

## Alberta Natural Gas Pools Discoveries and Trends 1990 – 1999

Kenneth J. Drummond (Drummond Consulting)  
400, 604 – 1<sup>st</sup> Street SW, Calgary, Alberta, T2P 1M7  
[ken@drummondconsulting.com](mailto:ken@drummondconsulting.com)

### ABSTRACT

A total of 10,263 gas pools were discovered in Alberta in the 1990's, with a total of 27.5 Tcf gas-in-place and initial marketable gas reserves of 17.6 Tcf. The largest pool discovered is Knopcik Montney A with marketable gas reserves of 244 Bcf. The average pool size is 1.7 Bcf, with a median of 0.7 Bcf. The historical record by decade shows a decreasing pool size, however the rate of decrease is becoming less and it is anticipated that discoveries of the next decade will be much the same as that of the 1990's.

### GAS DISCOVERIES 1990 - 1999

In the 1990's 10,263 gas pools (non-associated, associated and solution) were discovered with gas-in-place of 27.5 Tcf, and initial marketable gas reserves of 17.6 Tcf. The gas pools discovered in the 1990's represent 39.2% of the total number of pools discovered and contain 12.7% of the marketable gas. A statistical summary of these pools, including reservoir characteristics, is presented in table 1. Non-associated gas accounts for 93% of the initial marketable gas in 89% of the pools.

The 20 largest discoveries are shown in figure 1. The largest gas pool discovery of the 1990's is Knopcik Montney A discovered in 1993 with initial established marketable gas reserves of 244.4 Bcf., followed by Burmis Run A & Wab B, discovered in 1996, with initial marketable gas of 197.0 Bcf. There are 10 pools larger than 50 Bcf marketable gas. The top 20 pools by marketable gas contain 1.39 Tcf, of which 430.0 Bcf (31%) has been produced as of December 31, 1999.

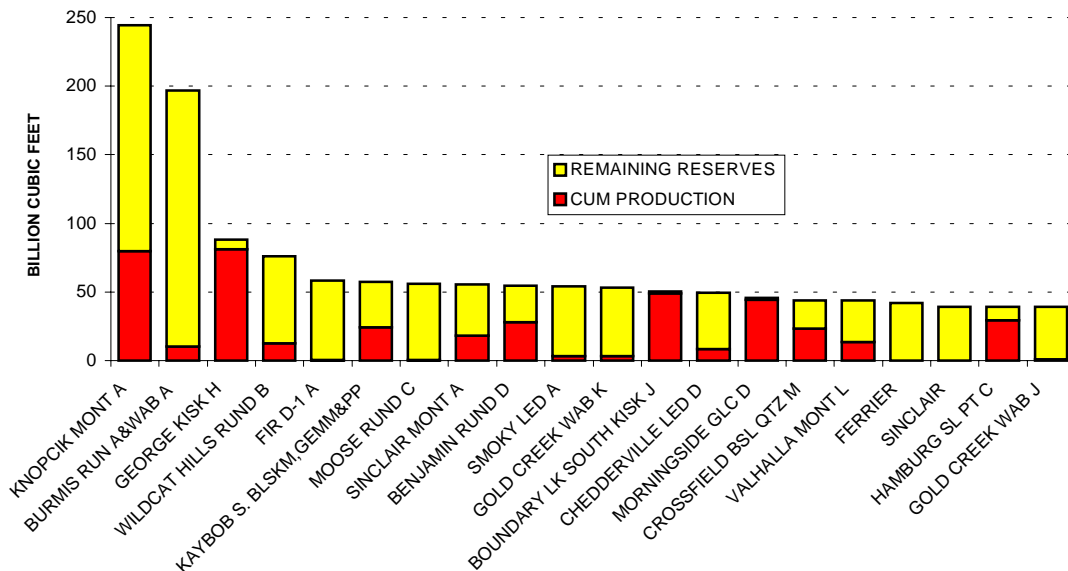
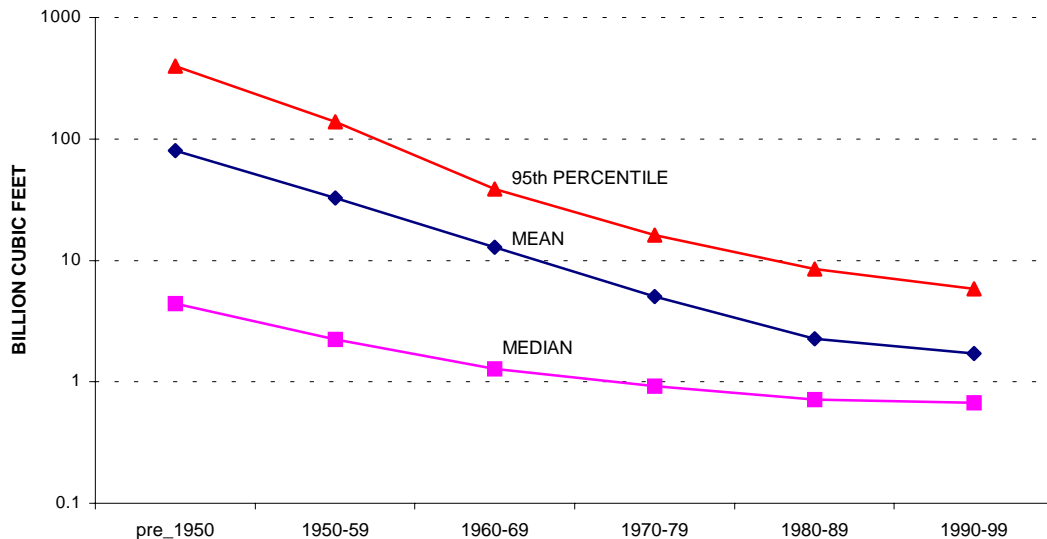


Figure 1: Top 20 gas pools by initial marketable gas, 1990 -1999

Central Alberta (AEUB area 5) had the largest number of discoveries, 3,246 pools with 3.74 Tcf, followed by southeast Alberta (area 3), with 2,260 pools, and 2.60 Tcf. The largest average pool size was 13.8 Bcf in the foothills (area 1).

Figure 2 shows the historical trend, of the mean, median and 95<sup>th</sup> percentile for Alberta gas pools by decade. Note these values are all decreasing; however the rate of decrease is becoming less in recent decades, and the next decade should be only slightly lower than current values. For the period, 1990 to 1999, the average pool size is 1.72 Bcf, the median is 0.67 Bcf, and the 95<sup>th</sup> percentile is 5.85 Bcf.



**Figure 2:** Alberta - initial marketable pool size by decade discovered.

The pool size distribution, number and marketable gas, is shown in figure 3. There are a total of 78 pools greater than 20 Bcf (0.8% of the total), with 2,932 Bcf (6.6%) of marketable gas. There are 6,304 pools (60%), with less than 1 Bcf of marketable gas. The most commonly occurring pool size class (mode) is the range 0.2 to 0.5 Bcf, with 24.5% of the pools. The largest volume of gas is in the 2 to 5 Bcf range, with 25.2% of the initial marketable gas..

It is anticipated that gas discoveries will be much the same, in the next decade, 2000 -2010. Numbers of pools may increase somewhat but gas volumes discovered should be maintained.

## References

Alberta Energy Utilities Board, 2000, Alberta's Reserves 1999, crude oil, oil sands, gas, natural gas liquids, sulphur, December 1999: Alberta Energy Utilities Board, Statistical Series 2000-18.

Alberta Energy Utilities Board, 2000, 1999 Gas Pool Reserves.

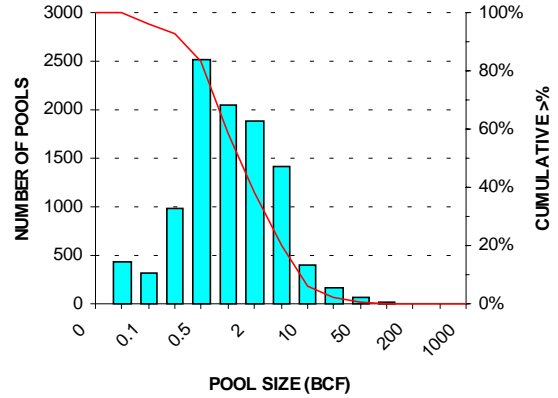
ALBERTA GAS POOLS - DISCOVERED 1990 - 1999

POOL SIZE DISTRIBUTION  
INITIAL MARKETABLE GAS (Billion Cubic Feet)

Size Bcf	No. of Pools	IMG Bcf	% of Pools	Cum % Pools	% of IMG	Cum % IMG
0	0	0.0	0.0%	100.0%	0.0%	100.0%
0.05	426	15.1	4.2%	100.0%	0.1%	100.0%
0.1	317	22.5	3.1%	95.8%	0.1%	99.9%
0.2	988	141.3	9.6%	92.8%	0.8%	99.8%
0.5	2517	874.7	24.5%	83.1%	5.0%	99.0%
1	2056	1,513.8	20.0%	58.6%	8.6%	94.0%
2	1891	2,683.1	18.4%	38.6%	15.2%	85.4%
5	1418	4,352.8	13.8%	20.2%	24.7%	70.2%
10	402	2,746.7	3.9%	6.3%	15.6%	45.5%
20	170	2,329.1	1.7%	2.4%	13.2%	29.9%
50	66	1,886.2	0.6%	0.8%	10.7%	16.6%
100	10	604.3	0.1%	0.1%	3.4%	5.9%
200	1	197.0	0.0%	0.0%	1.1%	2.5%
500	1	244.4	0.0%	0.0%	1.4%	1.4%
1000	0	0.0	0.0%	0.0%	0.0%	0.0%
2000	0	0.0	0.0%	0.0%	0.0%	0.0%
Total	10,263	17,611.0				

Total Number of Pools	10,263
Initial Marketable Gas	17,611
Largest Pool	244
Mean Pool Size	1.7
Median Pool Size	0.7
95th Percentile	5.9
75th Percentile	1.7
25th Percentile	0.3

POOL SIZE DISTRIBUTION - NUMBER



POOL SIZE DISTRIBUTION MARKETABLE GAS

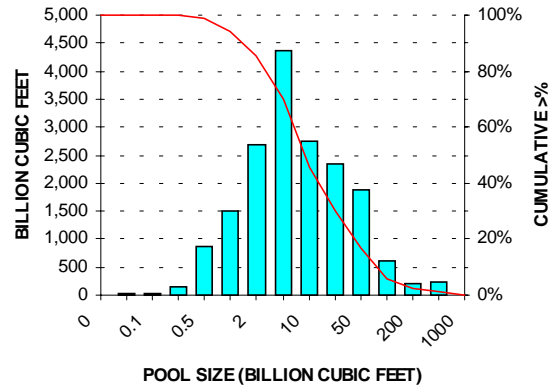


Figure 3. 1990 - 1999, Pool size distribution of non-associated, associated and solution gas pools

**Table 1. Statistical Summary**  
**ALBERTA GAS POOLS - DISCOVERED 1990 - 1999**  
 (From EUB 1999 Reserves database)

Year of first discovery	1990	
Original Gas-in-Place	27,525.4	BCF
Raw Recoverable Gas	19,793.2	BCF
Initial Marketable Gas	17,611.0	BCF
Raw Gas Recovery Factor (% of GIP)	71.9%	
Marketable Gas Recovery Factor (% of GIP)	64.0%	
Largest Pool (Gas-in-Place)	396.3	BCF
Largest Pool (Recoverable)	299.2	BCF
Largest Pool (Marketable)	244.4	BCF
Smallest Pool (Recoverable)	0.035	BCF
Smallest Pool (Marketable)	0.035	BCF
Number of Pools	10,263	
Average Pool Size (Gas-in-Place)	2.7	BCF
Average Pool Size (Recoverable)	1.9	BCF
Average Pool Size (Marketable)	1.7	BCF
Total Productive Pool Area	5,439,328	Acres
Largest Productive Pool Area	21,977	Acres
Smallest Productive Pool Area	3	Acres
Average Productive Pool Area	532	Acres
Ave. Rec. Mcf/Ac-Ft	287.6	MCF/AC-FT
Maximum Pay	715	Feet
Minimum Pay	0.3	Feet
Average Pay	13.9	Feet
Maximum Porosity	0.380	
Minimum Porosity	0.008	
Average Porosity	0.219	
Maximum Gas Saturation	1.000	
Minimum Gas Saturation	0.150	
Average Gas Saturation	0.648	
Deepest Pool Depth	15,995	Feet
Shallowest Pool Depth	107	Feet
Average Depth	3,362	Feet
Maximum Gas Density	1.390	
Minimum Gas Density	0.550	
Average Gas Density	0.625	
Average Pressure Gradient	0.311	Psi/Ft
Average Temperature Gradient	1.79	°F/100 Feet
Gas In Place Mcf/Prod. Acre	5,060	MCF/Acre
Rec. Gas Mcf/ Prod. Acre	3,639	MCF/Acre
Average Liquids Recovery	16.6	B/MMCF
Maximum 'Z' Factor	1.600	
Minimum 'Z' Factor	0.538	
Average 'Z' Factor	0.901	