

60<sup>th</sup> General Meeting  
25<sup>th</sup> & 26<sup>th</sup> of September 2024  
New Orleans, LA



Wellbore Positioning Technical Section



The Industry Steering Committee on  
Wellbore Survey Accuracy (ISCWSA)

# Validation of Well Placement Within Planned Ellipse of Uncertainty

Josh Albright



# Speaker Bio

- Josh Albright
- Technical Advisor at Superior QC



# Planning a Well

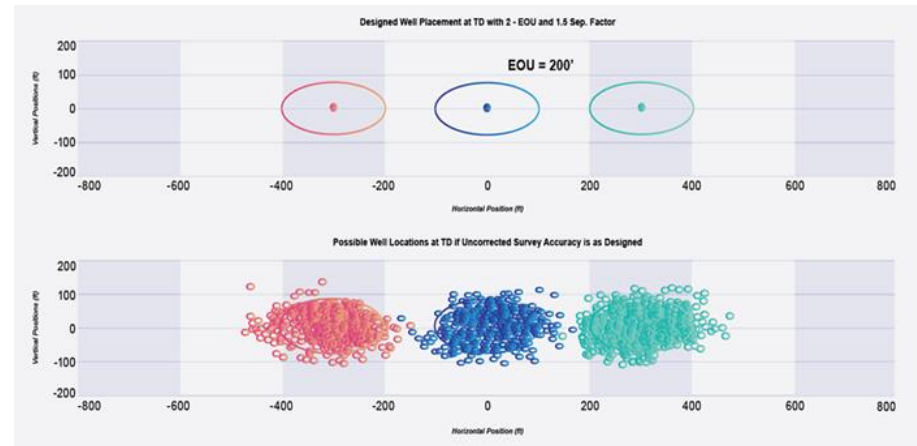
- Maximizing Reservoir Recovery
- Minimizing Risk
- AC Scans
- Well Spacing for pad drilling
- What error model will be used?

**It is assumed that the surveys of this well, future wells, and previous wells all fit within that error model**

# What that assumption means

\*Using 2-sigma EOU and 1.5  
Separation Factor\*

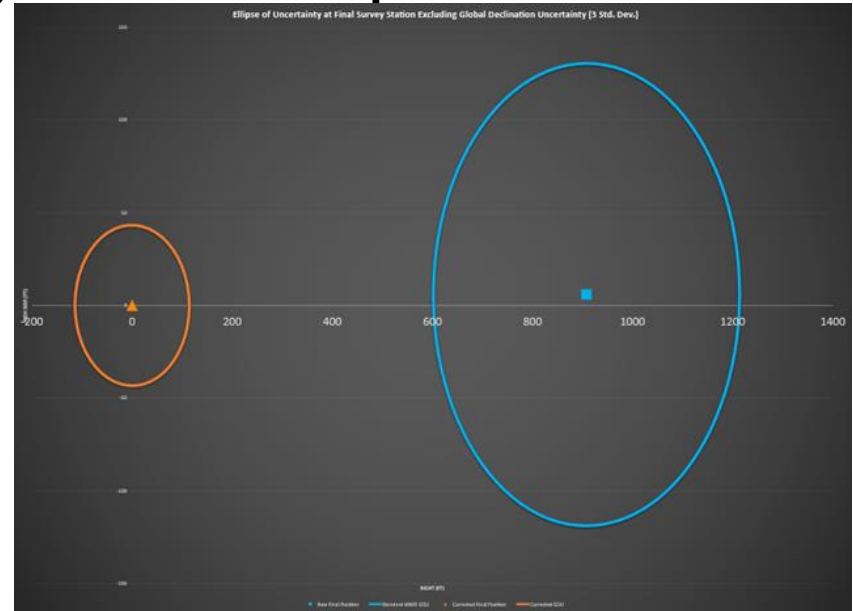
- 95% of the wells will fall within the planned EOU
- 300' of well spacing across pads



# Double Checking the Assumptions

Compared the corrected left/right final position vs the uncorrected final position and calculated EOU

- 1750 Wells in Permian, Delaware, and Eagleford Basin
- All data from wells corrected in real time
- 86 rigs - 25 service companies - 8 operators



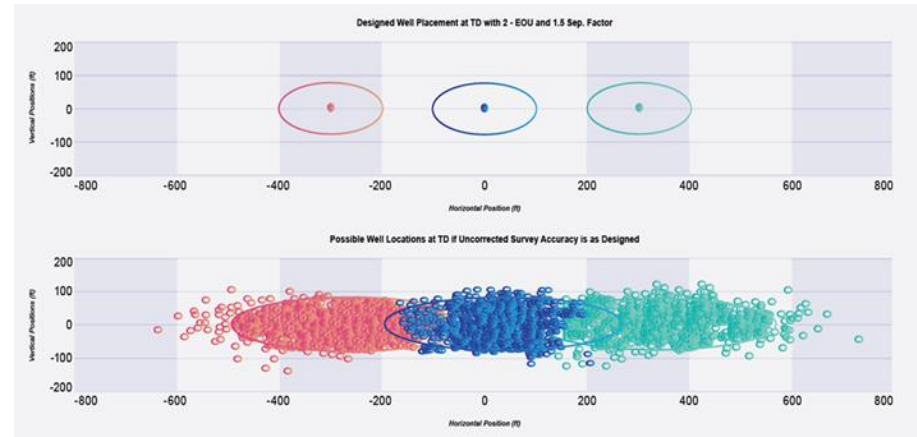
# What really happened?

\*Using 2-sigma EOU and Only accounting for left/right movement\*

Wells outside of the Planned EOU

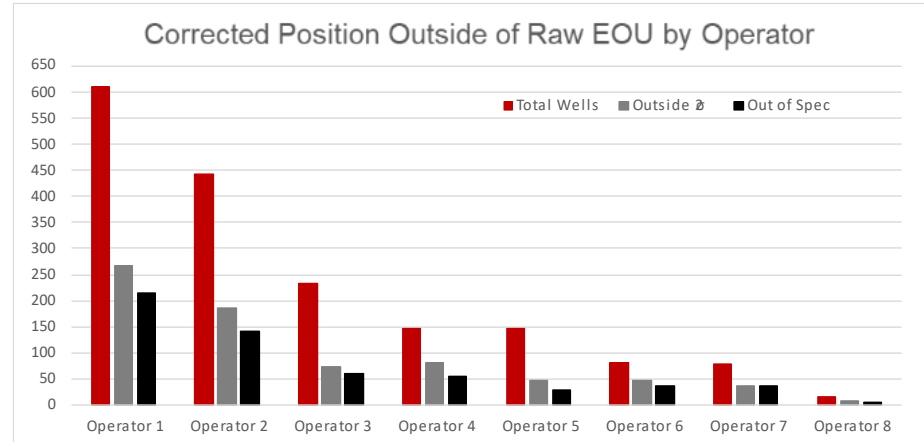
- 746 wells of 1750 tested (42.63%)
- 40% of wells drilling +/-30° N/S
- 69% of wells drilling +/-30° E/W

**427 wells (24.4%) fell outside of 3 $\sigma$**



# Revisiting Wells with Out of Spec Surveys

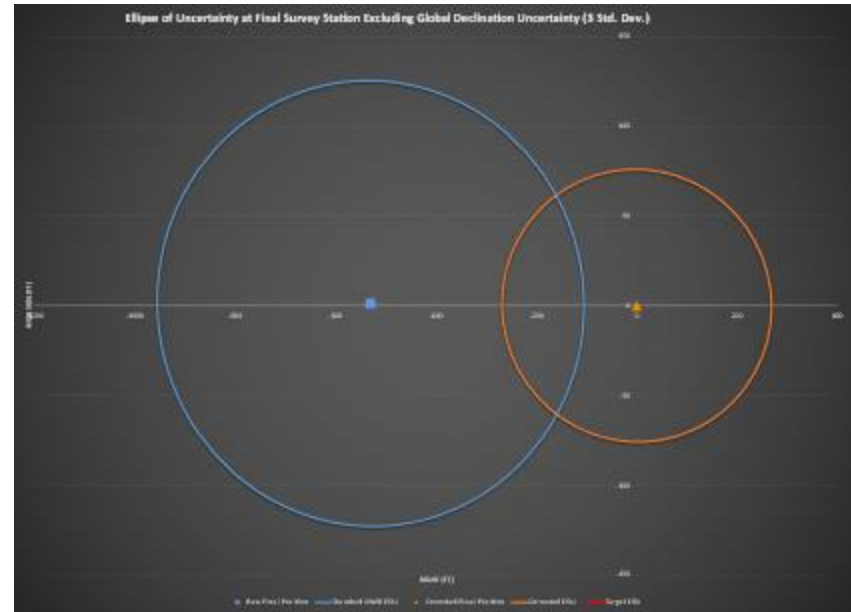
- 870 wells in original dataset had surveys in the lateral that were deemed “Out of Spec”
- Accounted for 33% of wells outside of planned EOUs
- Decided to expand dataset and exclude any wells that have surveys in the lateral that were “Out of Spec”



# Double Checking the Assumptions – Take 2

Compared the corrected left/right final position vs the uncorrected final position and calculated EOU

- 4061 Wells across US land
- All data from wells corrected in real time
- 238 rigs - 37 service companies  
- 51 operators





## What really happened? – Take 2

### Wells outside of the Planned EOU

- 1402 wells of 4061 tested (34.52%)
- 34% of wells drilling +/-30° N/S
- 45% of wells drilling +/-30° E/W
- 764 (18.81%) of wells failed 3 $\sigma$
- 1854 wells flagged as “Out of Spec”



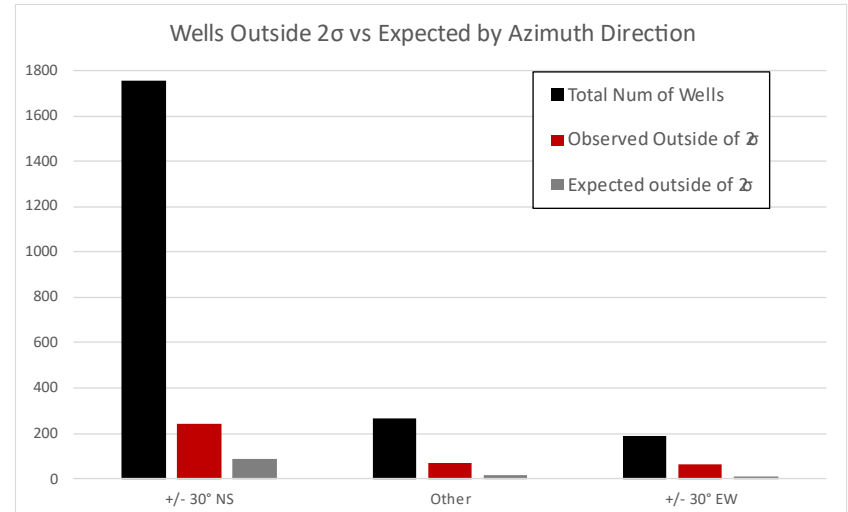
# After Removing Out of Spec Wells

\*Using 2-sigma EOU and Only accounting for left/right movement\*

Wells outside of the Planned EOU

- 369 wells of 2207 tested (16.72%)
- 14% of wells drilling +/-30° N/S
- 33% of wells drilling +/-30° E/W

**78 wells (3.66%) fell outside of 3 $\sigma$**



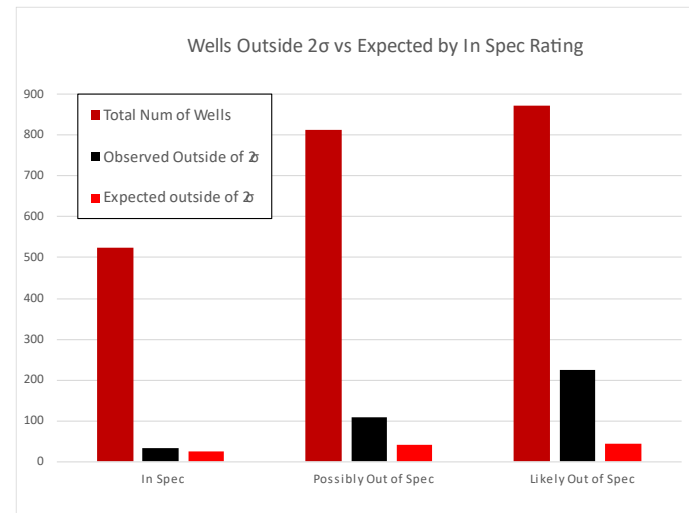


# Different Levels of “In Spec”

## Wells outside of the Planned EOU

- 6.5% of wells labeled “In Spec”
- 13.6% of wells labeled “Possibly Out”
- 25.8% of wells labeled “Likely Out”

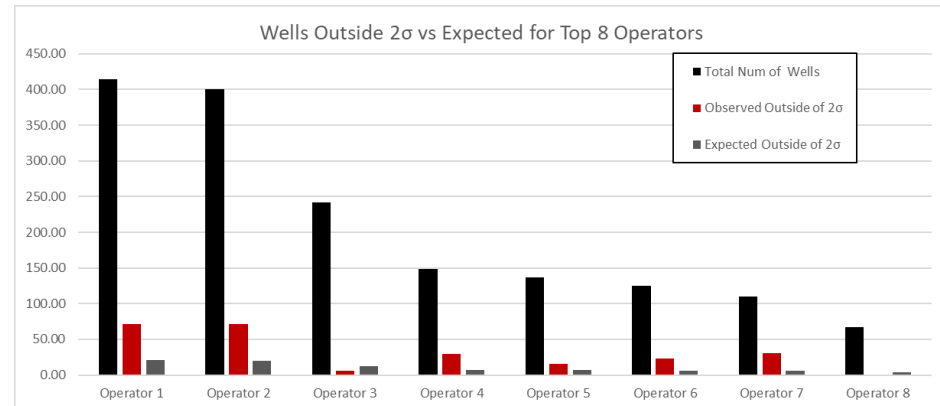
Most of these surveys passed Field  
Acceptance Criteria!





# Conclusion

- Wells in study were outside of  $2\sigma$  EOU over 3 times more than expected
- Over 6.5 times more likely when drilling E/W
- As survey's residuals approach failing FAC greatly increases the chance of being outside of planned EOU





Thank you

Questions?