

#### Modeling of system flow behaviour (reservoir to sea)

There are four data points in which we have good confidence... reservoir pressure of ~12000 psi, seabed water pressure of ~2250 psi, fluid properties (bubble point ~6600 psi, gas-oil ratio ~2800 scf/bbl, and fluid composition), and flow path to sea being out of the full bore of the riser.

We are currently less certain of the following aspects, and need to keep abreast of the up-to-date view on each in order to maintain the best available model of the system:

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are given below (for the two positions: cases of flow through trim pipe and flow through full bore riser). The model solves for flowrate and wellhead flowing pressure, given the orifice size and the inlet and outlet boundary conditions of reservoir and seawater pressure respectively.

The further variable of reservoir in-flow performance is also modelled with three illustrative values, 1 bbl/d/psi, 10 bbl/d/psi and fixed bottomhole pressure. The last of these three shows the maximum hydraulic capacity of the system from bottomhole to sea and is a theoretical-only worst case. In reality the reservoir will always impose some resistance to flow, given by the illustrative values of 1 and 10 bbl/d/psi. We need the view of Macondo subsurface modeller and well designer to give us their view of the most appropriate value.

The data generated takes the form of the following illustrative table:

| Orifice size inches diam | Flowrate stock tank bbl/day | Wellhead flowing pressure, psi | Flow path        |
|--------------------------|-----------------------------|--------------------------------|------------------|
| 0.25                     | 2523                        | 8567                           | All Drill string |
| 0.5                      | 9840                        | 8514                           |                  |
| 0.75                     | 20888                       | 8170                           |                  |
| 1                        | 33184                       | 7472                           |                  |
| 2                        | 58284                       | 4984                           |                  |
| 5                        | 66171                       | 4179                           |                  |

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