

Area/Region:	Windsor - Kennetcook Basin Nova Scotia						Cumberland Basin Nova Scotia					
Play Name:	Horton Bluff Shale	Lower Horton Bluff Tight Sandstone	Upper Windsor Group - clastics and carbonate	Macumber Fm (Gays River equiv.) - basal Windsor	Upper Horton Cheverie Fm	Glass sand (top of Horton Bluff Fm)	Horton Bluff Shale	Cumberland Coal Bed Methane (CBM)	Cumberland Group Boss Point sandstone, Ragged Reef fm	Mabou Group Upper Claremont Fm	Windsor Group - carbonates with interbedded evaporites	Horton Fm clastics
Ave. Surface Temp. (°C):	Estimated						Estimated					
Normal Pressure Gradient (kPa/m):	Evaluated from well drilling data - mud weights, indications of tight hole						Evaluated from well drilling data - mud weights, indications of tight hole					
Temp. Gradient (°C/100 m.):	Evaluated from well log data (Bottom hole temperatures)						Evaluated from well log data (Bottom hole temperatures)					
Raw Gas Gravity:	Dry gas based on interpreted thermal maturity in basin						Dry gas based on interpreted thermal maturity in basin					
1. Risk Component												
Risk Factors												
1. Source Rock	RISK FACTORS DISCUSSED IN REPORT TEXT											
2. Charge												
3. Migration /Timing												
4. Reservoir Rock												
5. Trap/Closure												
6. Seal/Containment												
2. Hydrocarbon Volume Component												
Reservoir Depth (mTVSS)	Min, average and Max depths for each play extracted from Petrel model of basins. Used to calculate Pressure, temperature, gas 'Z' factor						Min, average and Max depths for each play extracted from Petrel model of basins. Used to calculate Pressure, temperature, gas 'Z' factor					
Reservoir overpressuring (x hydrostatic)	Calculated from pressure gradients						Calculated from pressure gradients					
Reservoir Pressure (MPa)	Calculated as a function of depth for each monte Carlo iteration. Used to calculate Gas Expansion factor and adjust Gas adsorption capacity for pressure						Calculated as a function of depth for each monte Carlo iteration. Used to calculate Gas Expansion factor and adjust Gas adsorption capacity for pressure					
Reservoir Temperature (°C)	Calculated as a function of depth for each monte Carlo iteration. Used to calculate Gas Expansion factor and adjust Gas adsorption capacity for temperature						Calculated as a function of depth for each monte Carlo iteration. Used to calculate Gas Expansion factor and adjust Gas adsorption capacity for temperature					
H ₂ S Content	assumed to be negligible.						assumed to be negligible.					
CO ₂ Content	Range of values based around analyses of shale gas samples (Kennetcook-1). Assumed similar gas composition in formations above and proximal to Horton . Data used in estimation of gas 'Z' factor and in calculating the quantity of marketable gas from total gas recovery.						no data - assumed same range of values as Windsor basin					
GRV (e6m3) Best estimate	Mid point estimate data from Petrel model			Calculated using Area*Net_Pay/NTG			Mid point estimate data from Petrel model			Mid point estimate data from Petrel model		
GRV - Low - High estimates	high -low estimated ranges based on perceived uncertainty of mapped GRV						high -low estimated ranges based on perceived uncertainty of mapped GRV					
% variation on Mid value	+/- 20%		+/- 20%		+/- 20%		+/- 30%		+/- 20%		+/- 66%	
Total Play Area (sqkm) Best estimate	Mid point estimate data from Petrel model						Mid point estimate data from Petrel model					
Area- Low - High estimates	high -low estimated ranges based on perceived uncertainty of mapped area. P01 area limited to Basin maximum						high -low estimated ranges based on perceived uncertainty of mapped area. P01 area limited to Basin maximum					
% variation on Mid value	+/- 10%		+/- 10%		+/- 10%		+/- 15%		+/- 15%		+/- 10%	
Tested Play Area (sqkm)	Discovery (Kennetcook-1) not significant in size compared to play potential			Untested plays			Untested play			Area from Springhill CBM resource assessment taken as mid value. +/- 30% for low -high range		
Untested Play Area (sqkm)	Full play area						Full play area			Balance of Total play Area excluding Springhill		
Fraction of Untested Play Filled	assumed to be 1 for shale (source rock) plays		assumed to be 1 due to close proximity of Horton bluff Shale.				assumed to be 1 for shale (source rock) plays		assumed to be 1 for all coal beds.			
Developable Fraction of Total Play (see note 1 below)	a wide range has been applied from little more than the core of the Kennetcook discovery to a proportion seen in high quality shale plays.		In view of the lack of knowledge of the nature and distribution of sand quality, the same range has been applied as used for the Horton bluff shale.				a wider range has been applied than the Windsor Basin play because it is not known whether the accumulation exists and so no indications of reservoir quality		Low estimate guided by discovered Springhill Area resource (~13% of play area) described by Sproule. High estimate 3x low			
Fraction of Total Play in Trap			wide range of values applied considering lack of information on trapping mechanisms. Upside limited by consideration of P01 value		Play GRV has been defined as the volume of Carbonate accumulations with reservoir quality rock, so a higher proportion is expected than in Upper Windsor clastics		same range as upper Windsor clastics		same range as upper Windsor clastics		same wide range of values used for all plays considering lack of information on potential trapping mechanisms	
Fractional fill of Untested Play Traps			Lower range of values than other plays in basin due to higher seal/containment risk		Typical range for conventional traps and some risk on charge, migration, timing and seal/containment							
Fraction of PV Oil Bearing	assumed to be zero											

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Net to Gross (NTG)	range of values guided by analysis of NTG of Horton bluff shale in well Kennetcook-1 and range of observed values from typical Shale gas reservoirs	range of values tuned to yield a likely range of net pay thicknesses	range of values tuned to yield a likely range of net pay thicknesses based on expected depositional interpretation	range of values based on expected depositional interpretation	Values calculated from Net Pay *area/GRV	range of values tuned to yield a likely range of net pay thicknesses based on typical expected depositional interpretation	Very wide range applied considering the possibility that this geological interval may be interbedded with non reservoir rock	Values calculated from Net Pay *area/GRV	range of values tuned to yield a likely range of net pay thicknesses based on typical geology of reef buildups	range of values tuned to yield a likely range of net pay thicknesses based on typical expected depositional interpretation.	range of values tuned to yield a likely range of net pay thicknesses based on typical expected depositional interpretation.	Range of values based on expected depositional interpretation
Average Net Pay (m)	Values calculated from GRV*NTG/Area	Values calculated from GRV*NTG/Area	Values calculated from GRV*NTG/Area	Range of values directly estimated based on typical geology of carbonate buildups	Range of values directly estimated, based on depositional interpretation	Values calculated from GRV*NTG/Area	Values calculated from GRV*NTG/Area	Range of values entered directly – guided by aggregate coal bed thickness seen in Springhill area	Values calculated from GRV*NTG/Area	Values calculated from GRV*NTG/Area	Values calculated from GRV*NTG/Area	Range of values based on assumption that this is a similar formation to the Windsor Basin Galsg sand but with widened range of thickness uncertainty
Matrix Porosity	range of porosities typical of Shale reservoirs, guided by data from well Kennetcook-1	range of porosities typical of tight sandstone reservoirs, qualitatively guided by core descriptions from well Kennetcook-1	ranges of porosities appropriate to play type				Same properties as in Windsor basin horton bluff shale applied - nearest potential analogue		range of porosities typical of CBM reservoirs. No useful data gleaned from CBM resource assessments	ranges of porosities appropriate to play type		
Natural Fracture Porosity	range applied to cover wide open range of possibilities as seen in naturally fractured shale reservoirs. No measured data available	range applied to cover wide open range of possibilities as seen in naturally fractured sandstone reservoirs. No measured data available	no natural fracture porosity in these plays				Same properties as in Windsor basin horton bluff shale applied - nearest potential analogue		range applied to cover wide open range of possibilities as seen in naturally fractured coals. No measured data available. Data measurements are very difficult to obtain	no natural fracture porosity in these plays		
Hydrocarbon Saturation in matrix	range of saturations typically seen in shales is generally lower than conventional reservoirs - probably due to low porosities compared to typical conventional reservoirs	range of saturations lower on average than conventional plays because of low porosity reservoir	default range of saturations for undefined conventional reservoirs				Same properties as in Windsor basin horton bluff shale applied - nearest potential analogue		range of saturations typical for CBM reservoirs.	default range of saturations for undefined conventional reservoirs		
Free Gas Parameters	Initial Gas Compressibility 'Z' uncertainty						calculated for each monte Carlo iteration using Z as function of depth fusing Pressure and depth gradients and standard industry correlations for dry gas.					
	Gas Formation Expansion Factor						calculated for each monte Carlo iteration as a function of pressure, depth temperature and Z factor.					
Adsorbed gas parameters (see note 2)	Rock matrix density (kg/m ³)						Estimated ranges supported by samples from Kennetcook-1 well. Average adsorbed gas content & TOC takes into account that ~50% of the 'net interval' is shale in Kennetcook-1. The remainder is considered to be gas charged tight sandstone					
	Total Organic content (TOC, % wt)						No data. Assumed ranges of values based on Windsor analysis but with wider range to account for greater uncertainty					
	Ratio Langmuir volume /TOC (sm ³ /tonne)						Parameters estimated to fit within a range of typical industry values, centered on adsorbed gas yields calculated for assessment of CBM resources for Cumberland -Springhill area (Sproule report)					
	Langmuir Pressure (MPa)											
	Adsorbed gas saturation (fraction)											
	Solution GOR (ksm ³ /stm ³)						not used since oil prospectivity has been discounted					
	Oil Formation Volume Factor						not used since oil prospectivity has been discounted					
	Oil Recovery Factor						not used since oil prospectivity has been discounted					
	Gas Recovery Factor		reasonable industry range for shale gas				reasonable industry range for tight gas		reasonable industry range for shale gas		reasonable industry range for CBM	
3. Yield Component	Gas Liquids Yield (stm ³ /e6sm ³)						Reasonable range of liquid yields for dry gas -as observed from shale gas samples in well Kennetcook-1 . Geochemical analysis supports high likelihood of dry gas					
	Gas to BOE Conversion (Mscf/BOE)						standard industry usage					
	Surface Loss (Fuel gas, etc...)						Typical industry usage. Used to calculate marketable gas from total gas					
Notes												
1 Developable Fraction of Total Play						Developable Fraction of Total Play						
This parameter is applicable to unconventional plays where no conventional h/c trapping mechanism is present. This requires information from seismic and many appraisal wells to enable rigorous quantification						This parameter is applicable to unconventional plays where no conventional h/c trapping mechanism is present. This requires information from seismic and many appraisal wells to enable rigorous quantification						
No such information is available across these basins						No such information is available across these basins						
Upside limited by consideration of P01 value						Upside limited by consideration of P01 value						
2 Adsorbed Gas Parameters						Adsorbed Gas Parameters						
These are only used in Shale gas and Coal bed methane plays						These are only used in Shale gas and Coal bed methane plays						
Parameters are used to calculate adsorbed gas content as a function of depth						Parameters are used to calculate adsorbed gas content as a function of depth						