Regional Soil Gas Survey Conducted in Fortesa's Onshore Coastal Position (Senegal) Illustrates the Utility and Value of Surface Geochemistry

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In 2002 Fortesa commissioned Exploration Technologies, Inc. (ETI) to conduct a soil gas survey over their onshore coastal producing trend, including calibration grids over the known Gadiaga and Diam Niadio gas fields. This initial survey correctly identified the gas/condensate compositions of the two existing fields and suggested that any other coastal plays within the surveyed area would likely produce similar composition dry gas with minor condensate/oil. Samples were collected by Fortesa's local crews trained by ETI, significantly reducing the cost for collecting and analysing soil gas geochemical data in Senegal.

In May 2008 Fortesa's local crew collected over 2000 additional sites, greatly expanding the area surveyed into the undrilled shelf trend further from the coast. This second survey was designed not only to expand the coverage, but also overlap and interface with the previous 520 site 2002 survey. Contour and compositional dot maps for this interlaced data over previously mapped background and anomalous areas showed excellent repeatability, with no bias. Of even greater significance, the expanded data discovered new oil-prone subsurface sources, with much larger magnitudes clearly following the edge of the subsurface carbonate bank. Additional sampling driven by interactive interpretations integrated with other geological/geophysical data continued from 2008 up to 2019, resulting in the summary results just presented by Rogers Beall in the previous paper. It is highly likely that an onshore oil discovery might have been made more than 12 years earlier if these 4000 samples been collected in 2002, long before the offshore oil discoveries in 2014.

The most important lesson to be derived from this survey is the value of regional sampling for high grading source areas and for determining the "oil versus gas" potential of the area of interest. This survey also demonstrates the significance of using grids for determining the actual size and orientations of anomalies, a critical factor for interpretation and correlating seepage anomalies with specific subsurface geological and/or seimic features. As shown, using a variety of infill grids along with adequate regional sampling can lead to excellent results at a very modest exploration cost. This survey also demonstrates the repeatability of "free soil gas "samples for reliably mapping subsurface source areas over an extended time period including different seasons and many years (2002 to 2019).

Typically, most surveys would have ended in 2002, as many do, with positive results, but failing to unlock the true potential of the survey area due to a lack of adequate regional data for evaluation of the overall source potential. Experience using this "free soil gas" methodology for both exploration and environmental projects for over 40 years has demonstrated the reliability and repeatability for the shallow light (C1-C4) hydrocarbon seepage as the most effective and cost-efficient method for mapping the horizontal distribution of subsurface hydrocarbon sources within any basin or survey area.