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Department of Communications, Marine and Natural Resources



Executive Summarv

The Atlantic Basins of Ireland are an under-explored frontier petroleum province with proven working hydrocarbon systems. A new evaluation of the area, sponsored by the Petroleum Affairs Division, includes a major revision of the tectonic and deposition systems evolution.



Atlantic reconstruction shows the juxtaposition of the Porcupine and Rockall basins with the Orphan Basin of Eastern Canada. This reconstruction has shed light on the depositional environments and sediment transport directions. These new models show the likelihood of regional world class Upper and Lower Jurassic source rocks. Reservoir distribution at four stratigraphic levels controls the following play systems:

- Permo-Triassic play (proven by the Corrib and Dooish discoveries)
- Middle-Upper Jurassic deltaic and shelf plays
- Lower Cretaceous syn-rift shelf and basinal plays
- Tertiary shelf and basinal plays

Source rock modelling, prospect evaluation, and analogue basin review show a risked vet to find potential of at least 10 billion barrels of oil equivalent. The structural style allows for the presence of giant un-drilled structures.

Stratigraphy		Tectonic Episode	ATLANTIC IRELAND PLAYS	OFFSHORE EASTERN CANADA PLAYS	Regional Source Rock
-	PRIABONIAN		Base Oligocene u/c		
	BARTONIAN	PASSIVE SUBSIDENCE			
EOCENE	LUTETIAN		EOCENE SHELF PLAY		
	YPRESIAN				
ENE	THANETIAN	HERMAL UPLIFT	PALAEOCENE BASINAL PLAY		
ABO	SELANDIAN		35/18-1 35/19-1		
PA	DANIAN	-	Base renary ac 🙀		
	MAASTRICHTIAN	SUBSIDENCE			
ETACEOUS	CAMPANIAN				
L S	SANTONIAN	SIVE			
PER	CONIACIAN	PAS			
15	TURONIAN				
	CENOMANIAN		Intra-Canomanian ulc		
	CENUMANIAN				
	ALBIAN	SYN-RIFT	APTO-ALBIAN SHELF GREENSAND PLAY	BEN NEVIS & EIDER SSTS	
5					
EOU	ARTIAN		Intra-Aptian u/c		
TACE	APTIAN			AVALON SST	
CRE		SYN-RIFT	LOWER CRETACEOUS SHELF & DEEP-WATER PLAYS	•	
ER	BARREMIAN				
NOT	HAUTERIVIAN			CATALINA SST	
	VALANGINIAN		A 1751		
	BERRIASIAN		Base Cretaceous u/c 🕴 35/19-1		
MSSIC	TITHONIAN	SYN-RIFT	UPPER JURASSIC DEEP-WATER PLAY	HIBERNIA SST	meridge Clay
1	KIMMERIDGIAN	PASSIVE	Intra-Kimmeridgian u/c • 35/8-2	JEANNE D'ARC SST	2 East
IC UPPEF	OXFORDIAN		PLAY Connemara Intra-Oxfordian u/c MIDDLE-UPPER JURASSIC	1014 050 007	Ligitat
IASS	BATHONIAN		DELTAIC PLAY	VUTAGER SST	Bai-Bath
E JUR	BAJOCIAN		Intra-Bajocian w/c onnemara		Lacus- trine
IDDL					
IC M	TOARCIAN	SYN-RIFT			Toarcian
R JURASS	PLIENSBACHIAN				Sinem- Pliens
LOWE	SINEMURIAN				
	HETTANGIAN				
	RHAETIAN		Near Base Jurassic u/c		
R TRIASSIC	NORIAN	PASSIVE SUBSIDENCE			
UPPE	CARNIAN			Reservoir Facies	:
ETRIASSIC	LADINIAN		SHERWOOD SANDSTONE PLAY	fluvio-delta shelf slope/basir	aic in
Standard MIDDL	ANISIAN			Hydrocarbons	te
INAS	SCYTHIAN		Doolsh (P-Tr & prob MJ)	🏶 9as	

NORTH ATLANTIC PLAYS





Tectonic Evolution

The tectonic evolution of the area is complex, showing four rifting events.

These superimposed events control source and reservoir deposition resulting in the potential for stacked play systems.

A simplified stratigraphic column is shown.



illustrate the positioning of the Atlantic Ireland basins against the Orphan and Labrador basins of Eastern Canada (not palinspastically restored).



Depositional Environments

On the basis of the reconstructions, the depositional environments at closure in the Early Jurassic (left) and initial Atlantic separation in the Early Cretaceous (right) can be postulated.













Petroleum Affairs Vivision

The reconstructed basin and structural lineaments model is also shown. This illustrates the basin configuration immediately prior to the onset of Atlantic Rifting in the Mid Cretaceous (after Srivastava, 1996).



Source Rock Modelling

Well data combined with gross depositional environment models indicate Upper and Lower Jurassic regional world class source rocks. Volumetric assessment and expulsion modelling from the Lower

Jurassic alone, as illustrated, shows generated volumes of over 130 billion barrels of oil and around 50Tcf of gas.

Liassic Source with Geothermal Gradient of 30°/Km



The source rocks are generating today.

Structural Style

Rifting followed by basin margin inversion has resulted in a structural style characterised by simple tilted fault blocks as illustrated. These structures along with

large inversion features shown on seismic data invoke the possibility of giant un-drilled prospects.