

M.1 Work-Equid Report

Macondo was an exceptionally light oil which divides significantly when taken to the surface. As a result the shrinkage coefficient B_0 plays a major role in the calculation of oil released.

4.1.18 Two different methods to convert to surface volumes. Two approaches are used in the oil industry to convert from oil volume in the reservoir to oil volume at surface conditions. A higher amount of produced oil is calculated using the conversion factor produced by the Government's fluid expert Dr. Zick. He used a method known as multistage separation. This is what is used by oil companies to maximize volume during normal, planned production. When oil companies normally produce oil, they separate the oil and exsolved gas through a deliberately-engineered series of separators at a succession of decreasing temperatures and pressures. This multistage separation is designed to produce as much (valuable) oil, and as little (less valuable) gas as possible. The value of B_0 depends on the exact sequence of separations. It will be the lowest possible B_0 in order to produce the highest possible surface volume. Dr. Zick tries to convert the high-volume separation process that he expects BP was planning to use if it produced oil from Macondo for sale. But of course, the oil would not have been produced to such a degree as it would through surface separation in a normal process.

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4.1.19 *Dr. Zick's results.* The Government's fluid expert Dr. Zick used the Government's own definition of approximately 2.1.¹⁷¹ Dr. Hockaday-Daniels, however, said that he used a single-stage method for the conversion,¹⁷² so his number should be close to mine.¹⁷³

4.1.20 Connected oil volume: 109-114 MMbbl. Table A.7 shows my determinations of initial oil in place down are three values, derived from the values of B_0 measured by the three different laboratories. Thus, as will be the case for each input variable, I base the range on the measured data.

I arrive at a number – around 110 MMbbl – which has been agreed as plausible by all the Government investigators.¹⁷⁴ However, we arrive there by different methods. The Government experts arrived the

¹⁷¹ See Appendix F.2 and Appendix A.2.

¹⁷² See Table A.4.

¹⁷³ Dr. Hockaday-Daniels report (1.8, Table 1).

¹⁷⁴ Dr. Hockaday-Daniels' value of 2.21000 for initial formation oil was factor for his base case simulation model taken from his computer model files. Dr. Salter & Hargreaves used 2.141 (SR) page 27.

¹⁷⁵ See Hockaday-Daniels report (F.1, Appendix A.1, 24p-43).

¹⁷⁶ See Appendix F.2, Table F.1 and Table A.4.

¹⁷⁷ All but one of Dr. Hockaday-Daniels' "good match" simulation models over-estimate the oil volume – Appendix F.4.