

**VENKATESAN KUMAR**  
**PROCESS ENGINEERING CONSULTANT**

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## SUMMARY

A senior Process Engineering Consultant with 40+ years experience in the Downstream Oil & Gas Industry in Singapore & India. Currently developing innovative solutions in the field of Alternative Energy – LNG, Solar & Bio-fuels. Has specific exposure to energy conservation and energy efficiency improvement in Refineries & Petrochemical Plants. In order to support training and industrial activities, promoted A1 Process Associates (APA), a business entity registered in Singapore. Has in-depth knowledge of conducting FEED and techno-economic feasibility studies for refineries and petrochemical plants.



## QUALIFICATIONS

Bachelor of Chemical Engineering, UDCT, Bombay University 1973

## PROFESSIONAL

Member - Institution of Engineers Singapore (IES) 2008

Member - Sustainable Energy Association of Singapore (SEAS) 2008

Life Member – Indian Institute of Chemical Engineers 1992

## SKILLS SUMMARY

Total 40 years experience 20 years in Singapore and 20 years in India in process design and supervision as Process Manager/Lead Process Engineer with both Manufacturing and Engineering Organisations in the Downstream Oil and Gas Industry.

- Handled both Shell and ExxonMobil projects
- Experienced in Conceptual, FEED, BID, Basic, EPC detail engineering and Design of Refinery and Chemical Plant Facilities like Distillation, Licensed Units (FCC, MEROX), Blending units, Reactors, Heat Exchangers, Pumps, Compressors, Storage tanks, Utilities, End-of-Pipe Treatment Systems, Statutory Compliance Reporting, Operating Manuals, Commissioning and Technical Evaluation
- Process safety HAZID, HAZOP, SIL, PSSR
- Preparation of process design philosophy, spread sheets, generic data sheets and generic procedures
- Preparation and review of Process and Utility Design Philosophy, operation and control philosophy, Relief and blow down philosophy
- Preparation and review of Process Flow diagrams (PFDs), Safety Flow Diagrams (SFDs) and Piping Instrument diagrams (P&IDs), Equipments and Instruments Data sheets, spread sheets and equipment, Instrument and Line sizing calculations
- Review of Heat and Mass Balance HYSYS v7 Simulation, Surge Analysis and Fire water network (Using pipe net) reports
- Design and Review of Vendor Calculations and Documents of packages:-Well fluid heater, HP Separator, LP Separator, Produced Water Conditioning package, Nitrogen Generation System, Chemical dosing and Injection system, Pumps, Waste Heat Recovery Units, Shell and Tube Heat Exchangers, Compressors, Turbo generators, Instrument and Utility Air packages, Storage tanks, LP Ejector, Drilling systems, Fuel and Seal gas etc.
- Review of BID documents and Material selection
- Evaluation of Thermal design of Shell and tube Heat Exchangers
- Preparation and review of SAFE charts and Cause and Effects
- To assign set points for Instruments and safe control of facilities
- Technical Bid Evaluation, Material Selection and Client and Vendor coordination and Estimation of man-hours
- Assistance to Construction, Procurement, Mechanical completion, Pre-commissioning and commissioning activities
- Reviewing “As built drawings” and final handing over as per Customer’s Requirements

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## WORK EXPERIENCE

- a) Freelance Process Consultant – A1 Process Associates, Singapore – 2011-Present
- b) Lead Process Engineer – WorleyParsons Singapore, EPCM Contractor – 2006-2010
- c) HOD Process & Technical Advisor – Rotary Engineering Limited, Singapore – 1994 -2006
- d) Freelance Technical Consultant Mumbai, India – 1993-1994
- e) Alkyl Amines Chemicals Limited, Mumbai, India – 1988-1992
- f) Process Engineer – Davy Powergas India – 1978-1987
- g) Technical Engineer – HP (ESSO) Bombay Refinery – 1975-1978

## SOFTWARE HANDLED

- a) Process Simulation – HYSYS v7
- b) Surge Analysis – PIPENET
- c) Blowdown Studies – FLARENET
- d) Blowdown Drum Sizing – ESSO DP
- e) Safety Relief Valve Sizing - PSVSIZE

## DETAILS OF PROJECTS HANDLED

### REFINERY EXPERIENCE

- f) Process Expert – A1 Process Associates – 2011-Present
  - Expert review of 1-butene storage facilities for Wilmar-Elevance Bio-refinery, Gresik, Indonesia. Reviewed P&ID for 1-butene storage, prepared datasheets for marine loading arm, butene transfer pump, flare system, operation manual, commissioning guidelines and operator training.
  - FEED and detailed process engineering for Oiltanking Revamp of Phenol Tanks to NAO waxes storage. Prepared P&ID's for storage, pumping, jetty, truck loading, fire protection system. Operating philosophy, Control philosophy, Operation Manual, Commissioning Guidelines, Post-commissioning performance evaluation.
  - Hydraulic and Surge Study for Butadiene Line from Vopak to Lanxess. Developed spreadsheets for hydraulic and surge calculations using MS Excel.
  - Due diligence study for ExxonMobil Asphalt Jetty Fire Water System Surge Study. Developed spreadsheets for independent verification of surge pressures and mitigation based on ANSI B31.3 recommendations.
- g) Lead Process Engineer – WorleyParsons Singapore, EPCM Contractor – 2006-2010
  - Shell ECC Ethylene export facilities – FEED and Detailed Design. Supervised preparation of process documents like PFD, P&ID, process datasheets, instrument data sheets, operating and control philosophies, participated in HAZOP, SIL and PSSR. Commissioning and troubleshooting.
  - Shell ECC Raffinate Export Facilities – FEED and Detailed Design. Supervised preparation of process documents like PFD, P&ID, process datasheets, instrument data sheets, operating and control philosophies, participated in HAZOP, SIL and PSSR. Commissioning and troubleshooting.
  - ExxonMobil SPT Project – In Refinery Facilities FEED. Supervised preparation of FEED documents for storage and handling of 10 different refinery products including tank service changes, design of inline blending units, operation and control philosophies and FEED Report.
- h) Process Engineer – EXXON Baton Rouge Refinery – 1982
  - Refinery wide heat integration
  - Computer-aided heat exchanger design (Exxon proprietary software precursor to HTRI)
  - Heat Pipes and Heat Pumps

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- i) Technical Engineer – HP (ESSO) Bombay Refinery – 1975-1978
- Contact Engineer for CDU, Light Ends and LPG and Offsites. Daily contact with production units. Follow-up on yield and technical efficiencies, trouble-shooting etc.
  - Flare system debottlenecking including blowdown study. Evaluation of adequacy of existing flare and blowdown facilities for increased waste gas flows due to debottlenecking of upstream units. Exposed to flare tip sizing and H<sub>2</sub>S flaring.
  - Trouble-shooting and performance evaluation of licensed units like FCC and MEROX. Performance assessment, deviation from design, trouble shooting and liaison with Licensor for technical issues.
  - Commissioning and Performance Evaluation of Fuels Vacuum Pipestill Unit

### CHEMICAL PLANT EXPERIENCE

- j) Davy Powergas India – 1978-1987
- Techno-economic Feasibility Studies for Petrochemical Plants. Preliminary design, layout, equipment lists, enquiry data sheets, cost estimates, cost of production, fixed equipment cost, operating cost, project cost estimate, techno-economic feasibility report.
  - Feasibility study for Polybutenes Plant, Ethylene Amines Plant etc. Similar scope based on design docket given by Licensor.
  - Scale-up from R&D to Pilot Plant – Acetophenone Recovery from Phenol Plant Waste. Starting from R&D Report of lab-scale experiments scaled-up to pilot plant, tested and scaled-up further to commercial plant.
  - FEED and Detailed Design – LPG Storage, Bottling and Railcar/Truck Loading. Intensive in equipment packages and logistics facilities design.
  - FEED – Power generation from Carbon Black Plant waste gas using CO Boiler. FEED and Detailed design of waste gas collection, bag filter, boiler package and vent gas treatment.
- k) Alkyl Amines Chemicals Limited, India – 1988-1992
- Utilities Optimization in a Chemical Plant Product Recovery Train. Intensive exposure to performance optimization in chemical plant.
  - Debottlenecking of Multi-product Amines Plant to double capacity. Brownfield revamp experience.

### EQUIPMENT SIZING EXPERIENCE

- HRSG preliminary design for combined cycle power plant – 2016. Bid process design for heat recovery from existing gas turbine exhaust gas and retrofitting of existing steam turbine.
- Steam silencer design for Boiler PSV Vent Line – 2016. Detailed design of turbine exhaust steam silencer.
- Wet Scrubber Process Definition Proposal – 2016. Bid process definition of EO/PO vapour scrubber.
- Natural Draft heat exchanger design – 2016, Heat exchanger design for Offshore Platform
- MOPU – preliminary design of Well-head platform facilities for remote offshore platform. Analysis of well data, design of oil heaters, HP/LP Separators, Flare load calculation, Produced water treatment and disposal system etc.

### LNG STORAGE & REFRIGERATION EXPERIENCE

- Infrastructural Facilities Member SLNG Feasibility Study Tokyo Gas Team – 2005. Attended project development meetings, preliminary sizing, infrastructural cost estimation, site selection inputs.
- LNG Consultant to PetroChina LNG Regasification Terminals – 2007. Prepared PMC documents for proposed LNG Regasification Terminals, prepared presentations explaining various codes and standards for design of LNG storage tanks.
- Process Definition Studies – LNG based power generation plants. Bid process definition for proposed Regasified LNG based power plants in Emerging Economies.

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- EMA Smart Energy Challenge 2010 – Proposal for LNG Fuelling Station based on Onsite NG Liquefaction. Prepared and submitted proposal based on small-scale LNG liquefaction technology.

### **LNG STORAGE TRAINING EXPERIENCE (as Course Facilitator)**

- Two day course on Pressurised & Refrigerated Storage of Liquefied Gases – APA 2011
- One day course on Green Energy Technologies – IESA Jul 2010
- Presentation of Paper on Refrigeration Systems for Small LNG Plants – PSE Asia 2010 - NUS
- One day Natural Gas Course – IESA 2010
- LNG Storage & Regasification Terminals – Jun 2007 – PetroChina, Beijing

### **POWER PLANT AND ENERGY EFFICIENCY EXPERIENCE**

Belong to a unique generation which has seen the development of fired heaters from natural draft heaters (~70% efficiency) through Recuperative Furnaces (~82% efficiency) to CCPP's with HRSG (~92% efficiency)

- Developed efficiency models for Combined Cycle Power Plants based on Re-gasified LNG.
- Presented paper on “Simulation of Refrigeration Systems for Small LNG Plants”
- Presented a paper on “Thermal Efficiency Improvements in Fired Heaters and Furnaces”.
- Heat pipes and heat pumps (EXXON Baton Rouge Refinery USA)
- Crude preheat optimization studies
- CO boiler for FCCU off-gas and Carbon black plant off-gas
- Power plant and Refinery boiler performance appraisal
- Monitoring of BOP facilities like Water treatment, BFW pumps and Deareator performance
- Monitoring and Reporting of Quarterly Loss and Emissions to Pollution Control Board