All of the comments offered by the defense experts center in some way or another on the issue of erosion or other evolution in the state of the reservoir or bottom of the wellbore, the BOP and riser, and the pipe below the BOP. As such, I will respond by addressing these distinct subsystems individually. Several experts have offered alternative time-lines for the evolution of these, which I will also address in the context of these subsystems.

Erosion in the Reservoir, Cement Plug, Reamer Shoe, Float Collar, etc.

In my original report, I concluded that the resistance to flow in the bottom of the well was falling rapidly just before the explosion on April 20, and I used this conclusion in my calculation of the flow rates prior to May 8. This conclusion was based on calculations made by Mr. Emilsen.[16]

The calculations by Mr. Emilsen employed Olga-Well-Kill to simulate flow into and from the well. In these calculations, he varied the height of the net-pay zone to match measured pipe pressures and arrival of gas at the surface from 16:00 to 21:50 on April 20. In this manner, he produced several scenarios, of which his Case 7 most closely reproduced the observations. His variation of the net-pay zone is equivalent to variation in the productivity index in his calculations, but in fact this variation serves only as a surrogate for any restriction that might have existed and varied at the bottom of the well. Dr. Emilsen

was underway. We know with some certainty, for example, that the 5-inch pipe extending above the upper annular of the BOP was severely eroded, perforated, and failed completely within 36 hours from the start of the blowout. This did not occur in weeks or months, it occurred in a matter of hours. Because flow rates are the same throughout the system, I therefore believe that erosion in the reservoir, cement plug, reamer shoe, and/or the float collar would have occurred on a comparable time scale, hours or a few days -- not weeks, and this view is consistent with Mr. Emilsen's calculations.

of this increase is consistent with the pace at which other similar events were unfolding once the blowout was underway. We know with some certainty, for example, that the 5-inch pipe extending above the upper annular of the BOP was severely eroded, perforated, and failed completely within 36 hours from the start of the blowout. This did not occur in weeks or months, it occurred in a matter of hours. Because flow rates are the same throughout the system, I therefore believe that erosion in the reservoir, cement plug, reamer shoe, and/or the float collar would have occurred on a comparable time scale, hours or a few days -- not weeks, and this view is consistent with Mr. Emilsen's calculations.

The defense report of Dr. Johnson states that Mr. Emilsen's results show that this change was just a single step and that the two values of 13 and 16.5 feet for the net-pay height match all of the data over which each is applied.[18] I believe that this is a specious argument because Mr. Emilsen had no apparent

[16] From "Deepwater Horizon Accident Investigation Report," September 8, 2010. Appendix W, Case 7, Page 54. To match data and observations, the pay zone was increased from 13 and 16.5 feet, corresponding to effective productivity indices of 7.4 and 9.4 stbd/psi based on the nominal value of 49 stbd/psi and maximum pay zone of 86 feet used in that report. At this rate, the productivity index would reach 43.8 stbd/psi in 8.6 hours.

[17] Deposition of Morten H. Emilsen, December 8, 2011. See page 70 for example.

[18] Expert report of A. E. Johnson. Page 11.