

TABLE OF CONTENTS

BASIC ANALYSIS

| | |
|--|----|
| About This Report..... | 1 |
| Executive Summary..... | 3 |
| About Laurolactam..... | 6 |
| Introduction..... | 6 |
| Commercial Forms & Applications..... | 6 |
| Laurolactam Production Pathways Diagram..... | 7 |
| Process Overview..... | 8 |
| Product(s) Generated..... | 8 |
| Process Inputs..... | 8 |
| Technology Maturity Assessment..... | 9 |
| Highlights & Remarks..... | 11 |
| Industrial Site..... | 12 |
| Introduction..... | 12 |
| Process Unit Description..... | 14 |
| Site Infrastructure Description..... | 18 |
| Key Process Input and Output Figures..... | 22 |
| Labor Requirements..... | 22 |
| Capital Investment..... | 23 |
| Fixed Capital..... | 24 |
| Working Capital..... | 26 |
| Additional Capital Requirements..... | 27 |
| Total Capital Investment..... | 28 |
| Operating Costs..... | 29 |
| Operating Variable Costs..... | 31 |

* Available in 'Advanced' version only

| | |
|---|-----|
| Operating Fixed Costs..... | 32 |
| Depreciation..... | 32 |
| Total Operating Cost..... | 32 |
| Product Value Analysis..... | 34 |
| Corporate Overhead..... | 35 |
| Return on Capital Employed (ROCE)..... | 35 |
| Process Economics Summary..... | 36 |
| Product Value Composition..... | 36 |
| Economic Datasheet..... | 36 |
| Economic Remarks..... | 38 |
| References..... | 39 |
| 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 Total 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..... | 10 |
| Raw Materials Consumption..... | 22 |
| Labor Requirements..... | 22 |
| Plant Cost Estimate Accuracy Range (USD Million)..... | 25 |
| Owner's Cost Summary..... | 25 |
| Fixed Capital Summary..... | 26 |
| Working Capital Breakdown..... | 26 |
| Additional Capital Requirements Breakdown..... | 27 |
| Operating Variable Costs Breakdown..... | 31 |
| Operating Fixed Costs Breakdown..... | 32 |
| Operating Cost Summary..... | 32 |
| Corporate Overhead Costs Breakdown..... | 35 |
| Lauro lactam from Cyclododecane (Photonitration Process) - Datasheet..... | 37 |
| 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..... | D-2 |
| Utilities Share in Total Operating Cost..... | D-3 |
| Capital Investment Analysis for Different Capacities..... | D-5 |
| Operating Cost & Product Value Analysis for Different Capacities..... | D-6 |

* Available in 'Advanced' version only

Project Phases Schedule.....D-7

Materials & Utilities Prices (United States).....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

| | |
|---|------|
| Lauro lactam Production Pathways Diagram..... | 7 |
| Industrial Site Configuration..... | 13 |
| Lauro lactam Production Unit - Block Flow Diagram..... | 15 |
| Plant Cost Summary (USD Million)..... | 24 |
| Capital Investment Summary (USD Million)..... | 28 |
| Operating Cost Breakdown..... | 33 |
| Product Value Composition..... | 36 |
| Production Cost Report Development Methodology..... | 42 |
| Cost Contribution of Each Utility..... | D-3 |
| Capital Investment (USD Million) Versus Plant Capacity..... | D-4 |
| Operating Cost Versus Plant Capacity..... | D-5 |
| Implementation & Construction Schedule..... | D-8 |
| Process Unit (ISBL) Construction Cost Breakdown..... | E-3 |
| Site Infrastructure (OSBL) Construction Cost per 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..... | E-19 |

* Available in 'Advanced' version only