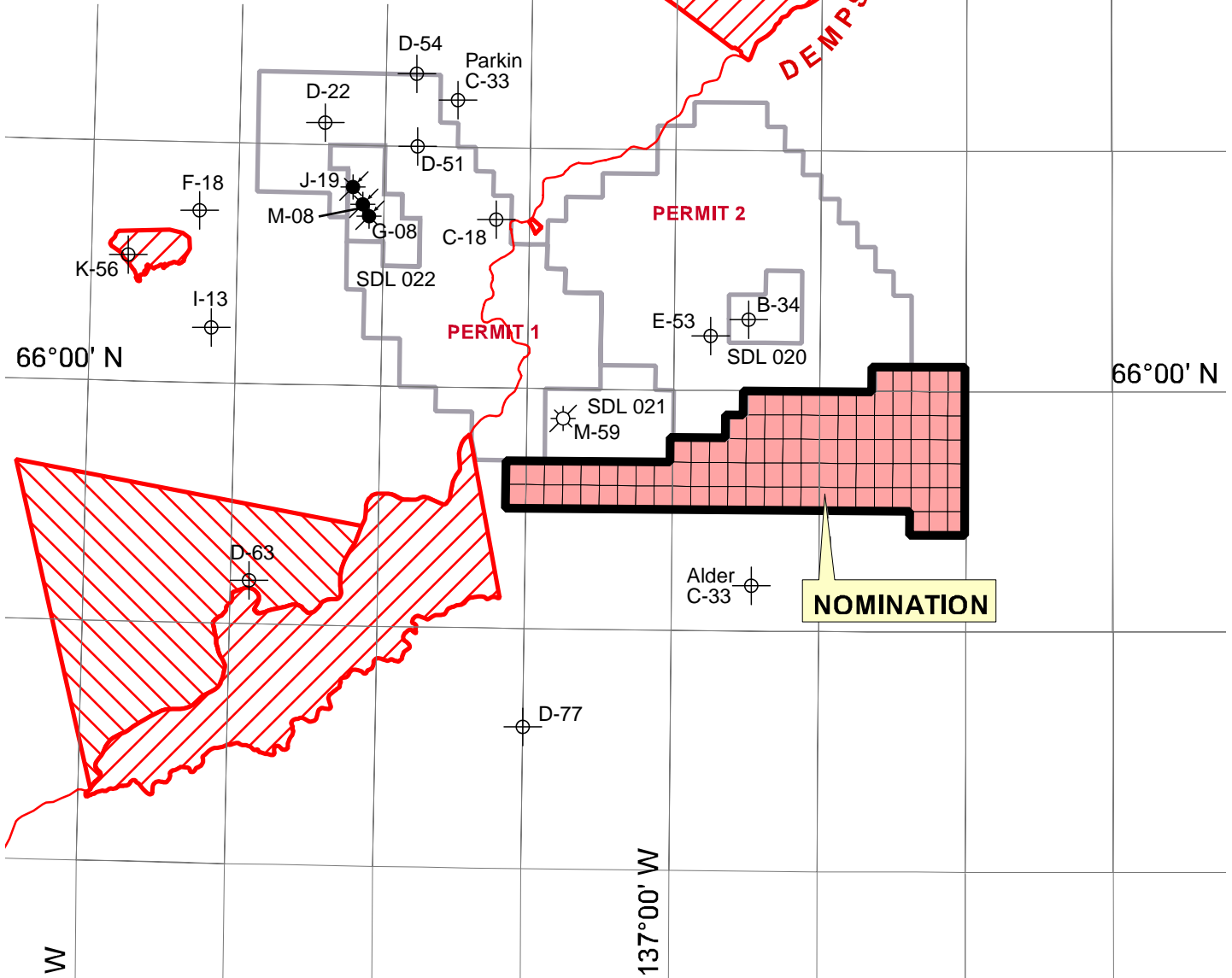
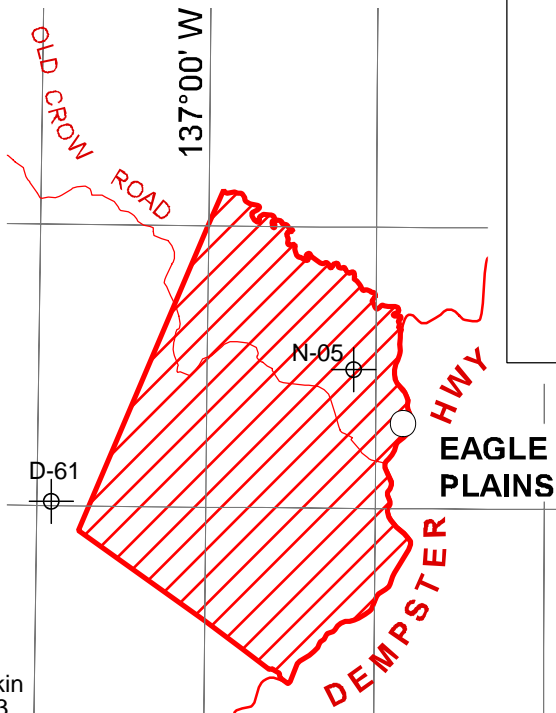
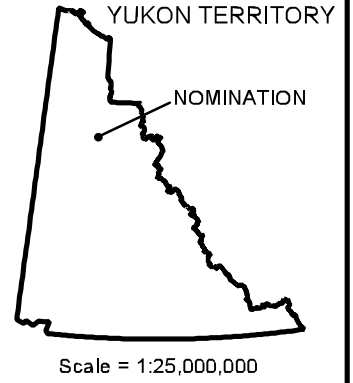
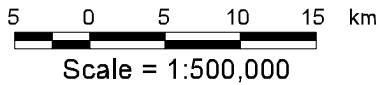
Tables

- Table 1 Well Results and Estimated Resource Table

Figure 1: EAGLE PLAIN LOCATION MAP

LEGEND:

-  Nominated Area
-  Oil & Gas Disposition
-  Vuntut Gwitchin First Nation R-Block
-  Tr'ondek Hwech'in First Nation R-Block
-  Road
-  Abandoned Well
-  Suspended Oil & Gas Well
-  Suspended Gas Well



DISPOSITION OWNERSHIP:
Permits 1 & 2: Anderson Exploration
SDL 020, 021, 022: Northern Cross & Chevron








Fig.1

FOR ILLUSTRATIVE PURPOSES ONLY

Figure 2: EAGLE PLAIN SEISMIC LINES (1961-1984)

LEGEND:

-  Nomination
-  Access Route
-  Seismic Line (1961-1984)
-  Abandoned Well
-  Suspended Gas Well

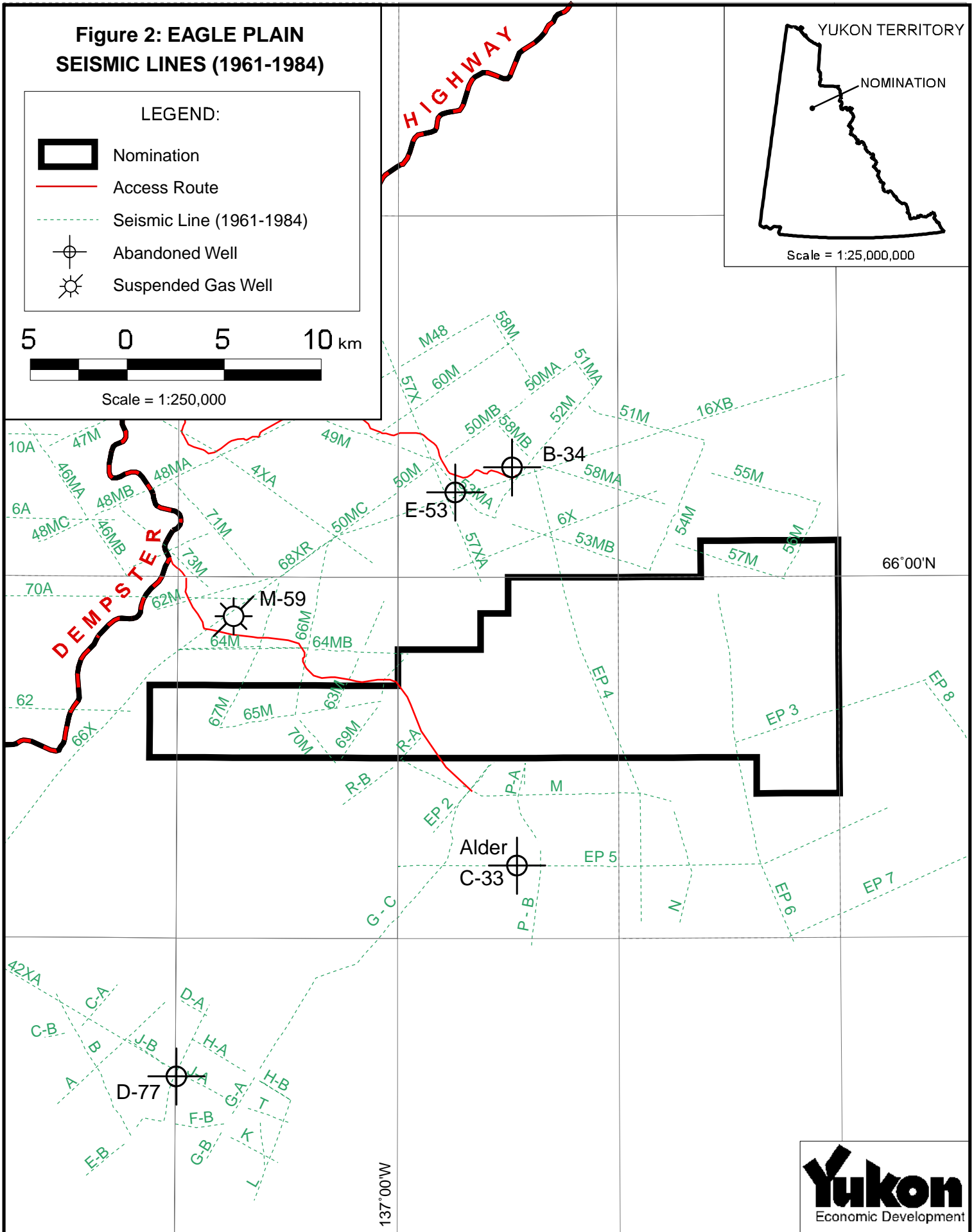
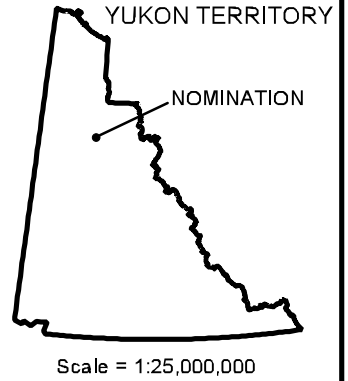
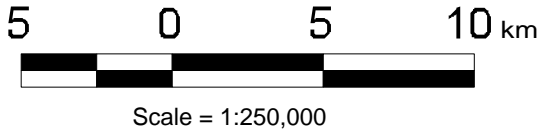


Fig.2

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FIGURE 3: WELL LIST AND STRATIGRAPHY

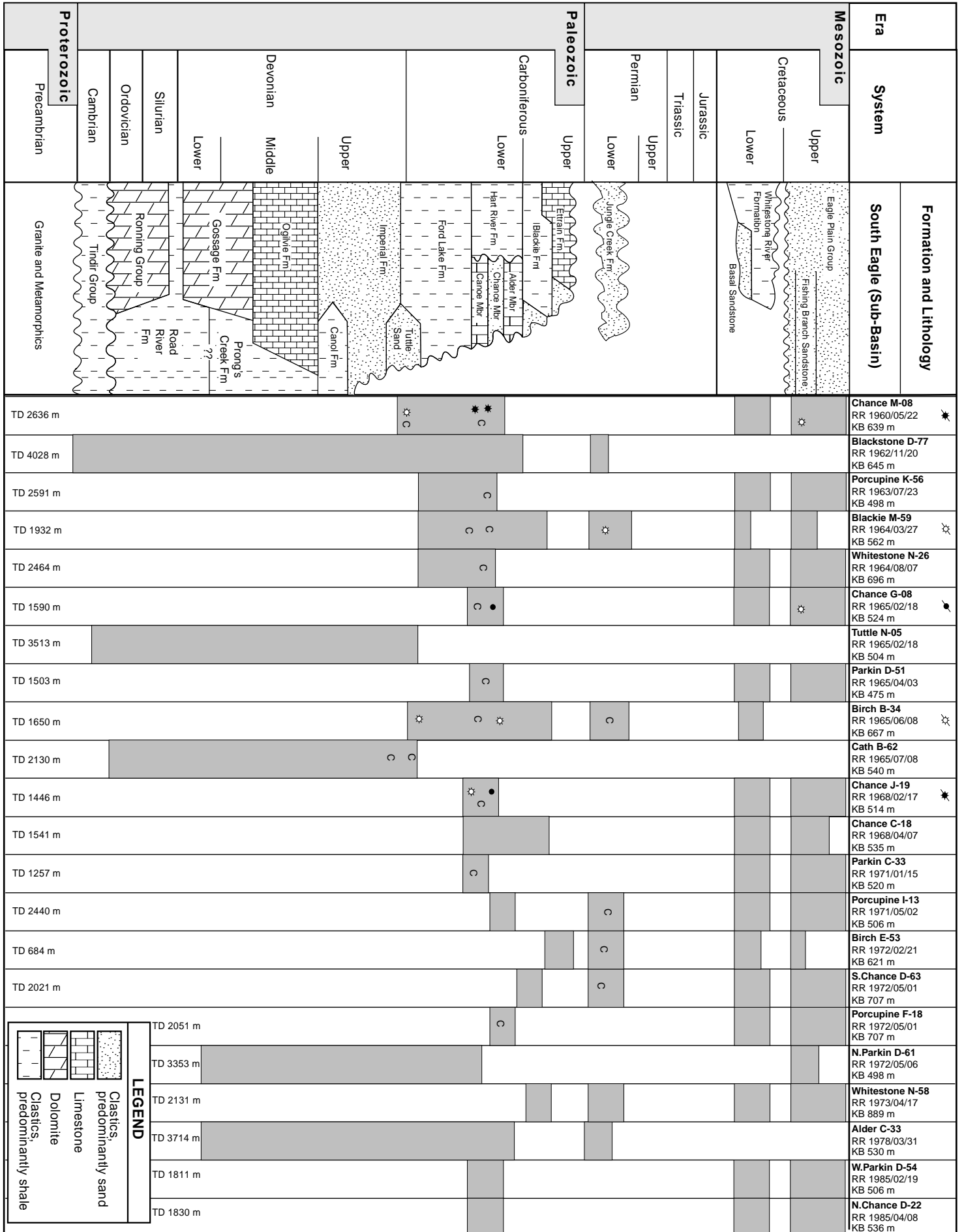


Fig. 3

FIGURE 4: DIAGRAMMATIC CROSS-SECTION - SOUTHERN EAGLE PLAIN BASIN

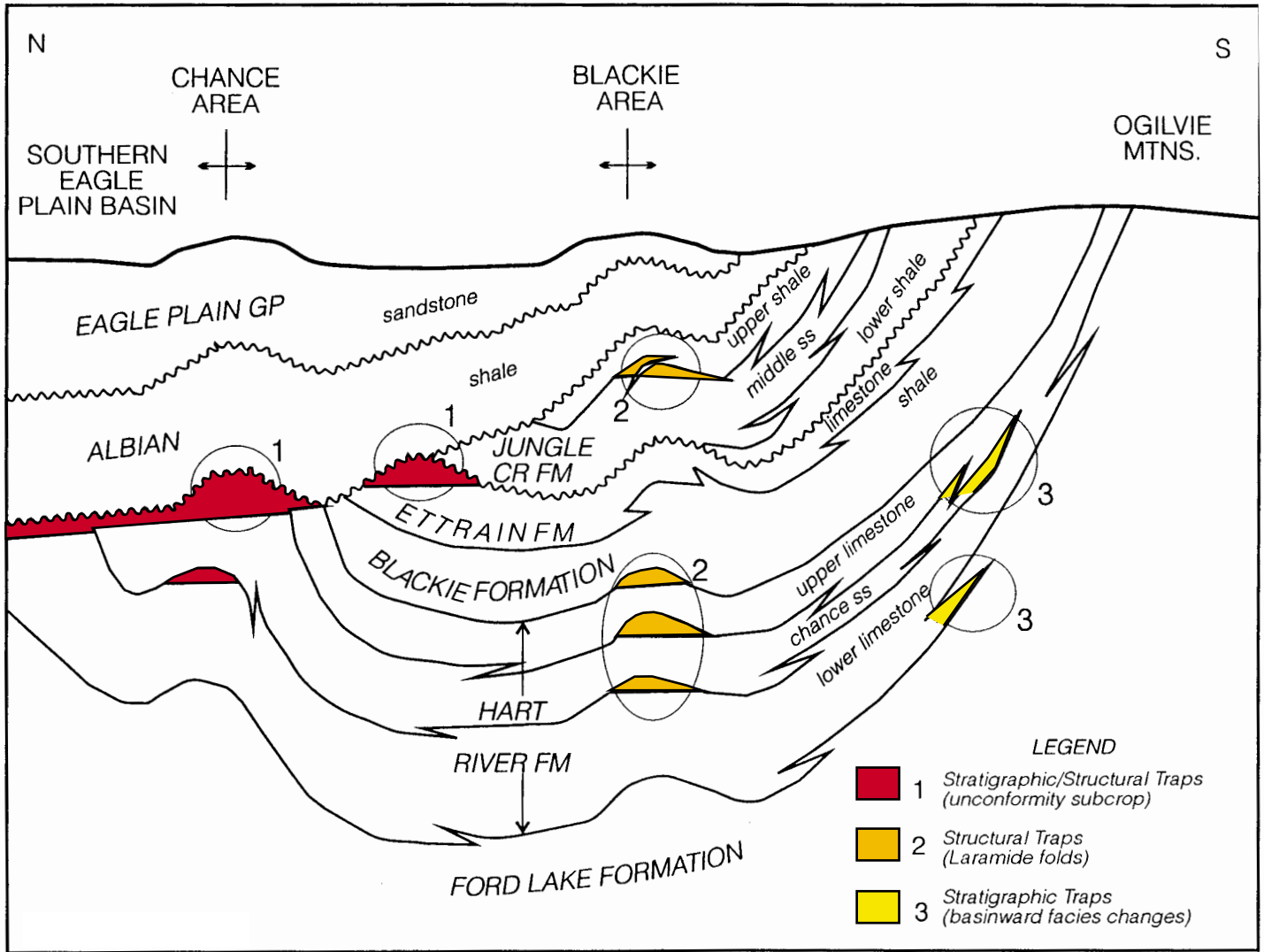


FIGURE 5: YUKON DISPOSITION LOCATION SCHEME

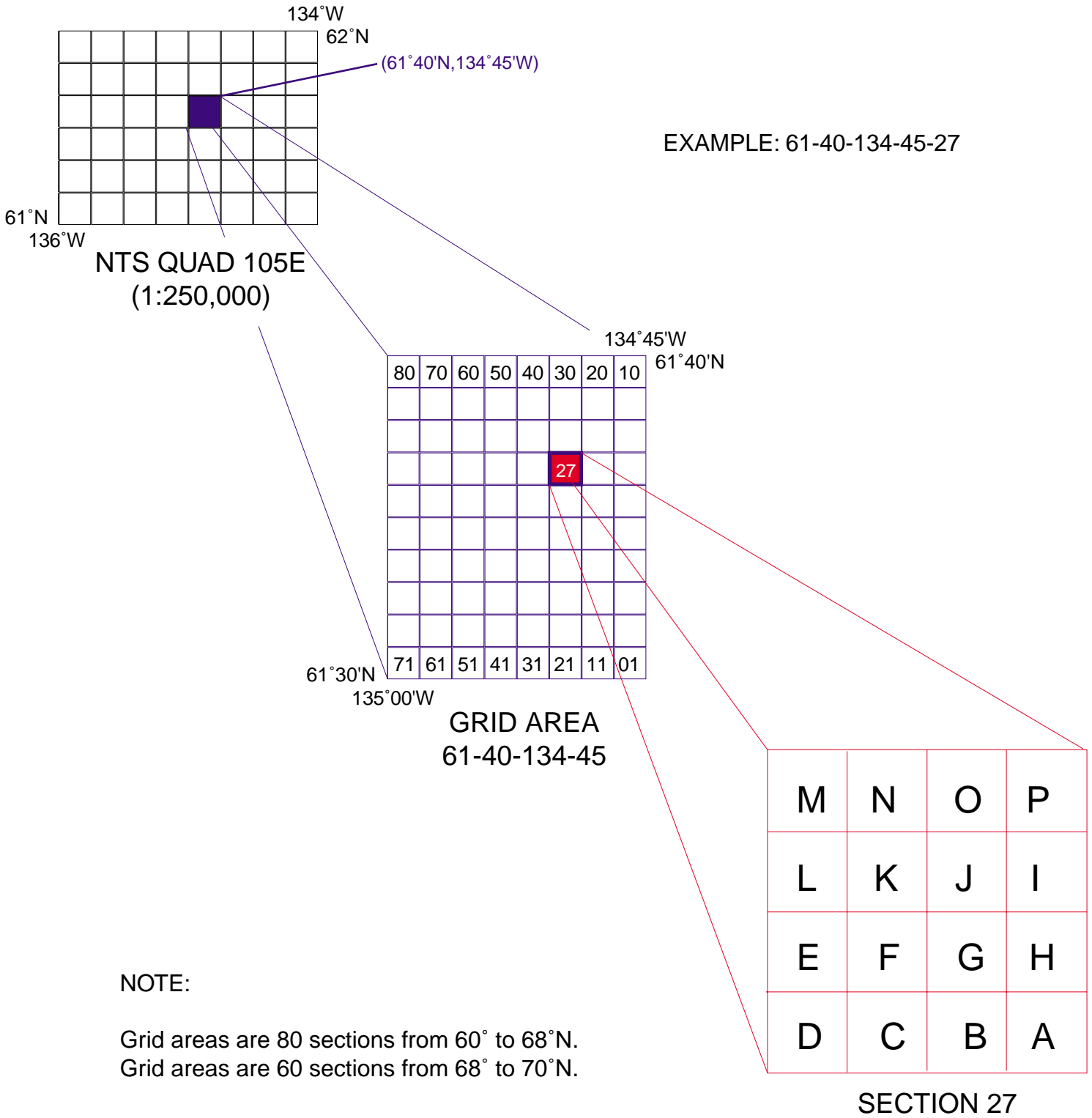


Fig. 5

TABLE 1: WELL RESULTS AND ESTIMATED RESOURCE TABLE

STATUS	LOCATION	ZONE	RECOVERY m ³ (ft ³)	ESTIMATED RESOURCE 10 ⁶ m ³ (MMbbls)
OIL				
◇	Chance D-22	Fishing Branch	oil cut mud	0
◇	Birch B-34	Jungle Cr.	oil cut mud	0
✱	Chance M-08	Chance #1	610 m (2,000) oil	700 (4.44)
		Chance #2	4 bbls oil	0 (0.12)
		Chance #3	4 bbls oil	0
		Canoe R.#2	290 m (1,000) oil	7.3 (0.05)
		Chance G-08	Chance #1A	360 m (1,180) oil
✱	Chance J-19	Chance #3	500 m (1,640) oil	260 (1.64)
		Canoe	oil cut mud	0
◇	E. Chance C-18	Canoe	37 m (120) cond.	0
◇	W. Parkin D-51	Canoe	91 m (300) oil	0
				Total Oil: 1.8 10⁶m³ (11.1 BCF)
GAS				
✱	Chance G-08	Fishing Branch	93,447 (3,300)	150 (5.0)
		Chance #1A	gas too small to measure	0
✱	Chance M-08	Fishing Branch	22,994 (812)	incl.
		Chance #1	283,174 (10,000)	770 (27.2)
		Chance #2	14,159 (500)	212 (7.5)
		Chance #3	14,159 (500)	212 (7.5)
		Canoe R. #2	283,000 (10,000)	2.8 (0.1)
		Tuttle	226,539 (8,000)	57 (2.0)
◇	W. Parkin C-33	Fishing Branch	7,929 (280)	0
		Canoe	gas too small to measure	0
◇	W. Parkin D-51	Fishing Branch	gas too small to measure	0
		Canoe	gas too small to measure	0
◇	N. Parkin D-61	Fishing Branch	gas cut water	0
◇	Whitefish J-70	Fishing Branch	gas cut water	0
◇	W. Parkin D-54	Fishing Branch	1,004 (36)	0
		Canoe	gas cut water	0
◇	Chance D-22	Fishing Branch	gas cut mud	0
✱	Blackie M-59	Jungle Cr.	79,288 (2,800)	660 (23.3)
		Canoe	4,021 (142)	0
◇	S. Chance D-63	Jungle Cr.	gas cut mud	0
◇	Birch E-53	Jungle Cr.	gas cut water	0
◇	Porcupine I-13	Jungle Cr.	368 (13)	0
		Canoe	1,444 (51)	0
◇	Birch B-34	Jungle Cr.	gas too small to measure	0
		Chance	150,000 (5,500)	179 (6.3)
		Tuttle	200,000 (7,300)	81 (3.0)
◇	E. Chance C-18	Chance	56,502 (1,600)	0
		Canoe	14,640 (512)	0
✱	Chance J-19	Canoe R. #1	62,690 (2,214)	52 (1.8)
◇	Porcupine K-56	Canoe	gas too small to measure	0
◇	Whitestone N-26	Tuttle	13,026 (460)	0
◇	Ellen C-24	Tuttle	gas cut mud	0
◇	Whitefish I-05	Tuttle	gassy water	0
◇	Ridge F-48	Tuttle	1,246 (44)	0
◇	S. Tuttle N-05	Ogilvie	gas too small to measure	0
		Gossage	28,540 (1,000)	0
◇	Schaffer O-22	Gossage	gas cut mud	0
◇	Peel Plat. N-49	Ogilvie	gassy mud	0
◇	N. Hope N-53	Ronning	gas cut mud	0
				Total Gas: 2,376 10⁶m³(83.7 BCF)

Oil	●
Oil & Gas	✱
Gas	✧
Suspended	✱✱
Abandoned	◇

Table. 1