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**14. INDEPENDENT MARKET RESEARCH REPORT**

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*[Prepared for inclusion in the Prospectus]*

Strategic Analysis  
of the  
Malaysian Drilling Fluids Market

4036-39

November 18, 2002

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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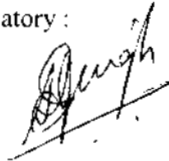
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# 1

## Market Engineering Research Methodology

### Objectives and Purpose

The objective of this report is to evaluate the current state of the drilling fluids market and forecast future revenues, product pricing, and unit sales. The report also identifies the key challenges facing the industry. For the market reviewed, market drivers as well as market restraints are evaluated.

This report forecasts the drilling fluids market for the period 2000 through 2005, with 2001 as the base year.

### Research Methodology

Frost & Sullivan employs a rigorous and comprehensive 12-step methodology in its market research. Frost & Sullivan has refined its methodology over many years of experience, having researched a wide diversity of markets in many different life cycles—from embryonic to mature. Frost & Sullivan's reference publication, *Industrial Market Engineering* (Publication 5168-80), explains the research methodology in great depth. Frost & Sullivan's Market Engineering system:

- Focuses on challenges, problems, and needs of industry participants
- Is based on primary market research, not secondary or previously published research
- Is based on detailed, comprehensive "bottom-up" data collection techniques
- Is based on measurements

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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## Market Engineering Forecasting Methodology

### Overview

One of the most common questions Frost & Sullivan receives from its clients is, "What is your forecasting methodology and how can I assess its level of credibility and accuracy?" This section on Frost & Sullivan's proprietary Market Engineering forecasting methodology has been added to answer this question.

Frost & Sullivan developed this proprietary system of forecasting because high-technology markets typically do not lend themselves well to statistically based forecasting methodologies.

This methodology integrates several forecasting techniques with the Market Engineering measurement-based system. It relies on the expertise of the analyst team in integrating the critical market elements investigated during the research phase of the project. These elements include:

- Expert-opinion forecasting methodology
- Delphi forecasting methodology
- Integration of market drivers and restraints
- Integration with the market challenges
- Integration of the Market Engineering measurement trends
- Integration of econometric variables
- Integration of customer demographics

The Market Engineering forecasting methodology is a seven-step system that maximizes the credibility and accuracy of the forecasts. The steps in this process are summarized in Figure I-1 and discussed in the following text.

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**


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Figure 1-1: Seven-Step Market Engineering Forecast Methodology, 2001

<b>Step</b>	<b>Method</b>
1	Market Engineering research process completed
2	Measurements and challenges analyzed over time
3	Identification of market drivers and restraints
4	Expert-opinion integration with analyst team
5	Forecasts calculated
6	Delphi technique integration when needed
7	Quality control within research department

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*Source: Frost & Sullivan*

#### Market Engineering Research Process Completed

The **Market Engineering** research process provides the navigational measurements of current market position and trends, which become the basis of the forecast.

#### Measurements and Challenges Analyzed over Time

Measurements and challenges are analyzed over time to provide more insight into their potential impact on market size and development.

#### Identification of Market Drivers and Restraints

At this stage, the analyst specifies the factors that will drive the market forward in terms of revenues and determines the elements that will inhibit growth.

#### Expert-Opinion Integration with Analyst Team

The interview process includes a variety of industry experts: competitors, regulatory officials, and key customers. These expert opinions on the direction of the market are integrated with the data and analysis already created.

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## 14. INDEPENDENT MARKET RESEARCH REPORT *(Cont'd)*

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### Forecasts Calculated

At this stage, analysts collect all the market data needed to create the initial forecast scenarios. Each scenario is tested to determine the most probable outcome for the market size. For example, the forecasts are matched to the leading economic indicators and drivers for each specific industry.

### Delphi Technique Integration When Needed

If data and forecast scenarios conflict, it becomes necessary to again discuss the market forecasts with the industry experts interviewed in the research process.

### Quality Control Within Research Department

Once the forecasts are integrated into the market section, the research director and other team members in the industry research group (IRG) check them. The forecasts are also checked for mathematical accuracy and internal consistency by the Final Review Preparation Department and the Editing Department.

## Strategic Significance of the Market Engineering Forecast

The Market Engineering forecast can have a significant impact on the business in several areas. Therefore, it should be integrated into business planning, strategy development, and decision-making.

## Judging Credibility and Accuracy of Market Engineering Forecasts

Frost & Sullivan forecasts integrate the key elements that typically have an impact on market growth and size. No one can consistently make accurate forecasts, but market research has a proven track record in making accurate projections of market trends and growth rates. The key test of credibility is whether the analyst team integrated all the critical elements of the market into the forecast. If all the elements that create a credible forecast are included in the analysis, then the forecast has strong credibility.

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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The accuracy of a forecast to within a 10 percent range over a seven-year period is not vitally important. What is important is that the overall trend be forecast correctly, because the overall trend drives the appropriate strategy and subsequent decisions. The Market Engineering forecasting methodology has consistently proved an accurate and reliable forecasting tool, particularly for high technology and industrial markets.

Over the past 40 years, Frost & Sullivan has had an impressive track record in forecasting emerging markets, new technologies, and shifts in existing markets. Unexpected events have always significantly changed the marketplace, but these do not occur often, and they typically merely delay the development of the market rather than destroy it. Frost & Sullivan always advise clients that its forecasts should not be the exclusive basis for decision making at their companies. It should be one more source of input and a support tool for their own work in investigating the market and creating a winning strategy.

In the final analysis, decision-making is based on the general trend of the forecast, not its absolute accuracy. Growth rate forecasts tend to fall into one of the following categories:

- Fast growth: 25 to 50 percent a year
- Medium growth: 5 to 25 percent a year
- Limited growth: 0 to 5 percent a year
- Medium decline: 5 to 25 percent a year
- Fast decline: 25 to 50 percent a year

It is important to accurately determine the range of the forecast, because that will have the greatest impact on the investment or strategy decision. Typically the decisions revolve around questions such as:

- Should the company enter the market?
- Should the company increase or decrease its investment?
- Should the company improve its performance in the market?

These decisions do not require accuracy within a few percentage points. They require accuracy in the determination of the general trend category. All business decisions carry some risk. Market Engineering increases the probability that the decisions will be correct, but it does not eliminate all risk.

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**14. INDEPENDENT MARKET RESEARCH REPORT** *(Cont'd)*

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## Market Engineering Forecast

Frost & Sullivan forecasts the world markets for goods and services by providing independent and economically unbiased information

Frost & Sullivan research can provide timely measurement information on market position and related trends, providing the basis for the forecast. This is often achieved through an understanding of the economic models and conditions that have a potential impact on market development.

Once market data is collected and analyzed, and the forecasts are developed, the forecasts are matched to the appropriate leading economic indicators for each specific industry. Analyst teams check the relationship to the economic indicators as part of the overall Frost & Sullivan quality control process.



# 2

## Strategic Analysis of the Malaysian Drilling Fluids Market (2001-2005)

### Market Overview and Definitions

Drilling fluids can be categorized under oil field chemicals. They are primarily pumped into wells to reduce the friction of drilling and are usually mixed with water, clay or mud, weighing material, typically barite and other chemicals. The drilling fluids provide numerous functions in the drilling process. They help move the drill cuttings to the surface for removal, give the "weight" to keep the underground pressures in check and also keep the drilling passage stable by cementing the walls and keep it from collapsing.

The end-users of drilling fluids are predominately the oil and gas exploration and production companies that use the same at oil drilling rigs. Only a small amount of drilling fluids, an almost negligible amount, goes to areas such as tunneling activities, water-wells, mineral explorations, soil investigation, and other non-oil industrial use. The market for drilling fluids in Malaysia is almost solely driven by the oil and gas industry.

The Malaysian market for drilling fluids is valued at about \$32.8 million in 2001. Its growth rate ranges at about three to four percent per annum. The CAGR is approximately 3.2 percent from 2001 to 2005.

### Overview of Malaysia's Oil and Gas industry

Malaysia's Gross Domestic Product (GDP) experienced approximately 5.5 percent growth in 2000 following recovery from the 1998 Asian Financial Crisis. However, growth was abrupt and in 2001, Malaysia saw its GDP growth decline again as a result of a slowdown in the global economy and declining exports. The GDP last year grew by only about 0.4 percent.

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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In 2002, Malaysia's GDP is projected to range between four to five percent. Frost & Sullivan forecasts a higher growth for Malaysia by third quarter of 2002 as a direct impact of stronger exports demands spurred by the recovering United States economy. Exports are also expected to increase following a slight upturn projected for the Japanese economy by end of 2002.

Malaysia is a mature oil producing country and the Government's stated policy is to continue to develop its oil and gas reserves. Malaysia's oil and gas fields are almost entirely offshore, either off Sarawak or Peninsular Malaysia (and now extending north to the Gulf of Thailand to the shared waters with Thailand).

In Malaysia, Petrolia Nasional (Petronas), which was formed in 1974 as a state entity with a mission to develop Malaysia's oil and gas industry, is the dominant oil and gas company in the country. Petronas controls oil production in Malaysia through partnerships with Exxon-Mobi (Esso Production Malaysia) and Shell (Sabah Shell Petroleum and Sarawak Shell/Petronas Carigali). Petronas and these large oil companies jointly run Malaysia's upstream oil industry. No private company can hold complete ownership of an upstream petroleum project, meaning that all operators are effectively joint ventures. The oil and gas industry accounted for about half of Malaysia's primary energy supply in 2001 and is expected to continue on as the major energy source for Malaysia.

Drilling activities are expected to continue and provide demand for drilling fluids in Malaysia. Malaysia contains proven oil reserves of 3.9 billion barrels, down from 4.3 billion barrels in 1996. Despite this trend toward declining oil reserves (due to a lack of major new discoveries in recent years), Malaysia's crude oil production has been stable in recent years, with monthly production numbers fluctuating between 660,000 barrels per day (bbl/d) and 730,000 bbl/d between 1996 and early 2001. In 2000, crude oil production averaged 690,000 bbl/d. In 2001; Malaysia produced an average of 3,969 million cubic feet of natural gas per day. At current production rates, Malaysia has about 14 years of crude oil reserves left and about 38 years of gas reserves or about 81.7 trillion cubic feet. However, Malaysia is embarking on production sharing contracts with international oil exploration companies to attract exploration interests in its waters. These steps are encouraging activities for discoveries in Malaysia.

In the meantime, Petronas, the state oil and gas company is also embarking on an international exploration and production strategy to increase its global reach. Malaysian drilling fluids companies are able to gain from Petronas' venture abroad if they are able to obtain global *mud engineering services* contracts with Petronas.

Petronas' global expansion strategy has led it to hold stakes in the oil and gas industry in over 22 countries around the world. While Malaysia's market for drilling fluids may decline if there

**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

are no new discoveries, long term global partnerships to supply Malaysia's Petronas worldwide operations may be a lucrative endeavor for drilling fluids companies in Malaysia.

## Market Engineering Measurement Analysis

Chart 2.1 presents the Market Engineering measurements for the Drilling Fluids Market in Malaysia in 2001.

Chart 2.1

### Total Drilling Fluids Market: Market Engineering Measurements (Malaysia), 2001

Measurement Name	Measurement	Trend
Market age	Mature stage	Stable
Revenues	\$32.8 million	-
Potential revenues (max. future market size by 2005)	\$37.5 million	Increasing
Base year market growth rate	4.0%	-
Forecast period market growth rate	3.2%	Stable
Price sensitivity	High	Increasing
Price range	\$28-45 / barrel	Stable
Competitors (active market competitors in base year)	4	Stable
Degree of competition	High	Stable
Market concentration (market share controlled by top three competitors)	Almost 100.0%	Stable

*Source: Frost & Sullivan*

## Market Trends and Forecasts

Figure 2-1 presents the top five industry trends and challenges in the drilling fluids market in Malaysia from 2002 to 2008.

**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

Figure 2-I

**Total Drilling Fluids Market: Top Five Industry Trends and Challenges (Malaysia), 2002-2008**

<b>Challenge</b>	<b>1-2 Years</b>	<b>3-4 Years</b>	<b>5-7 Years</b>
Limited Pool of End Users	High	High	High
Increasing Negotiation Power of End Users	High	High	High
High Cost Of Entry	Medium	Medium	Medium
Increasing Cost Pressures	Medium	High	High
Environmental Challenge	Low	Medium	Medium

Source: Frost &amp; Sullivan

**Limited Pool of End Users**

One of the key challenges in the drilling fluids market is the lack of a wide and diversified end-user pool. There are only a limited number of end users in the industry. Usage is narrow and limited to oil drilling companies such as Shell, Exxon-Mobil, Petronas and other exploration oil companies. Since only a few end user companies dominate the market for oil exploration activations, the competition for customers is very intense in the drilling fluids market.

Frost & Sullivan expects this trend of a small end-user pool to remain high throughout the forecast period.

**Increasing Negotiation Power of Buyers**

Large oil conglomerates in Malaysia like Petronas, Shell and Esso have lately seen their negotiation power against their suppliers increase. Trends in mergers, consolidations and alliances in the oil industry worldwide have forced supplier companies like drilling fluids companies in Malaysia to further compete for an increasingly smaller pool of end users. As competition for customers intensifies, prices are slashed and at times, are pushed down to the minimum. Drilling fluids companies find it very difficult to compete based on prices in the market. Those that prevailed in the Malaysian market such as KMC have high levels of competitive advantage in other areas such as technical expertise, quality control and production and warehouse facilities. Some drilling fluids companies in Malaysia are being squeezed out of the market.

However, a small number of drilling companies means less competition in the Malaysian market to drive technological innovation and change. Frost & Sullivan does not expect this situation to

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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negatively impact the drilling fluids market in Malaysia. Should Malaysian companies want to progress globally; the drive to innovate and improve will come from external or international factors rather than internal or domestic ones.

Frost & Sullivan expects this challenge of increasing buyer negotiation power to remain high throughout the forecast period. At a later stage, possibly after the forecast period, the research analyst expects to see an almost monopoly-like situation in the drilling fluids market. At this juncture, companies that survive the competition, after others exit due to cost pressure, regain some power to negotiate for higher prices.

#### High Cost of Entry

There is a high cost of entry into the market for drilling fluids. The drilling fluids industry has very high start-up costs or in other words, a very high ratio of fixed to variable costs. Fixed costs in the drilling fluids market include warehousing facilities, onshore mud storage facilities, mud laboratory, possibly a barite mill, the company's own bulking facility, and capabilities in mud engineering software. Without these support facilities, it may be difficult for new drilling fluids companies to secure projects with the end users or drilling operators.

The sunk costs invested into entering the market may be unrecoverable if an entrant decides to leave the market. In addition, considering that there is only a small pool of end users in the Malaysian market, many possible entrants are discouraged from pursuing the market in Malaysia. The drilling fluids market in Malaysia is close to uncontestable in 2002.

There are only four market participants and one new entrant, a Malaysian company called Yaztec. These competitors in the market place are likely to proceed unchallenged in the industry and they could monopolize the market. While this phenomena could have a negative impact on development of the industry as whole it gives a tremendous advantage to the existing drilling fluids companies in Malaysia.

Frost & Sullivan expects the challenge of high entry barriers to remain strong throughout the forecast period.

#### Increasing Cost Pressures

Most of the raw materials that go into the production of drilling fluids are chemicals and oil derivatives whose prices are highly reliant on the international oil prices. What seems ironic is that the same gas price hike that boosts demand will also increase cost for the drilling fluids

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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supplier. With the price of crude oil escalating due to diminishing oil reserves and controlled Organization of the Petroleum Exporting Countries (OPEC) production, the cost of producing drilling fluids has gone up in 2001. The increased in production costs has not successfully been passed down to end users, and profits have been squeezed. The profit levels of drilling fluids manufacturers have declined in recent years. This problem is further exacerbated with the devaluation of the Malaysian currency in the foreign exchange. The devaluation of the Ringgit from RM2.5 per \$1 in 1998 to RM3.8 per \$1 in 2001 has caused manufacturers to incur further costs in importing chemicals for the mixing or formulation of drilling fluids in Malaysia. Almost 70 percent of the costs of production drilling fluids are raw materials costs.

Frost & Sullivan expects the impact of this restraint to be medium throughout the forecast period.

#### Environmental Challenge

Malaysia currently does not have a specific set of regulations governing the use, treatment and disposal of oilfield drilling fluids or waste. All oil drilling waste is considered within the Environment Act and is categorized as 'Scheduled Waste'. As such, the oil industry's waste management provision is governed by the *Environmental Quality (Scheduled Wastes) Regulations, 1989*. The licensing of treatment and disposal sites is governed by the *Environmental Quality (Prescribed Premises Scheduled Wastes Treatment and Disposal Facilities) Regulations, 1989*. The Department of Environment (DoE) believes that the current set of regulations is sufficient to ensure that the oil industry treats its wastes, effluents, and emissions responsibly. It is unlikely that any significant changes will be implemented within the next four to five years.

However, on a more general environmental policy level, the latest important change is the inclusion of biodiversity regulations. The regulation has already been included as law but it has not been enforced yet. The area is still new, but aims to limit and regulate activities that may have effect on life forms. Before any project is carried out, the industrial operator will have to catalogue and audit the impact on the life forms in the area.

This will have important implications for both onshore and offshore oil drilling, and may develop as an important market driver of new environmental technologies in drilling fluids, especially in biologically sensitive areas. Increasing usage of environmentally safe drilling fluids or development of biodegradable form of drilling fluids are likely to spearhead the next generation of oil field chemicals. Companies in Malaysia face the global challenge of international environmental standards compliance and face the challenge of developing their own line of environmentally friendly and safe products, in order to compete globally.

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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## Major Industry Drivers

### Continued Growth in Oil Exploration and Drilling in Malaysia

Oil exploration and drilling is expected to continue in Malaysia and to continue driving the market for drilling fluids. Demand for oil field chemicals like drilling fluids is expected to increase, driven by fundamentals such as rising demand for energy and tight supply. At the end of 2001, Malaysia's Petronas Carigali began production from its Angsi field in the South China Sea off Malaysia. In addition, OPEC is also trying to keep global oil prices in the late \$20 / early \$30 per barrel range, giving oil companies incentives for more exploration and drilling, which is expected to boost demand for drilling fluids around the world and in Malaysia.

The oil & gas industry especially with reference to the drilling activities is not significantly volatile in comparison with oil prices. Building up and deploying the relevant infrastructure – like platforms, drilling rigs, etc. typically needs a timeframe of around two years. In addition, the contracts for procurement of items like drilling fluids / mud are consistent for a period of two to three years. Therefore, the impact of oil prices on the market (and prices) for drilling fluids typically has a lag period. The impact of changes in oil prices in the very near term are not significantly expected to have an impact on the market and pricing for drilling fluids.

The current geo-political situation especially the prospect of war in Iraq potentially could have an impact of the oil prices. A probable scenario in the event of a short war in Iraq (and restricted to Iraq) could be an increase in the production output from other oil producing (OPEC) nations – mainly Saudi Arabia. In this event, oil prices though volatile, are not expected to rise significantly and consequently no significant impact on the drilling fluids market. However the scenario of a prolonged conflict in the region could potentially lead to higher oil prices. This would lead to further exploration and development of marginal oilfields in order to increase production / output and this could have a positive effect on the market (volumes) and price realization for drilling fluids. This would therefore lead to greater revenues for companies in the drilling fluids business at a global level.

### Continued Growth in Demand for Environmentally Friendly Products

Continued demand for environmentally friendly products is expected to drive the next generation of drilling fluids. Drilling fluids that use natural oil as the base of drilling fluids are undergoing research and development. Water-based systems are currently the dominant drilling fluid systems and in most other developed countries, oil-based systems are no longer used. End-user companies such as Shell or Esso have strict environmental standards within their own

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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organizations, and will likely continue paying great attention to the preserving the environment in their oil drilling and exploration projects. This is expected to drive demand for innovations and development of drilling fluids that are environmentally safe.

## Major Industry Restraints

### High Entry Barrier

There is a high cost of entry, which is expected to keep the number of market participants from increasing in Malaysia. This, in essence, decreases the level of competition in the market. Without competition, the market and competitors could develop at a pace slower than the global markets. As globalization increases, there maybe some need for drilling fluids companies to compete with other multinationals. Currently, a Malaysian company KMC holds the majority of market share in the drilling fluids market in Malaysia. It has entered the market with the assistance and support of Malaysia's oil giant, Petronas. Malaysia's commitment to develop its local industries has also given the firm many advantages over foreign firms in entering the market. KMC is expected to continue being the leading market participant for drilling fluid as Frost & Sullivan does not foresee Malaysia and Petronas changing their policy with regards to the oil and gas industry in the future.



**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)****Revenue Forecasts**

Figure 2-2 and Chart 2.2 present the revenue forecasts for the drilling fluids market in Malaysia.

Figure 2-2

**Total Drilling Fluids Market: Revenue Forecasts (Malaysia), 2001-2005**

<b>Year</b>	<b>Revenue (\$Million)</b>	<b>Growth Rate (%)</b>
2001	32.8	---
2002	34.1	4.0
2003	35.3	3.5
2004	36.4	3.0
2005	37.5	3.0

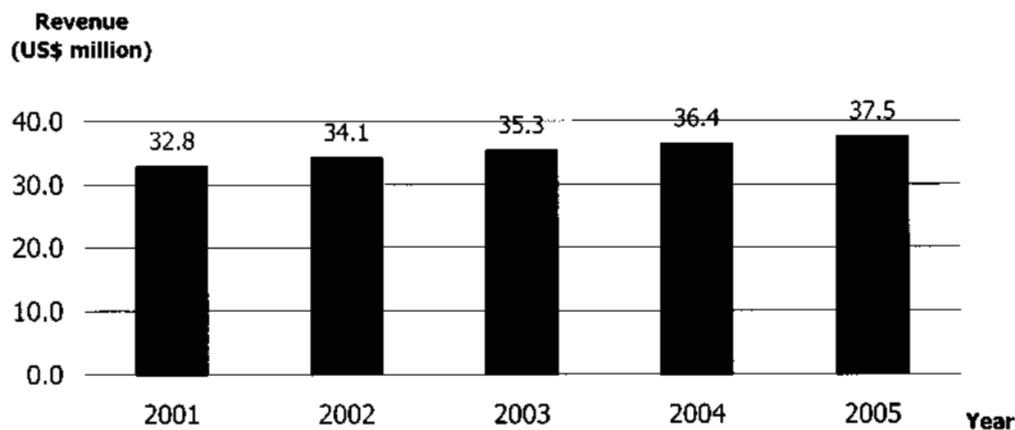
Compound Annual Growth Rate (2001-2005): 3.2%

*Note: All figures are rounded; the base year is 2001. Source: Frost & Sullivan*

**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

Chart 2.2

Total Drilling Fluids Market: Revenue Forecasts (Malaysia), 2001-2005



Source: Frost &amp; Sullivan

The revenue for the total drilling fluids market in Malaysia was estimated to be approximately \$32.8 million in 2001. In 2002, the market is expected to be about \$34.1 million and by 2005, it is expected to reach about \$37.5 million. The CAGR of the drilling fluids market from 2001 to 2005 is approximately 3.2 percent. The growth rates are expected to remain in the three to five percent range.

Growth may decline in the long run, as oil reserves in Malaysia diminish but that is not expected to happen for another decade or two and certainly not by 2005, which is the end of our forecast period. Oil production in Malaysia has been slightly declining since its peak in 1996. Drilling fluid companies in Malaysia are beginning to consider diversification into other areas of business to address the challenge of a small and shrinking end-user base. However, the situation can certainly improve should exploration work in Malaysia lead to new oil field discoveries in Malaysia. For example, Shell-Malaysia plans to invest RM 1 billion in offshore oil and gas exploration and production in 2002.

However, in order to remain conservative and prepare themselves for many different scenarios, KMC, for example, has begun to expand and serve clients in Indonesia. Although, KMC does not have direct presence as yet in the Indonesian market it is looking to diversify its coverage. It

**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

is looking to supply abroad range and currently is supplying intermediate chemicals for the production of drilling fluids to the Indonesian market.

### Demand Analysis by Segments

Figure 2-3 presents the revenue share of major market segments.

Figure 2-3

Total Drilling Fluids Market: Revenue Share of Major Market Segments (Malaysia), 2001-2002

Product Segment	2001 (%)	2001/2000 Trend
Water-based Drilling Fluids Systems	55	Up
Oil-based Drilling Fluids Systems	25	Down
Synthetic Drilling Fluids Systems	20	Stable

*Note: All figures are rounded; the base year is 2001. Source: Frost & Sullivan*

Water-based drilling fluids is the largest drilling fluid system in Malaysia. It represents about 55 percent of the products supplied by manufacturers. The demand and percentage sale of water-based drilling fluids is expected to increase during the forecast period. Some manufacturers have expressed that some end users use only water-based systems and in certain developed countries, water-based systems are the sole product used in terms of environmental standards compliance. However, water-based systems have been known to not provide dependable drilling performance in certain complex drilling environment where in the past, oil-based drilling fluids were used. Currently, there are no such regulations in Malaysia to discourage the use of oil-based fluids and water-based systems are forecast to continue sharing the market with oil-based systems.

The oil-based drilling fluids segment makes up approximately 30 percent of the total products supplied by drilling fluid manufactures in 2001. This segment is expected to decline as companies become more environmentally conscious and prefer to use water-based products. However, the phasing out of oil-based systems is not expected to happen anytime soon in the future in Malaysia although there is conscious effort on the part of end users or oil drilling operators to minimize the use of oil-based products. In certain developed countries like Australia, drilling fluids have solely been water-based. Oil-based drilling fluids have not been used since 1985.

**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

The synthetic drilling fluids segment represents about 15 percent of products sold in the Malaysian market. A higher use of synthetic-based fluids could reduce well drilling costs through shorter drilling times. This sector is expected to remain stable in the next five years. It may take some market share away from the conventional oil-based or water-based segments but the amount is not significant. Some operators are ambivalent about this segment because they are unsure about compliance with environmental standards and permits using synthetic-based fluids. Some operators are unsure about usage of synthetics based systems because they are not certain of its performance.

### Pricing Trends and Issues

Figure 2-4 presents the average price of major market segments.

Figure 2-4

#### Total Drilling Fluids Market: Pricing Trends of Major Market Segments (Malaysia), 2001

Product Segment	2001 (\$/barrel)	00/01 Trend
Water Based Systems	\$28 - \$33	Up
Oil Based Systems	\$40 - \$45	Up
Base Oil	\$70 - \$78	Up

*Note: All figures are rounded; the base year is 2001. Source: Frost & Sullivan Interviews*

#### Price in Relation to Raw Material Cost

The cost of oil-based drilling fluids is more expensive than water-based fluids. Drilling fluids price is closely linked to the global oil prices. Most of the chemicals used in drilling fluids are derivatives of crude oil and thus, the price movement of oil worldwide has a large effect on price movements of drilling fluids. The rise in crude oil prices in the last year has caused increases in raw material and production costs for drilling fluids companies. Although, OPEC has agreed to maintain crude oil production in the third quarter of 2001 to relieve rising prices, the increase is not expected to have a big impact in decreasing the prices of derivatives and raw material used in the drilling fluids production that are experiencing a supply shortage. Approximately 70 percent of the cost of drilling oil manufacturers is from raw materials cost.

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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In addition to water and oil-based fluids, synthetic-based fluids, which replace mineral oil in oil-based fluids with other oil-like substances are expensive compared to both the water-based or oil-based products. They are sometimes not the choice products because operators are unsure about the product's performance.

#### Price in Relation to Technical Support

Labor cost in Malaysia is rising and that can be a disadvantage to the cost of labor in Malaysia. The sale or acquisition of contracts to supply drilling fluids to oil operators comes with a high level of technical support. The shortage of expert engineers in Malaysia is also driving labor costs up and thus driving production cost higher. This in turn is expected to drive prices higher. Companies based in Malaysia are still able to compete effectively with foreign-based companies because they use local expertise and engineers rather than expatriate engineers as utilized in foreign-based companies.

#### Price Movement

With each drilling fluid types, there is a significant variation in composition either between different suppliers or internally within the company as a result of different fluid designs. Each soil condition requires different fluid compositions. As such, price per unit such as per barrel or per ton varies. For oil-based systems, 80 to 100 percent of compositions are the base oil, stored separately in the rigs while for water-based systems; water can be pumped from the rig area. In a typical discovery rig, there are approximately 660 barrels of based oil storage and 2,500 barrels of mud or drilling fluid storage.

Pressure to increase prices is high for drilling fluids companies in Malaysia. Frost & Sullivan expects companies to increase prices of drilling fluids in 2002. However, the magnitude of increase expected is minimal because drilling fluid companies in Malaysia face the challenge of competition and high end-user bargaining power. The upward pressure to increase prices is often offset by competitive pressure to keep prices low. As such, Frost & Sullivan expects a minimal price increase in Malaysia in the next few years.

**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)****Competitive Analysis**

Figure 2-5 presents the competitive structure of the drilling fluids market in Malaysia in 2001.

Figure 2-5

**Total Drilling Fluids Market: Competitive Structure (Malaysia), 2001**

<b>Number of Companies in the Market</b>	4
<b>Types of Competitors</b>	Multinationals Domestic Companies
<b>Distribution Structure</b>	Predominantly from manufacturers direct to customers Manufacturers typically engage in long-term contracts up to five years with customers
<b>Tiers of Competition</b>	1 Tier – Local Companies and Multinationals compete in the same market segments
<b>Notable Acquisitions and Mergers</b>	Not in the local market.
<b>Key End-User Group</b>	Oil and Gas Exploration
<b>Competitive Factors</b>	Technical Expertise Technical Service Product Quality Pricing Support Facilities

Source: Frost & Sullivan

The competition is high in this market as there are only a limited number of end users. There are only about four suppliers of drilling fluids in Malaysia. One is a wholly Malaysian owned company called KMC, one new entrant a Malaysian company called Yaztec, and the two notable foreign companies are M-I Drilling Fluids, Baker Hughes Inteq (BHI) and Baroid. There is no independent distributor for drilling fluids. The distribution chain is short from suppliers directly to drilling operators. Suppliers in Malaysia directly bid or tender for drilling projects and contracts typically last for about five years.

There have been many attempts made by foreign companies to penetrate the Malaysian market, by direct entry as well as acquisition. Most of the companies that entered the Malaysia market found it difficult to secure business because of the lack of understanding about the business culture in Malaysia and lack of business relationships in the country. Suppliers such as M-I

**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

Drilling Fluids have recently found their market share declining and BHI have also seen their market share remaining relatively inert.

There are three pertinent competitive factors in the Malaysian market as follows:

- Price
- Technical expertise and service
- Support facilities

Figure 2-6 shows the competitive support facilities available in the various drilling fluids companies in Malaysia in 2001.

Figure 2-6

Total Drilling Fluids Market: Competitive Support Facilities by Companies (Malaysia), 2001

Companies	% Usage of Local Engineers	Warehouse Facility	Onshore Mud Storage	Mud Laboratory	Barite Mill	Own Bulking Facility	Mud Engineering Software
<b>KMC</b>	96	Yes	Yes	Yes	Yes	Yes	No
<b>M-I</b>	60	Yes	Yes	Yes	No	No	Yes
<b>BHI</b>	30	Yes	No	No	No	No	Yes

Source: Frost & Sullivan Interviews

**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)****Market Share Analysis**

Figure 2-7 and Chart 2.3 present the market share trends on the major market participants in Malaysia in 2001.

Figure 2-7

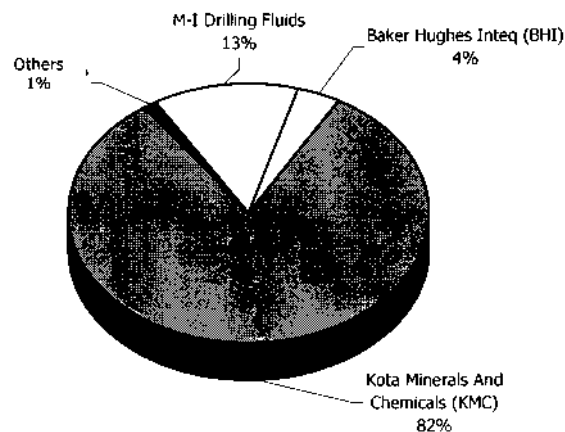
**Total Drilling Fluids Market: Market Share Trends of Major Market Participants (Malaysia), 2001-2002**

<b>Company</b>	<b>2001 (%)</b>	<b>2000/2001 Trend</b>
Kota Minerals And Chemicals (KMC)	82	Up
M-I Drilling Fluids	13	Down
Baker Hughes Inteq (BHI)	4	Down
Others include Baroid	1	N/A
<b>TOTAL</b>	<b>100</b>	

*Note: All figures are rounded; the base year is 2001. Source: Frost & Sullivan*

Chart 2.3

**Total Drilling Fluids Market: Market Share of Major Market Participants (Malaysia), 2001**



*Note: All figures are rounded; the base year is 2001. Source: Frost & Sullivan*



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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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KMC is the largest market leader in the Malaysian drilling fluids market. It represents about 82 percent of the market. M-I Drillings holds about 13 percent while BHI trails with about 4 percent market share. KMC's market share is expected to continue increasing as a result of continued support from Petronas and the Malaysian government with regards to securing of contracts. The Malaysian government intends to give a slight helping hand to Malaysian companies and allow Malaysian industries to grow out of their infancy before they liberalize.

### Conclusion

The market share in the drilling fluids market in Malaysia is not expected to change much in the next five years. Once contracts are secured, the company can usually be expected to follow through and supply the market for the duration of the contract. A five year service and supply contract is typical in this market. KMC currently holds a number of large contracts with major oil drilling companies in Malaysia and can be expected to continue and maintain its dominant position in the next five years or up to 2005.

## PROFILE OF TOP THREE COMPETITORS

### KOTA MINERALS AND CHEMICALS

Kota Minerals and Chemicals (KMC) was established in 1987 in Malaysia and has since grown into the leading oil and gas service company in the country. It is wholly Malaysian-owned and managed. KMC has over 50 mud engineers serving the Malaysian oil drilling industry and it has dominant market share in Malaysia, beating the likes of multinational drilling fluids companies like M-I Drilling Fluids and Baker Hughes.

The success of KMC in the Malaysia market is its local content strategy. Local engineers provide approximately 96 percent of its technical support while M-I and BHI have only 60 percent and 30 percent, respectively of technical support from local engineers. The advantage of having efficient yet cost-effective engineers gave KMC the cost advantage over the multinational firms in Malaysia. The use of expatriate engineers by M-I and BHI has significantly lowered their cost advantage as the service providers for oil field drilling fluids. As a result, they have lost market share significantly over the past five years.

In addition, the success of KMC can also be attributed to the commitment by the Malaysian government to encourage and develop its local oil and gas industry. In addition, Petronas'

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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commitment in helping the Malaysian oil and gas industry grow has also proven to be an advantage for growth for companies like KMC. However, the home grown advantage of KMC is not at the expense of effective and efficient management or high level of expertise of its engineers. Frost & Sullivan forecasts continue good growth for KMC in the Malaysian market. It also has strong potential to be a global player if it can secure contracts with Petronas to serve Petronas' increasing interests abroad.

### **M-I DRILLING FLUIDS**

M-I Drilling Fluids is the world's largest drilling and completion fluids supplier to the oil drilling industry. Headquartered in Houston, the company is a joint venture between Smith International (60 percent) and Schlumberger (40 percent). In 1998, it boasted of 3,300 employees and serviced 8,700 wells in 70 countries. M-I Drilling Fluids generated total revenue of \$11.82 billion dollars worldwide in 1998.

However, M-I only has a small presence in Malaysia. It lost control of the major market for drilling fluids when KMC separated from M-I to become its own company in 1996. In 2001, M-I Drilling Fluids represents about 12.7 percent of the Malaysian drilling fluids market.

### **BAKER HUGHES INTEQ**

The third largest operator in Malaysia is Baker Hughes Inteq. BHI operates in over 100 countries worldwide. In 1998, its revenues were \$6.31 billion of which two-thirds come from operations outside the United States. It is headquartered in Houston, Texas and the company employs approximately 28,000 worldwide with about one-half their workforce outside of the United States.

Despite a worldwide presence, its market share in Malaysia is small. In 2001, Baker Hughes Inteq represents only about 4.8 percent of the Malaysian drilling fluids market.

# 3

## Database of Key Industry Participants

### DRILLING FLUIDS PROVIDERS

#### KOTA MINERALS AND CHEMICALS SDN. BHD. KUALA LUMPUR

Kota Minerals & Chemicals Sdn. Bhd.  
No. 1-1 Block C1, Dataran Prima  
Jalan PJU 1/41  
47301 Petaling Jaya, Malaysia  
Tel: (60-3) 7880-6118  
Fax: (60-3) 7880-8918

#### KEMAMAN

Warehouse No. 18, Letter Box No. 72  
Kemaman Supply Base  
24007 Kemaman  
Terengganu Darul Iman, Malaysia  
Tel: (60-9) 863-1212  
Fax: (60-9) 863-1189

#### LABUAN

Asian Supply Base

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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Letter Box No. 82023  
87030 Labuan F.T. Malaysia  
Tel: (60-87) 650-821  
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**MIRI**

Lot 2164, 1st Floor, Block MCLD  
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Sarawak, Malaysia  
Tel: (60-85) 650-821  
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**M-I DRILLING FLUIDS KUALA LUMPUR**

**M-I DRILLING FLUIDS (M) SDN BHD**

13.2 West Wing Rohas Perkasa  
8, Jalan Perak, 50450 Kuala Lumpur, Malaysia  
Tel: (60-3) 2161-7655  
Fax: (60-3) 2161-7485

**KEMAMAN**

Bangunan Pentadbiran A  
Kemaman Supply Base  
24007 Kemaman  
Terengganu Darul Iman, Malaysia

**LABUAN**

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Asian Supply Base, Lock Bag No. 15  
87009 Labuan F.T., Malaysia

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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Kemaman Supply Base  
24000 Kemaman  
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Fax: (60-9) 863-1792

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**14. INDEPENDENT MARKET RESEARCH REPORT (Cont'd)**

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Fax: (60-87) 412-530

**RIG BUILDERS/ENGINEERS**

**KEPPEL FELS LIMITED**

50 Gul Road,  
Singapore 623351  
Tel: (65) 863 7200  
Fax: (65) 863 1739

**OIL OPERATORS**

**SHELL PETROLEUM COMPANY LIMITED**

Exploration and Production  
P.O. Box 11027  
Kuala Lumpur 50732  
Tel: (60 3) 255 9144  
Fax: (60 3) 251 2957

**PETROLIAM NASIONAL BERHAD (PETRONAS)**

Tower 1, PETRONAS Twin Towers  
Kuala Lumpur City Center  
50088 Kuala Lumpur

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**14. INDEPENDENT MARKET RESEARCH REPORT** *(Cont'd)*

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Fax: (60 3) 206 5055

**ESSO MALAYSIA BERHAD (EXXON MOBIL)**

Menara Esso

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