well file

Southland Royalty Company

November 18, 1982

Mr. Frank Chavez
Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

RE: SRC-Sategna #2E
1450' FSL & 1850' FEL
Section 21, T29N, R11W
San Juan County, New Mexico

Dear Frank:

We had the cement bond log on the subject well reviewed by Gearhart. Using conventional analysis techniques, their conclusions were:

1) The interval from 6250' to 5650' has good pipe and formation bond. The cured cement has a compressive strength in excess of 1500 psi. 5640' is the estimated top of the neat cement tail slurry.
2) The interval from 5650' to 5270' has a good hydraulic seal. Compressive strength cannot be determined using published charts.
3) The interval from 5270' to 4970' exhibits partial bonding. The compressive strength is indeterminable using published charts.
4) The interval from 4970' to the top logged depth of 4700' is questionable bond and compressive strength.

As stated earlier these results were using conventional analysis techniques and data. Gearhart will confirm that these techniques and even their tool response are affected by the presence of a gaseous phase. The presence of nitrogen in the cement will reduce the attenuation affect of cement and should give high responses, indicating poor bond.

We also had them rerun the tape of original CBL. All they saved on tape was the data portion from 6250' to 4400'. The run in the hole was not recorded. I checked with our foreman again and he reassured me that there was good cement bond from 0'-700' and the remaining interval (700'-4400') was similar to the log response in the 4400' range.

The job designed was adequate to hold back the anticipated formation pressures and provide the hydraulic seal between formations. I have included a schematic which shows what would have been the result if the well had not blown out. This shows that a properly placed foam slurry can meet the state requirements.

The job on this well was experimental and not many of the people on location had ever participated in a foamed cement job. There were some problems on handling the pumping of the slurry into place and problems with the slurry mix. The presence of nitrogen at surface indicates to me that the surfactant was not entraining the total nitrogen volume adequately. After the well blew out we continued pumping the slurry with the rams closed until the plug was bumped. The float was checked and held okay. We did still have pressure on the annulus. The well was left shut in with periodic checks of the annulus pressure. We tried to flare the gas coming out of the annulus during these checks. It would not burn indicating it was an escaped nitrogen bubble and the slurry was holding the gas zone at 500'. After waiting 9-1/2 hours it was apparent the nitrogen was not going to dissipate and it would still move the slurry if we allowed it to vent too long. An additional 125 sacks were pumped thru the bradenhead to push the nitrogen cap away and hold the cement slurry below in place. This would give a neat cement cap from 0 to 516'. The well was then left shut in for two hours. The bradenhead valve was opened up and the well flowed back for 5 minutes then died. With indicated good cement to 700' we have to assume that not all of the neat cement cap was blown out of the hole and it was in place as designed. It is also assumed that the foam slurry must be left static for at least 12 hours to achieve an adequate gel strength to prevent flow.

The questions of cement permeability and the presence of gas bubbles or channels cannot be answered with the information we have now. Laboratory data on foam slurries indicates it does have a higher permeability than most of the formations in the San Juan Basin. However, most of the formations in the area do not exhibit a natural flow tendency. A properly placed slurry should therefore provide an adequate formation to formation seal. This particular well possibly does have some gas pockets due to the blowout. Channeling was probably present as the nitrogen bubble came to the surface. We did pump for 20 minutes with the well closed in and this possibly stabilized the slurry. The channeling should be the only adverse effect on permeability. The slurry that lost the nitrogen should have a lower permeability then normal foamed cement. This still leaves several questions unanswered and with the present data they may remain unanswered. The only device we could think of to resolve the crossflow question would be a noise log. This could verify that crossflow does not exist which would imply good cement integrity.

We think that foamed cementing has potentially significant application in the San Juan Basin and do not want to see it unexplored because of problems with this well. If you have any other questions, please let us know and we will try to get them answered. The Sategna #2E was a learning experience for everyone involved.

I think we have gone over this procedure enough to have a good understanding of the problems encountered and ways to avoid them on the next job. If you still wish to have a hearing on the issue we will submit our next proposal for a foamed cement job with adequate time to go through the formal hearing process.

Sincerely,

SOUTHLAND ROYALTY COMPANY

R. E. Fielder

R. E. Fielder
District Engineer

REF/eg

Attachment

S.R.C.
Sategna #2E
Sec. 21 T. 29 N. R. 11 W