

TABLE OF CONTENTS

BASIC ANALYSIS

About This Report.....	1
Executive Summary.....	3
About Activated Carbon.....	6
Introduction.....	6
Commercial Forms & Applications.....	7
Powdered Activated Carbon Production Pathways.....	8
Process Overview.....	9
Product(s) Generated.....	9
Process Inputs.....	9
Technology Maturity Assessment.....	10
Highlights & Remarks.....	12
Industrial Site.....	13
Introduction.....	13
Process Unit Description.....	15
Site Infrastructure Description.....	19
Key Process Input and Output Figures.....	23
Labor Requirements.....	23
Capital Investment.....	24
Fixed Capital.....	25
Working Capital.....	27
Additional Capital Requirements.....	28
Total Capital Investment.....	29
Operating Costs.....	30
Operating Variable Costs.....	32

* Available in 'Advanced' version only

Operating Fixed Costs.....	33
Depreciation.....	33
Total Operating Cost.....	33
Product Value Analysis.....	35
Corporate Overhead.....	36
Return on Capital Employed (ROCE).....	36
Process Economics Summary.....	37
Product Value Composition.....	37
Economic Datasheet.....	37
Economic Remarks.....	39
References.....	40
Analysis Methodology.....	41
APPENDIX A - ABOUT INTRATEC.....	A-1
APPENDIX B - TERMS & CONDITIONS.....	B-1
APPENDIX C - REPORT SHARING TERMS.....	C-1
APPENDIX D - EXTENDED ANALYSIS.....	D-1
Utilities Consumption Breakdown.....	D-2
Utilities Consumption Figures.....	D-2
Impact of Utilities on Operating Cost.....	D-3
Economic Analysis for Different Capacities.....	D-4
Introduction.....	D-4
Capital Investment Comparison.....	D-4
Operating Cost & Product Value Comparison.....	D-5
Project Implementation & Construction Schedule.....	D-7
Materials & Utilities Pricing Data.....	D-9
Analysis Pricing Basis.....	D-9
Historical Prices.....	D-9

* Available in 'Advanced' version only

APPENDIX E - ADVANCED ANALYSIS*	E-1
Process Unit (ISBL) Construction Cost by Functional Unit	E-2
Infrastructure Construction Cost by Piece of Equipment	E-4
Introduction	E-4
Construction Cost: Area 90 - Storage Installations	E-5
Construction Cost: Area 91 - Utilities Facilities	E-7
Construction Cost: Area 92 - Support & Auxiliary Buildings	E-9
Site Infrastructure Cost Summary	E-11
Plant Cost Breakdown per Discipline	E-12
Introduction	E-12
Direct Costs Breakdown	E-13
Indirect Costs Breakdown	E-14
Plant Cost Breakdown Summary	E-15
Process Flow Diagrams & Equipment List	E-16

* Available in 'Advanced' version only

LIST OF TABLES

Economic Analysis Summary.....	5
Process Technology Maturity Scale.....	11
Raw Materials Consumption.....	23
Labor Requirements.....	23
Plant Cost Estimate Accuracy Range (USD Million).....	26
Owner's Cost Summary.....	26
Fixed Capital Summary.....	27
Working Capital Breakdown.....	27
Additional Capital Requirements Breakdown.....	28
Operating Variable Costs Breakdown.....	32
Operating Fixed Costs Breakdown.....	33
Operating Cost Summary.....	33
Corporate Overhead Costs Breakdown.....	36
Activated Carbon Production from Coconut Shell (Chemical Activation) - Economic Datasheet.....	38
Process Contingency Factor Estimation Methodology.....	46
Project Contingency Factor Estimation Methodology.....	47
Fixed Capital Estimate Accuracy Range.....	51
Maintenance Cost Estimation Methodology.....	54
Marketing & Advertising Cost Estimation Methodology.....	56
Research & Development Cost Estimation Methodology.....	56
Expected ROCE Factor Estimation Methodology.....	57
Net Utility Consumption Rates (per mt of Powdered Activated Carbon).....	D-2
Utilities Share in Total Operating Cost.....	D-3
Capital Investment Analysis for Different Capacities (MM USD).....	D-5
Operating Cost & Product Value Analysis for Different Capacities (USD/mt).....	D-6

* Available in 'Advanced' version only

Project Phases Schedule..... D-7

Materials & Utilities Prices (United States, Q1'21)..... D-9

Process Unit (ISBL) Construction Cost by Functional Unit..... E-2

Area 90 - Storage Installations: Scope Description..... E-5

Area 91 - Utilities Facilities: Scope Description..... E-7

Area 92 - Support & Auxiliary Buildings: Scope Description..... E-9

Site Infrastructure (OSBL) Construction Cost by Piece of Equipment..... E-11

Plant Construction Cost by Discipline..... E-15

* Available in 'Advanced' version only

LIST OF FIGURES

Process Schematic Diagram.....	4
Powdered Activated Carbon Production Pathways Diagram.....	8
Industrial Site Configuration.....	14
Block Flow Diagram - Manufacturing Process.....	16
Plant Cost Summary (USD Million).....	25
Capital Investment Summary (USD Million).....	29
Operating Cost Breakdown (USD/mt).....	34
Product Value Composition (USD/mt).....	37
Production Cost Report Development Methodology.....	42
Cost Contribution of Each Utility.....	D-3
Capital Investment (USD Million) Versus Plant Capacity.....	D-4
Operating Cost (USD/mt) Versus Plant Capacity.....	D-5
Implementation & Construction Schedule.....	D-8
Process Unit (ISBL) Construction Cost by Functional Unit.....	E-3
Site Infrastructure (OSBL) Construction Cost by Area.....	E-4
Storage Installations Construction Cost per Piece of Equipment.....	E-5
Utilities Facilities Construction Cost per Piece of Equipment.....	E-7
Support & Auxiliary Buildings Construction Cost per Piece of Equipment.....	E-9
Plant Construction Cost Summary.....	E-12
Direct Construction Costs by Discipline.....	E-13
Indirect Costs Summary.....	E-14
Process Flow Diagram (1 of 1).....	E-19

* Available in 'Advanced' version only