

Ryder Scott, government and E&P companies work together to attain success in T&T

1936 First employee of Ryder Scott, Donald T. May, analyzed cores brought back from T&T by founder Harry M. Ryder.	1972 to 1987 Evaluated 22 oil and gas fields using an intensive geologic approach in estimating the volumetrics.	1973 to 1981 Performed gas-deliverability and reserves studies of a license area offshore the east coast.	1978 Performed extensive study of all offshore gas reservoirs on the east and west coasts.	1980 to 1981 Evaluated gas fields offshore the east, southeast, west and north coasts for the Ministry and National Energy Corp.	1982 to 1994 Performed several independent studies for the government as it pursued a strategy of monetizing T&T gas reserves.	1995 Conducted an independent determination of gas reserves and resources for the National Gas Co.	1998 Conducted integrated field development studies of several fields in the Gulf of Paria.	2000 Evaluated gas volumes, commercial structures of Atlantic LNG Co. projects, including economics and international marketing.	2001 to 2003 Conducted countrywide deterministic and probabilistic evaluations of 100 fields as part of the country's gas master plan.	2005 to 2007 Audited gas resources and reserves. Evaluated complicated petrophysical data of the thinly laminated reservoirs.	2008 Began a country-wide evaluation of the petroleum reserves and resources of the oil fields.	2008 to present Conducted countrywide evaluations of offshore gas reserves. T&T uses reports to develop national energy policies and long-term gas contracts.
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A five-tank LNG ship in Trinidad and Tobago ©altinosmanaj/123RF.COM

Trinidad and Tobago has many positives to celebrate over the last several reserves audits, replacing 100 percent or more proved reserves and C1 contingent resources. Those volumes are represented in the country's technically recoverable resources (TRR) from 2016 to 2019.

TRRs are those quantities of petroleum producible using current available technology and industry practices, regardless of commercial or accessibility considerations. C1 volumes have the same level of technical certainty as proved reserves but have one or more commercial or accessibility constraints.

At a press conference, **Herman Acuña**, executive vice president at Ryder Scott, said, "Most of the gains came from successful exploration of deepwater blocks."

EOG had success with the Mento and Osprey East exploration wells and BHP had deepwater success with the Bele, Boom and Tuk exploration wells.

In 2019, operators drilled the largest number of exploration wells in the past 20 years at 16, a record that was last equaled in 2001, stated **Christian Welsh**, Ministry of Energy and Energy Industries, in an SPE technical paper this year.

Steeped in history and geology

Ryder Scott history with T&T began 85 years ago, a year before the firm was incorporated in Pennsylvania. In 1936, Ryder Scott's first employee, **Donald T. May**, developed chip-coring analysis using core samples taken from unconsolidated sands in Trinidad. Using that innovative technique, May was able to analyze porosity, permeability, saturations and other properties from a single plug of sand.

Decades later, Ryder Scott evaluated 22 oil and gas fields for Amoco Corp., National Energy Corp. and the government from 1972 to 1987. The firm used an intensive geologic approach in estimating the volumetrics, including generating structure and isopach maps for every pay sand in every field.

Today, the reservoirs of interest still exhibit a high degree of geological complexity, and are highly faulted with multi-layered pay zones.

Deji Adeyeye, vice president, recently made a presentation on the T&T work, and said, "The complexity of the subsurface leads to a large number of reservoir data records and a significant amount of geology work underpinning the gas reserves estimates, which are based on volumetrics, material balance

(P/Z) and performance."

As data began accumulating, Ryder Scott geologists saw the opportunity to integrate a geographic information system (GIS) with its mapping, so in 2017, the project began. GIS technology has advanced capabilities in spatial analysis and visualization of subsurface data. Ryder Scott set up ArcGIS as its GIS.

Brett Gray, senior vice president and geologist, said, "Initially, it was partial fact finding and digging through Ryder Scott archives to find missing pieces of data that the ministry had not collected from the operators themselves."

"With GIS, we can create, manage, analyze and generate maps. GIS links spatial with non-spatial data," said Gray.

He uses Microsoft applications Power BI and the Power Query base function in Excel with ArcGIS.

"The power in these apps is they allow you to quickly extract, transform and load data into common data tables that can be pushed into the GIS project," he said. "It allows me to create match tables, normalize operator names and remove typos in a quick, efficient manner vs. going through every spreadsheet in every year and table to ensure all those pieces

are normalized."

Ryder Scott is working on using more open source database types.

"This will help with future implementation and allow us to implement cross-platform support," said Gray. "We can load information from ArcGIS into Spotfire. I've got a Spotfire dashboard set up and you can click a field and it will provide map information, locations, etc."

Welsh stated in his paper that, "the Ministry of Energy and Energy Industries has and will continue to manage the hydrocarbon resources with the aid of independent petroleum consultants to assist in keeping the public aware of important developments in the oil and gas sector and to guide government policy in the development of the country's hydrocarbon resources."

The SPE paper, "20 Years of Independent Oil and Gas Audits: The Trinidad and Tobago Story," SPE-200985-MS, is available at onepetro.org.