

Drilling in Namibian Waters

Table 1 shows the rig types that have been used in Namibian waters. The two most common rig types used in Namibia are **semi-submersible rigs and drill ships**. The shallowest and deepest water depths drilled are 162.9m and 2134m respectively. The well drilled in the deepest water is Tapir South-1 in the Namibe Basin and it was drilled by the semi-submersible Maersk Deliverer.

Table 1. Exploration and appraisal wells.

Well Names	Year drilled	Operator	Water depth (m)	Drilling rig
Kudu 1	1974	Chevron	-167	Semi-Sub (Sedco 135)
Kudu 2	1987	Swakor	-168	Semi-Sub (ASTERIE)
Kudu 3	1988	Swakor	-165.5	Semi-Sub (ASTERIE)
Kudu 4	1996	Shell	-199.6	Semi-Sub (Petrobras XVI)
Kudu 5	1998	Shell	-162.9	Semi-Sub (Ocean Whittington)
Kudu 6	2002	Shell	-179.2	Semi-Sub (Ocean Whittington)
Kudu 7	2002	Shell	-170.1	Semi-Sub (Aker H-3)
Kudu 8	2007	Tullow Oil	-179.25	Semi-Sub (Pride South Seas)
2213/6-1	1995	Ranger Oil	-218	Semi-Sub (Omega)
1911/10-1	1995	Norsk Hydro	-631	Drillship (Pelerin)

Legend

- Exploration well
- Appraisal well

1911/15-1	1994	Norsk Hydro	-489.5	Semi-Sub (Scraqueo 4)
2012/13-1	1995	Sasol	-688	Drillship (Nedrill 1)
2815/15-1	1996	Chevron	-177.1	Semi-Sub (Petrobras XVI)
2313/5-1	1998	Shell Nam	-374.7	Semi-Sub (Hakury 5)
2513/8-1	1998	Norsk Hydro	-243	Semi-Sub (Hakuryu 5)
Wingat-1	2013	HRT	-1004.5	Semi-Sub (Transocean Marianas)
Murombe-1	2013	HRT	-1391	Semi-Sub (Transocean Marianas)
Moosehead-1	2013	HRT	-1716	Semi-Sub (Transocean Marianas)
Kabeljou-1	2012	Petrobras	-377	Drillship (Ocean Rig Poseidon)
Tapir South-1	2012	Chariot oil	-2134	Semi-Sub (Maersk Deliverer)
Kunene-1	2008	Sintezneftegaz	-772	Drillship (D/S Deep Venture)
Welwitschia-1A	2014	Repsol	-1041	Drillship (Rowan Renaissance)

The total depths of wells drilled offshore Namibia are shown in **Figure 1**. Wells drilled offshore Namibia fall within a total depth interval of 2553m and 5729m, with an average total depth (TD) of 4045 m.

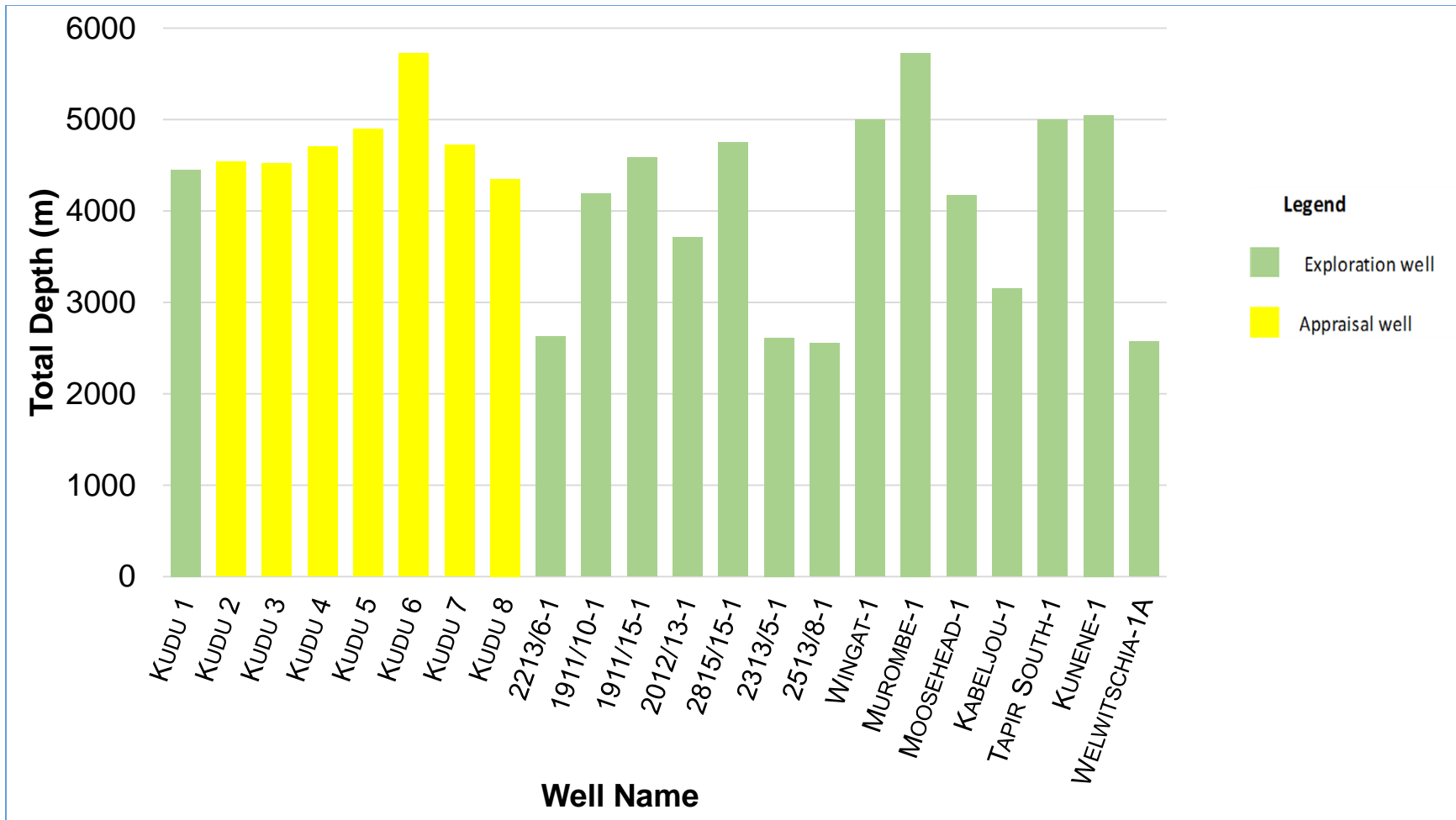


Figure 1. Depths for exploration and appraisal wells

Rig Time

Offset wells are commonly used to estimate how long it would take to drill a well in an area of similar geology or in the same basin.

Figure 2 shows an example of wells from each basin for rig time analysis (Rig time versus Total depth), based on the availability of data.

- Kudu 1 – Orange Basin
- 1911/15-1 – Walvis Basin
- Tapir South – Namibe Basin
- 2513/8-1 – Lüderitz Basin.

The rig time for wells offshore Namibia falls between 36 and 80 days, with an exception of Kudu 1 Well (about 112 days) which was drilled long time ago in 1974 and technology by then was not good enough to allow fast drilling. The average drilling time (period) is about 2 months.

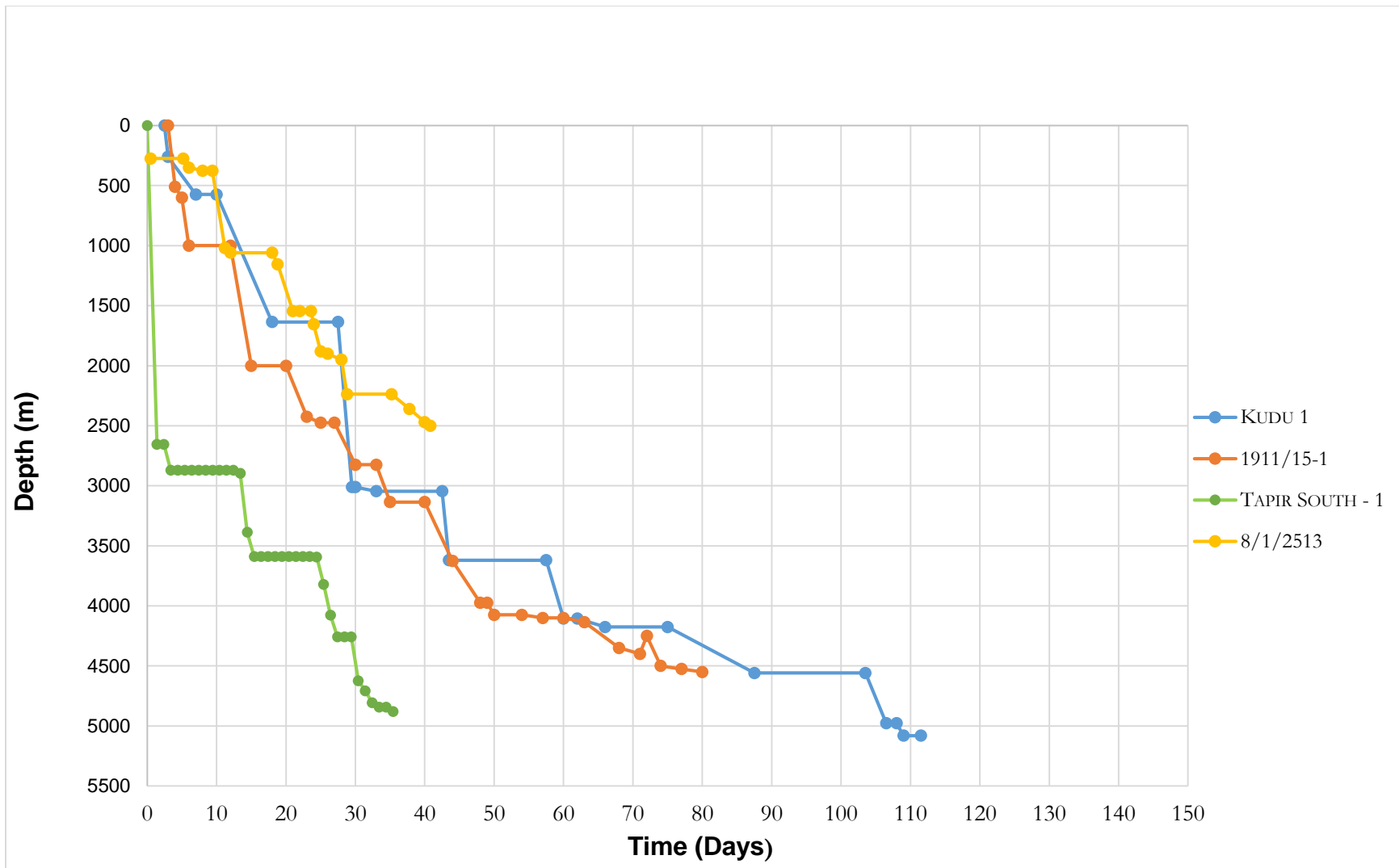


Figure 2. Rig time versus Total depth

Drilling Costs

Drilling costs for exploration and appraisal wells in Namibia are shown in the **figure 3** below. This figure only show the costs of some wells based on the availability of data. Equipment failures and hole problems, are the main causes of down time during drilling operations costing the companies millions of dollars. Rig type, rig capacity, rig generation and daily rate are the other factors that affect drilling cost. It is very important to do a thorough analysis of the drilling costs of offset wells for each basin to help in mitigating drilling uncertainties.

Looking at the wells drilled offshore Namibia as shown in **Figure 3**, there is a steady increase in drilling costs between 1995 and 2014, except an abrupt increase between 2002 and 2012 which was due to lack of drilling activities (no well drilled) for ten consecutive years. The highest drilling cost for the Welwitschia-1A well was a result of non-productive time (NPT) caused by technical faults within the rig.

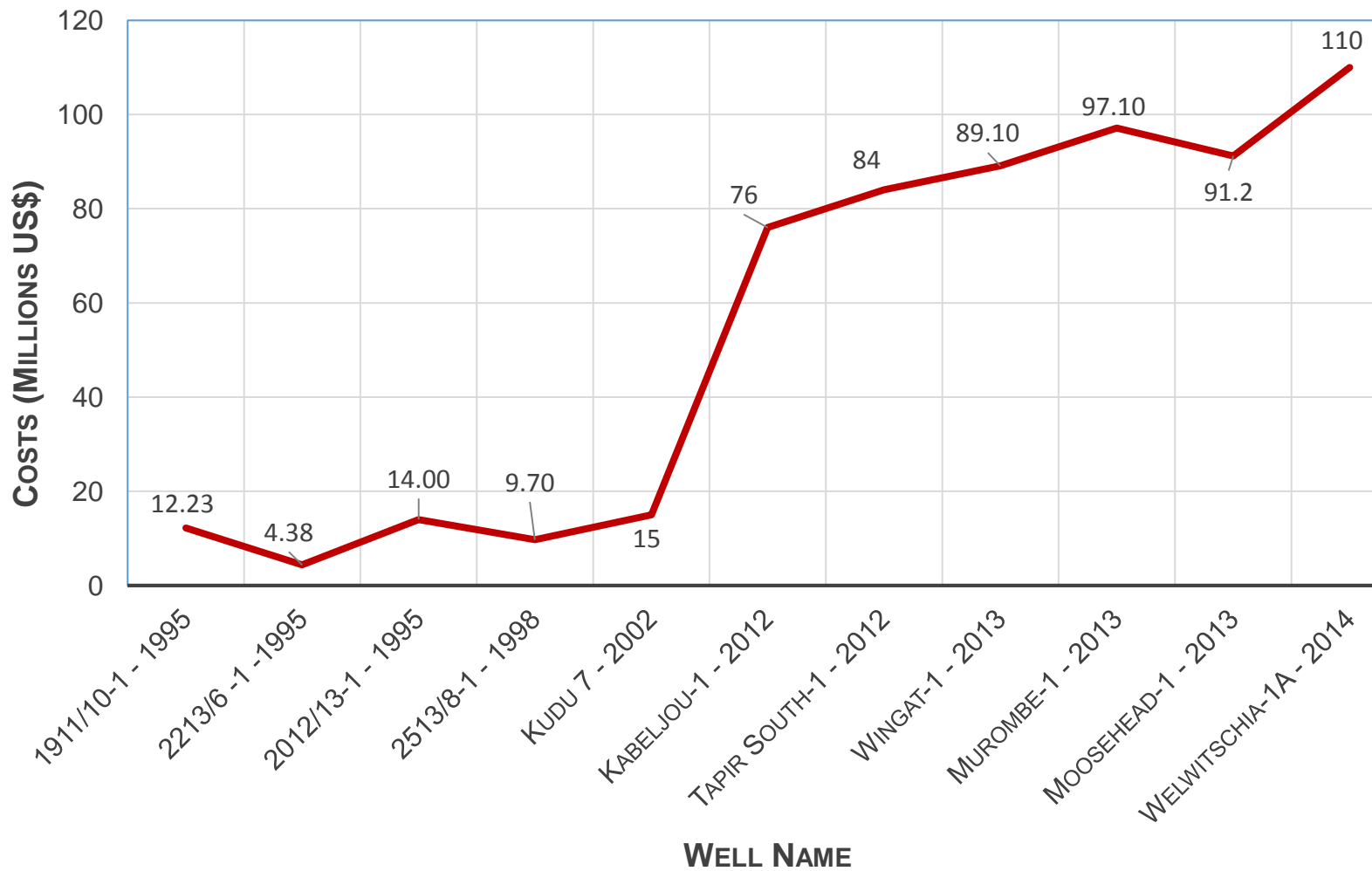


Figure 3. Reported drilling costs for exploration wells in Namibia