**Personal Details**

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Email address: narasuga@gmail.com

Nationality: Australian

##### Education

* Bachelor of Engineering (1973)
* Post Grad Dip in Coaxial Communications (Telecom) (1975)
* Post Grad Dip in Business Management (1981)
* TUV Functional Safety Engineer (2012)
* IECEx – Competent Person 001/002/009/010 (2014)

##### Professional Affiliations

* Chartered Professional Engineer, Australia. **CP Eng**
* Chartered Engineer (UK) **CEng**
* Chartered Marine Engineer (UK) **CMarEng**
* Fellow of the Institute of Marine Engineering,
Science & Technology, UK **FIMarEST**
* Member of Institution of Engineers, Australia **MIE Aust**
* Member of Institution of Engineers India **MIE India**
* Distinguished Toast Master **DTM**
* Member of Energy Institute UK

**Career Summary**

**Jul 12 – Jan 2017 Bumi Armada BHD,** Kuala Lumpur, Malaysia.
Armada Claire (Australia), Olembendo (ENI Angola) & Kraken (UK) FPSO’s

**Jun 09 – Jun 12 Maersk FPSO’s, COMO,** Perth, Western Australia.

Najumi Yin (Vincent) FPSO

**Jun 00 – Apr-2009 Transfield-Worley Woodside Alliance,** Perth, Western Australia.

NRA/GWA/Karratha Gas plant

**Jan 99 – Jun 2000 Plant & Platform Consulting Engineers,** New Plymouth, NZ

STOS/FCET/DYNOCHEM/PETROCHEM

##### Jul 98 - Nov 1998 ADMA-OPCO/ TECHNIP GEO PRODUCTION, Abu Dhabi

Gas Lift Compressor Change out Project

##### Jan 97 - Jun 1998 OCCIDENTAL PETROLEUM OF QATAR LTD,

PS1 Gas Lift Compressor Change out Project

**Sept 89 - Jan 1997 Shell Todd Oil Services** New Plymouth, NZ

Global Worley Limited, Maui A, B, MPS & FPSO Projects

**Oct 1981 – Aug 1989 CGE ALSTHOM** (Div COMSIP, Abu Dhabi**.**

ADNOC/ZADCO(Gas Plant)/ GASCO(LNG/LPG)/TOTAL/ QGPC

(Offshore) /ARAMCO (Offshore platforms) /ADNOC-FOD (Tank Farm)

##### Sep 1978 - Jul 1981 VIJAY TANKS & VESSELS Pvt Ltd., India

SPIC (Liquid Ammonia) /SAIL( LPG)/ KMML (LOX, LNG)/ Hulule Airport (Jet Fuel) Projects

**Sep 1975 - Sept 1978 INDIAN POST AND TELEGRAPHS DEPT**, Chennai, Indi**a**

Coaxial communications & No break power plants.

**Professional Highlights in various Projects:**

* Developed the curriculum & course notes for Process Control for ECU, Perth.

Also delivered many lectures in the universities at Perth & NZ for Uni & Polytechnic students.

* Handpicked to run jobs that required technical & commercial expertise to fast track co-ordinated solutions with many interested parties including Commissioning & Start-up activities.
* Demonstrated multi discipline knowledge and inter-discipline co-ordination with specific emphasise on EEHA/ EPD, Process Control, Instrumentation, Communications, machinery controls and Instrumentation.
* Handled many brown field projects from FEED to Start-up, including HAZOP, HAZID, OPREP, CREST, Constructability & Commissioning Risk studies.
* Good communication skills to ensure close co-operation of all the sub-contractors and Operations.
* Full understanding of the inter-relationship of various process used in Topsides/shipping & utilities.
* Involved in all aspects of Instrument Engineering and also involved in Flawless Start up activities.
* As a toastmaster coached number of clubs in improving the day to-day running of the clubs.
* Conducted number of in house courses on competency & regulatory aspects and always involved in upbringing of young engineers.

##### Detailed Employment History:

**July 2012 – Jan 2017 Bumi Armada BHD, Kuala Lumpur,
Lead Technical Authority & Critical Packages Manager.**

**Responsibilities:**

Projects Handled:

* Armada Claire FPSO (Australia) Lead Tech Authority & TA EEHA
* Kraken FPSO (UK, North Sea) Lead TA & Competency Issues & TPEF . (Technical Person with Executive Functions)
* Olembendo FPSO (ENI 1506Angola) Critical Packages Manager

**General Responsibilities:**

* Served as Lead Technical Authority including for EEHA, for the ship conversion FPSO projects.

##### *Responsible for the code compliance issues including arranging of training for the construction electricians and EEHA dossiers.*

##### *Advisor to BAB management and Consultant to the Bumi staff for Electrical, Instrumentation and Telecom departments, & Process Engineering Dept for Process Safety and instrument system interfaces including all matters related to EEHA.*

* *Responsible for identifying EEHA (Electrical Equipment in Hazardous areas) issues for code compliance to IEC 60079 and resolutions, including staff training for updates, installation practices including differences between IEC & AS 60079 codes and expected installation practices when working under regulated atmosphere. CAD (Conformity Assessment Documentation) assessor selection and Scope of Work finalisation are completed.*

##### *Armada Claire FPSO Apache - Australia*

##### First FPSO to sail into Australian waters under NOPSEMA regime and first FPSO to be certified under IEC 60079 regulations. Electrical Equipment evaluated were Pre-ATEX to current standards with the guidance/support by IEC Ex directorate.

##### Completed EEHA (Electrical Equipment in Hazardous Areas) documentation for: Implementation Strategy and the project plan and implementations and along with a team of 20 people, compliance to IEC 60079. EEHA documentation approval was achieved under Lloyds verification scheme.

##### Established the Technical Authority (TA) frame work for BAB and responsible for the implementation including TA selection, conducting workshops to explain their roles and responsibilities under TA frame work. Currently working with the Engineers and ensuring that their professional affiliations are up to date.

##### SIL determination and SIL loop finalisation issues – arranged for TUV Functional safety training, evaluation of existing instrumentation (25 years old) for SIL compliance, Functional Safety Management (FSM) determination for compliance to IEC 61508 & 61511.

##### ICSS system design finalisation, including conducting a workshop to determine the gaps between FSM and current design. Various co-ordination activities for ICSS design finalisation including initial work for Alarm rationalisation.

##### Finalisation of DTM (Disconnectable Turret Mooring) E&I and Hydraulic interface scopes including determination of mechanical protections for green waves and EX & IP issues balancing.

##### Olembendo FPSO ENI Angola 1506 Field

##### FPSO installation completed along with EPD documentation under Non-European ATEX regulations by Bumi Armada under ABS regulations.

##### *Co-ordination of the Over all EEHA manual with ABS.*

##### As a critical packages manager, responsible for the speedy delivery of following projects that were running more than 3 months behind schedule along with all required EPD documentation for the ATEX (Non European norms) compliance.

##### SPX Chemical Injection tanks and Pump skids

##### Veolia Water purification skids (PWT & SRU)

##### Mann LP Compressors

##### *.* Kraken FPSO Enquest, UK, North Sea.

##### First FPSO to sail into UK waters under OSDR regime. EX Equipment evaluated were both Electrical and Non-electrical (Mechanical).

##### Completed the strategy note for EEHA competency requirements to meet UK HSE regulations and ensured that all the competency training were conducted for all project & engineering & construction personal to meet UK HSE and DSEAR regulations. Also managed the transitional requirements of ATEX 1995 to ATEX 2015.

##### As TPEF, developed concepts and signed off the EPD documentation under ATEX 2015 regulations, at the time of departure from Singapore Fabrication Yard (95% completed) under DNV UK .

##### Responsible for the PED documentation, from concept to commissioning. Reached 90% PED documentation requirements at the time of ship’s departure from Keppel Shipyard at Singapore.

##### Developed and tested software (Internet based) program for handling EEHA/EPD requirements. (Total Tags 11300)

##### Developed and completed Non Electrical ATEX register along with all test documentation to comply with ATEX standards (can be extended to IEC 80079)

**Apr 2009 – Jun 2012 Maersk FPSO’s, Como, Perth Operations Support Engineer E& I**

**Responsibilities:**

* + Last assignment: On secondment to Woodside to help the Facilities Engineering Team during the ownership transfer phase from Maersk to Woodside.

### Technical Authority for Electrical, Instrumentation and Communications on the Ngujima-Yin (Vincent) FPSO

* + - FPSO sailed into Australian Waters designed to NORSOK standards. Resolution of day to day operations problems, including EEHA code conflicts with AS regulations were handled.
		- Investigations team member/leader for various operational issues
		- Day to handling of Clients (Woodside), Regulators (Lloyds, DMA, NOPSA) and sub-contractors.
		- Projects handled includes – EEHA documentation completion (approx. 2000 tags were missing in the Ex register), ICSS performance improvements, Alarm Rationalisation, Process improvements, COIN Project (that enables sub-contractors to access their software through various Fire walls), Oil-in-Water analyser approval issues with regulators, refurbishment of cabling in the immersion zone of the dis-connectable turret, besides day to day operational issues & maintenance, Fault current issues etc.

##### Jun 2000 – Apr 2009 TRANSFIELD WORLEY Woodside Alliance, Perth

**Snr Project Engineer /Lead Inlec Engineer/ Snr Instr Engineer**

**Responsibilities:**

Employed as Senior Project Leader/ Senior Instrument Engineer / Lead Inlec Engineer for GWA/NRA & also Karratha Gas Plant modification projects.

* As discipline engineer, responsibilities include Estimation of man-hours, participation in the OPREP/ CREST analysis team, detailed engineering, construction work packs, defining commissioning strategies and ongoing support.
* As a Project Leader, responsible for the preparation of estimates in EPROCS modules, Preparation of various presentations for meetings and finalisation of conceptual designs and

select study reports, monitoring of expenditures and Project Change Requests, co-ordination

with HR, Procurement Dept and Cost engineers.

##### Projects handled as a Project Leader (Instrumentation & Electrical) on NRA platform:

* + - **6.6 KV HV Switch board upgrade project** –
			* $4 Million HV Switchboard Rejuvenation project, responsibilities included FEED, budgeting, shutdown management, Sub-Contractor management (SILCAR & Worley Parsons Melbourne) and co-ordination with WEL Operations & contractors. Received a special bonus for handling this project.

Interesting experience during this project is a production trip initiated during this project which required an HAZOP of the platform ESD system with input from Process, Instrumentation, and Electrical disciplines & Operations Engineers. Championed the investigations and solution development team and also conducted HSER studies with the installation sub-contractors.

* + - **Solar turbines Fuel Gas Conditioning project.**
			* $2 Million Fuel Gas valve changeover project, responsibilities included FEED, budgeting, shutdown management, Sub-Contractor management (SOLAR & Worley Parsons Melbourne & TW & WEL) and co-ordination with WEL Operations & contractors.

Interesting experience during this project is the resolution of vendor engineering defects. USA based vendors had wrong as-built drawings that lead to the failure of the hydraulic motor twice. HAZOP of the P&ID and development of a solution with the vendors to ensure the defects are identified and checked before modification works were implemented. Modifications were successfully commissioned and handed over. Also recommended Fuel Gas header pressure increase or relocation of PSLL closer to the units to cater for pressure drop on the header.

* + - **HVAC Instrumentation Upgrade project**
			* $3 Million HVAC controls improvement project, responsibilities included budget revisions, construction/commissioning management, Sub-Contractor management (DES, TW & WEL) and co-ordination with WEL Operations & contractors.

Interesting experience during this project is the extent of P&ID errors/rectifications and resolution of a failed actuator/ positioner on a damper after the field investigations.

* + - **Fuel gas Improvements project.**
			* $10 Million FG quality improvement project, responsibilities included FEED, budgeting, shutdown management, Procurement Management, Scheduling Sub- Contractor management (PALL Filters, Heatex UK, & Worley Parsons Melbourne, TW & WEL) and co-ordination with WEL Operations & contractors. Close out & remedial actions after project cancellation.

Interesting experience during this project is the development of a seven step (phase) cut-over strategy and development of phased P&ID’s for each phase. This strategy was developed to avoid the platform total shutdown and to enable change over of the consumers by creating two parallel FG headers

* + - **Glycol Recirculation pumps skid change out project.**
			* $8 Million skid changeover project, responsibilities included budgeting, shutdown management, Procurement Management, scheduling, and co-ordination with WEL Operations & contractors.

Interesting experience during this project was the operations lack of confidence on the glycol system operations without the stand-by pump and also the modifications that were required to Service Water system, Potable water system and Instrument Air systems due to pipe line rerouting issues

##### Projects handled as a Project Leader at Karratha Gas Plant:

* + - **DOMGAS HVAC Control system modifications**
			* $4 Million HVAC control systems changeover project, responsibilities included FEED, unit shutdown management, Procurement Management, scheduling, and co- ordination with WEL Operations & sub-contractors (DES, UTS Carrier, Hayden, I&E Systems, TW & WEL). Job completed from concept to commissioning within 10 months. Received a special bonus for handling this project since the job was executed at Perth, site simultaneously, and involved employing directly competing commercial contractors.

Interesting experience was the speed of response of the PLC system & the plant shutdown systems required that the original equipment vendors (UTS Carrier) have to be brought to the site to fine tune the system performance. In addition, the interacting systems Chilled water system, Instrument Air system, Chiller management system interface, and Central Control Room PCS (Process Control System) provided challenges during the commissioning.

* + - **Plant Lighting Upgrade – FEED only**
			* $32 Million Plant lighting upgrade project, responsibilities included engineering management, budgeting, scheduling, and co-ordination with WEL Operations.
		- **Plant Security Upgrade – FEED & Initial Develop**
			* $36 Million Plant Security upgrade project, (part of ASIO project) responsibilities included conceptual study finalisation, control strategy integration on to Plant network, budgeting, scheduling, and co-ordination with WEL Operations.
			* **This is an Australian national security & intelligence upgrade project.**
		- **Turbine Control Upgrade Project**
			* $120 Million Plant Turbine Control upgrade project, responsibilities included engineering management (I&E Systems, Transfield Worley & Nuevo Pignone Italy), budgeting & financial forecast developments, scheduling, site construction/shutdown management (approx 70 electricians) and co-ordination with WEL Operations. In charge of Compressor control modifications in LNG 2 (5 machines), DOMGAS ( 2 machines) and Power Generation GT (2 machines) areas.
			* Championed the constructability review, shutdown readiness review and commissioning risk review meetings.

Interesting experiences during the commissioning period was the sign off & acceptance of the number construction/ commissioning workpacks (approx 100 in three different phases), interfaces to the Fire & Gas system, hydraulic system and platform PSD system s and co-ordination with the shutdown team that was completing major maintenance activities simultaneously on these machines.

##### Major projects handled as Instrument engineer in GWA & NRA platforms

* + - **GWA Recovered Oil study**
			* Study of level gauging arrangements on portable tanks, tripping systems and platform modifications. (FEED to Construction)
		- **GWA PCS Console Upgrade Project**
			* Completed initial FEED study and over all budgeting studies till WEL PE took over this project. Project finished off within 15% of my initial feed study estimates.
		- **GWA Well Head Hydraulic System Modifications**
			* Hydraulic systems modifications (BRISCO Control Panels), study of hydraulic reservoir & dampener capacity & control methodology, Operating methodology study and resolved the tripping issues. (FEED to hand-over)
		- **GWA & NRA Instrument Air System revamp**
			* NRA – FEED to Detailed Engineering only, GWA FEED to handover
			* NRA: $7 Million project: Study of Instrument air consumption, calculations of the

predicted peak demands, procurement co-ordination with ATLAS Capco, bids

preparation & evaluations, change over sequencing & commissioning methodologies development.

* + - **NRA Deluge System Modifications**
			* $4 Million project Study of hydraulic balancing issues, design of control panels, procurement & selection of CHUBB valves with pressure control capabilities
		- **NRA Diesel system Modifications (FEED to handover)**
			* Resolution of Diesel system balancing issues and study of system performance &

improvements to the over all operating system under varying operating conditions.

# Jan 1999 – Jun 2000 Plant & Platform Consulting Engineers, New Plymouth, NZ

## Principal Instrumentation, Control & Electrical Engineer

Development of DELV system from FEED to Implementation for STOS, FCE, PETROCHEM.

# Jul 1998 - Nov 1998 TECHNIP GEO PRODUCTION, Abu Dhabi

## Senior Instrument Engineer (Systems)

ADMA-OPCO Gas Injection Project

Design finalisation and tender bid evaluations of the PSD (Process Shutdown) system, Interface to

the PCS system, control valves finalisation & preparation of commissioning manuals and operating manuals.

# Jan 1997 - Jun 1998 OCCIDENTAL PETROLEUM OF QATAR LTD

## Senior Project Engineer Commissioning (I&E)

PS1 Gas Compression Upgrade Project

Responsibilities:

* Preparation of construction and commissioning budgets & CCBLD.
* Commissioning co-ordination of the DCS system, Remote control room and Compressor control systems in the PS1 Oil/Gas gathering platform and Gas compression platforms.
* Co-ordination between detailed Engineering contractor and construction department and development of commissioning methodologies and sequencing.
* Maximisation of pre-shutdown activities and shutdown works sequencing.
* Preparation of pre-commissioning/commissioning manuals.
* Preparation of hand over packages and commissioning dossiers

# Jan 1989 - Jan 1997 SHELL TODD OIL SERVICES Ltd, New Plymouth

## Lead Instrumentation & Control Engineer

### Responsible for Maui A CCR Modifications project from FEED to

Commissioning & Start-up

FPSO Project from FEED (Engineering) to commissioning including the Maui over all field communications strategies development which included Maui A, Maui B & FPSO.

##### Maui Stage II Development Project

Responsible for the instrument modifications on Maui A Platform,

* + Participated in the HAZOP of the MPA brown field modifications, MPB platform green field designs & inter tripping circuits HAZOP designed to achieve 99.9% reliability & 99.5% availability.
	+ The follow on engineering activities at Maui Production Station modifications and commissioning of the brown field modifications.
	+ Conceptual architecture development for MPA DCS and linking of MPA-MPB-FPSO

offshore DCS to MPS on shore DCS to create a Maui field DCS. Responsible for the man- hours/ budget control and alliance contractor’s (Rosemount & BCL) contracts negotiations,

set-up & commercial approvals.

* + Pre-commissioning & Commissioning tests of the remote trip system

##### Maui A Modifications Project

* + Developed the remote control strategy of MPA platform from the onshore based plant at

MPS.

* + Development of platform modifications strategy & every single wire in the central control room was changed to new wiring system, with planned platform trip oppurtunities over a 2

year period.

* + Responsible for the Pre-Commissioning of Panels at Rosemount USA, Site Commissioning activities and start-up activities.
	+ Commissioning Engineer at MPA and completed the pre-commissioning, Commissioning and Start-up activities.

##### MPB Platform Modifications

* + - Conceptual studies for the MPB platform modifications and control room modifications to

accommodate the MPB oil facilities.

* + - Development & negotiation of alliance contracts with DCS vendor (Rosemount) and Telecom vendor (BCL), contract control and administration. Co-ordinator for the

compilation of the over all commissioning manual and the over all commissioning punch

list for MPB & Updating the MPA/MPB operating manuals for the Maui Oil Facilities.

##### Whakaaropai FPSO

* + - Preparation of the design concepts for the FPSO based PCS system and preparation of the FPSO topsides PSD & ESD system concepts.
		- FPSO topsides operating manuals preparation development and development of testing procedures

## Nov 1993 - Dec 1993 New Zealand Refining Company, Whangarei

**Senior Instrument Engineer -**

**Oct 1981 – Aug 1989 CGE ALSTHOM (Div COMSIP), Abu Dhabi**

***Senior Instrumentation Engineer / Project Engineer E&I***

**Jan 1987 – Aug 1989 QCPC – Offshore Operations, Qatar**

 **PS 3: Bul-hanine Gas Lift Project:**

Detailed Engineering/ Pre-commissioning/ Commissioning/Start-up **LEAD INSTRUMENTATION & CONTROL ENGINEER - Technip Geo Production** Development of functional logic using Shell DEPs, design of fail-safe shutdown systems and flow

metering system using PLCs. Development of control room revamping works, including

commissioning strategies to accommodate the new facilities. & HAZOP studies.

##### SITE MANAGER - CGEE Alsthom Division COMSIP

Onshore fabrication works to minimise onsite welding, preparation of pre-commissioning dossiers, continued offshore to manage construction activities and pre-commissioning activities.

##### COMMISSIONING & START-UP ENGINEER - QGPC

On secondment to QGPC, completed the full system checks of PLC and flow metering system, verification to SAFE charts for the Gas Lift System including the compressor, 14 well haeds, and follow on system modifications and Commissioning of the gas lift facilities.

##### SENIOR Controls ENGINEER (EPG-12) QGPC

Consequent to gas lift project, responsible for the following projects implementation: glycol system improvements, Telecom system modifications, approval of maintenance and operating manuals, additional well hook-ups.

### Sept 1984 - Dec 1986 TOTAL ABU AL BUKHOOSH, Abu Dhabi

#### E& I Project Leader- New Projects Division

* Upgrading of various control systems on production platform and revamping of control room. Preparation of project initiation notes, budgets, managing design developments, issue of detailed engineering and construction tenders and contracts administration.
* Pre-commissioning & commissioning of the modifications.

### Apr 1984 - Aug 1984 ARAMCO / NPCC

#### Project Engineer (E&I) – 8x6 Well- head platforms

Sep 1983 - Jan 1984 ZADCO, Abu Dhabi

*Site Engineer – Installation and commissioning of CCTV systems.*

Feb 1983 - Aug 1983 ADNOC RUWAIS UTILITIES, UAE

*Site Engineer - Mistubishi Turbines Installation and precommissioning.*

Jul 1982 - Jan 1983 GASCO, Ruwals, UAE

*Site Engineer,*

Liquid Propane and Butane Custody Transfer Facilities

* Management of the site construction team for the installation of the hazardous area huts, control panels, flow meters & Pre-commissioning/ Commissioning & Start-up of the first fully automated LPG ship loading/ metering facilities.

### Oct 1981 - Jun 1982 ADNOC-FOD, Al Ain Depot, UAE

*Site Manager* Multi Product Pipeline & Storage terminal.

##### Sep 1978 - Jul 1981 VIJAY TANKS & VESSELS Pvt Ltd., India

**Design/ Project Engineer**

Jun 1980 - Jul 1981 SOUTHERN PETRO CHEMICALS, India

*Project Engineer – 10000MT Liquid Ammonia Project*

Jun 1980 - Jun 1981 STEEL AUTHORITY OF INDIA

*Project Engineer (I&E)- LPG Handling & Storage Project*

Jan 1980 - Jun 1980 KERALA MINERALS AND METALS, Quilon, India

*Design Engineer,*

*Liquid Oxygen, Liquid Nitrogen, LPG storage storage & handling facilities*

Dec 1978 - Dec 1979 HULULE AIRPORT, Maldives Island

*Instrumenation & Control Engineer*

Jet Fuel storage & handling facilities

**Sep 1975 - Sept 1978 INDIAN POST AND TELEGRAPHS DEPT, Madras, India**

***Junior Engineer (Coaxial Equipment Division)***

Number of long distance Co-axial communication & No break

power plant commissioning Projects.

**Rajaraman Lakshmi Narayanan**