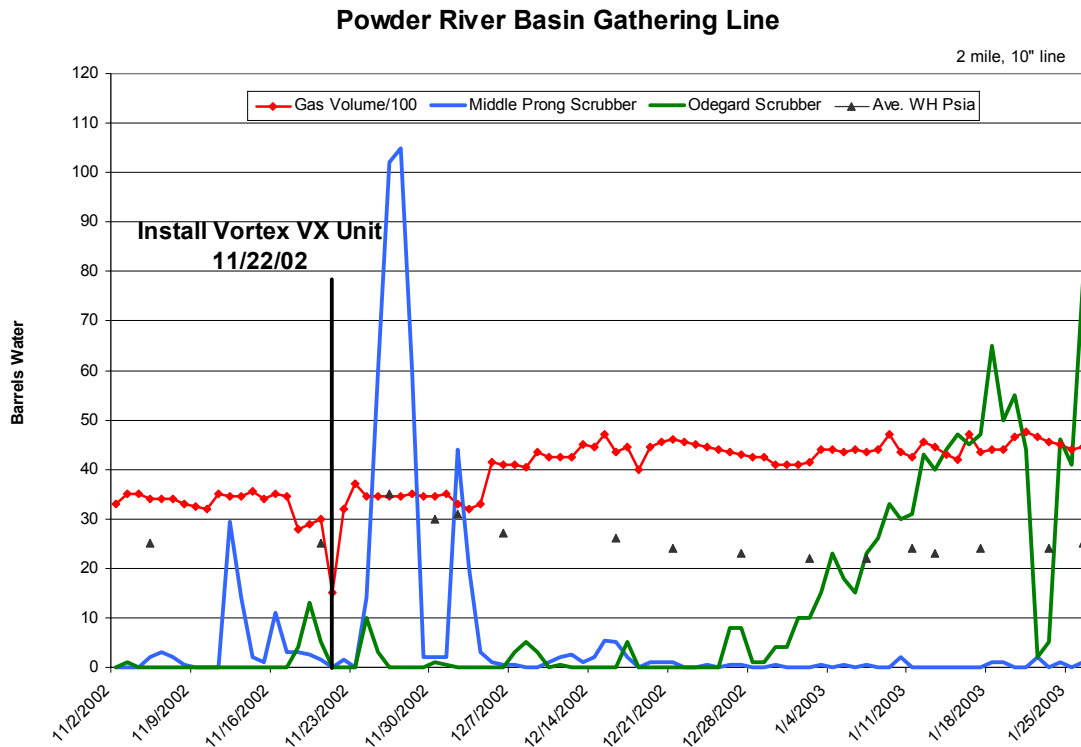
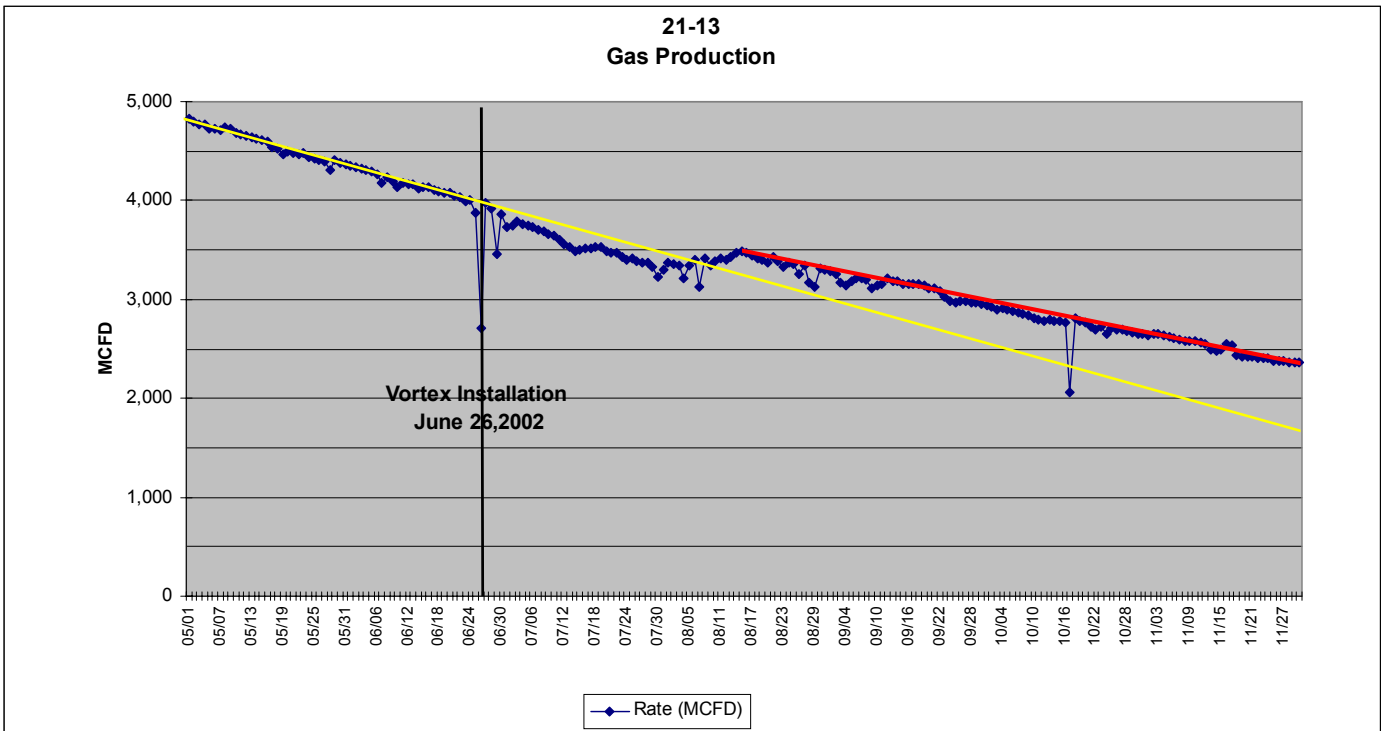


Gathering Trunk Lines Case Study 3/03

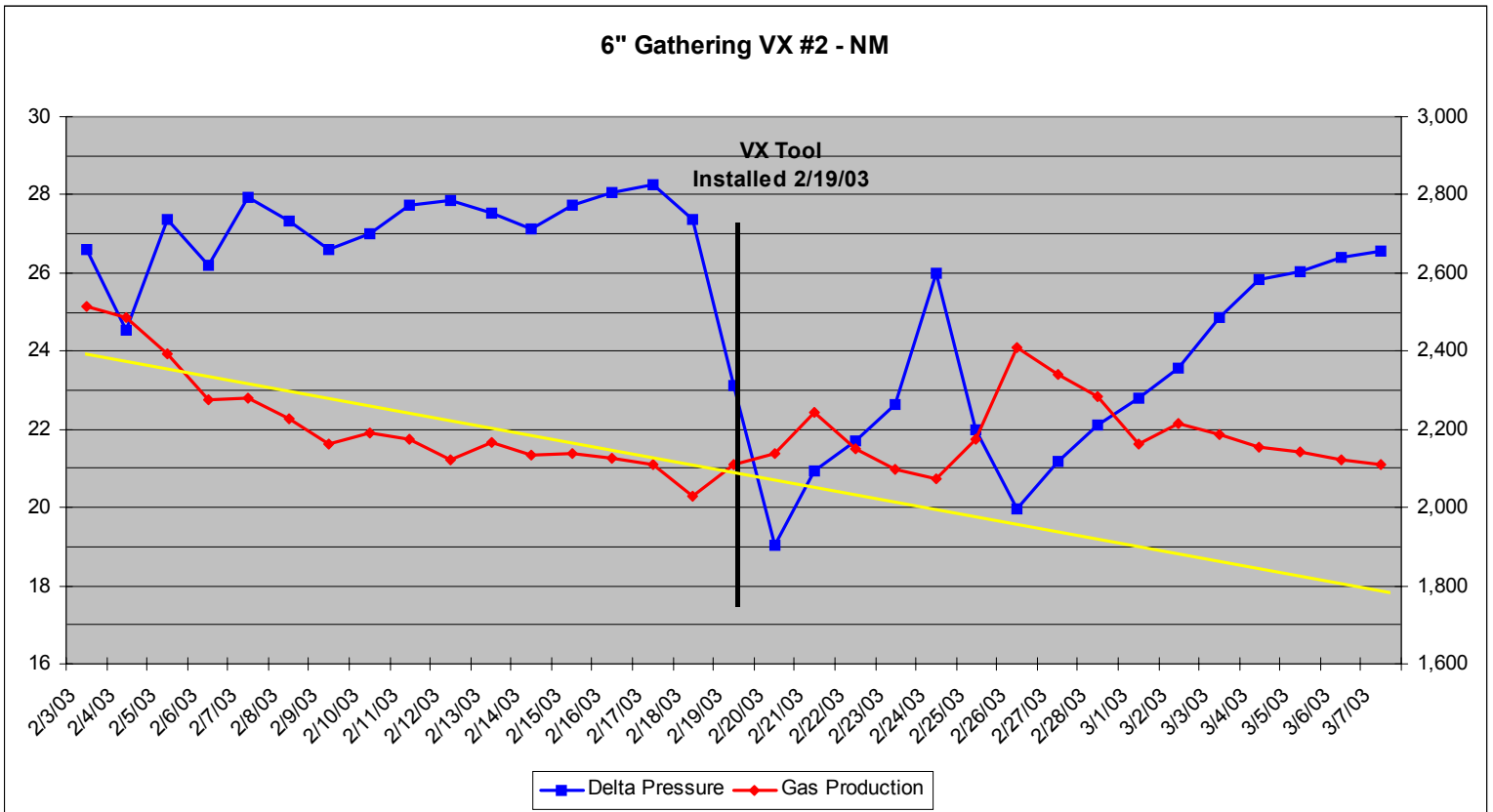
Powder River Basin – WY - Gathering Trunk Line VX Installation Removes Stagnant Liquids, Reduces Field Pressures and Increases Production - From the installation point of the 10" VX Tool to the scrubber at the end of the left leg of the Y was 2.33 miles. From the installation point to where an 8" line ties in at a 90 degree angle going off to the right is about 0.5 miles and is just over 1 mile long. Immediately after installation water produced at first scrubber 2 miles downstream increased dramatically. Six weeks after installation, water produced at the second scrubber also increased significantly. Field pressures have been reduced by about 3# from 13# down to 10#. Field production is up substantially from 3,400 MCFGPD to 4,400 MCFGPD. Some work was performed on a couple of the 12 wells in the field. It is estimated that the VX has enhanced production by 800 MCFD. Topography was not too severe, only modest rises/falls. However, it only takes a modest rise/fall to enable substantial liquid build up. It appears the VX moved about 200 BW with the first spike.



Powder River Basin – WY - Gathering Trunk Line - Enhanced Production - 1 - 8”
VX tool installed on a line that runs from a pod to a compressor station. This line did not exhibit characteristics of a line with significant liquid (pressure drop was not great and there was no water in the line when it was cut to do the install). About 30 days after installation, production shifted above the preinstallation production trend line. The post installation production trend continued to have greater variation from the pre-install trend line through 11/30/02. Modeled pressure variance analysis for the 1st 60 days after installation was inconclusive. However, there were several key pieces of data that were not available to perform the analysis.



San Juan Basin – NM - Gathering Trunk Line Installations - Enhanced Production and Reduced Pressure Drop - 2 - 6" VX tools were installed in February 2003 on trunk lines that collect gas from several smaller diameter feeder lines. These line were experiencing significant pressure drop and it was suspected that there was stagnant water in the lines. Immediately after installation, production shifted above the preinstallation production trend line. Additionally, the pressure drop was reduced significantly. The post installation production trend continued to have greater variation from the pre-install trend line through 2/28/02.



6" Gathering VX #1 - NM

