



# Executive Summary

**GEOCHEMICAL SOLUTIONS INTERNATIONAL INC. (GSI)** has conducted a geochemical study of oils from the deep-water areas of the Potiguar and Ceará Basins of Northeast Brazil. The study was designed to identify and compare the petroleum systems that have contributed to recent discoveries in this important area. The study includes 15 crude oils from ten wells, many of which are recent discovery wells. Samples have been analyzed using state-of-the-art oil fingerprinting techniques to evaluate the major factors governing oil quality and quantity including: (1) source facies, (2) thermal maturity, (3) distance of migration from source to trap, (4) extent and timing of biodegradation, and (5) degree of oil mixing. These new data have been compared and contrasted to data from approximately 200 crude oils from offshore wells studied previously (represented by red symbols in accompanying map).

Well	Basin	Field	Final (m)	Water (m)	LATITUDE	LONGITUDE	DATUM	Conclusion	Well Number
1-BRSA-1080-CES	Ceara		5973	2130	-2.817256	-38.615556	SIRGAS2000	9/13/2012	30096026232
1-BRSA-1175-CES	Potiguar		5829	1928	-3.888705	-37.201456	SIRGAS2000	10/14/2013	30101027044
1-BRSA-1205-RNS	Potiguar		5353	1733	-4.476360	-36.721212	SIRGAS2000	3/11/2014	72101027295
1-BRSA-710-RNS	Potiguar		3536	42	-4.836326	-36.224537	SIRGAS2000	7/16/2009	72101023693
1-BRSA-732D-RNS	Potiguar		4395	29	-4.719766	-36.698199	SIRGAS2000	11/29/2009	72101023890
1-BRSA-756-RNS	Potiguar		3523	59	-4.789542	-36.353681	SIRGAS2000	3/11/2010	72101024045
1-BRSA-862-RNS	Potiguar		4230	17	-4.866520	-36.395477	SIRGAS2000	4/25/2011	72101024966
1-BRSA-962-RNS	Potiguar		4620	31	-4.814396	-36.363904	SIRGAS2000	6/29/2012	72101025628
3-BRSA-272-RNS	Potiguar	SALEMA BRANCA	4005	40	-4.766203	-36.464332	SIRGAS2000	9/1/2004	72101020875
7-GJ-1A-RNS	Potiguar	GUAJUA	4790	50	-4.776723	-36.413466	SIRGAS2000	10/18/2005	72101021129

Oil geochemistry is a fundamental component of any regional exploration and production program. It can be used to determine the number of discrete sources in a basin and their respective stratigraphic and areal distribution, source age, lithology, depositional environment (marine, non-marine, lacustrine) and thermal maturity. Areas with overlapping petroleum systems can be identified in relation to possible oil mixing from two or more sources. Mapping source-related oil families is the first step toward understanding and predicting the lateral extent of oil fields and regional oil quality variations in the deep-water areas offshore Potiguar and Ceará Basins. The extent of processes that act to modify the original composition of oils, such as biodegradation and oil mixing, can also be assessed. This is a fundamental issue in Brazil because the effect of these processes can be widespread and can significantly degrade oil quality. Because oil quality can impact exploration economics at both the prospect and basin-wide scale, it is imperative to gain a firm understanding of the factors that govern it prior to acquiring acreage or drilling a well.

Deliverables for this study include an interpretative final report and associated montage. The final report contains a synthesis and interpretation of all information provided including oil-oil and oil-source rock correlations, thermal maturity, and oil quality. All geochemical data is provided in digital format in a database contained on CD that includes a proprietary data browser to facilitate access.

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