

**GEOLOGIC REPORT**  
**For**  
**Application for Compulsory Pooling**

Trilogy Operating, Inc.  
"Sapphire" No. 1  
1650' FEL & 2310' FNL  
Section 24, Unit "G", T-19-S, R-38-E  
Lea County, New Mexico

**INTRODUCTION**

The Sapphire Lease (NE/4 Section 24) is part of the Emerald Prospect, located in eastern Lea County, New Mexico one mile east of the Nadine (Drinkard-Abo) Field. The field has produced more than 608,000 BO and 3,260,000 MCFG from 22 wells since its discovery in 1950. Other pay zones in the Nadine Field include the Seven Rivers, Blinebry (Upper Clearfork), and Tubb. In most cases the Drinkard and Abo intervals have been commingled, so it is impossible to determine how much each zone has produced in individual wells. Structural position seems to be more critical to the Drinkard than to the Abo. In the Nadine Field the average cumulative production on a per well basis has been 30,000 BO and 163,000 MCFG. New acid stimulation techniques may allow increased drainage areas per well, thereby increasing the ultimate recoverable reserves on a per well basis.

Trilogy Operating, Inc. has drilled four wells on the Emerald Prospect in Section 24 in the last year. The Emerald No. 1 (Unit "J"), No. 2 (Unit "O"), No. 3 (Unit "I"), and Ruby No. 1 (Unit "N") wells, currently producing from commingled Drinkard and Abo pay zones, are producing a total of 140 BOPD and 1,200 MCFGPD with 200 BWPD.

In order to preserve the leasehold, Trilogy proposes to drill the Sapphire No. 1 in Unit "G" of Section 24 as an offset location to the No. 3 Emerald well to a depth sufficient to test the Drinkard and Abo Formations.

**STRUCTURE**

Based on interpretation of seismic data, the Emerald Prospect is believed to be part of a large low-relief structural platform, which is associated with the Hobbs Field structural complex. The platform contains the Nadine (Drinkard-Abo) Field and a few key wells in the East Nadine Drinkard and Abo Fields. (See Structural Cross Section A-A', previously submitted with the Application for Compulsory Pooling for the Ruby No. 1 well). The prospect is considered an extension of the Nadine Field. The structural interpretation for the prospect incorporates well control for the Yates, Tubb and Abo horizons with the seismic data. A well drilled at the proposed location for the Ruby No. 1 is expected to encounter the Tubb and Abo at subsea elevations that are flat to the Emerald No. 3 well.

## RESERVOIR DEVELOPMENT and RISK FACTORS

All of the carbonate reservoir-forming sediments of the Tubb, Blinebry, Drinkard, and Abo were deposited on a shallow water platform overlying a buried structural platform. Pelletal grainstones, packstones, and wackestones, along with oolitic grainstones, are the typical commercial reservoir facies where they have been dolomitized. The grainstones occur as filling sediments and well as shoal deposits. Many exposure surfaces are evident on logs, indicating that deposition was frequently interrupted by periods of low sea level. Alternating periods of deposition and exposure have resulted in the development of a heterogeneous reservoir composed of many individual cycles within a vertical interval of only a few hundred feet. This is evident within all the producing reservoirs. In the Drinkard Reservoir, impermeable layers, composed of either dense limestone or anhydritic limestone, often separate porosity zones. These layers may act as barriers to vertical fluid migration, suggesting that each porosity zone could have its own oil-water contact. Several of these cycles have been correlated in the three Emerald wells. They have been arbitrarily named zones "A" through "F", from the bottom of the Drinkard to the top, as shown on Structural Cross Section B-B' (previously submitted with Application for Compulsory Pooling for the Ruby No. 1 well).

**Drinkard-Abo** - In the Nadine Field production has been established throughout the entire Abo section wherever dolomite porosity is encountered. Production occurs over an interval that is approximately 600 feet in overall thickness. Down structure from the field the lower porosity intervals in the Abo appear to be wet and only the upper half of the reservoir is considered productive. The No. 2 Emerald well encountered better porosity and permeability in the Abo than either the No. 1 or No. 3 wells. Abo porosity development is less continuous, and less predictable than porosity trends in the Drinkard. Log analysis is also less reliable for the Abo Reservoir than for the Drinkard. The Sapphire No. 1 well is expected to be on strike with the Emerald No. 3 well, which is productive from only the upper portion of the Abo.

Within the Drinkard Reservoir the "A" zone (bottom zone) has the best porosity and permeability. Of the four wells drilled by Trilogy, only the No. 1 Emerald produces from the "A" zone. The "A" zone is wet in the Emerald No. 2 and No. 3 wells and in the Ruby No. 1 well, all of which are slightly low to the No. 1 Emerald well. The No. 2 well is completed in zones "B" and "C". The No. 3 well is the lowest of the three wells and is currently being completed in zones "C" and "D". Zone "D" is better developed in the No. 3 well than in the No. 1 well. If not for the fortuitous development of zone "D", the No. 3 well would probably be a marginally commercial well. The Sapphire No. 1 well is expected to be productive in zones "C" and "D".

**Secondary Objectives** - The Tubb and Blinebry are secondary objectives for the prospect. In Nadine Field Cross Timbers Operating Co. has identified behind pipe pay dolomites within the Tubb Formation. Their net pay map of the Tubb shows 8 to 15 feet of net porosity in most of their wells. No pay has been identified in the Tubb in any of the wells drilled by Trilogy. A possible pay zone was encountered in the middle Blinebry

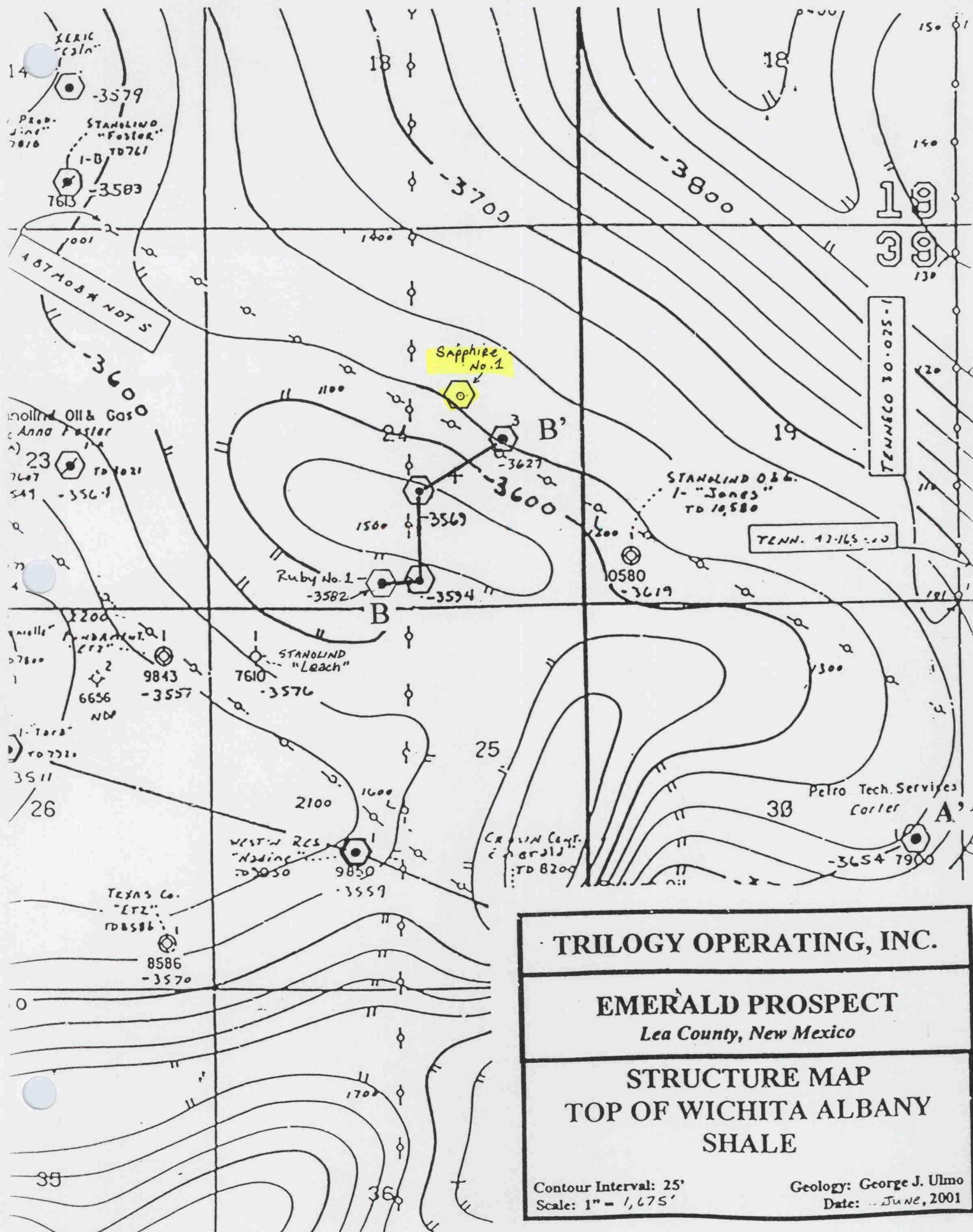
of the No. 3 Emerald well. However, log calculations suggest that the zone will produce with a very high water cut, so it is not considered to be a known pay interval at this time.

The San Andres is a prolific producer in the nearby Hobbs Field. Two and one-half mile northwest of the prospect, seven of the San Andres wells in section 15 produced more than 150,000 BO. Several of them produced in excess of 400,000 BO. However, none of the wells drilled by Trilogy have encountered any shows in the San Andres, so it is not considered to be a secondary objective.

### **SUMMARY**

In order to preserve the "Sapphire" leasehold in the NE  $\frac{1}{4}$  of Section 24, Trilogy Operating, Inc. proposes to drill the Sapphire No. 1 well at the proposed location to a depth sufficient to test the Drinkard and Abo Formations.

George J. Ulmo  
Consulting Geologist



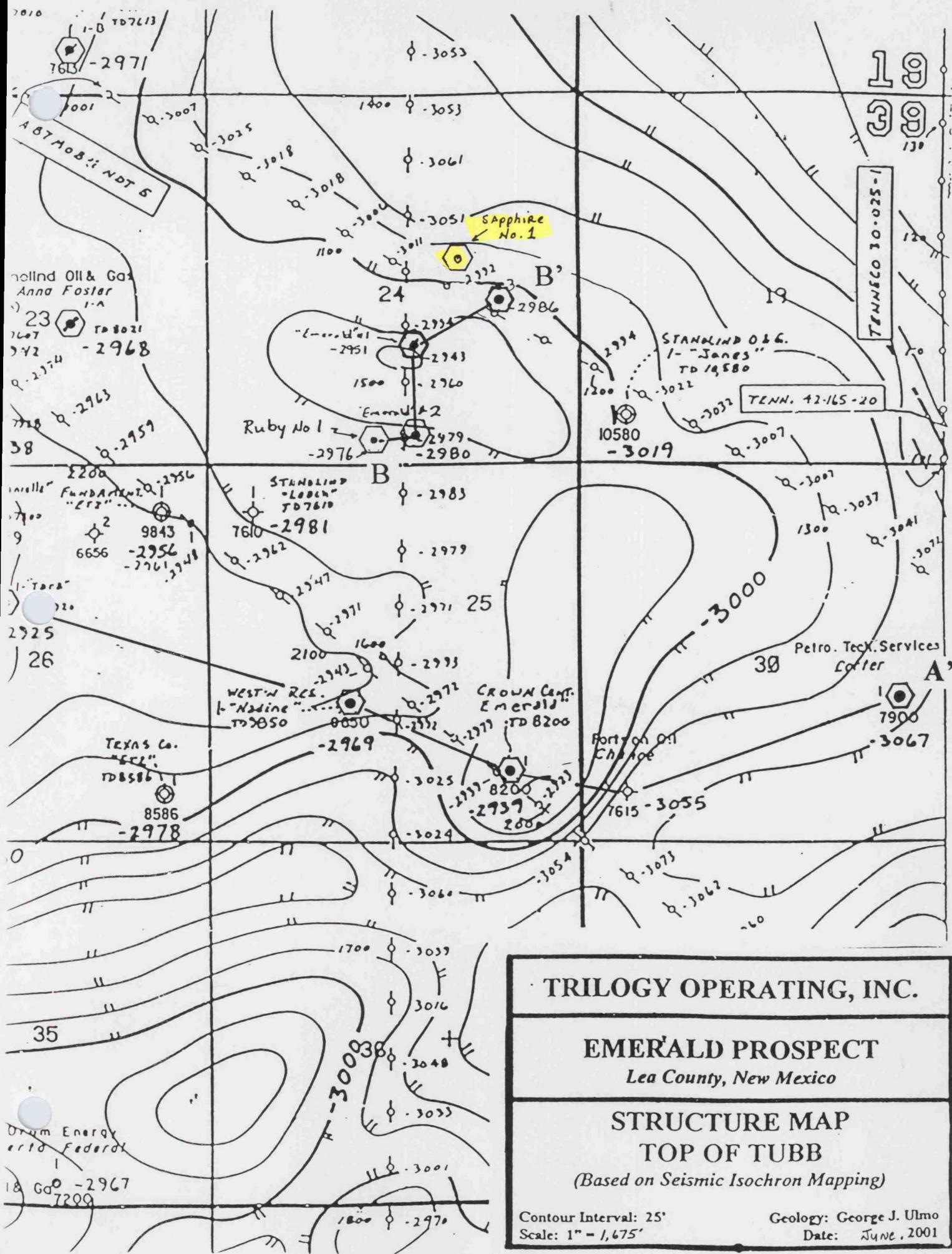
TRILOGY OPERATING, INC.

EMERALD PROSPECT  
Lea County, New Mexico

STRUCTURE MAP  
TOP OF WICHITA ALBANY  
SHALE

Contour Interval: 25'  
Scale: 1" = 1,675'

Geology: George J. Ulmo  
Date: June, 2001



<p><b>TRILOGY OPERATING, INC.</b></p>	
<p><b>EMERALD PROSPECT</b> Lea County, New Mexico</p>	
<p><b>STRUCTURE MAP</b> <b>TOP OF TUBB</b> (Based on Seismic Isochron Mapping)</p>	
<p>Contour Interval: 25' Scale: 1" = 1,675'</p>	<p>Geology: George J. Ulmo Date: June, 2001</p>