

# Facsimile Cover Sheet

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**Pages including this 3**  
**cover page:**

Dear Michael: Re: Washington 33 NSLs

Attached is my newest discussion for the ammended NSL we are requesting. I hope it deals adequately with expanding the geology. Brian told me the Yeso will be Empire-Glorleta-Yeso-SW Field. There is no vertical expansion for Artesia field being considered.

Thank you.

Dave

*Dave*

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**Geologic and Engineering Discussion for Amended Washington 33 State #12 Location  
(NSL-4003), Unit G of Section 33, T17s, R 28E, Eddy Co, NM**

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 Empire-Glorieta-Yeso-SW 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 potentialed 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 Empire-Glorieta-Yeso-SW 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.

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Surface location Problems:

ARCO attempted to obtain an orthodox location for #12 at 2310' FN& EL, but was prevented access by a buried east-west flowline under the location (see engineer's sketch plat). We had to shift the location 122' south (to 2432 FNL, 2270 FEL) to allow adequate and safe setback from the pipeline for the small United rig we will use. Any location on the north side of the pipeline would be too close to #11 to effectively drain in-place oil. The location is unorthodox because of the north measurement. As shown on the attached plat, this unorthodox location is completely surrounded by other ARCO tracts in the same lease, so there will be no impact on any other party.

Engineering Justification for Revised NSL Request:

ARCO has already shown the need for 2 strategically spaced wells in each 40-acre tract to recover reserves in the Artesia (Q-G-SA) Field, with 550-600' of gross pay interval. The new Empire-SW (Glorieta-Yeso) Field, with similar pay type and 220-250' of gross pay, is expected to perform like the San Andres, with low-rate, long-life reserves. Analog San Andres fields indicate we should expect 50 MBO per completion on 20-acre spacing, while other Yeso fields suggest 35 MBO on 20-acre spacing from this deeper pay. Based on other Yeso fields in Eddy County, we expect high variability in pay count and oil rate from one 20-acre Yeso location to the next, and need to retain maximum flexibility to make economic completions. ARCO cannot justify drilling any new well for Yeso reserves alone, nor could we consider directional drilling. ARCO and the State of New Mexico would be best served if all wells were cased to enable Yeso completions.

Production Planning:

In most cases, we expect to complete first in the San Andres dolomite, unless logs or neighboring well performance indicates the Yeso is more prolific. We plan to soon apply to vertically expand the Artesia- Q-G-SA field to include the Yeso, and thus enable co-mingling Yeso with San Andres to keep the wells economic, as was done at Grayburg-Jackson Field by Marbob.

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