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Estimated Consumption of Drilling Mud Materials in Australia and Papua - New Guinea

1963 - 1967

by

P.G. DUFF

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS
MINERAL RESOURCES BRANCH
PETROLEUM TECHNOLOGY SECTION

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ESTIMATED CONSUMPTION OF DRILLING MUD MATERIALS IN AUSTRALIA AND PAPUA - NEW GUINEA 1963 TO 1967

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SUMMARY

The estimated consumption of drilling mud chemicals used in drilling of exploration wells in Australia and Papua-New Guinea is presented.

The consumption figures were derived from averages obtained from well completion reports submitted in respect of drilling operations carried out under the Petroleum Search Subsidy Act, 1959/1966.

This record also contains a list of trade names for various mud chemicals used in Australia and Papua-New Guinea.

INTRODUCTION

Most of the chemicals used in drilling muds in Australia and Papua-New Guinea have been imported from the U.S.A. However, considerable interest in this market is now being shown by companies and private persons, operating in Australia, who have access to one or more of the chemicals required. The incidence of enquiries from the potential suppliers concerning the tonnages of various mud chemicals used yearly in Australia and Papua-New Guinea, has significantly increased in the last two years.

In an endeavour to satisfy these enquiries, calculations of the probable consumption of all chemicals used in drilling muds in Australia and Papua-New Guinea have been made from the data presented in the well completion reports in respect of the subdivided drilling operations. The number of well completion reports examined for each year is shown below:-

1963-83	reports	representing	74%	of	the	yearly	footage	drilled.
1964-91	"	"	44%	"	"	"	"	"
1965-43	"	"	24%	"	"	"	"	"
1966-48	"	"	44%	"	"	"	"	"
1967-33	"	"	24%	"	"	"	"	"

METHOD OF ESTIMATING YEARLY CONSUMPTION

Lists were made of the types and quantities of mud chemicals used during each year, and a composite list of the probable chemical consumption was prepared as follows:-

The average consumption of each chemical used for each 1,000 ft of hole drilled in the year being examined was determined. This value was then multiplied by the (aggregate) number of thousands of feet drilled during the year to obtain the probable consumption of each chemical during that year. Development wells as well as exploration wells were included.

The consumption figures so obtained must be taken as an approximate guide only, for the number and the type of the subsidised wells and the proportion of their aggregate footage in relation to the total footage drilled each year are not necessarily representative of the drilling conditions encountered by every well drilled that year.

RESULTS OF INVESTIGATIONS

The results of the investigation in the estimated consumption of drilling mud materials in Australia and Papua-New Guinea is shown in Table 1. Examination of this table indicates that, in general, the consumption has increased yearly. There are some exceptions where, for example, gypsum or salt muds have been used in certain areas in which contamination by the formation necessitated the use of these two chemicals but where, in the following year, drilling activity had moved away from such areas and, the use of gypsum or salt was no longer required.

The most significant feature observed is the increased use of lignite and lignosulphonate along with detergents, as additives for the production of the increasingly popular inhibited, surfactant muds. This is accompanied by a corresponding drop in the usage of tannin.

With the advent of oil-emulsion and invert oil-emulsion mud systems in Australian drilling, specialised products listed in the table as emulsifiers, gel builders and stabilisers are also being used at an increasing rate.

Air and mist drilling has accounted for the use of foamers or aerating agents in 1965/66 and the use of such products as extreme pressure lubricants and pipe freeing compounds was extensive in 1966/67.

An increase in the use of attapulgite, the clay base used in salt muds, from nil in 1963 to over 400 tons in 1966, is attributed to the use of salt muds in drilling in evaporite areas and of muds made up from salt water in off-shore drilling.

No values for the consumption of the Australian-made products can be given as reports from wells using both Australian and imported products such as bentonite, barytes and tannin do not, in general, record the consumption of each separately. For example, some wells have used "Sabar", Australian barytes and "Baroid", U.S.A. barytes but the consumption figures for both are recorded collectively under the one heading of "Barytes".

A reference list, presented as Table 2, indicates the main use of the various materials in Australia and Papua-New Guinea along with their various trade names.

TABLE 1.

ESTIMATED DRILLING MUD MATERIALS CONSUMPTION (Short Tons - 2,000 lb.)

Calculated as described in text, i.e. average consumption per 1,000 ft of hole drilled, from well reports examined, multiplied by total footage.

MUD CHEMICAL GROUP	1963	1964	1965	1966	1967	AVE.*
Bentonite	1920	1650	380	4700	7520	3920
Barytes	1500	900	3800	3060	8920	3440
Attapulgite	0	55	260	400	160	175
Lime ($Ca(OH)_2$)	0.2	1	16	43	0	-
Gypsum	0	0	0	200	0	-
Salt (NaCl)	0.2	0	0	650	0	-
Caustic Soda	140	100	480	400	540	330
Tannin	100	100	300	40	70	120
Lignite	108	67	380	450	870	375
Lignosulphonate	260	180	980	870	1,370	730
Starch	0	0	1	180	50	50
Carboxymethylcellulose	95	60	100	220	170	130
Soda Ash (Na_2CO_3)	84	8	50	50	65	50
Sodium Bicarbonate	14	5	17	25	54	23
Detergent	0	0	1140 gal.	3820 gal.	1670 gal.	1330 gal.
Defoamer	0	0	0	3	5	-
Preservative	0	0	1	11	0	-
Lubricant	0	0	0	1090 gal.	1,000 gal.	-
Extreme Press. Lubricant	0	0	0	380 gal.	1,760 gal.	-
Foamer	0	0	2130 gal.	4570 gal.	880 gal.	1520 gal.
Processed Hydrocarbon	0	0	0	18	16	-
I.O.E.+ Emulsifier	0	0	0	73	0	-
I.O.E.+ Gel Builder	0	0	0	7	0	-
I.O.E.+ Stabiliser	0	0	0	48	0	-
Calcium Chloride	0	0	12	85	12	22
Phosphate (various)	8	1	3	2	5	4
Silicate (sodium)	2	7	106	2	6	25
Sodium Bichromate	5	3	50	32	32	24
Lost Circulation Material	910	40	50	264	775	408

* Average per year taken over 5 years.

+ Invert Oil - emulsion.

TABLE. 2.

USES AND TRADE NAMES OF DRILLING MUD MATERIALS

MUD CHEMICAL GROUP	TRADE NAMES	CONTROL
Bentonite	Aquagel-Magcogel-Milgel Volclay-Unibond-Supercol	Viscosity - Fluid loss
Barytes	Baroid-Magcobar-Milbar Sabar.	Specific gravity
Attapulgite	Zeogel-Salt gel. Salt Water Gel	Viscosity, salt muds
Lime ($Ca(OH)_2$)	-	Lime muds - pH
Gypsum	-	"Gyp" muds
Salt (NaCl)	-	Salt saturated muds
Caustic Soda	-	PH
Tannin	Lovis-Myrtan-Rayflo Quebracho-F.E.8.	Viscosity - Gel
Lignite	Carbonox-Tannathin-C.C.16. Milcon-XP20.	Viscosity - Fluid Loss
Lignosulphonate	Q-Broxin-spensene Unical-R.D.11.	Viscosity - Fluid Loss
Starch	Dextrid-Mylogel-Stargel.	Fluid loss - viscosity
Carboxymethylcellulose	C.M.C.-Cellofas-Cellex Driscose	Fluid loss - viscosity
Soda Ash (Na_2CO_3)	-	pH
Sodium bicarbonate	-	Cement contamination
Phosphates (various)	Barafos-Magcophos-S.A.P.P.	Viscosity
Silicate (Sod. silicate)	Synergic	Inhibiter
Sodium bichromate	-	High temp. gellation
Detergent	D.M.S.-Comprox	Surfactant muds
Defoamer	Aluminium stearate	Defoam muds
Preservative	Formaldehyde	Fermentation
Lubricant	Scot Free - Pipe lax	Stuck pipe
Extreme press. lubricant	Bit lube.	Bit lubrication
Foamer	Tolfoam-Adofoam.	Foam in aerated muds
Processed hydrocarbon	Soltex	Fluid loss
I.O.E. Emulsifier	Invermul	Stable emulsion
I.O.E. Gel builder	Geltone-Petrotone	Viscosity
I.O.E. Stabiliser	Drill treat - Duratone	High temp. stabilisation
Calcium chloride	-	Inhibitor-Quick set cements
Lost circulation material	Fibres-Nut hulls-sawdust cellophane-Asbestos-Mica	Mud loss

* I.O.E. - Invert Oil Emulsion.