

CHAPTER ONE: INTRODUCTION	1
STUDY GOALS AND OBJECTIVES.....	1
REASONS FOR DOING THE STUDY	2
INTENDED AUDIENCE.....	2
SCOPE OF REPORT	3
METHODOLOGY	3
INFORMATION SOURCES.....	4
ANALYST CREDENTIALS.....	4
RELATED BCC REPORTS	4
BCC ONLINE SERVICES.....	4
DISCLAIMER	5
 CHAPTER TWO: SUMMARY	 6
SUMMARY.....	6
SUMMARY (CONTINUED)	7
SUMMARY (CONTINUED)	8
<i>SUMMARY TABLE GLOBAL MARKET FOR OILFIELD PROCESS</i> <i>CHEMICALS BY APPLICATION, THROUGH 2015 (\$ MILLIONS)</i>	9
<i>SUMMARY FIGURE VALUE OF OILFIELD PROCESS CHEMICALS BY</i> <i>APPLICATION, 2010 AND 2015 (\$ MILLIONS)</i>	9
 CHAPTER THREE: OVERVIEW	 10
INTRODUCTION	10
ENERGY DEMANDS VERSUS CHEMICAL CONSUMPTION.....	11
<i>TABLE 1 FORECAST WORLD ENERGY CONSUMPTION, 2010 AND</i> <i>2015 (QUADRILLION BTU)</i>	11
<i>FIGURE 1 FORECAST WORLD ENERGY CONSUMPTION, 2010 AND</i> <i>2015 (QUADRILLION BTU)</i>	12
OIL VERSUS NATURAL GAS	12
<i>TABLE 2 WORLD ENERGY CONSUMPTION BY FUEL TYPE, 2005–</i> <i>2035 (%)</i>	13
<i>FIGURE 2 WORLD ENERGY CONSUMPTION, 2005–2035 (% BY</i> <i>FUEL)</i>	14
GROWTH FORECAST FOR OILFIELD PROCESS CHEMICALS.....	14
INDUSTRY SUMMARY	15
CHEMICAL TYPES	15
CHEMICAL FUNCTIONS.....	16
CHEMICAL APPLICATIONS	16
INDUSTRY BACKGROUND	17
EXPLORATION AND DRILLING	17
Exploration and Drilling (Continued).....	18
<i>TABLE 3 DRILLING MUDS AND ADDITIVES</i>	19
CEMENTING	19

<i>TABLE 4 CEMENTING ADDITIVES AND THEIR PURPOSES</i>	20
WORKOVER AND COMPLETION.....	20
<i>TABLE 5 WORKOVER AND COMPLETION FLUIDS</i>	21
STIMULATION AND PRODUCTION	21
<i>TABLE 6 STIMULATION/PRODUCTION CHEMICALS</i>	22
ENHANCED OIL RECOVERY	23
<i>TABLE 7 ENHANCED OIL RECOVERY APPLICATIONS AND PRODUCTS</i>	24
CHAPTER FOUR: WORLDWIDE INDUSTRY STRUCTURE	25
OILFIELD CHEMICALS MARKET PLAYERS	25
<i>TABLE 8 WORLDWIDE MARKETERS OF OILFIELD PROCESS CHEMICALS, 2010</i>	26
<i>TABLE 8 (CONTINUED)</i>	27
<i>TABLE 8 (CONTINUED)</i>	28
<i>TABLE 8 (CONTINUED)</i>	29
<i>TABLE 8 (CONTINUED)</i>	30
<i>TABLE 8 (CONTINUED)</i>	31
<i>TABLE 8 (CONTINUED)</i>	32
MARKET SHARES	32
<i>TABLE 9 OILFIELD PROCESS CHEMICALS MARKET SHARE BY COMPANY, 2009 (%)</i>	33
<i>FIGURE 3 OILFIELD PROCESS CHEMICALS MARKET SHARE BY COMPANY, 2009 (%)</i>	34
OILFIELD CHEMICALS MARKET PLAYERS	34
AIR PRODUCTS AND CHEMICALS	34
ASHLAND AQUALON FUNCTIONAL INGREDIENTS	35
BAKER HUGHES	35
BAROID DRILLING FLUIDS	35
BASF	35
BRINE-ADD FLUIDS, LTD.....	36
CANADIAN ENERGY SERVICES (CES).....	36
CECA	36
CHAMPION TECHNOLOGIES/CHAMPION SERVO LTD	37
CLARIANT OIL SERVICES.....	37
COASTAL CHEMICAL CO., LLC	38
DOW CHEMICAL COMPANY	38
DUPONT DE NEMOURS, E.I.....	38
EMERY OLEOCHEMICALS (FORMERLY COGNIS DIVISION).....	39
FLEK (LLC)	39
HALLIBURTON.....	39
INNOSPEC	40
KEMIRA	40
LAMBERTI S.P.A.....	40
LUKOIL	40

MESSINA–OILCHEM	41
MI SWACO / M-I DRILLING FLUIDS	41
MIRRICO	41
NALCO COMPANY ENERGY SERVICES (ONDEO NALCO)	42
NEWPARK	42
NUR CHEMICALS & ENGINEERING INDUSTRIES CO.	43
RHODIA.....	43
SCHLUMBERGER.....	43
SEKISUI SPECIALTY CHEMICALS AMERICA LLC	43
SHRIEVE CHEMICAL GROUP	44
STEPAN.....	44
WEATHERFORD INTERNATIONAL LTD.....	44
CHAPTER FIVE: GOVERNMENT REGULATIONS AND POLICIES	45
OPEC AND OTHER ALLIANCES	45
OPEC AND OTHER ALLIANCES (CONTINUED)	46
ENVIRONMENTAL REGULATIONS.....	47
<i>TABLE 10 U.S. REGULATIONS SPECIFIC TO THE OILFIELD</i>	
<i>PROCESS CHEMICALS INDUSTRY</i>	48
<i>TABLE 10 (CONTINUED)</i>	49
<i>TABLE 10 (CONTINUED)</i>	50
LEGISLATION FOLLOWING INCIDENTS.....	51
TOXICITY TESTING.....	52
IMPACT OF REACH FOR COMPANIES ACTIVE IN THE E.U.....	52
GOVERNMENT SANCTIONS AND AGREEMENTS	53
POLITICAL UNREST	54
POLITICAL UNREST (CONTINUED).....	55
CHAPTER SIX: MARKETS BY PRODUCT TYPES AND FUNCTION	56
MARKETS BY PRODUCT TYPES AND FUNCTION.....	56
<i>TABLE 11 GLOBAL MARKET FOR OILFIELD PROCESS CHEMICALS</i>	
<i>BY PRODUCT TYPES, THROUGH 2015 (\$ MILLIONS)</i>	57
<i>FIGURE 4 MARKET PERCENTAGE BY PRODUCT TYPE, 2009 (%)</i>	57
SPECIALTY CHEMICALS.....	58
FUNCTIONS AND APPLICATIONS.....	59
<i>TABLE 12 FUNCTIONS OF SPECIALTY CHEMICALS AND THEIR</i>	
<i>APPLICATIONS</i>	59
MARKET FORECAST	60
<i>TABLE 13 SPECIALTY CHEMICAL SALES BY REGION, THROUGH</i>	
<i>2015 (\$ MILLIONS)</i>	60
<i>FIGURE 5 SPECIALTY CHEMICAL SALES BY REGION, 2010 AND</i>	
<i>2015 (\$ MILLIONS)</i>	61
COMMODITY CHEMICALS.....	62
DISTRIBUTION.....	63
FUNCTIONS	63

<i>TABLE 14 COMMODITY CHEMICALS AND THEIR FUNCTIONS</i>	64
MARKET FORECAST	64
<i>TABLE 15 COMMODITY CHEMICAL SALES BY REGION, THROUGH</i> <i>2015 (\$ MILLIONS)</i>	65
<i>FIGURE 6 COMMODITY CHEMICAL SALES BY REGION, 2010 AND</i> <i>2015 (\$ MILLIONS)</i>	66
POLYMERS.....	66
<i>TABLE 16 OILFIELD PROCESS CHEMICALS POLYMER FUNCTIONS</i> <i>AND THEIR APPLICATIONS</i>	67
<i>TABLE 17 POLYMER CHEMICAL SALES BY REGION, THROUGH</i> <i>2015 (\$ MILLIONS)</i>	67
<i>FIGURE 7 POLYMER CHEMICAL SALES BY REGION, 2010 AND 2015</i> <i>(\$ MILLIONS)</i>	68
GASES	68
<i>TABLE 18 OILFIELD PROCESS CHEMICALS GASES AND THEIR</i> <i>APPLICATIONS</i>	69
<i>TABLE 19 OILFIELD PROCESS CHEMICALS GASES BY REGION,</i> <i>THROUGH 2015 (\$ MILLIONS)</i>	70
<i>FIGURE 8 OILFIELD PROCESS CHEMICALS GASES AND THEIR</i> <i>REGIONAL SALES FORECASTS, 2010 AND 2015 (\$ MILLIONS)</i>	70
 CHAPTER SEVEN: MARKETS BY PRODUCT FUNCTION AND	
MANUFACTURERS	71
MARKETS BY PRODUCT FUNCTION AND MANUFACTURERS	71
<i>TABLE 20 GLOBAL MARKET FOR OILFIELD PROCESS CHEMICALS</i> <i>BY FUNCTION, THROUGH 2015 (\$ MILLIONS)</i>	72
<i>FIGURE 9 GLOBAL MARKETS BY CHEMICAL FUNCTION, 2010 AND</i> <i>2015 (\$ MILLIONS)</i>	73
CORROSION CONTROL	74
FACTORS	74
PRODUCTS AND PROJECTED SALES	75
<i>TABLE 21 CORROSION CONTROL PRODUCTS</i>	75
<i>TABLE 22 CORROSION CONTROL PRODUCTS MARKET BY REGION,</i> <i>THROUGH 2015 (\$ MILLIONS)</i>	76
<i>FIGURE 10 CORROSION CONTROL PRODUCTS MARKET BY</i> <i>REGION, THROUGH 2015 (\$ MILLIONS)</i>	77
RHEOLOGY MODIFIERS	77
FACTORS	77
PRODUCTS AND PROJECTED SALES	78
<i>TABLE 23 RHEOLOGY MODIFIERS PRODUCTS</i>	78
<i>TABLE 24 RHEOLOGY MODIFIERS PRODUCTS BY REGION,</i> <i>THROUGH 2015 (\$ MILLIONS)</i>	78
<i>FIGURE 11 RHEOLOGY MODIFIERS MARKET BY REGION, 2010</i> <i>AND 2015 (\$ MILLIONS)</i>	79
VISCOSIFIERS.....	79

FACTORS	79
PRODUCTS AND PROJECTED SALES	80
<i>TABLE 25 VISCOSIFIERS PRODUCTS</i>	<i>80</i>
<i>TABLE 26 VISCOSIFIERS PRODUCTS MARKET BY REGION,</i> <i>THROUGH 2015 (\$ MILLIONS).....</i>	<i>80</i>
<i>FIGURE 12 VISCOSIFIERS PRODUCT FORECAST BY REGION,</i> <i>AND 2015 (\$ MILLIONS).....</i>	<i>81</i>
SYNTHETIC-BASED MUDS	82
FACTORS	82
PRODUCTS AND PROJECTED SALES	82
<i>TABLE 27 SYNTHETIC-BASED MUDS PRODUCTS.....</i>	<i>82</i>
<i>TABLE 28 SYNTHETIC-BASED MUDS PRODUCTS BY REGION,</i> <i>THROUGH 2015 (\$ MILLIONS).....</i>	<i>83</i>
<i>FIGURE 13 SYNTHETIC BASED MUDS PRODUCTS BY REGION,</i> <i>AND 2015 (\$ MILLIONS).....</i>	<i>83</i>
SCALE CONTROL.....	84
FACTORS	84
PRODUCTS AND PROJECTED SALES	85
<i>TABLE 29 SCALE CONTROL PRODUCTS.....</i>	<i>85</i>
<i>TABLE 30 SCALE-CONTROL PRODUCTS MARKET BY REGION,</i> <i>THROUGH 2015 (\$ MILLIONS).....</i>	<i>86</i>
<i>FIGURE 14 SCALE-CONTROL PRODUCT FORECAST BY REGION,</i> <i>2010 AND 2015 (\$ MILLIONS).....</i>	<i>86</i>
FLUID LOSS CONTROL	87
FACTORS	87
PRODUCTS AND PROJECTED SALES	87
<i>TABLE 31 FLUID LOSS CONTROL PRODUCTS.....</i>	<i>87</i>
<i>TABLE 32 FLUID LOSS CONTROL PRODUCTS MARKET BY REGION,</i> <i>THROUGH 2015 (\$ MILLIONS).....</i>	<i>88</i>
<i>FIGURE 15 FLUID LOSS CONTROL PRODUCT FORECAST BY</i> <i>REGION, 2010 AND 2015 (\$ MILLIONS).....</i>	<i>88</i>
CEMENT RETARDERS	89
FACTORS	89
PRODUCTS AND PROJECTED SALES	89
<i>TABLE 33 CEMENT RETARDERS PRODUCTS.....</i>	<i>89</i>
<i>TABLE 34 CEMENT RETARDERS PRODUCTS BY REGION,</i> <i>THROUGH 2015 (\$ MILLIONS).....</i>	<i>90</i>
<i>FIGURE 16 CEMENT RETARDERS PRODUCTS BY REGION,</i> <i>AND 2015 (\$ MILLIONS).....</i>	<i>90</i>
BACTERIAL CONTROL	91
FACTORS	91
PRODUCTS AND PROJECTED SALES	91
<i>TABLE 35 BACTERIAL CONTROL PRODUCTS.....</i>	<i>92</i>

<i>TABLE 36 BACTERIAL CONTROL PRODUCTS MARKET BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	92
<i>FIGURE 17 BACTERIAL CONTROL PRODUCTS MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	93
WAX AND ASPHALTENE CONTROL.....	93
FACTORS.....	94
PRODUCTS AND PROJECTED SALES.....	94
<i>TABLE 37 WAX AND ASPHALTENE CONTROL PRODUCTS</i>	95
<i>TABLE 38 WAX AND ASPHALTENE CONTROL PRODUCTS BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	95
<i>FIGURE 18 WAX AND ASPHALTENE CONTROL PRODUCTS BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	96
HYDRATE CONTROL.....	96
FACTORS.....	96
PRODUCTS AND PROJECTED SALES.....	97
<i>TABLE 39 HYDRATE CONTROL PRODUCTS</i>	98
<i>TABLE 40 HYDRATE CONTROL CHEMICALS MARKET SHARE BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	98
<i>FIGURE 19 HYDRATE CONTROL CHEMICALS MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	99
HYDROGEN SULFIDE CONTROL.....	99
FACTORS.....	99
PRODUCTS AND PROJECTED SALES.....	99
<i>TABLE 41 HYDROGEN SULFIDE CONTROL PRODUCTS</i>	100
<i>TABLE 42 HYDROGEN SULFIDE CHEMICALS MARKET BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	100
<i>FIGURE 20 HYDROGEN SULFIDE CHEMICALS MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	101
OIL AND WATER SEPARATION.....	101
FACTORS.....	102
PRODUCTS AND PROJECTED SALES.....	102
<i>TABLE 43 OIL AND WATER SEPARATION PRODUCTS</i>	103
<i>TABLE 44 OIL AND WATER SEPARATION CHEMICALS MARKET SHARE BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	103
<i>FIGURE 21 OIL AND WATER SEPARATION CHEMICALS MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	104
FOAM CONTROL.....	104
FACTORS.....	104
PRODUCTS AND PROJECTED SALES.....	105
<i>TABLE 45 FOAM CONTROL PRODUCTS</i>	105
<i>TABLE 46 FOAM CONTROL CHEMICALS MARKET SHARE BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	105
<i>FIGURE 22 FOAM CONTROL CHEMICALS MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	106

MAINTENANCE AND UTILITY	106
FACTORS	106
PRODUCTS AND PROJECTED SALES	106
<i>TABLE 47 MAINTENANCE AND UTILITY CHEMICAL PRODUCTS</i>	107
<i>TABLE 48 MAINTENANCE AND UTILITY CHEMICALS MARKET BY</i>	
<i>REGION, THROUGH 2015 (\$ MILLIONS)</i>	107
<i>FIGURE 23 MAINTENANCE AND UTILITY CHEMICALS MARKET BY</i>	
<i>REGION, 2010 AND 2015 (\$ MILLIONS)</i>	108
COMMODITY CHEMICALS.....	108
PRODUCTS AND PROJECTED SALES	109
<i>TABLE 49 COMMODITY CHEMICAL PRODUCTS</i>	109
<i>TABLE 50 COMMODITY CHEMICALS MARKET BY REGION,</i>	
<i>THROUGH 2015 (\$ MILLIONS)</i>	109
<i>FIGURE 24 COMMODITY CHEMICALS MARKET BY REGION, 2010</i>	
<i>AND 2015 (\$ MILLIONS)</i>	110
MULTIFUNCTIONAL CHEMICALS.....	110
PRODUCTS AND PROJECTED SALES	110
<i>TABLE 51 MULTIFUNCTIONAL CHEMICAL PRODUCTS</i>	111
<i>TABLE 52 MULTIFUNCTIONAL CHEMICALS MARKET BY REGION,</i>	
<i>THROUGH 2015 (\$ MILLIONS)</i>	111
<i>FIGURE 25 MULTIFUNCTIONAL CHEMICALS MARKET BY REGION,</i>	
<i>2010 AND 2015 (\$ MILLIONS)</i>	112
SHALE CONTROL	112
FACTORS	112
PRODUCTS AND PROJECTED SALES	113
<i>TABLE 53 SHALE-CONTROL CHEMICAL PRODUCTS</i>	113
<i>TABLE 54 SHALE CONTROL CHEMICALS MARKET BY REGION,</i>	
<i>THROUGH 2015 (\$ MILLIONS)</i>	113
<i>FIGURE 26 SHALE CONTROL CHEMICALS MARKET BY REGION,</i>	
<i>2010 AND 2015 (\$ MILLIONS)</i>	114
ACIDIZING	114
FACTORS	114
PRODUCTS AND PROJECTED SALES	115
<i>TABLE 55 ACIDIZING CHEMICAL PRODUCTS</i>	116
<i>TABLE 56 ACIDIZING CHEMICALS MARKET BY REGION,</i>	
<i>THROUGH 2015 (\$ MILLIONS)</i>	116
<i>FIGURE 27 ACIDIZING CHEMICALS MARKET BY REGION, 2010</i>	
<i>AND 2015 (\$ MILLIONS)</i>	117
OTHER PRODUCTS AND TECHNOLOGIES.....	117
E-COMMERCE	118
CHAPTER EIGHT: MARKETS BY PRODUCT APPLICATION	119
PRODUCT APPLICATION AND MANUFACTURERS	119
<i>TABLE 57 GLOBAL MARKET FOR OILFIELD PROCESS CHEMICALS</i>	
<i>BY APPLICATION, THROUGH 2015 (\$ MILLIONS)</i>	120

<i>FIGURE 28 ANNUAL SALES BY APPLICATION, 2010 AND 2015 (\$ MILLIONS)</i>	121
<i>DRILLING</i>	122
<i>DRILLING-RELATED CHEMICAL SALES VS. OIL PRODUCTION</i>	123
<i>TABLE 58 GLOBAL DRILLING-RELATED CHEMICAL SALES VS. OIL PRODUCTION, THROUGH 2015 (MILLIONS)</i>	124
<i>FIGURE 29 GLOBAL DRILLING-RELATED CHEMICAL SALES VS. OIL PRODUCTION, THROUGH 2015 (\$ MILLIONS)</i>	124
<i>TABLE 59 GLOBAL OILFIELD PROCESS CHEMICALS SALES VS. OIL PRODUCTION, THROUGH 2015 (MILLIONS)</i>	125
<i>FIGURE 30 OILFIELD PROCESS CHEMICALS SALES VS. OIL PRODUCTION, 2010 AND 2015 (MILLIONS)</i>	125
<i>DRILLING CHEMICAL PRODUCTS AND PROJECTED SALES</i>	126
<i>TABLE 60 EXAMPLES OF PRODUCTS USED FOR DRILLING, INCLUDING DRILLING MUDS AND THEIR ADDITIVES</i>	127
<i>TABLE 61 DRILLING CHEMICALS MARKET BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	127
<i>FIGURE 31 DRILLING PRODUCTS MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	128
<i>WORKOVER AND COMPLETION FLUIDS</i>	129
<i>TABLE 62 WORKOVER AND COMPLETION FLUIDS PRODUCTS</i>	129
<i>TABLE 63 WORKOVER AND COMPLETION CHEMICALS MARKET BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	130
<i>FIGURE 32 WORKOVER AND COMPLETION CHEMICALS MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	130
<i>CEMENTING ADDITIVES</i>	131
<i>TABLE 64 CEMENT ADDITIVE AND SPECIALTY PRODUCTS</i>	131
<i>TABLE 65 CEMENTING CHEMICALS MARKET BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	132
<i>FIGURE 33 CEMENTING CHEMICALS MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	132
<i>STIMULATION AND PRODUCTION CHEMICALS</i>	133
<i>TABLE 66 STIMULATION/PRODUCTION CHEMICALS</i>	133
<i>TABLE 67 STIMULATION CHEMICALS MARKET BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	134
<i>FIGURE 34 STIMULATION CHEMICALS MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	134
<i>TABLE 68 PRODUCTION CHEMICALS MARKET BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	135
<i>FIGURE 35 PRODUCTION CHEMICALS MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	135
<i>ENHANCED OIL RECOVERY</i>	136

FACTORS	136
Factors (Continued)	137
SALES PROJECTIONS	138
Sales Projections (Continued)	139
<i>TABLE 69 ENHANCED OIL RECOVERY MARKET BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	140
<i>FIGURE 36 ENHANCED OIL RECOVERY MARKET BY REGION, 2010 AND 2015 (\$ MILLIONS)</i>	140
PROCESSES OF ENHANCED OIL RECOVERY	141
Specific Techniques	142
CO ₂ Injection	142
CO ₂ Injection(Continued)	143
Nitrogen Injection	144
Water Injection	145
Chemical Injection	145
Microbiological Enhanced Oil Recovery (MEOR)	146
Steam Injection	146
Alternative/New Technologies	147
<i>In Situ</i> Combustion.....	147
THAI (Toe to Heel Air Injection).....	147
SAGD (Steam Assisted Gravity Drainage).....	147
Cold Flow Production.....	148
<i>TABLE 70 EOR TECHNOLOGY CHEMICALS</i>	148
CHAPTER NINE: TECHNOLOGY.....	149
PRODUCT DEVELOPMENT.....	149
RESEARCH AND DEVELOPMENT (R&D)	150
<i>TABLE 71 NEW TECHNOLOGY / PRODUCT DEVELOPMENT & RESEARCH</i>	151
<i>TABLE 72 IMPACTS OF NEW TECHNOLOGY PRODUCT DEVELOPMENT AND RESEARCH</i>	152
NEW TECHNOLOGY.....	152
NEW TECHNOLOGY (CONTINUED)	153
<i>TABLE 73 DRILLING & PRODUCTION RELATED RESEARCH AND NEW TECHNOLOGY</i>	154
<i>TABLE 73 (CONTINUED)</i>	155
<i>TABLE 74 POTENTIAL IMPACTS OF DRILLING AND PRODUCTION TECHNOLOGY</i>	155
<i>TABLE 74 (CONTINUED)</i>	156
CHAPTER TEN: PATENTS.....	157
PATENTS	157
DRILLING PATENTS	158
EOR PATENTS	158

METHODOLOGY OF PATENT SURVEYS INCLUDED IN THIS STUDY	159
<i>TABLE 75 U.S. PATENTS (GRANTED AND PENDING) BY MAIN PROCESS APPLICATION, 2000–2010</i>	160
<i>TABLE 76 EUROPEAN/WORLD PATENTS (GRANTED AND PENDING) BY MAIN PROCESS APPLICATION, 2000–2010</i>	160
<i>TABLE 77 PATENTS (GRANTED AND PENDING) PER YEAR, 2000–2010</i>	161
PATENTS BY COMPANY	161
<i>TABLE 78 U.S. PATENTS (GRANTED AND PENDING) BY COMPANY, 2000–2010</i>	161
<i>TABLE 78 (CONTINUED)</i>	162
<i>TABLE 78 (CONTINUED)</i>	163
<i>TABLE 79 EUROPEAN / WORLD PATENTS (GRANTED AND PENDING) BY COMPANY, 2000–2010</i>	163
<i>TABLE 79 (CONTINUED)</i>	164
PATENTS PENDING	164
NEW PRODUCT OPPORTUNITIES	165
<i>TABLE 80 PRODUCT DEVELOPMENT/IMPORTANT APPROACH</i>	165
CHAPTER ELEVEN: METHODS OF MANUFACTURE	166
MATERIALS	166
<i>TABLE 81 LIST OF MATERIALS COMMONLY USED FOR THE MANUFACTURE OF OILFIELD PROCESS CHEMICALS</i>	166
<i>TABLE 81 (CONTINUED)</i>	167
MATERIAL COSTS	168
<i>TABLE 82 INDUSTRY IMPACT OF MATERIAL COST FACTORS</i>	169
CHAPTER TWELVE: COMPANY EXPERTISE AND KNOW HOW	170
<i>TABLE 83 COMPANY EXPERTISE</i>	170
<i>TABLE 83 (CONTINUED)</i>	171
<i>TABLE 83 (CONTINUED)</i>	172
<i>TABLE 83 (CONTINUED)</i>	173
CHAPTER THIRTEEN: GROWTH OPPORTUNITIES	174
GROWTH OPPORTUNITIES	174
<i>TABLE 84 WORLD CRUDE OIL PRODUCTION BY COUNTRY, THROUGH 2015 (MILLION BARRELS PER YEAR)</i>	175
<i>TABLE 85 WORLD NATURAL GAS PRODUCTION BY COUNTRY, THROUGH 2015 (MILLION BARRELS OIL EQUIVALENT PER YEAR)</i>	176
REGIONAL IMPACTS TO INDUSTRY	177
CHAPTER FOURTEEN: INDUSTRY STRUCTURE	178
INDUSTRY DRIVING FORCES	178

STRATEGIES FOR STAYING COMPETITIVE	178
CYCLES AND OTHER WEAKNESSES ASSOCIATED WITH THE OIL AND GAS INDUSTRY	179
TRADE PRACTICES	180
INDUSTRY LIFE CYCLE	180
Impact/Dependency on Other Industries	181
<i>TABLE 86 WORLD OIL PRODUCTION PROJECTIONS BY REGION, THROUGH 2015 (MILLION BARRELS PER DAY).....</i>	<i>181</i>
<i>FIGURE 37 WORLD OIL PRODUCTION PROJECTIONS BY REGION, 2010 AND 2015 (MILLION BARRELS PER DAY).....</i>	<i>182</i>
<i>TABLE 87 WORLD OIL PRODUCTION PROJECTIONS BY REGION, THROUGH 2030 (MILLION BARRELS PER DAY).....</i>	<i>182</i>
<i>FIGURE 38 WORLD OIL PRODUCTION PROJECTIONS, 2000–2030 (MILLION BARRELS PER DAY).....</i>	<i>183</i>
Criteria for Success.....	183
Criteria for Success Continued)	184
Criteria for Success Continued)	185
APPENDIX 1: COMPANY PROFILES.....	186
COMPANY PROFILES	186
ADVANCED AROMATICS L.P.	186
AIR LIQUIDE, L'.....	186
AIR PRODUCTS AND CHEMICALS	186
AKZONOBEL	187
AL SANEA CHEMICALS	187
ALBEMARLE	187
ALKAN LTD.....	188
ANCHOR DRILLING FLUIDS USA, INC.....	188
AQUA CHEMICALS	188
ASHLAND AQUALON FUNCTIONAL INGREDIENTS	189
AUBIN	189
AVA S.P.A.....	189
BAKER HUGHES INCORPORATED	190
BARIT URALA	190
BAROID INDUSTRIAL DRILLING PRODUCTS (HALLIBURTON)	190
BARZAGHI S.R.L.	191
BASF	191
BASF CORPORATION	191
BEFAR GROUP CO., LTD.....	191
BEST DRILLING CHEMICALS BDC INTERNATIONAL BV	192
BJ SERVICES COMPANY	192
BORREGAARD LIGNOTECH	192
BRINE-ADD FLUIDS, LTD.....	193
BRITISH PETROLEUM CORPORATION (BP)	193

BWA WATER ADDITIVES.....	193
BYCOSIN AB	194
CABOT SPECIALTY FLUIDS LTD.....	194
CANADIAN ENERGY SERVICES.....	195
CANAMARA UNITED SUPPLY LTD.....	195
CEBO INTERNATIONAL B.V. (CEBO HOLLAND B.V.)	195
CECA	196
CELANESE	196
CHAMPION SERVO LTD	196
CHAMPION TECHNOLOGIES	196
CHEMEX, INC.....	197
CHEMJECT INTERNATIONAL INC.....	197
CHEMSERV PRODUCTS INC.....	197
CHEMTURA.....	198
CHENGDU CATION CHEMISTRY CO., LTD.....	198
CHEVRON.....	198
CHIMEC S.P.A.....	198
CHINA NANHAI MAGCOBAR MUD CORP, LTD.....	199
CHINA PETROLEUM DEVELOPMENT AND TECHNOLOGY CORPORATION (CHINA NATIONAL PETROLEUM CORP. CNPC).....	199
CLARIANT OIL SERVICES.....	199
CLEARWATER ENGINEERED CHEMISTRY.....	200
CNPC BOHAI DRILLING ENGINEERING CO., LTD.....	200
COASTAL CHEMICAL CO., LLC	200
CONOCOPHILLIPS.....	201
CRODA INTERNATIONAL PLC	201
CYTEC INDUSTRIES	201
DORF KETAL CHEMICALS PVT. LTD.....	202
DOW CHEMICAL COMPANY	202
DRILLING SPECIALTIES COMPANY	202
DUPONT DE NEMOURS, E.I.....	203
EMERY OLEOCHEMICALS GROUP	203
ENERCHEM INTERNATIONAL, INC.....	203
ENERGY CHEMICAL CO. SEMNAN	204
ENVIRONMENTAL BIOTECHNOLOGIES, INC.....	204
EXXONMOBIL.....	204
FLEK (LLC FLEK).....	205
GCHEMICAL COMPANY	205
GLOBAL DRILLING FLUIDS & CHEMICALS LTD.	205
GULF COAST CHEMICAL	205
GUMPRO CHEM	206
HALLIBURTON COMPANY.....	206
HEBEI HUAYUN HONGYE CHEMICAL CORPORATION	206

HEXION SPECIALTY CHEMICALS COMPANY.....	206
GLOBAL HEADQUARTERS.....	206
180 EAST BROAD STREET.....	206
INEOS OLIGOMERS.....	207
INNOSPEC.....	207
INNOVATIVE CHEMICAL TECHNOLOGIES CANADA LTD. (ICTC).....	207
INTERCHEM LTD.....	208
KEMIRA OYJ.....	208
KMCO.....	208
LAMBERTI S.P.A.....	209
LIPESA.....	209
LUBRIZOL.....	209
LUKOIL.....	210
MARATHON OIL COMPANY.....	210
MARUBENI SPECIALTY CHEMICALS.....	210
MESSINA.....	210
MI SWACO.....	211
MICRO BAC.....	211
MIDWEST CUSTOM CHEMICALS.....	212
MIRRICO.....	212
MONTELLO INC.....	212
MULTI-CHEM.....	213
NALCO / NALCO ENERGY SERVICES.....	213
NATIONAL CHEMICAL AND PETROLEUM INDUSTRIES.....	213
NAVDEEP CHEMICALS PVT. LTD.....	214
NEWPARK.....	214
NUR CHEMICALS & ENGINEERING INDUSTRIES CO.....	214
OCCIDENTAL PETROLEUM CORPORATION.....	215
OIL CHEM TECHNOLOGIES (OCT).....	215
OPPENHEIMER BIOTECHNOLOGY, INC.....	215
PETROCHINA.....	216
PETROFERM.....	216
PETROTREAT.....	216
PRODUCTION CHEMICAL INTERNATIONAL HOLDINGS LTD.....	216
PUYANG KAILI CHEMICAL CO., LTD.....	217
QINGDAO OCEANVIEW INTERNATIONAL CO., LTD.....	217
QUIMICA APOLLO S.A. DE C.V.....	217
RAMEX AS.....	218
RE CHEM SERVICES GMBH.....	218
RECON TECHNOLOGY.....	218
REDA OILFIELD.....	219
RHODIA S.A.....	219

ROEMEX LTD.....	219
ROHM AND HAAS COMP.	220
SANJEL CORPORATION	220
SCHLUMBERGER & SMITH INTERNATIONAL	220
SCOMI ANTICOR S.A.	220
SEKISUI SPECIALTY CHEMICALS AMERICA	221
SETAC CHEMICAL CORPORATION	221
SHELL CHEMICALS, ROYAL DUTCH	221
SHELL INTERNATIONALE PETROLEUM MIJ B.V.....	221
SHRIEVE CHEMICAL GROUP	222
SICHEM	222
SMC TECHNOLOGIES	222
STEPAN.....	223
SYRGIS PERFORMANCE CHEMICALS (PCHEM).....	223
TBC-BRINADD	223
TIORCO	223
TOTAL S.A.	224
TRICAN WELL SERVICE LTD.	224
UNITOP CHEMICALS	225
VASUDHA CHEMICALS	225
WEATHERFORD INTERNATIONAL	225
WELL FLOW LLC	226
WILDCAT CHEMICALS AUSTRALIA PTY., LTD.....	226
OTHER ORGANIZATIONS AND COMPANIES	226
AMERICAN GAS ASSOCIATION	226
AMERICAN PETROLEUM INSTITUTE	226
IHS ENERGY GROUP.....	227
INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA.....	227
INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS.....	227
OGP - INTERNATIONAL ASSOCIATION OF OIL & GAS PRODUCERS.....	227
OPEC - ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES.....	228
U.S. DEPARTMENT OF ENERGY (DOE.) / ENERGY INFORMATION ADMINISTRATION, EIA	228
APPENDIX 2: LISTS OF PATENTS	229
TABLE 88 PENDING U.S. PATENTS BY COMPANY/INVENTOR (LISTED PER COMPANY, ON PATENT NUMBER).....	229
TABLE 88 (CONTINUED).....	230
TABLE 88 (CONTINUED).....	231
TABLE 88 (CONTINUED).....	232
TABLE 88 (CONTINUED).....	233
TABLE 88 (CONTINUED).....	234

<i>TABLE 88 (CONTINUED)</i>	235
<i>TABLE 88 (CONTINUED)</i>	236
<i>TABLE 88 (CONTINUED)</i>	237
<i>TABLE 88 (CONTINUED)</i>	238
<i>TABLE 88 (CONTINUED)</i>	239
<i>TABLE 88 (CONTINUED)</i>	240
<i>TABLE 88 (CONTINUED)</i>	241
<i>TABLE 88 (CONTINUED)</i>	242
<i>TABLE 88 (CONTINUED)</i>	243
<i>TABLE 88 (CONTINUED)</i>	244
<i>TABLE 88 (CONTINUED)</i>	245
<i>TABLE 88 (CONTINUED)</i>	246
<i>TABLE 88 (CONTINUED)</i>	247
<i>TABLE 88 (CONTINUED)</i>	248
<i>TABLE 88 (CONTINUED)</i>	249
<i>TABLE 88 (CONTINUED)</i>	250
<i>TABLE 88 (CONTINUED)</i>	251
<i>TABLE 88 (CONTINUED)</i>	252
<i>TABLE 88 (CONTINUED)</i>	253
<i>TABLE 89 U.S. PATENTS BY COMPANY (2000–2010) (LISTED PER COMPANY, ON PATENT NUMBER)</i>	253
<i>TABLE 89 (CONTINUED)</i>	254
<i>TABLE 89 (CONTINUED)</i>	255
<i>TABLE 89 (CONTINUED)</i>	256
<i>TABLE 89 (CONTINUED)</i>	257
<i>TABLE 89 (CONTINUED)</i>	258
<i>TABLE 89 (CONTINUED)</i>	259
<i>TABLE 89 (CONTINUED)</i>	260
<i>TABLE 89 (CONTINUED)</i>	261
<i>TABLE 89 (CONTINUED)</i>	262
<i>TABLE 89 (CONTINUED)</i>	263
<i>TABLE 89 (CONTINUED)</i>	264
<i>TABLE 89 (CONTINUED)</i>	265
<i>TABLE 89 (CONTINUED)</i>	266
<i>TABLE 89 (CONTINUED)</i>	267
<i>TABLE 89 (CONTINUED)</i>	268
<i>TABLE 89 (CONTINUED)</i>	269
<i>TABLE 89 (CONTINUED)</i>	270
<i>TABLE 89 (CONTINUED)</i>	271
<i>TABLE 89 (CONTINUED)</i>	272
<i>TABLE 89 (CONTINUED)</i>	273
<i>TABLE 89 (CONTINUED)</i>	274
<i>TABLE 89 (CONTINUED)</i>	275
<i>TABLE 89 (CONTINUED)</i>	276

<i>TABLE 89 (CONTINUED)</i>	277
<i>TABLE 89 (CONTINUED)</i>	278
<i>TABLE 89 (CONTINUED)</i>	279
<i>TABLE 89 (CONTINUED)</i>	280
<i>TABLE 89 (CONTINUED)</i>	281
<i>TABLE 89 (CONTINUED)</i>	282
<i>TABLE 89 (CONTINUED)</i>	283
<i>TABLE 89 (CONTINUED)</i>	284
<i>TABLE 89 (CONTINUED)</i>	285
<i>TABLE 89 (CONTINUED)</i>	286
<i>TABLE 89 (CONTINUED)</i>	287
<i>TABLE 89 (CONTINUED)</i>	288
<i>TABLE 89 (CONTINUED)</i>	289
<i>TABLE 89 (CONTINUED)</i>	290
<i>TABLE 89 (CONTINUED)</i>	291
<i>TABLE 89 (CONTINUED)</i>	292
<i>TABLE 89 (CONTINUED)</i>	293
<i>TABLE 89 (CONTINUED)</i>	294
<i>TABLE 89 (CONTINUED)</i>	295
<i>TABLE 89 (CONTINUED)</i>	296
<i>TABLE 89 (CONTINUED)</i>	297
<i>TABLE 89 (CONTINUED)</i>	298
<i>TABLE 89 (CONTINUED)</i>	299
<i>TABLE 89 (CONTINUED)</i>	300
<i>TABLE 89 (CONTINUED)</i>	301
<i>TABLE 89 (CONTINUED)</i>	302
<i>TABLE 89 (CONTINUED)</i>	303
<i>TABLE 89 (CONTINUED)</i>	304
<i>TABLE 89 (CONTINUED)</i>	305
<i>TABLE 89 (CONTINUED)</i>	306
<i>TABLE 89 (CONTINUED)</i>	307
<i>TABLE 89 (CONTINUED)</i>	308
<i>TABLE 89 (CONTINUED)</i>	309
<i>TABLE 89 (CONTINUED)</i>	310
<i>TABLE 89 (CONTINUED)</i>	311
<i>TABLE 89 (CONTINUED)</i>	312
<i>TABLE 89 (CONTINUED)</i>	313
<i>TABLE 89 (CONTINUED)</i>	314
<i>TABLE 89 (CONTINUED)</i>	315
<i>TABLE 89 (CONTINUED)</i>	316
<i>TABLE 89 (CONTINUED)</i>	317
<i>TABLE 89 (CONTINUED)</i>	318
<i>TABLE 89 (CONTINUED)</i>	319
<i>TABLE 89 (CONTINUED)</i>	320

<i>TABLE 89 (CONTINUED)</i>	321
<i>TABLE 90 EUROPEAN/WORLD PENDING PATENTS BY COMPANY, 2000–2010 (LISTED PER COMPANY, ON PATENT NUMBER)</i>	322
<i>TABLE 90 (CONTINUED)</i>	323
<i>TABLE 90 (CONTINUED)</i>	324
<i>TABLE 90 (CONTINUED)</i>	325
<i>TABLE 90 (CONTINUED)</i>	326
<i>TABLE 90 (CONTINUED)</i>	327
<i>TABLE 90 (CONTINUED)</i>	328
<i>TABLE 90 (CONTINUED)</i>	329
<i>TABLE 90 (CONTINUED)</i>	330
<i>TABLE 90 (CONTINUED)</i>	331
<i>TABLE 90 (CONTINUED)</i>	332
<i>TABLE 90 (CONTINUED)</i>	333
<i>TABLE 90 (CONTINUED)</i>	334
<i>TABLE 90 (CONTINUED)</i>	335
<i>TABLE 91 EUROPEAN / WORLD PATENTS BY COMPANY, 2000–2010 (LISTED PER COMPANY, ON PATENT NUMBER)</i>	336
<i>TABLE 91 (CONTINUED)</i>	337
<i>TABLE 91 (CONTINUED)</i>	338
<i>TABLE 91 (CONTINUED)</i>	339
<i>TABLE 91 (CONTINUED)</i>	340
APPENDIX 3: REFERENCES	341
<i>TABLE 92 REFERENCES</i>	341