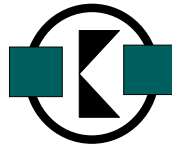


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*an early subscription offer for
a comprehensive technology and economic assessment of:*

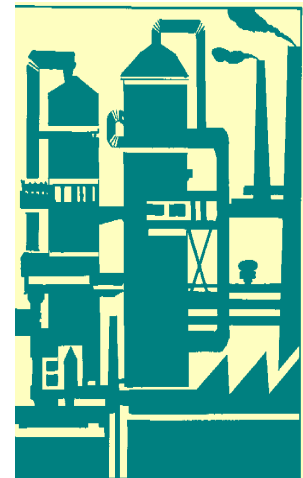
The Changing Face of the Lube Oil Basestock Business

Volume I - The Conoco/Pennzoil Venture

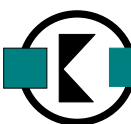
The third largest lube oil facility in the US starts up in
1997

How will this plant affect your bottom

Targeted to
be the
lowest cost
US producer
of
basestocks
in 1997



Exxon
Baytown, TX

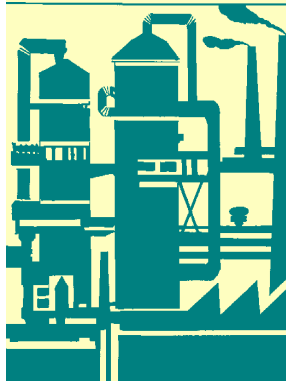


Manufacturing Economics Practice

line?



Conoco/Pennzoil
Lake Charles, LA



Star Enterprises
Port Arthur, TX

Executive Summary

The third largest base oil plant in the United States will start up in less than two years and it will be capable of producing close to 10% of the US supply. This independent technology and economic assessment will answer these and other critical questions:

- ✓ What will be the production cost structure of this facility?
- ✓ How low in price will the operation be able to go?
- ✓ What special products will this new plant produce?
- ✓ What strategic, logistic, environmental and technical advantages will this facility have?
- ✓ How will my bottom line be affected once this joint venture starts up?
- ✓ What strategic plans should our firm make to protect its market position?

This multiclient study will provide information on:

- ✓ The technology used
- ✓ The manufacturing costs
- ✓ The advantages and disadvantages this plant has

We invite you to look through this early subscription offer of an independent assessment that could save your bottom line.

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Introduction

The North American lube oil basestock business will undergo more supply and demand changes in the next ten years than the industry has seen in the last two decades.

For example, suppliers to Conoco/Pennzoil may find themselves scrambling to find new markets for basestock after the Conoco/Pennzoil joint venture plant goes on-stream, making Pennzoil self sufficient. The sudden increase in merchant supply may result in depressed basestock prices that will in turn affect every other lube oil basestock supplier.

The demand for higher performance products is increasing and select product categories are moving beyond the capabilities of conventional basestock refining technology. Furthermore, environmental requirements continue to add to the cost of production and favor newer and more efficient operations.

While the performance level of basestocks is expected to be forced up, and prices down, the overall demand for finished lubricants in the North American market may likely continue to be soft. Therefore, the basestock business will be increasingly more competitive over the next five to ten years.

The complexities of the issues will challenge even the most experienced business planners. This study will provide executives with the insights and information they will need to plan for the difficult times ahead.

How will these trends affect your business?

For some, the trends in the basestock business will mean prosperity. For others, however, particularly the marginal players, the trends could mean exits. How your particular business will be affected is a complex question that requires accurate, independent, and up-to-date information and insights on both supply-and-demand-side issues. Here are some of the ways your business could be affected:

Basestock manufacturers

- Opportunities to increase margins with higher quality basestocks
- Shifts in product slates (types and grades)
- Increased price pressure
- Increased manufacturing cost
- Rationalization of refineries and lube blend plants (consolidation of suppliers)
- Acquisitions, mergers, and joint ventures

- Global trading

Finished lubricant manufacturers

- Opportunities to increase market share through the use of high-quality conventional basestocks and unconventional basestocks
- Potentially favorable basestock pricing
- New formulations and blending strategies
- Increased testing/qualification costs
- Changes in both captive and merchant supply lines
- Partnering
- Rationalization of product slates
- Development of additive components and packages to meet increasingly stringent performance requirements
- Increased demand for components and packages designed for use with unconventional basestock
- Potential loss of business if rationalization of product lines and suppliers does occur

Refinery engineering/construction firms

- Opportunities to upgrade existing refineries to produce higher quality basestocks
- Opportunities to design and construct refineries to produce unconventional basestocks

What Will The Report Deliver?

This is a presubscription offer to a new multiclient study titled:

The Changing Face of the Lube Oil Basestock Business, Volume II - North America.

This report will provide a thorough analysis of the commercial issues surrounding the entire basestock business in North America. Also, it will analyze and compare the product slates and technologies of the manufacturers in this region - data essential to critical strategic planning.

More than just a comparative study, this valuable report will cover:

- Key business drivers affecting supply and demand
- Demand assessment and projections to the year 2005
- Supply structure analysis and projections to the year 2005
- Technology and product slates of each player
- Overview of lube oil basestock technology
- Industry competitive analysis
- Business dynamics
- Overall business assessment

Why Purchase This Study?

To make informed business decisions

In the next two years, radical changes in the industry will require executives to make critical strategic decisions. Most important, they will need to prepare revised long-term business plans based on the latest information if they are to continue to maintain their position. This report is designed to provide up-to-date, independent, and accurate data needed for these critical decisions.

To access accurate marketing data, economically

This data is gathered by a team with experience in the lube oil business and backgrounds in marketing, engineering, and business. Kline's rigorous methodology, based on detailed primary research ensures our data is accurate and reliable. Because we are making this study available to a number of clients, the cost to each subscriber is only a fraction of the cost if the subscriber were to prepare this study on an exclusive basis or in-house.

Who would benefit from these studies?

This study is applicable to basestock refiners, lubricant marketers, and additive companies. It should be purchased by general managers, basestock supply and distribution managers, basestock business managers, lubricant research managers, business planners in refining and marketing, original equipment manufacturers (OEMs), engineering firms, and others with a vested interest in the future of the lube oil basestock business. In addition, additive manufacturers, synthetic basestock producers, and companies interested in investments, mergers, or acquisitions would benefit from this information.

The following provides a tentative table of contents and details on this unique study. Pricing information and a subscription agreement are included with this brochure.

|

Objective

Data that will be presented

To make informed decisions, business executives will be required to thoroughly understand the market trends and dynamics and the competitive forces driving the business. Obtaining accurate, independent, and timely insights and information on these issues is critical to effective planning and executing strategies and tactics that will ultimately determine who will be the future leaders and laggards in the basestock business.

In view of these needs, the objectives of this study will be to:

- Determine and quantify the primary driving forces that will affect supply and demand in the next ten years
- Assess what the projected demand will be to the year 2005 for lube oil basestock by type and grade
- Assess the supply structure and project what the supply will be for each basestock to the year 2005
- Gather and analyze up-to-date information on the manufacturing practices of each player and, with this information, determine their current relative cost position
- Determine the current and projected business economics of each product in North America
- Construct scenarios about the future of the lube oil basestock business, based on all of the data gathered

How will this study help you?

The ultimate goal of this study is to assist executives in making informed decisions that affect their business using reliable, independent and accurate up-to-date information. The information presented in this study will assist business planners in:

- Deciding whether to invest more capital
- Identifying where to focus capital expenditures based on their firm's particular position in the marketplace
- Determining which plants are the best choices for consolidation
- Developing effective pricing strategies (which products should go up in price, which should go down, and where)
- Projecting possible plant closures or expansions

The study can also be invaluable to investors looking for opportunities in alliances, mergers, and acquisitions.

Tentative Table of Contents

- | | |
|---|---|
| <p>I. Introduction</p> <p>II. Business Forces Driving Supply and Demand</p> <p>A. Supply issues</p> <ol style="list-style-type: none"> 1. Current refinery operations <ol style="list-style-type: none"> a) Current basestock slate, capacity and quality b) Technology c) Flexibility d) Planned technology changes and debottlenecking e) Environmental issues 2. Feedstock sourcing and future implications 3. Strategic alliance, merger, and acquisition activity 4. Captive demand 5. Other supply-related issues <p>B. Demand issues</p> <ol style="list-style-type: none"> 1. Finished lubricants growth rates 1995 to 2005 by: <ol style="list-style-type: none"> a) Product category (engine oil, ATF, gear, grease, compressor, hydraulic, others) b) Viscosity grade c) Conventional, synthetic, semisynthetic 2. Performance specifications <ol style="list-style-type: none"> a) By product category and viscosity grade b) Additive technology <p>III. Demand Analysis and Projections</p> <p>A. Demand for finished lubricants 1995 to 2005 by:</p> <ol style="list-style-type: none"> 1. Product category (engine oil, ATF, gear, grease, compressor, hydraulic, others) 2. Viscosity grade <p>B. Demand for basestocks 1995 to 2005 by:</p> <ol style="list-style-type: none"> 1. Type (paraffinic, naphthenic, synthetic) 2. Grade 3. Technology: conventional basestocks, unconventional basestocks (EXXSYN, ISODEWAXING, XHVI, PAO, others) <p>IV. Supply of Basestocks 1995 - 2005</p> <p>A. Type (paraffinic, naphthenic, synthetic)</p> <ol style="list-style-type: none"> 1. Technology (conventional, unconventional) 2. Potential exits, new entrants, debottlenecking projects | <p>V. Supply and Demand Balance</p> <p>A. By viscosity grade - 1995 to 2005</p> <p>VI. International Trade</p> <p>A. Overview of worldwide movement of basestocks:</p> <ol style="list-style-type: none"> 1. Net exporting regions 2. In-balance regions 3. Movement of basestocks between regions <p>B. Future outlook</p> <ol style="list-style-type: none"> 1. Changes in demand that may influence trade patterns 2. Changes in supply that may influence trade patterns 3. Expected movement of basestock between regions: in years 2000 to 2005 <p>VII. Manufacturing Technology Assessment</p> <p>A. Current lube basestock technology by North American refinery:</p> <ol style="list-style-type: none"> 1. Technology 2. Flexibility 3. Environmental issues 4. Others <p>B. Future plans</p> <ol style="list-style-type: none"> 1. Conventional basestocks 2. Unconventional basestocks 3. Debottlenecking 4. Others <p>VIII. Supplier Profiles</p> <p>A. Basestock refiners</p> <p>B. Basestock manufacturers (PAO) and others</p> <p>IX. Industry Competitive Analysis</p> <p>A. Definition of conventional basestock configuration</p> <p>B. Detailed cost analysis of one representative configuration</p> <p>C. Extrapolation of representative configuration to remaining North American refineries</p> <p>X. Business Economics</p> <p>XI. Overall Business Assessment 1995 - 2005</p> <p>A. Basestock performance, leading to several demand scenarios</p> <p>B. Supply leading to several sets of supply/demand scenarios</p> <p>C. Pricing</p> |
|---|---|



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Details of What This Study Will Cover

Overview

1. Business Forces Driving Supply and Demand
2. Demand Analysis and Projections
3. Supply of Basestocks 1995-2005
4. Supply and Demand Balance
5. International Trade
6. Manufacturing Technology Assessment
7. Supplier Profiles
8. Industry Competitive Analysis
9. Business Economics
10. Overall Business Assessment 1995-2005

The following is a brief description of the major sections.

1. Business Forces Driving Supply and Demand

In order to predict what the future supply and demand will be, we will first identify and **quantify** the forces that affect and drive these parameters from 1995 to 2005. This portion of the report will analyze the current market drivers in detail and provide quantitative data. A partial list of the kinds of business drivers that will be examined in detail is shown below. Others will be added as uncovered by the study.

Supply Drivers

- Refinery operations
 - Current basestock slate and capacity
 - Technology
 - Expansion and debottlenecking plans
 - Flexibility
 - Environmental issues

Demand Drivers

- Increasingly stringent performance specifications in automotive and industrial lubricants
 - Fuel economy
 - Emissions
 - High temperature/high shear

The Changing Face of the Lube Oil Basestock Business Details of What This Study Will Cover
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- Low temperature performance
- Oxidation stability
- OEM design trends
 - Lube oil sump capacities
 - On-board oil change indicators
 - Fill-for-life systems
- Maintenance practices
 - Oil change intervals
- Macro economics
- Vehicle equipment population trends
- Finished lubricant and basestock pricing
- Additive technology
- Market penetration of synthetic and semisynthetic lubricants

2. Demand Analysis and Projections

This section will provide a thorough analysis of demand issues. It will provide data on:

- Historical demand from 1990 to 1995 by basestock type and grade
- Demand for finished lubricants from 1995 to 2005
- Demand for basestocks, 1995 to 2005, by type, grade, and technology, including EXXSYN, ISODEWAXING, XHVI, PAO, and other unconventional basestocks

Basis for this analysis:

The foundations of this analysis will be constructed from primary interviews with blenders and formulators of finished lubricants, additive suppliers, OEMs, additive manufacturers, and other key players in the basestock business. In addition, this analysis will take into account the impact that current business trends will have on demand for basestocks by type and grade, including conventional basestocks and such unconventional basestocks as EXXSYN, XHVI, ISODEWAXING, PAO, and others.

3. Supply of Basestocks 1995-2005

In order to assess the total supply of basestocks by type, technology, and viscosity grade, we look at each player in detail. This section will include the following data:



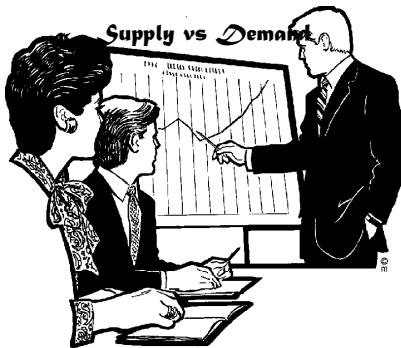
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- A breakdown of nameplate capacity and production levels by viscosity grade and basestock type
- Historical supply data and projections to the year 2005
- Potential exits, new entrants, and debottlenecking projects

Basis for this assessment

As with the demand analysis section of the report, the Supply of Basestocks 1995-2005 section will be constructed primarily from field and phone interviews. The objective of these interviews will be to:

- Assess the current and future position of each basestock refinery in the North American market
- Understand the relationship the refineries have with their respective downstream businesses and merchant customers
- Predicted plant shutdowns
- New players entering the market
- Customer base
- Captive demand
- Alternative uses of feedstock serving the basestock unit
- By/coproduct disposal/marketing issues



4. Supply and Demand Balance

This section will consolidate the insights and information gathered from Sections I, II, and III of this study into a comprehensive analysis of finished lubricants and basestock supply and demand for 1995. Based on this information, it will provide projections of supply and demand balance through the year 2005. The analysis will provide supply and demand balance by basestock, type, grade, and technology, including forecast balance for such unconventional basestocks as EXXSYN, ISODEWAXING, XHVI, PAO, and others in the North American market.

The Changing Face of the Lube Oil Basestock Business Details of What This Study Will C
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5. International Trade

Although this study is focused on the commercial aspects of the basestock business in North America, basestock is traded worldwide. North America and Western Europe are net exporters of basestock to consumers in other regions. With changing demand and supply in Asia and growing demand in Latin America, international trade of basestock will affect the North American supply and demand balance.

This section will examine the shifts in trading patterns that will result from projected changes in supply and demand.

6. Manufacturing Technology Assessment

For each refinery in North America, the following information will be provided:

- An assessment of the technology employed
- A summary of their current market position, with a discussion of such issues as:
 - Ability of the refinery to meet more stringent performance specifications
 - Environmental issues
 - Expansion plans
 - New technologies they view as favorable

Here is an example of the kinds of technologies employed in North America that will be covered in this section:

- Solvent Extraction: *Furfural, NMP, Phenol*
- Hydrocracking
- Dewaxing: *MEK/Toluene, Catalytic Dewaxing, Dill Chill, ISODEWAXING*
- Finishing: *Hydrofinishing, Clay Finishing, Bauxite Percolation*



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7. Supplier Profiles

This section will provide a profile of each refinery in North America that will cover:

- Basestock capacity by type and grade
- Capacity Utilization
- Environmental Issues
- Future Plans
- Others

We will also cover manufacturers of such unconventional basestocks as PAO and esters.

8. Industry Competitive Analysis

Which refineries in the United States are at risk?

This section will consolidate and analyze the information provided in all of the previous sections to determine which refineries are at risk. The basis used to develop our list of "at risk" refineries follows:

1. Develop a manufacturing cost analysis on one representative configuration.
2. The manufacturing cost of this representative assessment will be compared with the manufacturing costs for the Conoco/Pennzoil joint venture, developed in Volume I.
3. Conduct a "semi-quantitative" cost analysis to identify which refineries are at risk from a cost position.
4. We will then take into account other business drivers, such as captive demand, level of quality of existing production, environmental investments necessary, and other factors which will affect a refinery's viability.

The conclusion of this analysis will provide our assessments of which refineries will be at risk.

9. Business Economics

This section will provide a detailed analysis of the business economics and dynamics of each basestock type based on supply and demand trends. It will provide projections to the year 2005.

The Changing Face of the Lube Oil Basestock Business Details of What This Study Will Cover
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This section will address likely price movements in the industry. The analysis will be based on the supply/demand scenarios outlined in Section IV, and outlook for international trade in section V. We will also examine historical industry reaction to oversupply and raw material cost movements.

10. Overall Business Assessment 1995-2005

The conclusion of the report will present an analysis that will tie together the demand, supply, technology, and other commercial factors into an overall business assessment of the lubrication oil basestock business in North America.

It will provide an assessment of the most likely scenario for the future of the business and alternative scenarios based on varying:

- Basestock performance, leading to several demand scenarios
- Supply, particularly several sets of supplier exit scenarios
- Pricing, focused on depth and breadth of expected margin compression



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Methodology Used for This Study

The overall survey and analysis will be completed by a team of experienced professionals on the Kline staff, along with associates retained for this project. While members of the team will draw heavily on their backgrounds and prior experience in the finished lubricant and basestock business, major emphasis will be placed on primary data gathered through personal interviews. An estimated 150 to 200 interviews will be conducted to complete the survey. These interviews will be with finished lubricants and basestock marketers, additive companies, basestock refiners, original equipment manufacturers, and others.

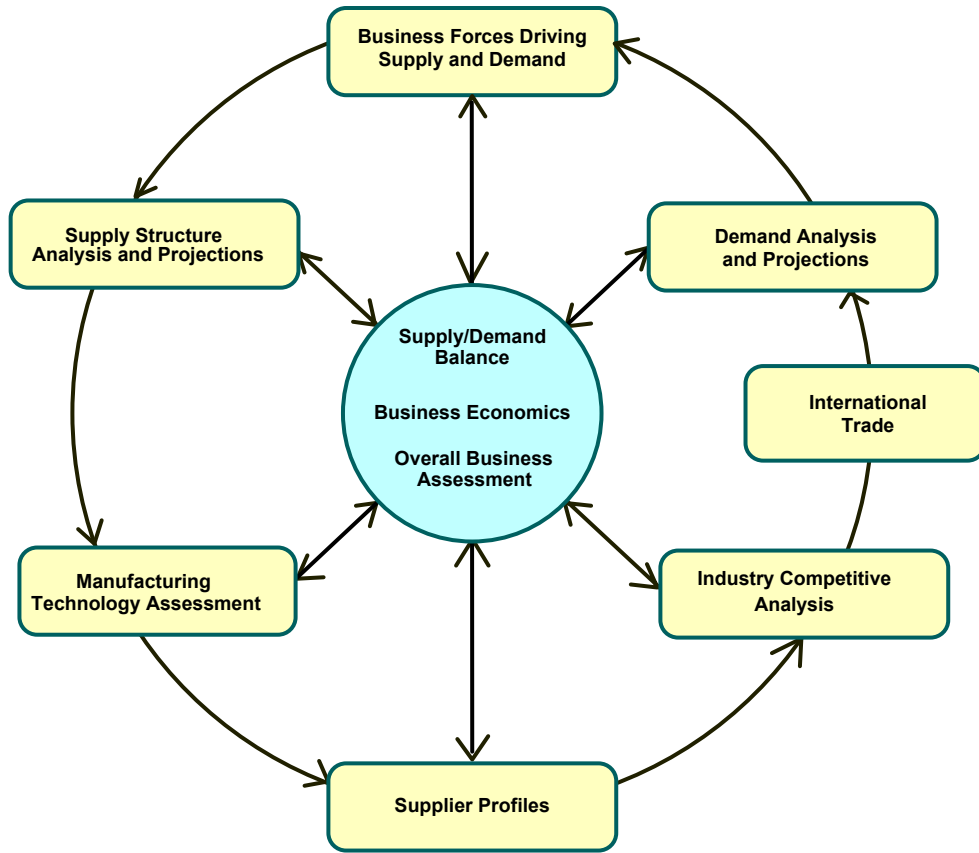
The method of analysis used in developing *The Changing Face of the Lube Oil Basestock Business* will comprise several key modules developed in parallel. This approach provides our research team with a highly effective means to share and build on insights and information derived from numerous sources. Additionally, this approach enables our research team to test the validity of the data gathered. Figure 1 illustrates the interrelationship of each section in this study, and how our research team will share, build on, and test the primary data gathered.

Figure 1

Schematic of Kline & Company's Approach to
The Analysis of The Changing Face of The Lube Oil Basestock
Business



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The Kline Difference

Our Experience

Since our founding over 35 years ago, Kline & Company, Inc. has become a global leader in business research and strategic consultation to the lubricant, chemical, petrochemical, and allied industries. We have developed a reputation for accuracy and reliability.

Our Methods

Developed over 35 years of experience, our systematic approach to gathering and analyzing information, based on detailed primary research, guarantees results.

Our Team Approach

We employ experienced professionals, each specializing in their particular field. We organize our experts into effective teams, each member contributing a particular expertise. Our project team can also draw on the expertise of the rest of the Kline professionals to assist them with the study.



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The Unique Kline Project Team

We use specialized personnel organized in cooperative project teams. Each team member has a particular set of expertise to contribute. They work together through all three phases of our study, to develop accurate information.

The team will consist of:

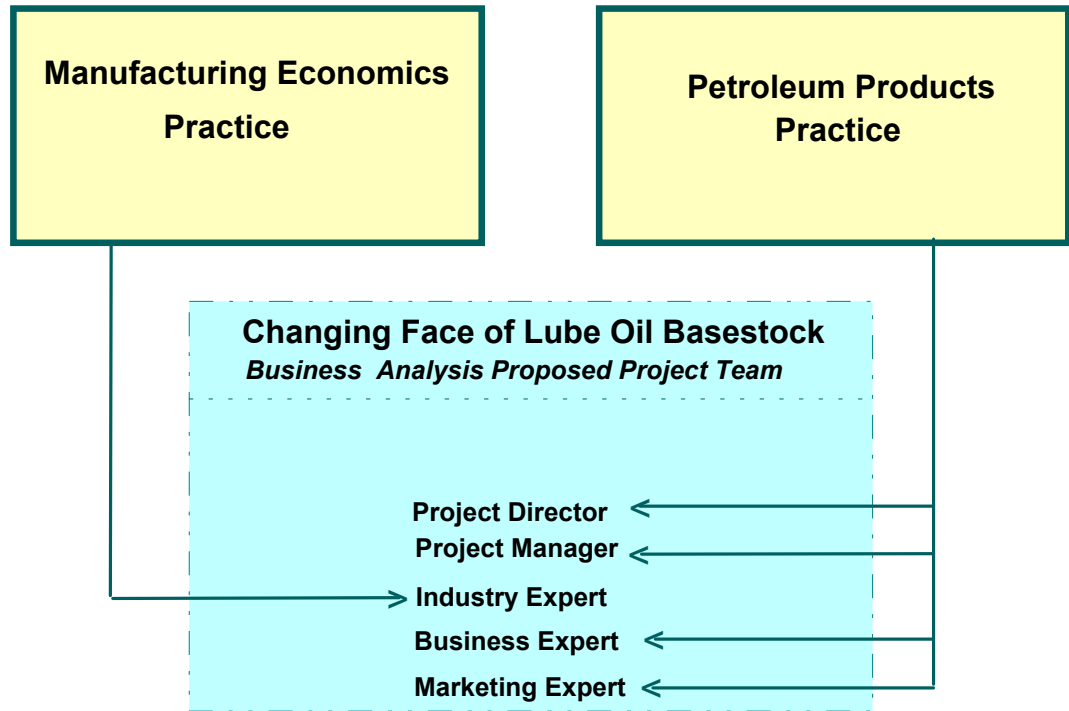
- A project director
- One or more technical experts
- One or more business and marketing experts
- One or more project specialists with special skills in developing primary information

These team members can draw upon other Kline resources and will develop the industry information from sources outside of Kline. The project team for this study will consist of members from both our Petroleum Products Practice and Manufacturing Economics Practice, as shown on Figure 2.

Figure 2
The Project Team



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Our Credentials

An International Firm

Established in 1959, Kline & Company, Inc. is an international business consulting firm offering a comprehensive range of services to the chemical and petroleum industries. Our headquarters are in Fairfield, NJ, and we currently have representative offices in:



- Brussels, Belgium
- Tokyo, Japan
- Melbourne, Australia
- Monterrey, Mexico
- Sao Paulo, Brazil

We have a reputation for delivering high-quality studies and assessments. We complete approximately 200 proprietary assignments and close to a dozen multiclient studies each year.

Our Human Resources - Our Best Asset

Kline's resources include experts in all areas of the lubricant, chemical, and petroleum fields. This diversity allows us to tailor a special project team for each study that provides the right blend of expertise in the fields of marketing, technology, manufacturing economics, intelligence, and strategic planning.



Our project teams are experienced at researching and analyzing information available from a variety of industry sources. These teams are further supported by the entire Kline organization, providing a wealth of experience and knowledge within our firm. This high level of technical support and expertise allows us to maintain a high standard of execution and consistently deliver quality studies and assessments.



Kline's Key Strength Is Clearly The Depth of Industry Experience

Kline currently has twelve industry-based practices, each specializing in a particular business area. Each Industry Practice Team consists of experts who have demonstrated records of success and years of experience in these industries. As previously indicated, the project team for *The Changing Face of The Lube Oil Basestock Business* is composed of members of each of two practice teams:

- The Petroleum Products Practice Team
- The Manufacturing Economics Practice Team

Our Petroleum Products Practice Team

Our Petroleum Products Practice Team consists of:

- Five full-time professionals
- Four with major oil or key independent experience in lubricants and fuels
- A combination of sales, product and market development, and technical service experience
- A combined 60 years of lubricants, chemical, and consulting experience

Our Manufacturing Economics Practice Team

Kline's Manufacturing Economics Practice Team has completed numerous technology assessments for companies in the refinery and chemical processing industries. This group specializes in business problem solving. We call upon this team whenever clients need to:

- Benchmark their technology against competing technologies
- Re-engineer and improve their manufacturing cost position
- Evaluate the impact expansion or consolidation of manufacturing capacity will have on their overall manufacturing cost
- Evaluate the cost structure of new technologies prior to implementation

As stated before, these clients value the level of detail, the accuracy, and the reliability of the cost assessments we develop. The survival of their business depends on the



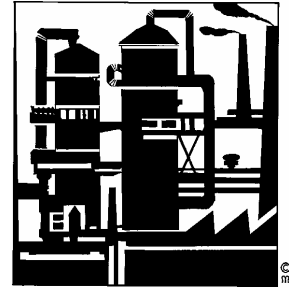
critical strategic technology and marketing decisions they make based on the data Kline provides.

Our assessments are complete and comprehensive. They include details of the critical factors that affect the manufacturing of the technology under study.



Relevant Assessments and Studies

The Petroleum Products Practice Team has worked with the Manufacturing Economics Practice Team to complete a number of relevant assignments, including business strategies, acquisition analyses, manufacturing economics, competitive assessments, lubricants (basestocks and finished), market size and segmentation, image analysis, and other proprietary assignments. The Petroleum Products Practice Team's experience has also been pivotal in the ongoing success of our highly regarded continuing program, *Opportunities in Lubricants*, and other syndicated studies, including:



- *Metal Working Fluids USA 1994*
- *The Outlook for Petroleum Waxes 1990-2000*
- *Lubricants and Fuel Additives 1990 and 1994*
- *Investment Opportunities in Specialty Lubricant Manufacturers 1988*
- *The Outlook for Petroleum Waxes 1985-1995*
- *Air Conditioning and Refrigerant Lubricants 1994*

In addition, in the last six years we have completed over 15 studies in the basestock area. Our basestock expertise was recently recognized by a major basestock refiner, which retained us to deliver a talk to an audience of its basestock suppliers and customers. This talk examined basestock supply/demand, changing performance requirements, and the role of unconventional basestocks in various formulation applications.

In addition, Kline's Petroleum Products Practice has delivered several papers on the lubricants business at meetings of the National Petroleum Refiners Association (NPRA).



Terms of the Assessment

Confidentiality

To ensure each subscriber obtains the maximum benefit from this new assessment, Kline & Company, Inc. agrees to:

1. Keep the identity of each subscriber confidential
2. Keep the information developed confidential and limited to subscribing companies for a period of three years

Schedule of Completion

Decision to Launch	4nd Quarter 1995
Completion	3rd Quarter 1996