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CAMERON

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To: Naval Goel, McMoRan

From: Charles Gibbs, Sr. Principal Engineer, Cameron Drilling Systems

Copy: Jay Jurena, Director of Engineering, Cameron Drilling Systems

Subject: Shear Calculations for 13-5/8" 25k EVO BOP

The purpose of this memo is to provide McMoRan with calculated shear pressures at MASP for shearing two different pipe sizes using Cameron's 13-5/8" 25k EVO BOP. Cameron document EB-702D was developed to assist users in defining the shearing requirements for drilling operations. Per the information supplied by McMoRan, shear calculations have been made for the following BOP with the pipe listed. (Note: All pipe shears are assumed to be made with DVS rams.)

- 13-5/8" 25k EVO BOP
  - 2-7/8" x 0.362" wall (ID= 2.151") V-150 pipe
  - 3-1/2" x 0.430" wall (ID=2.640") C22HS160 pipe

Per EB-702D and the information supplied by McMoRan, the following data was used for the BOP.

- 13-5/8" 25k EVO BOP
  - C1= 327, C2= 36
  - MASP = 25,000 psi

For both pipe materials (V-150 and C22HS160) a C3 factor of 0.19 was used.

Using the above information and the equations in EB-702D, shear pressures for the above BOP and pipe combinations at both zero and maximum wellbore pressure (MASP) are shown below:

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13-5/8” 25k EVO BOP

- 2-7/8” x 0.362” wall V-150 pipe
  - At zero wellbore pressure, estimated shear pressure = **926** psi
  - At 25,000 psi wellbore pressure, estimated shear pressure = **3,678** psi
- 3-1/2” x 0.430” wall C22HS160 pipe
  - At zero wellbore pressure, estimated shear pressure = **1,433** psi
  - At 25,000 psi wellbore pressure, estimated shear pressure = **4,186** psi