American Warrior
Microbial Enhanced Oil Recovery
Project Results

DATA COLLECTION AND ANALYSIS

Historical Data:

Daily Gauge reports and pumper notes were used to establish pre- and post-treatment production averages. Zero production days; typically noted as down or pumping in the gun barrel were excluded. Multiple well leases pumping into a common tank battery were assumed to be pumping all wells on those days counted as production days. The statistical analysis excluded production gauge inches one deviation above or below the mean so that days when one or more wells are not pumping are not counted as production days. Cold weather, mechanical problems, and workovers are external factors that can skew production data. These factors were considered in the data analysis.

Analysis Methodology:

A mean averages are calculated for given date ranges using gauge inches for all days in the range except for days showing zero gauge inches which are typically noted as down days or pumping in gun barrel. Variance and standard deviations are calculated excluding zero gauge inch days. Daily production inches are then reviewed and days showing more than two standard deviations above or below the mean average are excluded and not counted in the total 'production days' reported. The result establishes total gauge inches and number of production days for a given date range. Total gauge inches for each date range are then divided by the number of production days to arrive at average inches per day. This figure is then multiplied by the BBLS per inch for the given stock tanks to yield the average BOPD production.

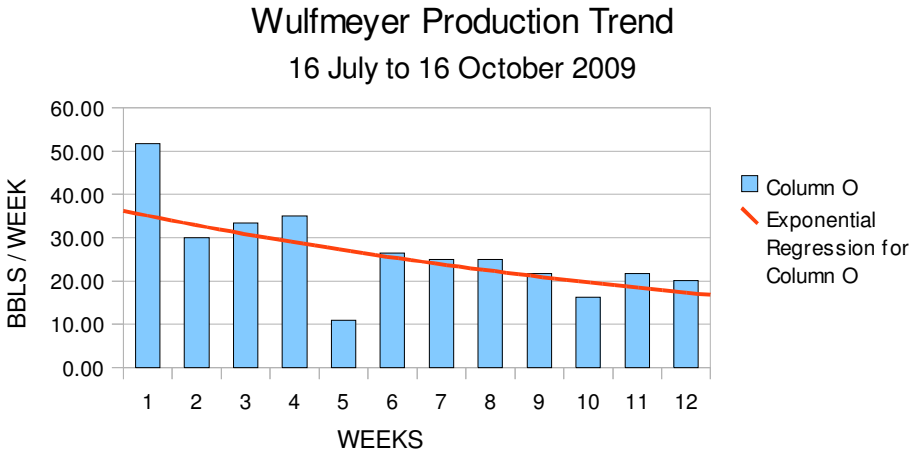
PRELIMINARY RESULTS

H.H. Wulfmeyer	106440

	Pre MEOR	Post MEOR
Production Days	89	46
Total BBLS	285.69	108.21
Avg BOPD	3.21	2.35

NOTE: Post-treatment raw production data from 1 December, 2009 through 30 April, 2010 contains numerous inconsistencies. Production data for these months will be included after verification. Charted post-production data runs from 16 July, 2009 through 30 November, 2009.

The H.H. Wulfmeyer production has been trending downward since July 2009. The 86 day pre-treatment average was 3.21 BOPD, trending down to a 53 day pre-treatment 2.95 BOPD average, and down further to a 30 day pre-treatment average of 2.66 BOPD.



This trend continues downward for the 46 day post-treatment period which averages 2.35 BOPD. However, MEOR treatments were scheduled to take place at 30-45 day intervals. Looking at the 30 day post-treatment average shows 2.76 BOPD which is slightly **above** the pre-treatment 30 day average of 2.66 BOPD. The decline was arrested for 4 weeks and then resumes the fifth week after treatment.