

CHAPTER ONE: INTRODUCTION	1
STUDY GOALS AND OBJECTIVES	1
REASONS FOR DOING THIS STUDY	1
INTENDED AUDIENCE.....	1
SCOPE OF REPORT	1
METHODOLOGY	2
INFORMATION SOURCES	2
ANALYST’S CREDENTIALS.....	3
RELATED BCC RESEARCH REPORTS.....	3
BCC ONLINE SERVICES.....	3
DISCLAIMER	3
 CHAPTER TWO: SUMMARY.....	 4
SUMMARY	4
<i>SUMMARY TABLE.....</i>	<i>5</i>
<i>REVENUES FROM SPECIALTY CHEMICALS FOR WATER</i>	
<i>TREATMENT BY SEGMENT, THROUGH 2013.....</i>	<i>5</i>
(<i>\$ BILLIONS</i>).....	<i>5</i>
<i>SUMMARY FIGURE REVENUES FROM SPECIALTY CHEMICALS</i>	
<i>FOR WATER TREATMENT, 2007-2013 (\$ BILLIONS)</i>	<i>6</i>
 CHAPTER THREE: OVERVIEW	 7
DEFINITIONS	7
HISTORY	7
HISTORY (CONTINUED)	8
MODERN HISTORY OF WATER TREATMENT	8
Modern History of Water ... (Continued)	9
<i>TABLE 1 MODERN HISTORY OF WATER TREATMENT.....</i>	<i>10</i>
 CHAPTER FOUR: PRODUCT OVERVIEW	 11
<i>TABLE 2 CLASSIFICATION OF SPECIALTY CHEMICALS FOR</i>	
<i>WATER TREATMENT.....</i>	<i>11</i>
CLASSIFICATION OF CHEMICALS BY SPECIALTY	11
CORROSION INHIBITORS	11
<i>TABLE 3 COMPARISON OF VARIOUS CORROSION INHIBITORS</i>	<i>12</i>
<i>TABLE 3 (CONTINUED).....</i>	<i>13</i>
<i>TABLE 4 TYPES AND EXAMPLES OF CORROSION INHIBITORS.....</i>	<i>13</i>
Disadvantages of Amines as Corrosion Inhibitors.....	13
Polymeric Corrosion Inhibitors	14
Patent Analysis.....	15
<i>TABLE 5 PATENTS: CORROSION INHIBITORS, 2000–2008.....</i>	<i>15</i>
<i>TABLE 5 (CONTINUED).....</i>	<i>16</i>

<i>TABLE 5 (CONTINUED)</i>	17
<i>TABLE 5 (CONTINUED)</i>	18
<i>TABLE 5 (CONTINUED)</i>	19
<i>TABLE 5 (CONTINUED)</i>	20
SCALE INHIBITORS	20
<i>TABLE 6 EXAMPLES OF CORROSION AND SCALE INHIBITORS</i>	21
<i>TABLE 6 (CONTINUED)</i>	22
COAGULANTS AND FLOCCULANTS	22
Coagulants and Flocculants (Continued)	23
<i>TABLE 7 EXAMPLES OF ORGANIC AND INORGANIC COAGULANTS</i>	24
Coagulant Selection.....	24
Inorganic Coagulants	24
Inorganic Coagulant Reactions	25
Alum.....	25
Ferric Sulfate.....	25
Ferric Chloride	25
Ferrous Sulfate.....	25
Sodium Aluminate	25
Polymers.....	25
Polymers (Continued)	26
<i>TABLE 8 PATENTS: ORGANIC COAGULANTS/FLOCCULANTS FOR PURIFICATION OF WASTE WATER</i>	27
<i>TABLE 8 (CONTINUED)</i>	28
Patent Analysis.....	28
<i>TABLE 9 PATENTS: COAGULANTS AND FLOCCULANTS, 2000–2008</i>	28
<i>TABLE 9 (CONTINUED)</i>	29
<i>TABLE 9 (CONTINUED)</i>	30
DISINFECTANTS AND BIOCIDES	30
Disinfectants.....	30
<i>TABLE 10 TYPES OF DISINFECTANTS AND DISINFECTION METHODS</i>	31
<i>TABLE 10 (CONTINUED)</i>	32
<i>TABLE 11 COMPARISON OF DISINFECTION TECHNIQUES</i>	33
<i>TABLE 12 TYPES AND EXAMPLES OF DISINFECTANTS</i>	33
Biocides	34
<i>TABLE 13 TYPES OF BIOCIDES</i>	34
Chlorinated Phenolics.....	34
Quaternary Ammonium Salts	34
<i>TABLE 14 DESCRIPTION OF OXIDIZING AGENTS</i>	34
Chlorosocyanurates	34
<i>TABLE 14 (CONTINUED)</i>	35
<i>TABLE 15 DESCRIPTION OF NON-OXIDIZING AGENTS</i>	35
<i>TABLE 15 (CONTINUED)</i>	36
Fouling of Water Systems.....	36

Fouling of Water Systems (Continued).....	37
Standards for Drinking Water Disinfection in The EU	38
<i>TABLE 16 DISINFECTION APPLICATIONS IN THE EUROPEAN</i>	
<i>UNION</i>	39
Chlorine Production.....	40
<i>TABLE 17 METHODS OF PRODUCING CHLORINE</i>	40
<i>TABLE 17 (CONTINUED)</i>	41
<i>TABLE 18 ADVANTAGES AND DISADVANTAGES OF CHLOR ALKALI</i>	
<i>PROCESS</i>	41
Patent Analysis.....	42
<i>TABLE 19 PATENTS: BIOCIDES AND DISINFECTANTS</i>	42
<i>TABLE 19 (CONTINUED)</i>	43
<i>TABLE 19 (CONTINUED)</i>	44
<i>TABLE 19 (CONTINUED)</i>	45
CHELATING AGENTS.....	45
DISPERSANTS	46
REGENERANTS	46
DEFOAMERS/ANTI FOAMING AGENTS.....	47
Defoamers/Anti Foaming Agents (Continued)	48
Patent Analysis.....	49
<i>TABLE 20 PATENTS: DEFOAMING AGENTS, 2000-2008</i>	49
<i>TABLE 20 (CONTINUED)</i>	50
<i>TABLE 20 (CONTINUED)</i>	51
PH ADJUSTERS AND SOFTENERS	51
<i>TABLE 21 EXAMPLES OF PH ADJUSTERS AND SOFTENERS</i>	52
<i>TABLE 22 DETAILED WATER SOFTENING TECHNIQUES, BY TYPE</i>	
<i>OF SOFTENER</i>	52
<i>TABLE 22 (CONTINUED)</i>	53
<i>TABLE 22 (CONTINUED)</i>	54
<i>TABLE 22 (CONTINUED)</i>	55
Ion Exchange Resins: Classification and Properties.....	55
<i>TABLE 23 TYPES OF ION EXCHANGE RESINS</i>	56
FLUORIDATION CHEMICALS.....	57
Advantages	57
Disadvantages.....	58
Fluoridation Chemicals	58
<i>TABLE 24 PATENTS: FLUORIDATION CHEMICALS</i>	58
<i>TABLE 24 (CONTINUED)</i>	59
OXIDANTS	59
<i>TABLE 25 PRIME OXIDATION CHEMICALS AND THEIR</i>	
<i>DESCRIPTION</i>	59
OXYGEN SCAVENGERS	59
ALGAECIDES	60
RESIN CLEANERS	60

ODOR CONTROL	60
<i>TABLE 26 ODOR CONTROL METHODOLOGIES</i>	61
Waste Water Odor Control: An Evaluation of Technologies:	61
Background	61
<i>TABLE 27 SUMMARY OF ODOR CONTROL TECHNOLOGIES</i>	62
Vapor-Phase Technologies	63
Wet Air Scrubbing	63
Liquid Redox Technology	64
Biofiltration.....	65
Solid Scavengers	65
Carbon Adsorption.....	66
Liquid-Phase Technologies.....	67
Iron Salts.....	67
Bioxide Process	67
Oxidizing Agents.....	68
Anthraquinone.....	68
Digester Gas Treatment.....	68
Activated Charcoal	69
Patent Analysis.....	70
<i>TABLE 28 PATENTS: ACTIVATED CHARCOAL PRODUCTION (2000– 2008)</i>	71
<i>TABLE 28 (CONTINUED)</i>	72
FILTER MEDIA	73
<i>TABLE 29 TYPES OF FILTER MEDIA</i>	73
<i>TABLE 29 (CONTINUED)</i>	74
Conventional Sand Filter	74
Conventional Carbon Filter	75
Biological Sand Filter	75
Biological Carbon Filter	76
<i>TABLE 30 COMMONLY USED FILTER MEDIA</i>	77
<i>TABLE 30 (CONTINUED)</i>	78
<i>TABLE 30 (CONTINUED)</i>	79
CLASSIFICATION BY APPLICATIONS	80
<i>TABLE 31 PERCENTAGE DISTRIBUTION AMONG SEGMENTS (%)</i>	80
INDUSTRIAL.....	80
MUNICIPAL.....	81
COMMERCIAL/RESIDENTIAL	81
CHAPTER FIVE: INDUSTRY OVERVIEW.....	82
ISSUES AND CHALLENGES	82
GROWTH DRIVERS.....	83
DEMOGRAPHICS AND GROWTH OF AN ECONOMY	83
WATER USE AND WATER POLLUTION	83
GROWTH IN DEVELOPING COUNTRIES.....	84

CONSOLIDATION.....	84
TECHNOLOGICAL IMPROVEMENTS	85
REGULATIONS AND LEGISLATIONS.....	85
UNTREATED WASTEWATER	86
TRENDS	86
WATER TREATMENT IS SHIFTING TO BECOME MORE SERVICES ORIENTED	86
WATER TREATMENT CHEMICALS MARKET FOCUS SHIFTS TOWARDS INDUSTRIAL SECTOR.....	86
DEMAND FOR NONCHEMICAL WATER TREATMENT EQUIPMENT AND SUPPLIES IS PROJECTED TO REGISTER FASTER GROWTH THAN CHEMICAL PRODUCTS.....	87
DEVELOPED NATIONS SHIFT FOCUS ON SOPHISTICATED TREATMENT TECHNIQUES	87
INDUSTRY STRUCTURE, BUSINESS STRATEGIES, MARKETING ACTIVITIES	88
BUSINESS STRATEGIES AND TACTICS	88
MARKETING ACTIVITIES.....	89
CHAPTER SIX: REGIONAL ANALYSIS.....	90
<i>FIGURE 1 WATER TREATMENT AS A PERCENTAGE OF THE SPECIALTY CHEMICALS INDUSTRY, 2008 (%)</i>	90
UNITED STATES	91
<i>TABLE 32 USAGE OF WATER RESOURCES</i>	91
EUROPE.....	92
ASIA.....	93
<i>TABLE 33 TOP INDUSTRY CONTRIBUTORS TO THE SPECIALTY CHEMICALS FOR WATER TREATMENT INDUSTRY IN ASIA, 2008</i>	94
INDIA	94
India (Continued).....	95
CHINA	96
China (Continued)	97
CHAPTER SEVEN: MARKET ESTIMATES	98
<i>TABLE 34 GLOBAL SPECIALTY WATER TREATMENT CHEMICALS REVENUES BY REGION, THROUGH 2013 (\$ BILLIONS)</i>	98
<i>FIGURE 2 PERCENTAGE CONTRIBUTION OF COUNTRIES TO SPECIALTY WATER TREATMENT CHEMICALS INDUSTRY, 2008 (%)</i>	99
<i>FIGURE 3 PERCENTAGE CONTRIBUTION OF COUNTRIES TO SPECIALTY WATER TREATMENT CHEMICALS INDUSTRY, 2013 (%)</i>	100
<i>TABLE 35 CORROSION INHIBITORS: REVENUE FORECAST BY REGION, THROUGH 2013 (\$ MILLIONS)</i>	101

<i>TABLE 36 COAGULANTS AND FLOCCULANTS: REVENUE FORECAST BY REGION, THROUGH 2013 (\$ MILLIONS)</i>	101
<i>TABLE 37 BIOCIDES: REVENUE FORECAST BY REGION, THROUGH 2013 (\$ MILLIONS)</i>	101
<i>TABLE 38 SCALE INHIBITORS: REVENUE FORECAST BY REGION, THROUGH 2013 (\$ MILLIONS)</i>	102
<i>TABLE 39 GLOBAL SPECIALTY WATER TREATMENT CHEMICALS MARKET: REVENUE FORECAST BY SEGMENT, THROUGH 2013 (\$ BILLIONS)</i>	102
<i>FIGURE 4 SHARE OF SEGMENTS IN GLOBAL SPECIALTY CHEMICALS FOR WATER TREATMENT, 2008 (%)</i>	103
<i>FIGURE 5 SHARE OF GLOBAL REVENUES IN SPECIALTY CHEMICALS FOR WATER TREATMENT, 2013 (%)</i>	104
<i>TABLE 40 GLOBAL SPECIALTY CHEMICALS FOR WATER TREATMENT: REVENUE FORECAST BY INDUSTRY, THROUGH 2013 (\$ BILLIONS)</i>	105
<i>FIGURE 6 SHARE OF INDUSTRY IN GLOBAL REVENUES FOR SPECIALTY CHEMICALS FOR WATER TREATMENT, 2008 (%)</i>	105
<i>FIGURE 7 SHARE OF INDUSTRY IN GLOBAL REVENUES FOR SPECIALTY CHEMICALS FOR WATER TREATMENT, 2013 (%)</i>	106
CHAPTER EIGHT: INDUSTRY STRUCTURE	107
INDUSTRY PLAYERS	107
<i>TABLE 41 STAKES OF INDUSTRY PARTICIPANTS, 2007</i>	107
<i>TABLE 42 POTENTIAL ENTRANTS</i>	108
KEY PARTICIPANTS PROFILES	108
ALBEMARLE COPORATION	108
Profile	108
ARCH CHEMICALS INC.	109
Profile	109
ASHLAND WATER TECHNOLOGIES	110
Profile	110
Industries Served by Ashland Water Technologies	111
Revenue by Region for Ashland Water Technologies.....	112
BUCKMAN LABORATORIES	112
Profile	112
Water Treatment	112
BWA WATER ADDITIVES	113
Profile	113
CIBA SPECIALTY CHEMICALS HOLDING INC.	113
Profile	114
CHEMTREAT (DANAHER CORPORATION)	115
Profile	115
DOW CHEMICAL	116
Profile	116

ECOLAB INC	117
Profile	117
GE WATER & PROCESS TECHNOLOGIES	118
Profile	118
GENERAL CHEMICAL PERFORMANCE PRODUCTS LLC.....	119
Profile	119
ISRAEL CHEMICALS	120
Profile	120
KEMIRA GROUP	120
Profile	120
Key Future Strategies:	121
KURITA WATER INDUSTRIES LTD (JAPAN)	122
Profile	122
Key Strategies.....	123
NALCO COMPANY	123
Profile	123
Key Strategies.....	124
NORIT NV	125
Profile	125
OCCIDENTAL CHEMICAL CORPORATION	126
Profile	126
OLIN CORPORATION	127
Profile	127
Key Strategies for Chlor Alkali Segment:	127
ORGANO CORP	128
Profile	128
PPG INDUSTRIES INC.....	128
Profile	129
PQ CORPORATION.....	129
Profile	130
QEMI INTERNATIONAL, INC.....	130
Profile	130
ROHM & HAAS.....	131
Profile	131
SNF FLOERGER	132
Profile	132
SOLVAY SA.....	132
Profile	132
Key Strategies of the Company.....	133
SUEZ ENVIRONNEMENT SA	133
Profile	134
ACCEPTA.....	135
ALCAN CHEMICALS.....	135
ALPHEUS ENVIRONMENTAL LTD	135

AMERALIA INC.....	135
APPLIED SPECIALTIES INC	135
AQUA MARINE CHEMICALS LTD	135
AQUAIR INC.....	136
ARIES CHEMICALS LTD	136
B&V WATER TREATMENT LTD.....	136
BEACON WATER TREATMENT LTD.....	136
BRITE-TECH	136
BROWNE LABORATORIES INC	137
CHEMICAL EQUIPMENT LABS INC	137
CHEMTURA CORPORATION	137
CHLOROXY TECH LTD.....	137
ENPAR TECHNOLOGIES	137
ENVIRONMENTAL AND MECHANICAL SERVICES LTD	137
FERALCO.....	138
GEO SPECIALTY CHEMICALS INC.....	138
VEOLIA ENVIRONNEMENT.....	138
STRATEGIC ALLIANCE ACTIVITY IN THE PAST 3 YEARS	138
DOW ACQUIRES ROHM AND HAAS, CREATING WORLD'S LEADING SPECIALTY CHEMICALS AND ADVANCED MATERIALS COMPANY, 2008.....	139
PENTAIR AND GE WATER & PROCESS TECHNOLOGIES FORM JOINT GLOBAL WATER FILTRATION VENTURE, 2008	139
PQ CORPORATION MERGES WITH INEOS SILICAS, 2008	139
CHEMTREAT, INC. ACQUIRED BY DANAHER CORPORATION, 2007.....	139
KEMIRA PURCHASES CYTEC INDUSTRIES' WATER TREATMENT BUSINESS, 2007	140
CHEMTURA SELLS WATER TREATMENT CHEMICALS DIVISION.....	140
KEMIRA TO ACQUIRE WATER TREATMENT CHEMICALS COMPANY NHEEL QUÍMICA LTD IN BRAZIL, 2007	140
KEMIRA ACQUIRES ARKEMA'S COAGULANT BUSINESS FOR WATER TREATMENT, 2007	140
ASHLAND ACQUIRES WATER TREATMENT BUSINESS OF DEGUSSA AG, 2006.....	141
KEMIRA ACQUIRES MAJORITY STAKE IN CHONGQING LANJIE TAP, 2006	141
KEMIRA TAKES OVER FOUR SUBSIDIARIES FROM PARCON, 2006.....	141
DOW CHEMICAL TO OWN OMEX ENVIRONMENTAL, 2006.....	141
GENTEK PURCHASES GAC MIDAMERICA, 2006	141

ASHLAND ACQUIRES THE ASSETS OF NANJING CLEAR ENVIRONMENT PROTECTION CO. LTD., 2006.....	142
<i>TABLE 43 SUMMARY OF STRATEGIC ALLIANCE ACTIVITY.....</i>	<i>142</i>
CHAPTER NINE: REGULATORY OVERVIEW.....	143
UNITED STATES.....	143
UNITED STATES (CONTINUED).....	144
AIR.....	145
WATER.....	146
SOLID WASTE.....	146
CANADA.....	146
EUROPEAN UNION.....	147
EUROPEAN DRINKING WATER GUIDELINE 98/83/EC.....	148
BIOCIDAL PRODUCTS GUIDELINE.....	148
REACH.....	148
REACH (Continued).....	149
REACH (Continued).....	150
REACH (Continued).....	151
CHINA AND JAPAN.....	152
<i>TABLE 44 LAWS AND REGULATIONS IN CHINA.....</i>	<i>153</i>
<i>TABLE 45 LAWS AND REGULATIONS IN JAPAN.....</i>	<i>154</i>