

**Geological and Engineering Attachment  
Washington "33" State #12**

**Summary:**

ARCO Permian requests administrative approval for an unorthodox location for Washington 33 State # 12, a new well we propose to drill to the Artesia-Q-G-SA Pool and the newly-defined Artesia (Glorieta-Yeso) Pool. This location is required for geologic reasons. This well is on the same 40-acre tract as Washington 33 State #11 (API 30-015-30193; Yeso/San Andres orthodox location approved) in Unit Letter G of Section 33. ARCO holds 100% of all rights down to the top of Abo shale on this 600-acre lease.

**Background of ARCO NSL Requests in the area:**

ARCO was granted NSL-4003 approval for drilling the Washington #12 location to the Queen-Grayburg-San Andres on April 14, 1998. Division Administrative Orders NSL-915-A, NSL 915-B, NSL 809-A, NSL 999-A, NSL-4007, NSL-4035, NSL-4036, and NSL-4060 have also been granted for other unorthodox Artesia (Queen-Grayburg-San Andres) locations on the same lease. Recent completions (documented below) now indicate that all remaining new wells in Section 33 should be cased through the Yeso to allow for a low-cost completion in this deeper zone. We therefore propose to drill Washington #12 to 4200', or 1100' deeper than originally proposed. An amended NSL-4060 will also be requested by separate letter to enable us to drill Washington #19 and #23 to the Yeso.

**Washington #9 and #14 Results:**

In June 1998, ARCO completed Washington #9 in unit letter F of Section 33 for 28 BOPD, 65 MCFD and 716 BWPD, after sandfrac. A copy of this nearby log showing the Yeso dolomite pay is attached. Washington #14 in Unit letter H was also completed in June from the Yeso, and potential for 9 BOPD, 25 MCFD, and 863 BWPD. We believe the larger 175,000# frac on the latter well is responsible for improved stabilized production of around 40 BOPD. According to the NMOCD Artesia office, this new field will be designated the Artesia (Glorieta-Yeso) Pool. These wells also have uphole San Andres pay, as shown on the second attached log.

**Geology:**

The Yeso (the upper part of which is sometimes called the Paddock Formation) is a fine-crystalline, anhydritic, slightly vuggy dolomite that lies under the Glorieta sand. The lower Yeso (which we are not producing from) is sometimes called the Tubb and Drinkard in Lea County. A structure map of the top Glorieta sand, which is a better geologic marker than the Yeso, has been provided. This map shows up to 5-degree dip to the SE in Section 33, with the "crest" of the structure plunging due east, one mile north of us in Section 28. The gross 250' of Yeso pay we produce from is the same dolomite interval as found at Atoka (Glorieta/Yeso) Field, East Empire (Yeso), and the deeper Grayburg-Jackson (San Andres) pay. This dolomite rarely produces without a major frac job.

The San Andres dolomite is an established pay from offset wells, and maps showing top San Andres Structure and Gross Pay are also included. The San Andres structure dips SE and is similar to the Glorieta structure. Gross pay interval across Section 33 ranges from 500 to 600 feet.