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# Spectra Dynamics Ltd.

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... Excellence in Performance ...

# Outline

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- Company Background
- Strengths and Capabilities
- Some Projects & Customers
- Key Personal Outline
- Next Steps

# Spectra Dynamics Limited



- Offices in Vadodara (HQ), Mumbai & Delhi
- Consulting Services
  - Conceptual Design
  - Front-end Engineering Design
  - Detailed Engineering
  - Safety Services
- Over 100 projects
- About 25 technical personnel
- [www.specdynamics.com](http://www.specdynamics.com)



# The Promoters

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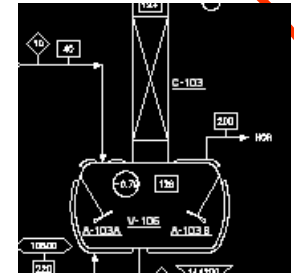
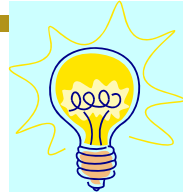
## ■ Ajit Kapadia

- MS Chemical Engineering, Louisville, KY 1963
- Career Highlights
  - 1963 – 1970, Process Engineer, Girdler and Fluor Inc, in USA
  - 1970 – 1984, Process Engineer & Dept Head, Union Carbide & EIL
  - 1984 – 1987, Director Planning, GAIL
  - 1987 – 2003, Startup President & Managing Director, HOEC

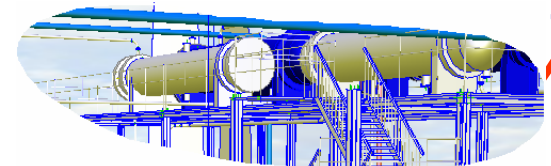
## ■ KG Tuli

- Formed Paramount Limited in 1960 - Vadodara, India
- EPC Contractor
  - Waste Water & Effluent Treatment Plants
  - Air Pollution Control Systems
- 200+ personnel, 270+ Major Projects Executed, 10+ Countries

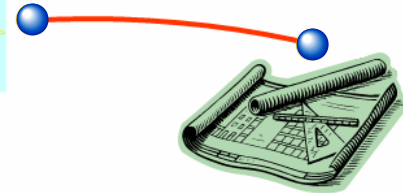
# Consulting Services



- **Conceptual Design**
- **Front-End Engineering Design**
- **Detailed Engineering**
- **Safety Services**



# Conceptual Design



- **Commercial Technology Selection**
  - Identification of available technologies
  - Techno-commercial analysis
    - Viability for Indian conditions
    - Payback period & Sensitivity analysis
- **Client Technology Development**
  - Interact with client R&D department
  - Firming of the process scheme
- **Spectra Technology Solutions**
  - Ammonia Separation & Recovery
  - Solvent Separation & Re-circulation
  - LPG Recovery from Natural Gas

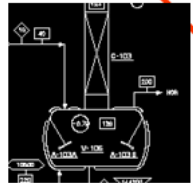
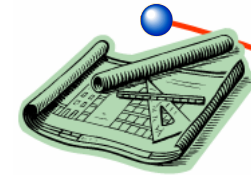
Get the right technology for your needs !

# Front-End Engineering Design (FEED)



## ■ Complete FEED Package Development

- ❑ Process Simulation
- ❑ Optimized Heat & Mass Balance
- ❑ Process Flow Diagram (PFD)
- ❑ Equipment Specifications Sheets
- ❑ Piping & Instrumentation Diagram (P&ID)
- ❑ Conceptual Equipment Layout
- ❑ Instrument Specification
- ❑ Equipment and Line List



## ■ Specialization in

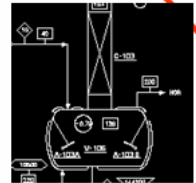
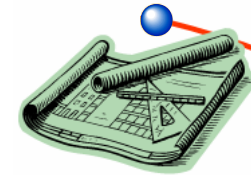
- ❑ Complex Distillation and Separation Systems
- ❑ Heat Exchanger Design / Rating

# Front-End Engineering Design (FEED)



## ■ Feasibility Studies & Cost Estimation

- Green field project feasibility
- Brown field project feasibility
  - Improved product purity
  - Change in feed type / feed composition



## ■ Scale up of Lab / Pilot Plant to Commercial Plant

- Commercial-scale plant design from
  - Pilot plant operations
  - Laboratory scale operation
- Reactor systems, mass and heat transfer equipment



# Front-End Engineering Design (FEED)



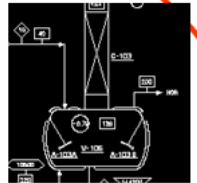
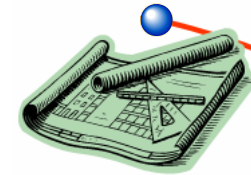
## ■ Conversion of Batch Process to Continuous Process

### □ Unit Operations

- Reactors, filtration systems, distillation & extraction systems

### □ Typical benefits

- Lower downtime & higher throughput
- Lesser Cost of Production
- Better operation and quality control

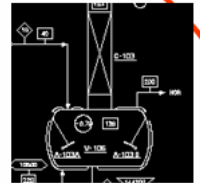
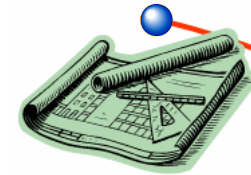


# Front-End Engineering Design (FEED)



## ■ Process Simulation Studies

- ❑ Complete Plant Design
- ❑ Operations Decision Support
- ❑ Plant Troubleshooting



## ■ Heat Exchanger Design & Analysis

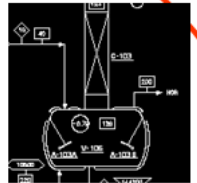
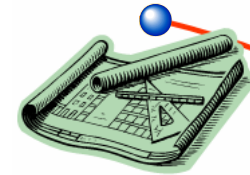
- ❑ Thermal Design
- ❑ Vibration Analysis
- ❑ Mechanical Design
- ❑ Exchanger Train / Network Design & Optimization

# Front-End Engineering Design (FEED)



## ■ Relieving Systems and Flare Networks

- Design / Validation Studies
- Relief valve – load calculations, backpressure and orifice sizing
- Flare lines, headers, pots, flare stack



## ■ Plant Improvement / De-bottlenecking Studies

- Identification of Bottleneck / Improvement Areas
- Modifications for Bottleneck Elimination / Improvements
- Utility / Energy Optimization and Integration

Many modifications require minimal capital expenditures!

# Front-End Engineering Design (FEED)



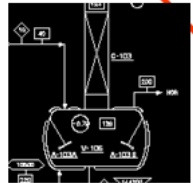
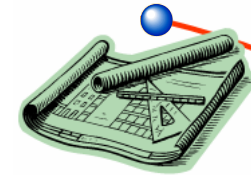
## ■ Equipment Engineering Services

### □ Mechanical Design

- Preparation of mechanical data sheets
- Generation of fabrication drawings
- Review of Vendor drawings

### □ Equipment Types

- Shell and tube heat exchangers
- Pressure Vessels
- Columns
- Air coolers
- Flat bottom storage Tanks
- Others



# Detailed Engineering



## ■ Project Co-ordination & Management

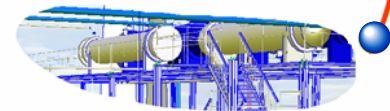
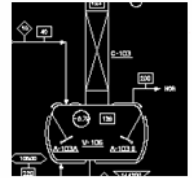
- ❑ Coordination among engineering disciplines
- ❑ Project progress monitoring & reporting
- ❑ Coordination with Client

## ■ Technical Assistance for Procurement

- ❑ Detailed Equipment Specifications
- ❑ Quotes from Vendors
- ❑ Technical review of vendor documents

## ■ Piping Design

- ❑ Pipe Stress Analysis
- ❑ Piping Material Specifications
- ❑ Equipment & Piping Layout Plans, Isometrics
- ❑ Bill of Materials



# Detailed Engineering



## ■ Instrument Engineering

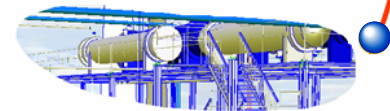
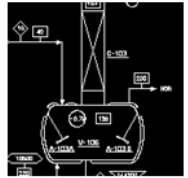
- ❑ Specs for Field Instruments
- ❑ Control Panel Specification
- ❑ Cable Layouts and Bill of Material

## ■ Electrical Engineering

- ❑ Single Line Diagrams
- ❑ Cable Sizing and Specs for MCC & PCC
- ❑ Cable, Lighting, Earthing Layouts and Bill of Materials

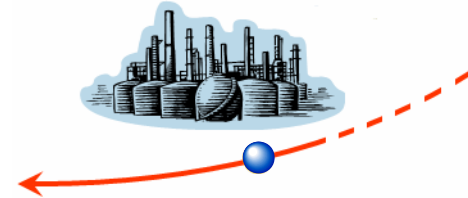
## ■ Civil / Structural Design & Engineering

- ❑ Buildings & Structures, Equipment Foundation & Pipe Racks
- ❑ Architectural Design
- ❑ Bill of Materials



Resource network of associates

# Safety Services



- **Conducting / Leading Safety Studies**
  - HAZOP
    - HAZard & OPerability Study
  - HAZID
    - HAZard IDentification Study
  - Safety Layout Reviews
    - Review of Equipment Layout from Safety Perspective
  - Safety Audits
    - Studies for operating facilities

# Strengths and Capabilities

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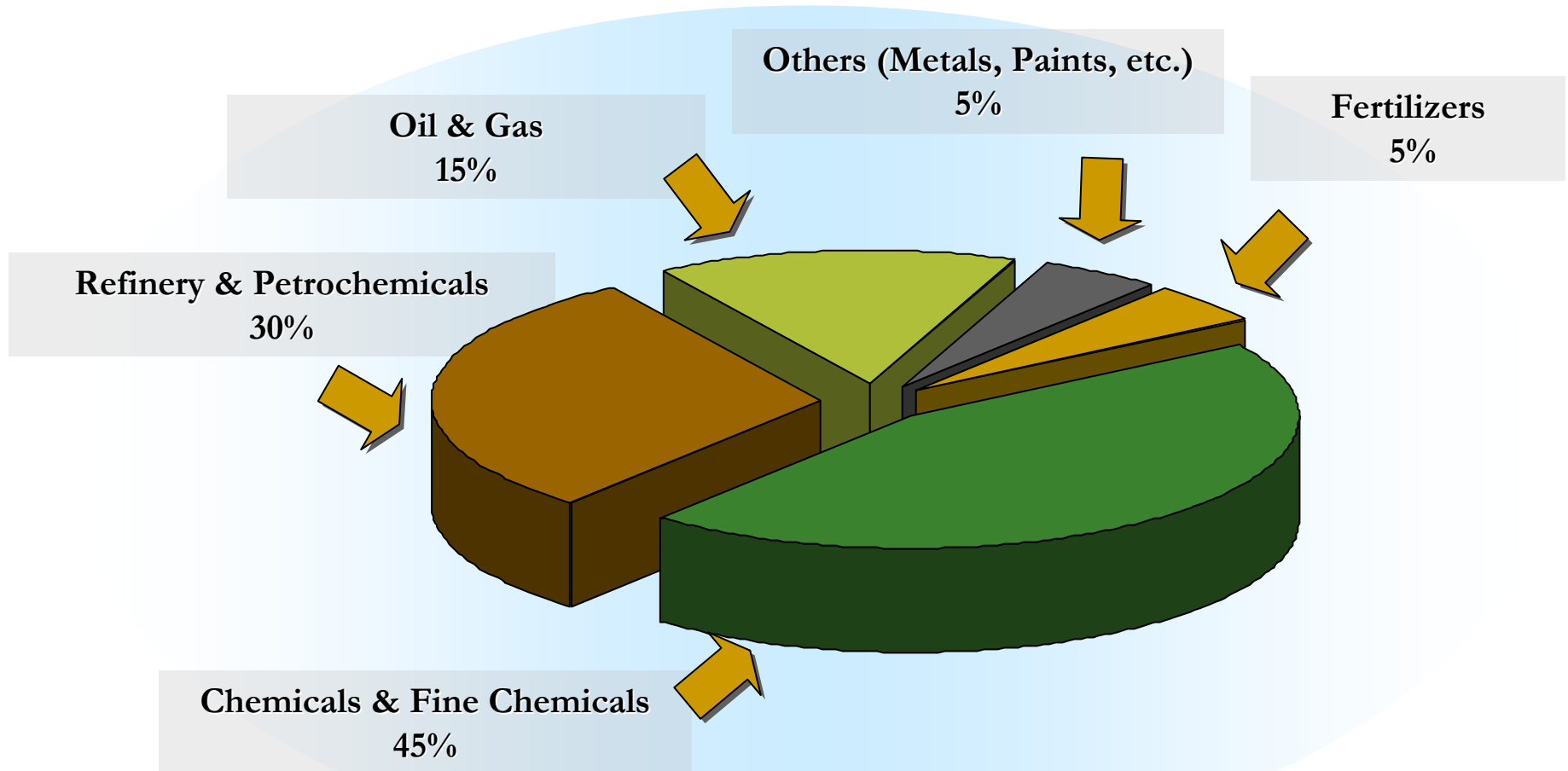


## ■ Technical Strengths

- 25 technical personnel
- Expertise in
  - Complete FEED packages
  - Simulation and Heat Exchanger Design Software
  - HSE Services
- Detailed Engineering
  - Access to 200+ technical resources (Paramount Ltd.)



# Strengths and Capabilities



We cover a wide spectrum of market segments!

# Strengths and Capabilities

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## ■ Professional Work Quality

- Highly skilled dedicated staff
  - Average experience of about 15 years
  - Over 50% of the staff have an advanced degree
- Multiple levels of checks and reviews

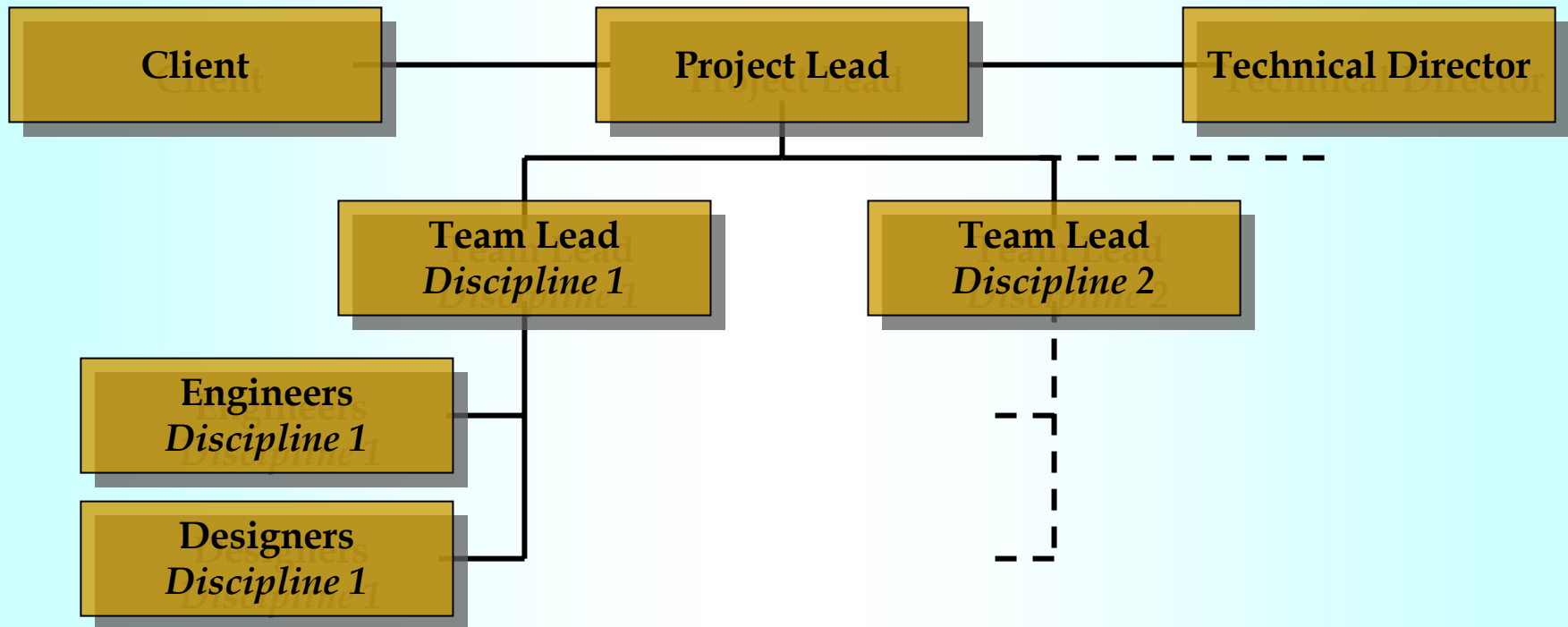
## ■ Focused Management

- A closely-held family corporation
  - Owners are all working managers
- Professionally managed organization

# Strengths and Capabilities



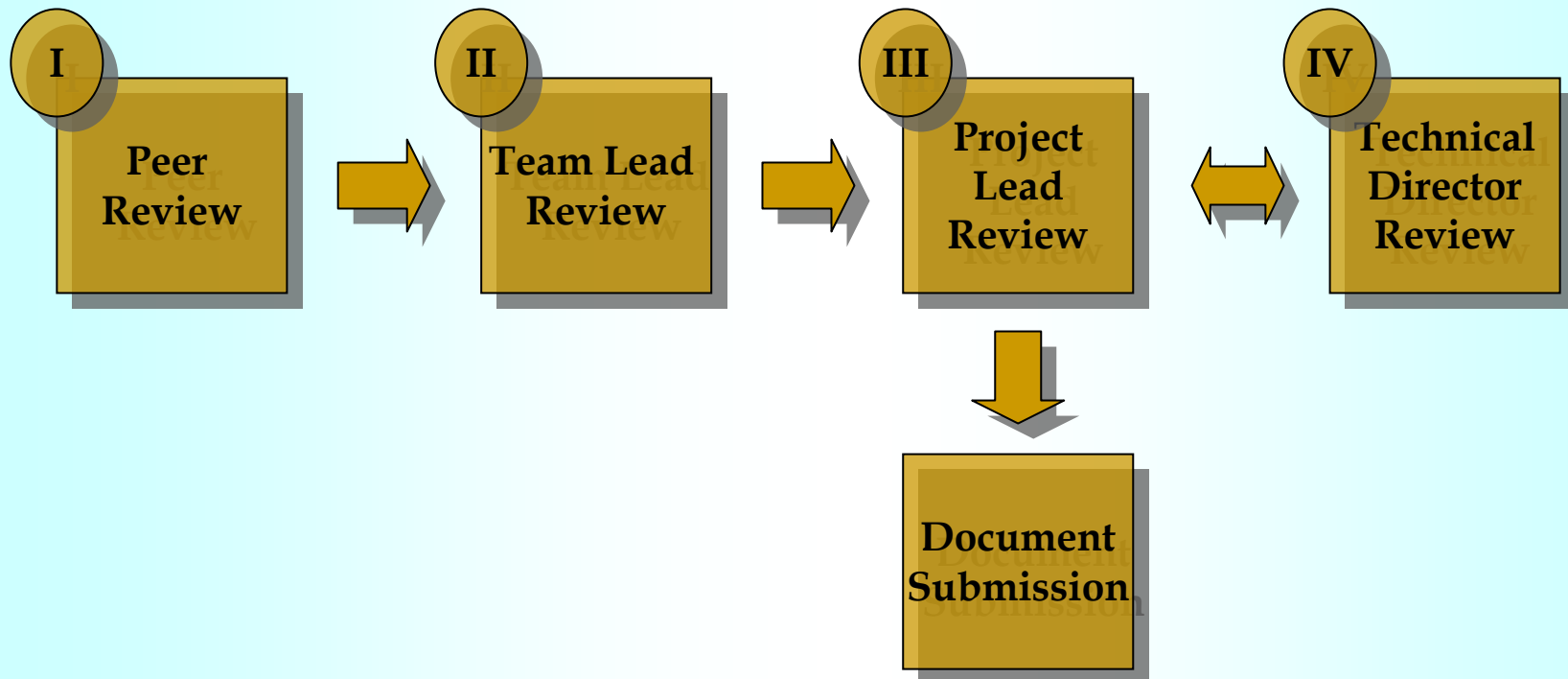
## Typical Project Organizational Chart



# Strengths and Capabilities



## Typical Project Review Process



# Strengths and Capabilities

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## ■ Domestic Experience

- Extensive local customer-base
  - Repeated projects from various customers
  - Several other major chemicals players in India
- Indian codes and standards, work culture

## ■ International experience

- Key people with plenty of international history
- International projects / domestic projects for multinationals
- API / ASME codes

# Software Packages



## ■ Process Simulation

- ❑ PRO/II®: Premier Process Simulation Package
- ❑ VisualFlow®: Flare Network Simulation and Analysis
- ❑ INPLANT®: Plant Piping Systems Simulation and Optimization
- ❑ DATACON®: DCS Data reconciliation for H & M Balance

## ■ Heat Exchanger Design & Simulation

- ❑ HTRI®: Premier Heat Exchange Design & Analysis Package
- ❑ Hextran®: Heat Ex Network Design / Optimization

## ■ Mechanical Design

- ❑ PVElite®: Columns, pressure vessels, etc.

## ■ Life Cycle Asset Information Management

- ❑ Comos®: Integrate Engineering Documents & Data

Industry-leading specialty software packages!

# Select List of Projects



- Over 100 projects completed since inception
- Conceptual Design
  - Anhydrous Alcohol Technology: Bayer, Baroda
  - Ammonia Recovery Technology: UPL, Ankleshwar
  - Condensate & LPG Recovery System: Canoro, Assam
- Front-End Engineering Design
  - Naphtha Stabilization Unit: IOCL, Barauni
  - Relief Valves & Flare System: Shell, Hazira
  - Lube Oil Re-refining Plant: Chemie Tech, Dubai
  - FCCU & DCU FEED Package P&ID Development: Essar, Jamnagar
  - Specialty Pigments Plant (4 nos.): Heubach Colour, Ankleshwar

# Select List of Projects



## ■ Detail Engineering

- ❑ Moisture Control & Dehazing Facility, MAB Refinery, KNPC
- ❑ Gasoline Blending System: Yokogawa / IOCL, Gujarat
- ❑ Validation of Oil and Gas Separation Facility, HOEC

## ■ Safety Studies

- ❑ Pramoda Oil Field & North Balol Gas Collection System, HOEC, Chennai
- ❑ CDU / VDU / SGU, Essar Oil Limited, Jamnagar
- ❑ Propylene Technology, Udhe, Mumbai

## ■ Design, Engineering, Procurement, Construction Mgmt

- ❑ MPP Plant: India Malt (Lubrizol), Baroda

## ■ Heat Exchanger Design Projects

- ❑ Fabricators: TEMA India Limited & Grasim Industries Limited
- ❑ EPC / EPCM Companies: Punj Lloyd, EIL, Stone & Webster Rolta



# Select List of Customers



# List of International Customers



## ■ Europe

- ❑ EUSA (Germany)
- ❑ Heubach (Germany)
- ❑ Bayer (Germany)
- ❑ Linde (Germany)
- ❑ Transpek Silox (Belgium)

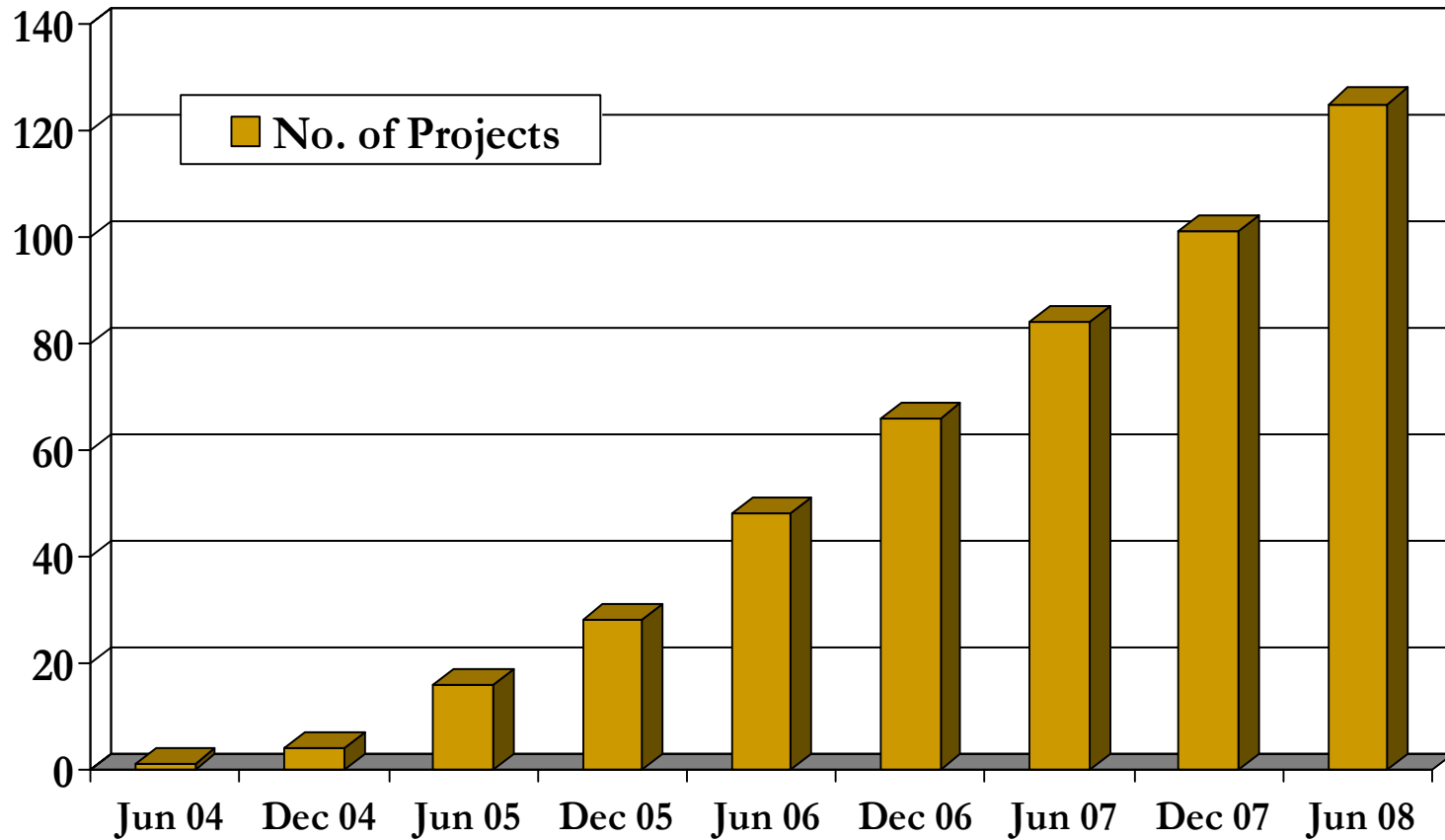
## ■ Middle -East

- ❑ KNPC
- ❑ Total (Yemen)

## ■ North America

- ❑ Stone & Webster (USA)
- ❑ Inox/ Air Products (USA)
- ❑ Lubrizol (USA)
- ❑ TEMA India (USA)
- ❑ Rhine Engineering (USA)
- ❑ Wink Inc (USA)
- ❑ Tartan Engr (Canada)
- ❑ Equinox Engr (Canada)
- ❑ Sunoco (USA)
- ❑ Navajo (USA)

# Project Growth



# Key Personnel Outline

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## Mr. A.C. Kothari, Technical Director

- M.S. Chemical Engineering, Texas Tech Univ., 1981
- 27 years experience in Process Engineering
- 8 years in Houston, with Halder Topsoe & John Brown

## Mr. Jay Kapadia, Executive Director

- M.S. Chemical Engineering, Univ of Houston, 1995
- 13 years in Process Engineering & Advanced Process Solutions
- 11 yrs in Houston, with Honeywell, Fluor & Invensys

## Mr. D.P. Joshi, General Manager

- B.E. Chemical Engineering, M.S. University, 1973
- 35 years experience in Design, Engineering & Project Execution
- About 10 yrs of overseas experience in Gulf

## Mr. Nitin Gole, General Manager

- M.E. Chemical Engineering, M.S. University, 1991
- 15 years experience in Process Engineering
- 3 yrs in Houston, GTC Technologies

## Mr. Bhupendra Devani, Deputy General Manager

- B.E. Chemical Engineering, M.S. University, 1991
- 16 years experience in Process Engineering, Project Mgmt

# Next Steps

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