

## **DETERGENT ALKYLATES - WORLD MARKETS, 1995-2010**

With more than 2.7 million tons of global capacity, detergent alkylates have reached a period of relative prosperity. Environmental pressures and trade disorganization problems, which were the prime features earlier in the decade, have been largely left behind. A short term feedstock shortage is close to correcting. Competition from detergent alcohol has lessened for the time being. Producers seem to face unprecedented prosperity in the new millennium.

There are important issues that must also be faced. The feedstock situation could turn from famine to feast, reversing a key price driver. Competition from detergent alcohols is set to revive with the addition of 200 to 300 thousand tons of new alcohols capacity around 2002/2003. With the rate of BAB substitution having slowed, the major growth engine for LAB will be the substitution of soap-based products in developing economies, and this penetration no longer proceeds rapidly. In a number of markets, competition from other anionics like AES and AOS may impact future growth levels for LAB.

*Detergent Alkylates - World Markets, 1995-2010* includes a detailed global analysis of LAB, BAB and its sulfonated derivatives by region over the 1995-2010 period. The study reports on areas of substitution, consumption and trends, as well as competing materials. It evaluates historical, current and future (based on current announcements) supplies in each region for both LAB and BAB and documents trade by country for 1999. It also contains information by region on the need for additional capacity.

The report provides a full view of all facets of the detergent alkylate industry: raw material supplies and requirements, producers, surfactant consumption, environmental issues, and sulfonation capacities. It provides the outlook for LAB and BAB and their derivatives on a regional and global basis in the context of formulation issues, consumer preference, competition with other surfactants, demographic, environmental and customer-related issues.

This comprehensive study was completed in August 2000, is priced at \$15,000 and is available for immediate delivery. The following pages contain the table of contents and other details. Please contact us at the address on the back of the cover if you have any questions.

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### CONTENTS

	<u>Page</u>
Description of the Study	2
Table of Contents	4
Sample Tables	18
Qualifications & Personnel	26
How to Subscribe	29

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## DESCRIPTION OF THE STUDY

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*Detergent Alkylates - World Markets* is a comprehensive study which details the production, capacity, trade and supply/demand balance by region for both LAB and BAB. Major factors affecting the outlook are examined including raw material requirements, surfactant consumption trends, novel technological developments, sulfonation capacity, and environmental issues, among others. Historical and forecast consumption of LABS and BABS is reviewed in depth over the 1995-2010 period by application and end use, incorporating an understanding of the formulation trends, competition with alcohol-based surfactants, consumer preferences and customer-oriented requirements.

CAHA's in-depth analysis of this major market is offered as a 523-page report organized in the following chapters. A brief discussion of each of the main chapters is provided below.

### RAW MATERIALS

Regional capacities for normal paraffins, internal olefins, alpha-olefins, and propylene tetramer are detailed over the 1994-1999 period. Supply/demand issues are also addressed for each of these raw materials. The impact of the new Gas-to-Liquid plants, which offer a new source of normal paraffins, is reviewed. Demand for internal and alpha-olefins is declining as LAB plants consuming these two raw materials have closed or will convert to n-paraffin feedstock in the future. Feedstock requirements for LAB and BAB production over the 1999-2010 period are forecast. Present and historical prices for these raw materials are also included to complete the picture.

### LAB AND BAB MARKETS

This section includes a review of alkylbenzene technologies including processes, raw materials, reactor design and resulting LAB compositions. A discussion of the ongoing technological developments emphasizes novel processes and potential new variants of LABS.

Regional market analyses include an overview of current (1999), historical and future capacities with a detailed discussion of each producer. A historical 1995-1999 supply/demand balance is presented and includes demand and demand growth, production, and operating rates. A future 2000-2010 supply/demand balance details demand and demand growth in the context of current and future supply, and quantifies the expected surplus or shortage in LAB and BAB production capacities required to meet future regional demand.

A series of regional 1999 trade balances offer valuable insight about inter-regional movements of LAB and BAB along with individual country imports and sourcing. Pricing, consumption, market trends and demand-oriented issues are also addressed.

### SURFACTANT END USE MARKET TRENDS AND ISSUES

This analysis of global and regional surfactant markets details total surfactant consumption by end use market area and discusses LABS, BABS and competing surfactants. Formulation issues, consumer preferences, and competition with other products such as alcohol-based surfactants are organized by major end use area: household, industrial and institutional cleaners and industrial applications. Details of individual applications are included.

### ENVIRONMENTAL ISSUES

Environmental and health issues related to branched and linear alkylbenzene sulfonate as well as other surfactants are reviewed. Issues such as biodegradability, toxicity and environmental pollution are discussed and their potential impact on future regional consumption evaluated. Legislative efforts, testing methods and results are explained along with other prominent issues.

### LINEAR AND BRANCHED ALKYL BENZENE SULFONATE

This chapter begins with a discussion of sulfonation technology and tables of sulfonators and their capacities by country. Supply changes in terms of new sulfonation capacity as well as closures over the 1995-1999 period are quantified and detailed.

LABS and BABS consumption is analyzed over the 1995-2010 period for each major region. Consumption of each sulfonated product is segmented by end-use market (household, I&I, industrial) and by application (HDL, HDP, and LDL) when available, over the 1995-2010 period. Each regional analysis encompasses a discussion of end use markets and customers in which demographics, formulations, environmental issues and customer-related issues are evaluated.

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# TABLE OF CONTENTS

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		<u>Page</u>
	PREFACE	ii
	EXECUTIVE SUMMARY	iv
	TABLE OF CONTENTS	xx
	List of Tables	xxvi
	List of Figures	xxxii
I.	INTRODUCTION	I-1 - I-4
	Background	I-2
II.	RAW MATERIALS	II-1 - II-55
	Introduction	II-1
	Normal Paraffins	II-2
	Technology	II-2
	Producers and Capacities	II-6
	North America	II-9
	Latin America	II-9
	West Europe	II-10
	Asia/Pacific	II-10
	Other Regions	II-11
	Production	II-11
	North America	II-12
	Latin America	II-12
	West Europe	II-13
	Asia/Pacific	II-13
	Other Regions	II-13
	Supply/Demand Issues	II-14
	Prices	II-17
	Detergent End Use Utilization	II-21
	World n-Paraffin Demand Forecast for Alkylate	II-21
	North America	II-22
	Latin America	II-22
	West Europe	II-22
	Asia/Pacific	II-22
	Other Regions	II-23
	Internal Olefins	II-24
	Technology	II-24
	Paraffin Dehydrogenation	II-24
	Isomerization and Disproportionation (I/D)	II-27
	Producers and Capacities	II-27
	Shell	II-27
	CONDEA	II-28
	Mitsubishi	II-28
	Fushun	II-28

Table of Contents (continued)

	<u>Page</u>
Production	II-29
Supply/Demand Issues	II-30
Prices	II-33
Detergent End Use Utilization	II-34
World IO Demand Forecast for Alkylate	II-34
Alpha-Olefins	II-37
Technology	II-37
Producers and Capacities	II-38
Production	II-41
Supply/Demand Issues	II-41
Prices	II-42
Detergent End Use Utilization	II-44
Alpha-Olefin Demand Forecast for Alkylate	II-45
Propylene Tetramer	II-47
Technology	II-47
Producers and Capacities	II-48
Supply/Demand Balance	II-50
Prices	II-52
Detergent End Use Utilization	II-53
World Propylene Tetramer Demand Forecast For Alkylate	II-54
III. LINEAR AND BRANCHED DETERGENT ALKYLATE MARKETS	III-1 - III-110
Sources and Technologies	III-1
Introduction	III-1
Linear Alkylbenzene	III-1
Branched Alkylbenzene	III-2
Starting Materials and Processes	III-2
Olefins	III-2
Alkyl Chlorides	III-4
Reactor Design	III-5
LAB Compositions	III-5
Developments in New Technology	III-8
Markets	III-11
World Overview	III-11
Production	III-11
North America	III-22
Producers and Capacities	III-22
Supply/Demand Balance	III-26
Imports/Exports	III-29
Prices	III-31
Consumption	III-33
Demand Forecast	III-34
Latin America	III-36
Producers and Capacities	III-36
Supply/Demand Balance	III-41
Imports/Exports	III-43
Prices	III-47
Consumption	III-47

Table of Contents (continued)

	<u>Page</u>
Demand Forecast	III-49
West Europe	III-51
Producers and Capacities	III-51
Supply/Demand Balance	III-56
Imports/Exports	III-60
Prices	III-62
Consumption	III-63
Demand Forecast	III-64
Asia/Pacific	III-65
Producers and Capacities	III-65
Supply/Demand Balance	III-78
Imports/Exports	III-81
Prices	III-86
Consumption	III-87
Demand Forecast	III-90
East Europe	III-91
Producers and Capacities	III-91
Supply/Demand Balance	III-95
Imports/Exports	III-97
Prices	III-98
Consumption	III-98
Demand Forecast	III-99
Middle East/Africa	III-100
Producers and Capacities	III-100
Supply/Demand Balance	III-104
Imports/Exports	III-106
Prices	III-109
Consumption	III-109
Demand Forecast	III-109
 IV. SURFACTANT END MARKET TRENDS AND ISSUES	 IV-1 - IV-146
World Overview	IV-1
North America Markets	IV-5
Summary	IV-5
Household Products	IV-7
Summary	IV-7
Heavy Duty Powders	IV-11
United States	IV-11
Canada	IV-13
Surfactant Consumption	IV-14
Heavy Duty Liquids	IV-17
United States	IV-17
Canada	IV-18
Surfactant Consumption	IV-18
Light Duty Liquids	IV-20
United States	IV-21
Canada	IV-22
Surfactant Consumption	IV-22

Table of Contents (continued)

	<u>Page</u>
Fabric Softeners	IV-24
Other Household Products	IV-25
Hard Surface Cleaners	IV-25
Laundry Aids	IV-27
Automatic Dishwashing Detergents	IV-29
Other Products	IV-29
Surfactant Consumption	IV-30
Industrial and Institutional Cleaners	IV-31
Summary	IV-31
Industrial, Institutional and Commercial	
Laundries	IV-36
Hard Surface Cleaners	IV-36
Commercial Dishwashing	IV-36
Other I&I End Uses	IV-37
Industrial Applications	IV-41
Summary	IV-41
Agricultural Chemicals	IV-46
Plastics and Elastomers	IV-47
Textiles	IV-48
Other Industrial Uses	IV-50
Latin America Markets	IV-51
Summary	IV-51
South and Central America Overview	IV-54
Mexico Overview	IV-57
Household Products	IV-61
Summary	IV-61
Heavy Duty Detergents	IV-64
Light Duty Detergents	IV-66
Other Household Products	IV-67
Industrial and Institutional Cleaners	IV-67
Industrial Applications	IV-68
West Europe Markets	IV-70
Summary	IV-70
Household Products	IV-71
Summary	IV-71
Heavy Duty Powders	IV-79
Heavy Duty Liquids	IV-87
Light Duty Liquids	IV-93
Industrial and Institutional Cleaners	IV-99
Summary	IV-99
Industrial, Institutional and Commercial Laundries	IV-102
Hard Surface Cleaners	IV-103
Commercial Dishwashing	IV-104
Other I&I End Uses	IV-104
Industrial Applications	IV-106
Summary	IV-106
Agricultural Chemicals	IV-108
Plastics and Elastomers	IV-108

Table of Contents (continued)

	<u>Page</u>
Textiles	IV-111
Polishes	IV-112
Asia/Pacific Markets	IV-113
Summary	IV-113
Household Products	IV-115
Summary	IV-115
Heavy Duty Detergents	IV-117
Light Duty Liquids	IV-123
Other Household Products	IV-126
Industrial and Institutional Cleaners	IV-128
Summary	IV-128
Commercial and Institutional Laundries	IV-131
Hard Surface Cleaners	IV-132
Commercial Dishwashing	IV-133
Industrial Applications	IV-133
Summary	IV-133
Agricultural Chemicals	IV-135
Pulp and Paper	IV-136
Plastics and Elastomers	IV-136
Textiles	IV-137
Others	IV-137
Other Regions Markets	IV-138
Summary	IV-138
Household Products	IV-139
Detergent Markets	IV-141
Industrial and Institutional Cleaners and Industrial Applications	IV-143
Surfactant Consumption	IV-143
V. ENVIRONMENTAL ISSUES	V-1 - V-81
Introduction	V-1
Biodegradability	V-3
Introduction	V-3
ERASM Activities	V-5
Surfactant Biodegradability Legislation in the U.S.	V-8
Anaerobic Biodegradability	V-10
Methods for Determination of Biodegradability	V-14
Specific Analytical Methods	V-15
MBAS Method for Anionic Surfactants	V-15
Specific Analytical Methods for LABS	V-15
Biodegradation Test Procedures	V-15
OECD Test Procedures	V-16
Other Biodegradation Test Methods	V-18
The Biodegradability of Surfactants Today	V-24
Linear and Branched Alkylbenzene Sulfonates	V-25
Biodegradability Data on Various Surfactants	V-34
Toxicity	V-35
Introduction	V-35
Mammalian Toxicity	V-35

Table of Contents (continued)

	<u>Page</u>
Aquatic Toxicity	V-37
Terrestrial Toxicity	V-38
Endocrine Disruption	V-39
Toxicity Testing	V-40
Toxicity of LABS	V-41
Comparative Data for Other Surfactants	V-46
Environmental Safety	V-47
Assessment of Environmental Safety of Surfactants	V-47
Assessment of Product Safety — The AISE Approach	V-49
Legislation Related to Toxicity	V-52
Legislation in the U.S.	V-52
Legislation in Europe	V-54
EEC Dangerous Preparation	V-59
Environmental Pollution	V-63
Clean Air Act and Volatile Organic Compounds (VOC)	V-63
Clean Water Act	V-68
Drinking Water Legislation	V-70
Life Cycle Inventory	V-71
Regional Reviews and Outlook	V-73
United States	V-73
Historical Background	V-73
Current Situation	V-73
Future	V-75
Europe	V-75
Latin America	V-78
Asia/Pacific	V-80
Other Regions	V-80
VI. LINEAR AND BRANCHED ALKYL BENZENE SULFONATE	VI-1 - VI-85
Technology	VI-1
Sulfonation	VI-1
Utilization	VI-39
Markets	VI-40
World Overview	VI-40
North America	VI-45
Producers, Capacities, Locations	VI-46
End Use Markets/Customers	VI-48
Latin America	VI-51
Producers, Capacities, Locations	VI-53
End Use Markets/Customers	VI-57
West Europe	VI-61
Producers, Capacities, Locations	VI-62
End Use Markets/Customers	VI-65
Asia/Pacific	VI-69
Producers, Capacities, Locations	VI-69
End Use Markets/Customers	VI-74
Other Regions	VI-76
Producers, Capacities, Locations	VI-76

Table of Contents (continued)

	<u>Page</u>
End Use Markets/Customers	VI-82
VII. APPENDIX	VII-1 - VII-10
List of Abbreviations	VII-1
List of Contacts	VII-5

# LIST OF TABLES

<u>Table</u>	<u>Page</u>
1 Detergent Alkylate Consumption, 1999 and 2010	iv
2 Linear Alkylbenzene Consumption by Region, 1999 and 2010	v
3 Branched Alkylbenzene Consumption by Region, 1999 and 2010	vi
4 World - Alkylbenzene Balance, 1999	vii
5 World - Linear Alkylbenzene Demand, Capacity and Difference by Region, 2000-2010	viii
6 World - Branched Alkylbenzene Demand, Capacity and Difference by Region, 2000-2010	xi
7 World - Raw Material Consumption for Alkylate Production, 1995-2010	xiii
8 World - Linear Alkylbenzene Sulfonate Consumption by Selected End Use and by Region, 1995-2010	xvii
9 World - Branched Alkylbenzene Sulfonate Consumption by Region, 1995-2010	xviii
10 World - Branched Alkylbenzene Sulfonate Consumption by Selected End Use, 1995-2010	xix
II-1 Potential n-Paraffin Production From Proposed GTL Plants	II-4
II-2 World - n-Paraffin Capacity, 1994-1999	II-6
II-3 World - C <sub>10+</sub> Normal Paraffin Producers and Capacities, 1999	II-7
II-4 World - n-Paraffin Production by Region, 1999	II-12
II-5 World - Announced New Linear Alkylbenzene Capacity and Feedstock Positions	II-15
II-6 U.S. - Refiner Prices for Resale of Kerosene, 1980-2000	II-18
II-7 U.S. - n-Paraffin Prices, 1990-1999, Asia C&F	II-19
II-8 World - Normal Paraffin Demand for Linear Alkylbenzene by Region, 1995-2010	II-23
II-9 World - Internal Olefin Producers and Capacities, 1999	II-29
II-10 World - Internal Olefin Producers and Production, 1999	II-30
II-11 LAB/BAB Plant Closures by Type, 1992-2000	II-32
II-12 World - Internal Olefin Demand for Linear Alkylbenzene Production, 1995-2010	II-34
II-13 Current and Potential Internal Olefin Customers	II-36
II-14 World - Alpha-Olefin Producers and Capacities, 1994 and 2000	II-40
II-15 World - Alpha-Olefin Production by Region, 2000	II-41
II-16 Price History of Selected Alpha-Olefins, 1984-2000	II-43
II-17 World - Alpha-Olefin Demand by End Use, 2000	II-44
II-18 World - Alpha-Olefin Demand for Alkylate, 1995-2010	II-46
II-19 World - Propylene Tetramer Producers and Capacities, 1994 and 1999	II-49
II-20 World - Propylene Tetramer Production, 1994 and 1999	II-51
II-21 U.S. - List Price History For Propylene Tetramer, 1984-1999	II-53
II-22 World - Propylene Tetramer Demand For Branched Alkylbenzene Production, 1995-2010	II-55
III-1 Typical High and Low 2-Phenyl LAB Compositions	III-6
III-2 Typical Linear Alkylbenzene Compositions	III-8
III-3 World - Alkylbenzene Capacity by Region, 1999	III-11
III-4 World - Alkylbenzene Production by Region, 1995-1999	III-12
III-5 World - Alkylbenzene Production by Type, 1995-1999	III-13

List of Tables (continued)

<u>Table</u>	<u>Page</u>
III-6 World - Linear Alkylbenzene Production by Region, 1995-1999	III-14
III-7 World - Branched Alkylbenzene Production by Region, 1995-1999	III-15
III-8 World - Linear Alkylbenzene Balance, 1999	III-15
III-9 World - Branched Alkylbenzene Balance, 1999	III-16
III-10 World - Alkylbenzene Demand by Region, 1995-1999	III-17
III-11 World - Linear Alkylbenzene Demand, Capacity and Difference by Region, 2000-2010	III-19
III-12 World - Branched Alkylbenzene Demand, Capacity and Difference by Region, 2000-2010	III-20
III-13 North America - Alkylbenzene Producers and Capacities, 1999	III-22
III-14 North America - Historical and Forecast Alkylbenzene Capacities, 1995-2005	III-24
III-15 North America - Alkylbenzene Supply/Demand, 1995-1999	III-28
III-16 North America - Alkylbenzene Supply/Demand, 2000-2010	III-29
III-17 North America - LAB Trade Balance, 1999	III-30
III-18 North America - BAB Trade Balance, 1999	III-31
III-19 North America - LAB Consumption by End Use Segment, 2000	III-33
III-20 U.S. - Alkylbenzene Consumption by Type, 1995-2010	III-35
III-21 Canada - Alkylbenzene Consumption by Type, 1995-2010	III-35
III-22 North America - Alkylbenzene Consumption by Type, 1995-2010	III-35
III-23 Latin America - Alkylbenzene Producers and Capacities, 1999	III-37
III-24 Latin America - Historical and Forecast Alkylbenzene Capacities, 1995-2005	III-38
III-25 Latin America - Alkylbenzene Supply/Demand, 1995-1999	III-41
III-26 Latin America - Alkylbenzene Supply/Demand, 2000-2010	III-43
III-27 Latin America - LAB Trade Balance, 1999	III-44
III-28 Latin America - BAB Trade Balance, 1999	III-46
III-29 Latin America - Alkylbenzene Status in Household Products by Country, 1999	III-48
III-30 Latin America - Alkylbenzene Consumption by Type, 1995-2000	III-50
III-31 West Europe - Alkylbenzene Producers and Capacities, 1999	III-51
III-32 West Europe - Historical and Forecast Alkylbenzene Capacities, 1995-2005	III-53
III-33 West Europe - Alkylbenzene Supply/Demand, 1995-1999	III-57
III-34 West Europe - Alkylbenzene Supply/Demand, 2000-2010	III-59
III-35 West Europe - Linear Alkylbenzene Trade Balance, 1999	III-60
III-36 West Europe - Branched Alkylbenzene Trade Balance, 1999	III-62
III-37 West Europe - Alkylbenzene Consumption by Type, 1995-2010	III-64
III-38 Asia/Pacific - Alkylbenzene Producers and Capacities, 1999	III-65
III-39 Asia/Pacific - Historical and Forecast Alkylbenzene Capacities, 1995-2010	III-68
III-40 Asia/Pacific - Alkylbenzene Supply/Demand, 1995-1999	III-79
III-41 Asia/Pacific - Alkylbenzene Supply/Demand, 2000-2010	III-80
III-42 Asia/Pacific - LAB Trade Balance, 1999	III-81
III-43 Asia/Pacific - BAB Trade Balance, 1999	III-85
III-44 Asia/Pacific - Alkylbenzene Types Consumed in Household Applications by Country, 1999	III-88
III-45 Asia/Pacific - Alkylbenzene Consumption by Type, 1995-2010	III-90
III-46 East Europe - Linear Alkylbenzene Producers and Capacities, 1999	III-91
III-47 East Europe - Historical and Forecast Alkylbenzene Capacity, 1995-2010	III-93
III-48 East Europe - Alkylbenzene Supply/Demand, 1995-1999	III-96
III-49 East Europe - Alkylbenzene Supply/Demand, 2000-2010	III-97
III-50 East Europe - LAB Trade Balance, 1999	III-98

List of Tables (continued)

<u>Table</u>	<u>Page</u>
III-51 East Europe - Alkylbenzene Consumption by Type, 1995-2010	III-99
III-52 Middle East/Africa - Linear Alkylbenzene Producers and Capacities, 1999	III-100
III-53 Middle East/Africa - Historical and Forecast Alkylbenzene Capacities, 1995-2010	III-102
III-54 Middle East/Africa - Alkylbenzene Supply/Demand, 1995-1999	III-104
III-55 Middle East/Africa - Alkylbenzene Supply/Demand, 2000-2010	III-106
III-56 Middle East/Africa - Linear Alkylbenzene Trade Balance, 1999	III-107
III-57 Middle East/Africa - Branched Alkylbenzene Trade Balance, 1999	III-108
III-58 Middle East/Africa - Alkylbenzene Consumption by Type, 1995-2010	III-110
IV-1 World - Total Surfactant Consumption by End Use, 1995-2010	IV-2
IV-2 World - Surfactant Consumption by Region, 1995-2010	IV-3
IV-3 World - Major Surfactant Consumption by Type, 1995-2010	IV-4
IV-4 North America - Surfactant Consumption by End Market Area, 1995-2010	IV-5
IV-5 North America - Total Surfactant Use, 1995-2010	IV-7
IV-6 North America - Major Household Product Consumption, 1995-2010	IV-8
IV-7 U.S. - Major Household Product Consumption, 1995-2010	IV-9
IV-8 North America - Surfactant Consumption in Household Products Production, 1995-2010	IV-10
IV-9 U.S. - Consumption of Heavy Duty Detergents, 1995-2010	IV-12
IV-10 Canada - Consumption of Heavy Duty Detergents, 1995-2010	IV-13
IV-11 North America - Surfactant Consumption in Heavy Duty Powders, 1995-2010	IV-15
IV-12 North America - Consumption of Heavy Duty Liquids, 1995-2010	IV-17
IV-13 North America - Surfactant Consumption by Type in Heavy Duty Liquids, 1995-2010	IV-19
IV-14 North America - Consumption of Light Duty Liquids, 1995-2010	IV-21
IV-15 North America - Surfactant Consumption by Type in Light Duty Liquids, 1995-2010	IV-24
IV-16 North America - Consumption of Other Household Products, 1998	IV-25
IV-17 North America - Surfactant Consumption by Type in Other Household Products, 1995-2010	IV-30
IV-18 North America - Surfactant Consumption in Industrial and Institutional Cleaners by End Use, 1995-2010	IV-31
IV-19 North America - Surfactant Consumption by Type in Industrial and Institutional Cleaners, 1995-2010	IV-32
IV-20 U.S. - Surfactant Consumption in Industrial and Institutional Cleaners by End Use, 1995-2010	IV-33
IV-21 U.S. - Surfactant Consumption by Type in Industrial and Institutional Cleaners, 1995-2010	IV-34
IV-22 Canada - Surfactant Consumption in Industrial and Institutional Cleaners by End Use, 1995-2010	IV-35
IV-23 Canada - Surfactant Consumption by Type in Industrial and Institutional Cleaners, 1995-2010	IV-35
IV-24 North America - Surfactant Consumption in Industrial End Uses, 1995-2010	IV-41
IV-25 North America - Surfactant Consumption by Type in Industrial End Uses, 1995-2010	IV-42
IV-26 U.S. - Surfactant Consumption in Industrial End Uses, 1995-2010	IV-43
IV-27 U.S. - Surfactant Consumption by Type in Industrial End Uses, 1995-2010	IV-44
IV-28 Canada - Surfactant Consumption in Industrial End Uses, 1995-2010	IV-45
IV-29 Canada - Surfactant Consumption by Type in Industrial End Uses, 1995-2010	IV-46
IV-30 U.S. - Surfactant Consumption in Agricultural Chemicals, 1995-2010	IV-47
IV-31 U.S. - Surfactant Consumption in Plastics and Elastomers, 1995-2010	IV-48
IV-32 U.S. - Surfactant Consumption in Textile Chemicals, 1995-2010	IV-50

List of Tables (continued)

<u>Table</u>	<u>Page</u>
IV-33 Latin America - Surfactant Consumption by End Market Area, 1995-2010	IV-52
IV-34 Latin America - Surfactant Consumption by Type, 1995-2010	IV-52
IV-35 Latin America - Branched Alkylbenzene Sulfonate Status in Household Products by Country, 1999	IV-53
IV-36 South and Central America - Surfactant Consumption by End Use, 1995-2010	IV-54
IV-37 South and Central America - Surfactant Consumption by Type, 1995-2010	IV-56
IV-38 Mexico - Surfactant Consumption by End Use, 1995-2010	IV-58
IV-39 Mexico - Surfactant Consumption by Type, 1995-2010	IV-58
IV-40 Latin America - Surfactant Consumption by Type in Household Products, 1995-2010	IV-61
IV-41 Latin America - Surfactant Consumption by Type in Industrial and Institutional Cleaners, 1995-2010	IV-68
IV-42 Latin America - Surfactant Consumption by Type in Industrial Process Aids, 1995-2010	IV-69
IV-43 West Europe - Total Surfactant Consumption by Type, 1995-2010	IV-70
IV-44 West Europe - Surfactant Consumption by End Market Area, 1995-2010	IV-71
IV-45 West Europe - Major Household Detergent Production by End Use, 1995-2010	IV-72
IV-46 West Europe - Surfactant Consumption by Type in Household Detergent Production, 1995-2010	IV-75
IV-47 West Europe - Surfactant Consumption in Heavy Duty Powders by Country, 1998	IV-84
IV-48 West Europe - Surfactant Consumption by Type in Heavy Duty Powders, 1995-2010	IV-84
IV-49 West Europe - Surfactant Consumption in Heavy Duty Liquids by Country, 1998	IV-90
IV-50 West Europe - Surfactant Consumption by Type in Heavy Duty Liquids, 1995-2010	IV-92
IV-51 West Europe - Surfactant Consumption in Light Duty Liquids by Country, 1995-2010	IV-96
IV-52 West Europe - Surfactant Consumption by Type in Light Duty Liquids, 1995-2010	IV-97
IV-53 West Europe - Surfactant Consumption in I&I Cleaners by End Use, 1995-2010	IV-100
IV-54 West Europe - Surfactant Consumption by Type in Industrial and Institutional Cleaners, 1995-2010	IV-101
IV-55 West Europe - Surfactant Consumption in Industrial End Uses, 1995-2010	IV-106
IV-56 West Europe - Surfactant Consumption by Type in Industrial End Uses, 1995-2010	IV-107
IV-57 Asia/Pacific - Surfactant Consumption by End Market Area, 1995-2010	IV-113
IV-58 Asia/Pacific - Total Surfactant Consumption by Type, 1995-2010	IV-114
IV-59 Asia/Pacific - Household Product Consumption by End Use, 1995-2010	IV-116
IV-60 Asia/Pacific - Surfactant Consumption by Type in Household Detergents, 1995-2010	IV-117
IV-61 Asia/Pacific - Consumption of Heavy Duty Detergents, 1995-2010	IV-118
IV-62 Asia/Pacific - Consumption of Powder Detergents, 1995-2010	IV-119
IV-63 Asia/Pacific - Surfactant Consumption in Heavy Duty Detergents by Country, 1998	IV-120
IV-64 Asia/Pacific - Surfactant Consumption by Type in Heavy Duty Detergents, 1995-2010	IV-121
IV-65 Asia/Pacific - Consumption of Light Duty Liquids by Country, 1998	IV-124
IV-66 Asia/Pacific - Surfactant Consumption in Light Duty Liquids by Country, 1998	IV-125
IV-67 Asia/Pacific - Surfactant Consumption by Type in Light Duty Liquids, 1995-2010	IV-126
IV-68 Asia/Pacific - Surfactant Consumption by Type in Other Household Products, 1995-2010	IV-127
IV-69 Asia/Pacific - Consumption of I&I Cleaning Products by End Use, 1995-2010	IV-128
IV-70 Asia/Pacific - Surfactant Consumption in I&I Cleaners by End Use, 1995-2010	IV-130
IV-71 Asia/Pacific - Surfactant Consumption by Type in Industrial and Institutional Cleaners, 1995-2010	IV-131
IV-72 Asia/Pacific - Surfactant Consumption in Industrial End Uses, 1995-2010	IV-134
IV-73 Asia/Pacific - Surfactant Consumption by Type in Industrial End Uses, 1995-2010	IV-135
IV-74 Other Regions - Consumption of Household Detergents, 1998	IV-139

List of Tables (continued)

<u>Table</u>		<u>Page</u>
IV-75	Other Regions - Surfactant Consumption by Type in Household Products, 1995-2010	IV-144
IV-76	Other Regions - Total Surfactant Consumption by Type in Selected End Uses, 1995-2010	IV-145
V-1	OECD Screen and Confirmatory Test Conditions	V-18
V-2	Tests for Ready Biodegradability Recommended by OECD	V-22
V-3	Tests for Inherent Biodegradability Recommended by OECD	V-23
V-4	Simulation Tests for Biodegradability	V-24

List of Tables (continued)

<u>Table</u>	<u>Page</u>
V-5 Primary and Ultimate Biodegradability of LABS and BABS in Standard Laboratory Test Procedures	V-26
V-6 Biodegradability Data on Various Surfactants	V-34
V-7 Results of Mammalian Toxicology Tests with LABS	V-36
V-8 Toxicity Data on Various Surfactants	V-46
V-9 California - VOC Standards for Selected Consumer Products	V-65
VI-1 World - Sulfation/Sulfonation Capacity Summary by Region, 1999	VI-4
VI-2 North America - List of Sulfators/Sulfonators and Capacities, 1999	VI-5
VI-3 Latin America - List of Sulfators/Sulfonators and Capacities, 1999	VI-9
VI-4 West Europe - List of Sulfators/Sulfonators and Capacities, 1999	VI-14
VI-5 Asia/Pacific - List of Sulfators/Sulfonators and Capacities, 1999	VI-18
VI-6 Other Regions - List of Sulfators/Sulfonators and Capacities, 1999	VI-26
VI-7 World - New Sulfonation Capacity	VI-33
VI-8 World - Sulfonation Plant Closures, 1995-1999	VI-36
VI-9 World - Linear Alkylbenzene Sulfonate Consumption by Region, 1995-2010	VI-41
VI-10 World - Linear Alkylbenzene Sulfonate Consumption by Selected End Use and by Region, 1995-2010	VI-43
VI-11 World - Branched Alkylbenzene Sulfonate Consumption by Region, 1995-2010	VI-44
VI-12 World - Branched Alkylbenzene Sulfonate Consumption by Selected End Use, 1995-2010	VI-45
VI-13 North America - Linear Alkylbenzene Sulfonate Consumption by Selected End Use, 1995-2010	VI-45
VI-14 North America - Major Linear Alkylbenzene Sulfonate Producers and Capacities, 1999	VI-47
VI-15 U.S. - Linear Alkylbenzene Sulfonate Consumption in Selected Major Applications, 1995-2010	VI-48
VI-16 Canada - Linear Alkylbenzene Sulfonate Consumption by Selected End Use, 1995-2010	VI-51
VI-17 Latin America - Linear Alkylbenzene Sulfonate Consumption by Selected End Use, 1995-2010	VI-52
VI-18 Latin America - Branched Alkylbenzene Sulfonate Consumption by Selected End Use, 1995-2010	VI-52
VI-19 Latin America - Major Alkylbenzene Sulfonate Producers and Capacities, 1999	VI-54
VI-20 Latin America - Branched and Linear Alkylbenzene Sulfonate Status in Household Products by Country, 1999	VI-58
VI-21 South and Central America - Linear and Branched Alkylbenzene Sulfonate Consumption, 1995-2010	VI-59
VI-22 Mexico - Linear and Branched Alkylbenzene Sulfonate Consumption, 1995-2010	VI-61
VI-23 West Europe - Linear Alkylbenzene Sulfonate Consumption by Selected End Use, 1995-2010	VI-62
VI-24 West Europe - Major Alkylbenzene Sulfonate Producers and Capacities, 1999	VI-63
VI-25 West Europe - Linear Alkylbenzene Sulfonate Consumption in Selected Major Applications, 1995-2010	VI-68
VI-26 Asia/Pacific - Linear Alkylbenzene Sulfonate Consumption by Selected End Use, 1995-2010	VI-69
VI-27 Asia/Pacific - Major Alkylbenzene Sulfonate Producers and Capacities, 1999	VI-70
VI-28 Asia/Pacific - Branched Alkylbenzene Sulfonate Consumption by Selected End Use, 1995-2010	VI-75
VI-29 Asia/Pacific - Linear Alkylbenzene Sulfonate Consumption in Selected Major Applications, 1995-2010	VI-76
VI-30 Other Regions - Major Linear Alkylbenzene Sulfonate Producers and Capacities, 1999	VI-78
VI-31 Other Regions - Linear and Branched Alkylbenzene Consumption, 1995-2010	VI-83

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## LIST OF FIGURES

---

---

<u>Figure</u>		<u>Page</u>
I-1	Material Flow For Detergent Alkylate	I-2
II-1	Petrochemicals Used in Surfactant Intermediate Manufacture	II-1
II-2	Commercial Utilization Routes of Normal Paraffins in Detergent Intermediate Manufacture	II-5
II-3	U.S. Refiner Prices for Resale of Kerosene and Asian n-Paraffin Prices, 1990-1999	II-20
II-4	“Pacol-Olex” Unit Configuration	II-26
IV-1	North America - Surfactant Consumption by End Use, 1995-2010	IV-6
IV-2	North America - Surfactant Consumption in Household Products, 1995-2010	IV-10
IV-3	North America - Surfactant Consumption in Heavy Duty Powders, 1995-2010	IV-16
IV-4	North America - Surfactant Consumption in Heavy Duty Liquids, 1995-2010	IV-19
VI-1	Total LABS Consumption by Region, 1998 and 2010	VI-40
VI-2	World - LABS Consumption by End Use, 1998	VI-42

## SAMPLE TABLES

Table 4				
WORLD - ALKYL BENZENE BALANCE, 1999 (thousand tons)				
	Production	Net Imports	Net Exports	Consumption
<b>LINEAR ALKYL BENZENE</b>				
North America				
Latin America				
West Europe				
Asia/Pacific				
East Europe				
Middle East/Africa				
TOTAL				
<b>BRANCHED ALKYL BENZENE</b>				
North America				
Latin America				
West Europe				
Asia/Pacific				
East Europe				
Middle East/Africa				
TOTAL				

Table 5				
WORLD - LINEAR ALKYL BENZENE DEMAND, CAPACITY AND DIFFERENCE BY REGION, 2000-2010 (thousand tons)				
Region	2000	2005	2010	AAGR % 2000-2010
NORTH AMERICA				
Demand				
Capacity				
Surplus (Deficit)				
LATIN AMERICA				
Demand				
Capacity				
Surplus (Deficit)				
WEST EUROPE				
Demand				
Capacity				
Surplus (Deficit)				
ASIA/PACIFIC				
Demand				
Capacity				
Surplus (Deficit)				
EAST EUROPE				
Demand				
Capacity				
Surplus (Deficit)				
MIDDLE EAST/AFRICA				
Demand				
Capacity				
Surplus (Deficit)				
WORLD				
Demand				
Capacity				
Surplus (Deficit)				

Table 7						
WORLD - RAW MATERIAL CONSUMPTION FOR ALKYLATE PRODUCTION, 1995-2010 (thousand tons)						
Raw Material	1995	1999	2000	2005	2010	AAGR (%) 1999-2010
Normal paraffins						
Alpha-olefins						
Internal olefins						
Propylene tetramer						
TOTAL						

Table III-15						
NORTH AMERICA - ALKYL BENZENE SUPPLY/DEMAND, 1995-1999 (thousand tons)						
	1995	1996	1997	1998	1999	AAGR % 1995-1999
LINEAR ALKYL BENZENE						
Demand						
Net Exports (Imports)						
Production						
Capacity						
Operating Rate (%)						
BRANCHED ALKYL BENZENE						
Demand						
Imports						
ALKYL BENZENE						
Demand						
Net Exports (Imports)						
Production						
Capacity						
Operating Rate (%)						

Table III-27

LATIN AMERICA - LAB TRADE BALANCE, 1999  
(thousand tons)

Producer	Capacity	Production	Imports		Exports		Consumption
			Country	Volume	Country	Volume	
ARGENTINA							
BRAZIL							
VENEZUELA							
MEXICO							
COLOMBIA							
CHILE							

Table III-27 (continued)							
Producer	Capacity	Production	Imports		Exports		Consumption
			Country	Volume	Country	Volume	
ECUADOR							
PERU							
URUGUAY							
Other Central America							
Caribbean Region							
Other South America							
TOTAL							

Table III-41

ASIA/PACIFIC - ALKYL BENZENE SUPPLY/DEMAND, 2000-2010  
(thousand tons)

	2000	2001	2002	2003	2004	2005	2010	AAGR% 2000-2005	AAGR % 2000-2010
LINEAR ALKYL BENZENE									
Demand									
Capacity									
Surplus (Deficit) Capacity									
BRANCHED ALKYL BENZENE									
Demand									
Capacity									
Surplus (Deficit) Capacity									
ALKYL BENZENE									
Demand									
Capacity									
Surplus (Deficit) Capacity									

Table IV-6							
NORTH AMERICA - MAJOR HOUSEHOLD PRODUCT CONSUMPTION, 1995-2010 (thousand tons)							
	1995	1998	2000	2005	2010	AAGR % 1995-2000	AAGR % 2000-2010
Heavy duty powders							
Heavy duty liquids							
Light duty liquids							
Others							
Hard surface cleaners							
Auto dish products							
Others							
Subtotal							
Laundry aids							
TOTAL							

Table IV-47						
WEST EUROPE - SURFACTANT CONSUMPTION IN HEAVY DUTY POWDERS BY COUNTRY, 1998 (thousand tons)						
Country	LABS	AE	AES	AS	Other <sup>a</sup>	TOTAL
France						
Germany						
Italy						
Spain						
U.K.						
Other						
TOTAL						

<sup>a</sup> Does not include soap.

Table IV-48							
WEST EUROPE - SURFACTANT CONSUMPTION BY TYPE IN HEAVY DUTY POWDERS, 1995-2010 (thousand tons)							
	1995	1998	2000	2005	2010	AAGR % 1995-2000	AAGR % 2000-2010
Linear alkylbenzene sulfonates							
Alcohol ethoxylates							
Alcohol ethoxysulfates							
Alcohol sulfates							
Glucosamides							
Other <sup>a</sup>							
TOTAL							

<sup>a</sup> Does not include soap

Table VI-25							
WEST EUROPE - LINEAR ALKYL BENZENE SULFONATE CONSUMPTION IN SELECTED MAJOR APPLICATIONS, 1995-2010 (thousand tons)							
	1995	1998	2000	2005	2010	AAGR % 1995-2000	AAGR % 2000-2010
HOUSEHOLD							
Heavy Duty Powders							
Heavy Duty Liquids							
Light Duty Liquids							
Miscellaneous							
Subtotal							
I&I							
INDUSTRIAL							
TOTAL							

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## QUALIFICATIONS AND PERSONNEL

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Colin A. Houston & Associates Inc. was founded in 1971 to provide consulting services to the chemical industry worldwide. The primary area of expertise was and continues to be surfactants: raw materials, intermediates, major surfactants, and the surfactant-consuming industries. Other areas of activity include: a variety of industry studies on such topics as detergent builders, ingredients for personal care products, and bleaching agents; engineering studies such as a worldwide study of glycerine evaporation plants with recommendations for improved efficiency; a world study of the state of the art in spray-drying detergents; contracts with the U.S. Government to develop industry effluent guidelines; and business strategy and acquisition studies.

The reputation thus earned by CAHA for comprehensive, high quality techno-economic and market analyses has led to a variety of engineering, marketing, and strategic planning studies for individual clients in North America, West Europe, Asia/Pacific and Other regions.

In 1995, CAHA completed its fourth global detergent alkylate study. Previous world detergent alkylate studies were conducted in 1988, 1990 and 1992.

The project team approach utilized by CAHA includes a core of senior and technical professionals augmented by expert consultant associates. The following brief synopses present the staff and consultants who carried out the study, DETERGENT ALKYLATES - WORLD MARKETS, 1995-2010.

***Joel H. Houston, President,***

was the project leader for numerous multiclient studies including HIGHER ALCOHOLS: MARKET FORECAST TO 2010, SURFACTANTS FOR EMERGING MARKETS IN ASIA/PACIFIC, 1996-2010, OPPORTUNITIES IN PERFORMANCE SURFACTANTS IN THE U.S., SURFACTANTS FOR CONSUMER PRODUCTS - NORTH AMERICAN FORECAST TO 2008, and DETERGENT ALKYLATE - WORLD MARKETS, 1992-2005. He has guided CAHA's research in oleochemicals since 1980, and in detergents since 1987. Mr. Houston has extensive experience in projects for consumer products, has presented papers at CMRA, ECMRA and CSMA meetings, and is the editor of CAHA's global detergent newsletter, AGGLOMERATIONS. He is a member of CDMA, AOCS and ASTM.

***Marilyn L. Bradshaw, Vice President,***

was the project leader for INDUSTRIAL APPLICATIONS OF SURFACTANTS - NORTH AMERICAN FORECAST TO 2010, POLYOLEFIN COMONOMERS - WORLD MARKETS, 1995-2005 and ALPHA-OLEFINS - WORLD MARKETS,

1990-2002. Other recent multiclient studies she has directed include THE U.S. METALWORKING INDUSTRY AND SURFACTANT CONSUMPTION, 1995-2005, and U.S. I&I CLEANING PRODUCTS - SURFACTANT SUPPLIERS AND CUSTOMERS. She is the author of CAHA's monthly alpha-olefin newsletter and provides consultation to clients on alpha-olefins. Since joining CAHA in 1980, she has also been the project leader for numerous proprietary projects such as an analysis of the growth prospects for 22 U.S. surfactant ethoxylators. Ms. Bradshaw has a B.A. from Finch College and an economics and management certificate from Manhattanville College. She is an active member of CDMA.

***Dr. Darrel L. Muck, Senior Research Associate,***

authored our multiclient studies GLUCOSAMIDES: THE CHALLENGE OF A NEW SUGAR-BASED SURFACTANT, 1993-1998 and DEVELOPMENTS IN DETERGENT BUILDER SYSTEMS - NORTH AMERICAN REPORT TO 2005. He has also contributed sections of CAHA's studies INDUSTRIAL APPLICATIONS OF SURFACTANTS - NORTH AMERICAN FORECAST TO 2010, SURFACTANTS FOR EMERGING MARKETS IN ASIA/PACIFIC, 1995-2010, SURFACTANTS FOR CONSUMER PRODUCTS - NORTH AMERICAN FORECAST TO 2008, OPPORTUNITIES IN PERFORMANCE SURFACTANTS IN THE U.S. and was responsible for the Paint end use chapter of MAJOR INDUSTRIAL APPLICATIONS OF SURFACTANTS - NORTH AMERICAN FORECAST TO 2005. Dr. Muck has 30 years experience in the chemical industry and was most recently Director of Commercial Development, FMC Chemicals Division. He holds B.S./ M.S. degrees in chemistry from Wichita State University and a Ph.D. in Organic Chemistry from the University of Florida. He is a member of ACS and AOCS.

***H. James Bigalow, Senior Research Associate,***

authored the Paper and Textiles end use sections of our multiclient studies INDUSTRIAL APPLICATIONS OF SURFACTANTS - NORTH AMERICAN FORECAST TO 2010 and SURFACTANTS FOR EMERGING MARKETS IN ASIA/PACIFIC, 1995-2010, contributed to DETERGENT ALKYLATES - WORLD MARKETS, 1995-2010 and SURFACTANTS FOR CONSUMER PRODUCTS - NORTH AMERICAN FORECAST TO 2008 and has worked on proprietary detergent and surfactant studies. Mr. Bigalow has over 20 years experience as a senior marketing research executive in the chemical industry. He has conducted successful business analysis projects which have included financial evaluations of businesses and acquisition candidates, identifying current and future markets for new and existing products, and product development and usage. Additional experience has included economic and sales forecasting, strategic planning, proprietary market research projects, benchmarking, and product safety. He is a member of the CDMA, the Society of Competitive Intelligence Professionals (SCIP), ACS and the Chemical Marketing and Economics Division of the ACS. Mr. Bigalow holds an M.S. Industrial Administration, Krannert School of Management, Purdue University and a B.S. degree in Chemistry, Denison University.

***Max M. Negrin, Project Director,***

recently joined CAHA and was a primary author of DETERGENT ALKYLATES - WORLD MARKETS, 1995-2010. He also authored a section of a proprietary study on a new bleach catalyst and conducted a study of the market potential for a new bio-flavor. Mr. Negrin has over 12 years of experience in the chemical industry spanning basic R&D, product development, sales and marketing, chemical trading and chemical business consulting. Product and market areas have included polymers and coatings, adhesives and sealants, plating and electronic chemicals, polyacrylates, polyethylene, styrene block copolymers and fluoropolymers. Mr. Negrin has published four patents among which are patents on unique water soluble systems. He holds a B.A. in Chemistry and an M.S. in Physical Chemistry from New York University.

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