

Protection Engineering And Research Laboratories

Company Profile



Focus is the art of knowing what to ignore !



Engineered to Innovate

With a vision to become a global centre of excellence in the field of Power System Protection and Automation, we at PEARL are committed to our core beliefs and values viz., Innovation, Integrity, Quality, Commitment and Customer Relationship.

About Us

Protection Engineering And Research Laboratories provides expert technical solutions in the field of Power System, its Protection and Automation. At PEARL we have highly qualified people with decades of industrial and academic experience. We have expertise to offer in a wide range of activities including research, design, application, engineering and on-site troubleshooting.

Established in 2007, PEARL has been offering its services to major industries and utilities in Asia and Australia. We provide our services to conduct various power system studies including protection setting and coordination, load flow, short circuit, transient stability and motor starting studies. In addition to conducting power system and protection studies, we specialise in conducting post fault analysis to identify the root cause of power interruptions and provide solutions to avoid such incidents in future.

We have conducted training programs for participants from different parts of Asia and Australia. We have experience in training engineers from power generation, transmission and distribution utilities and also from different types of industries including steel, oil and gas, water, mining, cement and aluminium.

Providing power system and post fault analysis consultancy gives us exposure to power systems and practices across the globe and keeps us updated with the latest products and systems. This enriches the quality and effectiveness of our training courses.

At PEARL we firmly believe that regular infusion of fresh talent into the field is the key to the sustained growth of the power industry. We allocate considerable resources to create enthusiasm in young engineers and motivate them to choose a career in the field of power system protection and automation.

PEARL Consultancy

Consulting Services

We offer expert consulting services to industries, utilities, consultants and OEMs to support them at various stages of the project, including power system planning, design, execution and operation. The list of services offered includes conducting power system studies, designing protection systems, conducting audit of protection systems installed at existing power systems and analysing power system tripping incidents.

Power System Studies

Power system studies are conducted to analyse the performance of an electrical system during various normal and abnormal conditions that can occur in the system. The studies are also conducted to understand the impact to an existing system, when adding a new electrical system to it. These studies, conducted at various stages of the power project, have specific objectives.

A power system study done at the planning stage is used to finalise the electrical system layout and the optimum configuration. The power system studies done at the design stage are used to finalise the rating of various equipments to be used in the power system. Power system studies are also conducted at the implementation stage of the project to analyse the designed system with the actual data of the equipment installed in the power system. The output of these studies are used to calculate the protection equipment settings.

Sometimes power system studies are also conducted on an existing power system which has undergone expansion in various phases. This may be required to update the protection setting / operating practice to help in improving the operating efficiency of the system.

On completion of every study, we provide a comprehensive report with the results of the study. We also provide a detailed analysis of the results

and provide valuable suggestions for system design, installation, operation and maintenance.

The power system studies we can conduct includes,

- Power flow analysis
- Reactive power analysis and compensation requirement evaluation
- Power system contingency evaluation
- Short circuit analysis
- Transient stability analysis
- Motor starting analysis
- Motor re-acceleration analysis
- Harmonic analysis
- Insulation co-ordination
- Arc flash analysis for switchgear
- Load shedding scheme evaluation
- Protection device setting calculation and coordination
- Earthing system study

Protection System Design

Since power systems are very dynamic with varying system conditions and configurations, every system becomes unique with its own signature. We recognise that designing the protection system, taking into account this uniqueness, is vital for ensuring its effectiveness. With our rich, global experience, following the best engineering practices, we provide the most appropriate protection system solution, customised to the needs of the application.

At the end of the protection system design activity, we provide a report with detailed protection SLD with specification for the protection system elements including relays and instrument transformers. The report shall also include all necessary protection interlocks and operating philosophy required as input for protection scheme manufacturing, testing and commissioning.

PEARL Consultancy

Protection Audit

This service is specifically designed for power systems that are in-operation and which may have undergone expansion in stages. It is common for systems that expanded in stages to have protection schemes implemented from different OEMs at various parts of their network. We adopt a structured approach to verify the adequacy of the protection system for the prevailing electrical network and operating philosophy. We shall have dialogue with the system operation / maintenance staff to understand bottlenecks in their system and suggest solutions to overcome them.

As part of the audit report we shall present a comprehensive analysis of the protection system and evaluate its adequacy. All limitations in protection system design and implementation shall be identified and listed. Suggestions to overcome the identified limitations shall be provided.

For legacy systems, we offer consultancy services to provide the best refurbishment advice, restoring old scheme drawings and also coming up with innovative solutions to execute the refurbishment activities with minimal or no outage of the primary plant.

Our protection audit and refurbishment advice can help in ensuring that the protection system continues to be effective and efficient.

Power System Tripping Incident Analysis

Complexities of the power system with its own unlimited influencing factors, combined with the type and quality of operational practices can lead to situations of unwanted and unexplained operation of a protection system. Analysing every such incident by identifying the cause is vital in preventing such incidents from recurring. Such an analysis also provides valuable insights into various aspects of the primary and secondary systems, contributing to its improvement. Performing this analysis requires a very high level of power system and protection application knowledge, hands-on field experience, along with an analytical troubleshooting approach.

Our in-depth knowledge, vast experience and hands-on approach puts us at a very good advantage to perform on-site investigations into the unwanted operations of the protection system. We perform a thorough investigation into the incident, analysing the available post fault data to identify the cause of the incident. We also provide valuable inputs to improve the performance and to avoid repetition of such incidents.

Often, repeated nuisance operation of a protection system leads to it being kept out of service. This could be due to the unsuccessful earlier attempts to identify the causes and rectify them. The reasons could be many, such as failure of protection device, incorrect setting, wrong wiring and improper operating practice. With our experience we can investigate into such installations, identifying the cause and provide assistance in restoring the protection system and putting it back into service. This results in the customers getting complete returns for their investment.

PEARL Training Courses

" An investment in knowledge always
pays the best interest."

- Benjamin Franklin

Learning is a continuous process and it enables one to be competitive in their field. Successful organisations across the world give high priority to train their employees regularly.

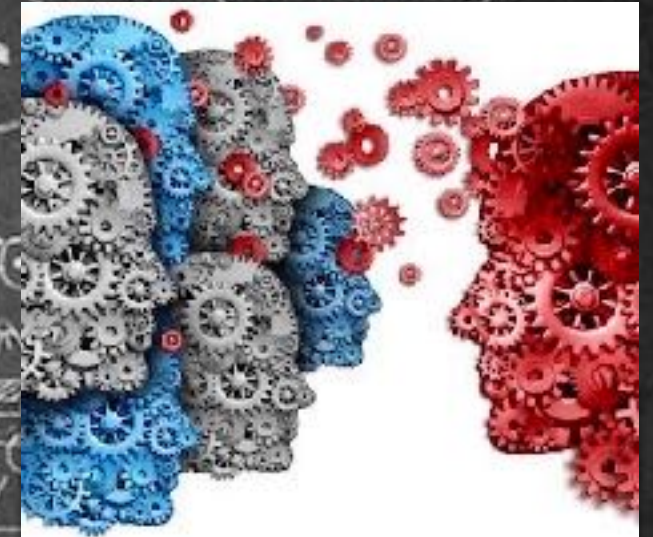
With technology changing continuously and power system growing in complexity and size, updating the knowledge of the power system operation, maintenance and design staff has become a necessity. In addition to increasing the quality and efficiency of the staff, it also increases the general job satisfaction level and helps in retaining employees.

Consistent with this belief and built on a strong experience in the field of Power System Protection and Automation, PEARL offers an extensive range of training modules for practicing professionals at different capacities, from fresh to experienced engineers. Our training modules cover the entire spectrum of power system protection, including generation, transmission, distribution and industrial systems. These courses are designed to suit professionals at different responsibilities

such as research, design, application, operation and maintenance, testing and commissioning, etc. We also create new modules to meet specific requirements of our customers.

We differentiate our training offerings with our highly skilled faculty and by being flexible and customising the modules to the needs of our trainees. Our courses package a wealth of fundamental knowledge, theoretical studies, several numerical examples and are enriched with real field case studies.

For a list of trainings offered by PEARL please contact us.



The training will be conducted by Dr. Pradeep and Dr. Tamiye, who together founded the Protection Engineering And Research Laboratories in 2007 and have been managing its operations since then. They personally involve in every technical service provided by PEARL.

Résumés of Technical Leads @ PEARL

Dr. G. Pradeep Kumar

A PhD from the University of Western Ontario, Canada, Pradeep has a wide range of industrial and academic experience in the field of power system protection and automation, spanning close to three decades.

Technical Skills

Work experience of over 30 years, has helped in developed an array of skills in application, research, development and training. His skill sets include,

- Providing expert technical advice and solution in power system protection design, application and engineering
- Protection device setting and co-ordination for Transmission, Generation and Industrial power systems
- Research and development of numerical protection relay algorithms
- Conducting training courses in subjects related to power system covering areas of design, application, operation and testing
- Scheme engineering
- Site investigation and trouble shooting

Work Experience

Pradeep started his career with GEC ALSTHOM as a management trainee in 1995. He then worked under various responsibilities including testing and commissioning engineer; application engineer; marketing engineer; service manager and application manager. In 2003 when he left GEC ALSTHOM (then AREVA) he was heading their marketing and application department and responsible for the geographical region of India & South Asia. In Canada, he worked as a research assistant in the Power Systems group of the University of Western Ontario. His research areas included numerical relay algorithms, effect of FACTS devices on relay performance, Relay communication protocols, etc.. He has published his work in leading journals and conferences. An international patent has been filed for his Ph.D work. He had designed and conducted on-line power system protection course for the post graduate degree offered by the University of Waterloo, Canada. He also has rich experience teaching students of undergraduate and graduate levels at the University of Western, Ontario. In January 2007, he returned to India and established the Protection Engineering And Research Laboratories, based at Chennai.

Educational Qualifications

Pradeep completed his Bachelor of Engineering degree in Electrical and Electronics engineering from the University of Madras in 1995. In 2003, he went to Canada to pursue higher studies and completed his

doctoral degree, specialising in power system protection, in November 2006, from the University of Western Ontario.

Publications and Patents

Journal and Conference Publications

- "Performance of Distance Relays on Shunt-FACTS Compensated Transmission Lines" IEEE Transactions on Power Delivery, Volume 20, Issue 3, July 2005 Page(s):1837 – 1845.
- "Current Transformer Dimensioning for Numerical Protection Relays" IEEE Transactions on Power Delivery, Volume 22, Issue 1, Jan 2007 Page(s):108 – 155.
- "Influence of CT Saturation on Line Current Differential Protection Algorithm" IET Transactions on Generation, Transmission & Distribution, Volume 1, Issue 2, March 2007 Page(s):270 – 277.
- "Control and automation of power system substation using IEC61850 communication" Proceedings of IEEE Conference on Control Applications, 2005. CCA-2005. Aug. 29-31, 2005 Page(s):1331 – 1336
- "Protection and communication issues in deregulated power systems" International conference on power system operation in deregulated regime, Bhanaras Hindu University, Varanasi, India, 6th & 7th March, 2006.
- "Current transformer dimensioning for line differential protection" International conference on power system protection, Central Power Research Institute, India, 20th & 21st February, 2007.
- "Influence of Shunt FACTS Devices on Distance Relays" 1st IndiaDoble Protection and Automation conference, 20-22 November, 2008, Chennai, India.

Patents

- A new numerical protection relay algorithm developed as part of his Ph.D thesis has been patented (Publication No. EP2012402 A3) under the title "Improvements In Or Relating To Current Differential Protection Relays".

Professional Memberships

- Member IEEE since 2004
- Member IET since 2004
- CIGRE member since 2007
- Life member CBIP Since 2020



Résumés of Technical Leads @ PEARL

Dr. M Tamije Selvy

A PhD from the University of Western Ontario, Canada, Tamije is the co-founder of Protection Engineering and Research Laboratories, Chennai. With a combination of power system and software knowledge, she has extensive experience in software modelling of relays, simulation of power systems, research and development of numerical protection relay algorithms and development of power system related software applications, spanning over two decades.

Technical Skills

The 26 years of academic and industrial experience has enabled her to acquire skills in multiple disciplines. Her skill sets include,,

- Protection system application
- Software modelling of relays
- Simulation of power systems
- Research and development of numerical protection relay algorithms
- Development of power system related software applications
- Post fault analysis

Work Experience

Tamije started her career in 1998, with DSQ software a Chennai based software company, as a software engineer, where she worked for two years. From 2000 to 2006, she worked as a research assistant in the Power systems groups of the University of Saskatchewan, Canada and the University of Western Ontario, Canada. As a researcher she worked on solving issues related to transmission line protection, reliability, software modelling of relays. She also worked on developing new methodology for wide-area network based simulation and testing of power system and protection. She also has a rich experience teaching undergraduate students at the University of Saskatchewan and the University of Western Ontario. In Canada, she also worked as a freelance software consultant and developed software applications for the Railway Association of Canada, software application for fault location for AREVA, T&D, UK. She returned to India in April 2007 and has assisted in establishing Protection Engineering and Research Laboratories.

Educational Qualifications

Tamije did her under-graduation in Electrical and Electronics engineering at the Pondicherry Engineering College, Pondicherry, India, graduating in 1998. Then she went to Canada to pursue post-graduate studies, in August 2000. She did her master's degree at the University of Saskatchewan where she specialised in the

area of Power System Protection. She did her doctoral degree at the University of Western Ontario, where she specialised in software modelling of relays and completed it in December 2006..

Journal and Conference Publications

- "A novel Approach to Determine Minimal Tie-Sets of Complex Networks" IEEE Transactions on Reliability, March 2004, Volume 53, No. 1, Pages 61-70. Conferences
- "A New Concept for Enhanced Simulation of Power Systems" Proceedings of the Int. Conference on Power System Transients, June 19-23, 2005, Montreal, Paper # 223.
- "Use of Relay Models for Protection Studies without Revealing their Design Details" Published in the proceedings of the 2004 International Conference on Advanced Power Automation and Protection, Oct 25-28, 2004, Jeju island, Korea. pp 63 - 68.
- "A Client-Server Paradigm for Protection Studies" Proceedings of the IEEE T&D Conference and Exposition, Dallas, USA, Sept. 7-10, 2003.
- "Advancements in Relay Modelling" Proceedings of the International Power Engineering Conference, Singapore, Nov./Dec. 2003.

Professional Memberships

- Member IEEE since 2004



Power System Study Jobs Executed by PEARL

| S. NO. | JOB DESCRIPTION | CUSTOMER | ORDER RECEIVED | STATUS | SOFTWARE |
|--------|---|---|----------------|-----------|--|
| 1 | On-site technical consultation at Indian Oil Corporation Guwahati Refinery, Assam | Indian Oil Corporation Limited, Guwahati Refinery, INDIA | January 2025 | Completed | None |
| 2 | Power System Study for Dumad Plant of Indian Oil Corporation Limited | Indian Oil Corporation Limited, Gujarat Refinery, INDIA | December 2024 | Ongoing | ETAP |
| 3 | Power System Study for India Oil Corporation, Haldia Refinery. | SNS Technocorp Pvt. Ltd., New Delhi | September 2024 | Ongoing | ETAP |
| 4 | Consulting services for electrical power system study at Guru Gobind Singh Refinery of HMEL, Bhatinda | HPCL-Mittal Energy Limited, Bathinda, Punjab, INDIA | July 2024 | Completed | ETAP |
| 5 | Protection Setting Study for CCP4 230kV GIS of Sembcogen at Banyan, Singapore | GE Grid Solutions Pte Ltd (GE Vernova), Singapore | June 2024 | Completed | None |
| 6 | On-site technical consultation at Indian Oil Corporation Guwahati Refinery, Assam | Indian Oil Corporation Limited, Guwahati Refinery, INDIA | April 2024 | Completed | None |
| 7 | Relay coordination study for the electrical system at Paste PVC Plant of Chemplast, Cuddalore | Chemaplast Sanmar Pvt. Ltd., Cuddalore, Tamil Nadu, INDIA | April 2024 | Completed | ETAP |
| 8 | On-site technical consultation at Indian Oil Corporation Guwahati Refinery, Assam | Indian Oil Corporation Limited, Guwahati Refinery, INDIA | October 2023 | Completed | None |
| 9 | Expert Consulting Service for developing Algorithm and Matlab code for enhancement of the Automatic Fault Analysis software (AFA2.0) and development of Web based COMTRADE reader for TNB Malaysia. | Comfort Alliance Sdn Bhd., Kuala Lumpur, Malaysia | August 2023 | Completed | Matlab, Python, Django, Javascript & React |
| 10 | Power system and protection studies for MRPL refinery and Aromatic Complex | Mangalore Refineries and Petrochemicals Limited, Mangalore, Karnataka | January 2023 | Completed | ETAP |
| 11 | Power system and protection study for CPP electrical system of Guru Gobind Singh Refinery of HMEL | HPCL-Mittal Energy Limited, Bathinda, Punjab, INDIA | December 2022 | Completed | ETAP |
| 12 | Power system and protection study for operating refinery electrical power system at IOCL Barauni refinery in parallel with 220kV grid | Indian Oil Corporation Limited, Barauni Refinery, Bihar, INDIA | December 2022 | Ongoing | ETAP |
| 13 | Expert Consulting Service for developing Algorithm and Matlab code for selected modules of the Automatic Fault Analysis software of TNB Malaysia. | Comfort Alliance Sdn Bhd., Kuala Lumpur, Malaysia | September 2022 | Completed | Matlab |
| 14 | Power system study for grid parallel operation feasibility for Indian Oil Corporation Bongaigaon Refinery | Indian Oil Corporation Limited, Bongaigaon Refinery, INDIA | June 2022 | Completed | ETAP |
| 15 | On-site technical consultation at Indian Oil Corporation Guwahati Refinery, Assam | Indian Oil Corporation Limited, Guwahati Refinery, INDIA | June 2022 | Completed | None |

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|--------|--|---|------------------|-----------|----------|
| 16 | Feasibility study for new induction motor and DG addition to the LAB electrical system of Tamil Nadu Petroproducts Limited, Chennai | Tamil Nadu Petroproducts Limited, Tamil Nadu, INDIA | May 2022 | Completed | ETAP |
| 17 | Overcurrent & Earth fault setting review for BS-VI HT system at Mangalore Refineries and Petrochemicals Limited | Mangalore Refineries and Petrochemicals Limited, Mangalore, Karnataka | March 2022 | Completed | ETAP |
| 18 | Generator Protection Setting Calculation for Black Point Power Station, Hong Kong | GE Grid Solutions Pte Ltd, Singapore | March 2022 | Completed | None |
| 19 | Protection Setting Study for 400/220kV Mariakani Substation, Kenya | GE Grid Solutions Pte Ltd, Singapore | March 2022 | Completed | None |
| 20 | Power System Study for Indian Oil Coporation, Guwahati Refinery for Grid parallel operation | Siemens Ltd, Kolkatta | January 2022 | Completed | ETAP |
| 21 | Power System Study for India Oil Corporation, Panipat Refinery & Naptha Cracker Plant | SNS Technocorp Pvt. Ltd., New Delhi | January 2022 | Completed | ETAP |
| 22 | Algorithm development for Power Quality Module of AFA for TNB Malaysia | Comfort Alliance Sdn Bhd., Kuala Lumpur, Malaysia | January 2022 | Completed | Matlab |
| 23 | Power System Study for the plant of TCI Sanmar Chemicals, Port Said, Egypt | TCI Sanmar Chemicals S.A.E, Egypt | March 2021 | Completed | ETAP |
| 24 | Protection study for the electrical system of Tamil Nadu Petroproducts Limited, Chennai | Tamil Nadu Petroproducts Limited, Tamil Nadu, INDIA | January 2021 | Completed | ETAP |
| 25 | Protection study for 220/132kV PAC ON substation of CEM Macau | GE Grid Solutions Limited, Hong Kong | January 2021 | Completed | None |
| 26 | Online consultancy to troubleshoot the reason for residual current observed in the generator incomers at OMPL, Mangalore and suggest solution to solve problem | ONGC Mangalore Petrochemicals Limited, Mangalore | December 2020 | Completed | None |
| 27 | Reactive Power Compensation study for power factor correction at the 6.6kV HDT and SDU S/S of IOCL Haldia Refinery | Indian Oil Corporation Limited, Digboi Refinery, INDIA | October 2020 | Completed | ETAP |
| 28 | Algorithm Development for Automatic Fault Analysis System for TNB Malaysia | Total Power Solutions, Sdn. Bad, Kuala Lumpur, Malaysia | June 2020 | Completed | Matlab |
| 29 | Protection Setting Study for REALISATION DE LA STN DE DESSALEMENT D'EAU DE MER DE ZARAT Project (De-salination plant) in Tunisia | VA TECH WABAG, India | March 2020 | Ongoing | ETAP |
| 30 | Protection setting review for the Captive Power Plant of India Cement at Sankarnagar, Tamil Nadu, INDIA | India Cement Limited | March 2020 | Completed | ETAP |
| 31 | Protection Setting Review for 33/11kV NDOOD JHAM Substation of Abu Dhabi Transmission Company | February 2020 | March 2020 | Completed | None |
| 32 | Power system study for IOCL Haldia refinery | Power system study of IOCL Haldia refinery | February 2020 | Completed | ETAP |
| 33 | Protection study for the 275, 33 & 11kV TATAU substation of Sarawak Energy Berhad, Malaysia | GE Power Services (Malaysia) Sdn Bhd | February 2020 | Completed | None |
| 34 | Onsite consultancy for analysing tripping incident at IOCL Digboi Refinery | Indian Oil Corporation Limited, Digboi Refinery, INDIA | July 2019 | Completed | None |
| 35 | Protection study for Al Dhafrah 400kV Switching Station of Abu Dhabi Transmission Compay | ABB, Dubai, UAE | June 2019 | Completed | None |
| 36 | Onsite consultancy for reliability improvement at Mangalore Refineries, Karnataka | Mangalore Refinery, Karnataka, INDIA | April & Dec 2019 | Completed | None |
| 37 | Protection setting review for the LT system of India Cement at Sankarnagar, Tamil Nadu, INDIA | India Cement Limited | January, 2019 | Completed | None |

Power System Study Jobs Executed by PEARL

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|--------|--|---|------------------|-----------|-----------|
| 38 | Protection relay setting review for Haldia Refinery of Indian Oil Corporation Limited, West Bengal, INDIA | M/s Jeevandeep Enterprise | November 2018 | Completed | ETAP |
| 39 | Protection study for the 275, 132 & 33kV SERUDIT substation of Sarawak Energy Berhad, Malaysia | GE Power Services (Malaysia) Sdn Bhd | September 2018 | Completed | None |
| 40 | Onsite consultancy for reliability improvement at Mangalore Refineries, Karnataka | Mangalore Refinery, Karnataka, INDIA | April & May 2018 | Completed | None |
| 41 | Power system and protection study for Gujarat Refinery of Indian Oil Corporation Limited, Vadodara, INDIA | Siemens Ltd., INDIA | March 2018 | Completed | ETAP |
| 42 | Protection setting review for the Cement plant of India Cement at Sankarnagar, Tamil Nadu, INDIA | India Cement Limited | January, 2018 | Completed | None |
| 43 | Protection setting review for Digboi Refinery, of Indian Oil Corporation, INDIA | Indian Oil Corporation Limited, Digboi Refinery, INDIA | January, 2018 | Completed | ETAP |
| 44 | Onsite consultancy for reliability improvement at Digboi Refinery, of Indian Oil Corporation, INDIA | Indian Oil Corporation Limited, Digboi Refinery, INDIA | December, 2017 | Completed | None |
| 45 | Power system study of IOCL Bongaigaon refinery for INDMAX project | L&T, Hydrocarbon Engineering Ltd | October, 2017 | Completed | ETAP |
| 46 | Protection study for Bismayah 400/132/11kV substation, IRAQ | ABB Germany | September, 2017 | Completed | None |
| 47 | Harmonic study for analyze the effect of installing capacitor bank at Chennai Petroleum Corporation Limited, INDIA | Adarsha Control & Automation, Chennai, INDIA | May, 2017 | Completed | ETAP |
| 48 | Onsite consultancy for reliability improvement at Digboi Refinery, of Indian Oil Corporation, INDIA | Indian Oil Corporation Limited, Digboi Refinery, INDIA | April, 2017 | Completed | None |
| 49 | Protection study and relay setting calculation for Tudan 132kV Substation Project of Sarawak Energy Berhad, Malaysia | Alstom Services Sdn Bhd., Kuala Lumpur, Malaysia | April, 2017 | Completed | None |
| 50 | Protection Study for the Waster-to-Energy Plant of National Environment Agency, Singapore | GE Grid Solutions Pte Ltd, Singapore | April, 2017 | Completed | None |
| 51 | Onsite consultancy for reliability improvement at Gujarat Refinery, of Indian Oil Corporation, INDIA | Indian Oil Corporation Limited, Gujarat Refinery, INDIA | January, 2017 | Completed | None |
| 52 | Power system study for reliability enhancement at Guwahati Refinery of Indian Oil Corporation Limited, Assam, INDIA | Indian Oil Corporation Limited, Guwahati Refinery, INDIA | January, 2017 | Completed | ETAP |
| 53 | Protection study for Bellara Algerian Qatari Steel Plant, Algeria | ABB Germany | November, 2016 | Completed | Digsilent |
| 54 | Protection System Review for 3 x 700 MW Manjung Power Plant of Tenaga Nasional Berhand, Malaysia | GE Grid Solutions Pte Ltd, Singapore | October, 2016 | Completed | None |
| 55 | Onsite consultancy for Retrofitting of Generator Protection System at Mangalore Refinery, Karnataka, INDIA | Mangalore Refinery and Petrochemicals Limited, Karnataka, INDIA | September, 2016 | Completed | None |
| 56 | Protection Setting Review for Melbourne Airport Terminal | ABB Pty, Australia | September, 2016 | Completed | None |
| 57 | Power System Study for 2 x 800 MW Jimah Power Plant, Malaysia | Total Power Solutions, Sdn. Bad, Kuala Lumpur, Malaysia | September, 2016 | Completed | ETAP |
| 58 | Onsite consultancy for reliability improvement at Haldia Refinery of Indian Oil Corporation Limited, INDIA | Indian Oil Corporation Limited, Haldia Refinery, INDIA | June, 2016 | Completed | None |

Power System Study Jobs Executed by PEARL

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|--------|---|---|-----------------|-----------|-----------|
| 59 | Onsite consultancy for reliability improvement at Mangalore Refinery, Karnataka, INDIA | Mangalore Refinery and Petrochemicals Limited, Karnataka, INDIA | April, 2016 | Completed | None |
| 60 | Protection study and relay setting calculation for Tudan 275kV Substation Project of Sarawak Energy Berhad, Malaysia | Alstom Services Sdn Bhd., Kuala Lumpur, Malaysia | March, 2016 | Completed | None |
| 61 | Power system studies to connect the new BPSTG at HPCL Mumbai Refinery | HPCL, Mumbai, INDIA | February 2016 | Completed | ETAP |
| 62 | Protection relay setting calculation for 66kV Bus bar protection of Waratah Place SS, Australia | ABB Pty, Australia | October 2015 | Completed | None |
| 63 | Protection relay setting review for 220kV Cape Lambert Substation of RTIO, Australia | ABB Pty, Australia | October 2015 | Completed | Digsilent |
| 64 | Insulation co-ordination study for KVMRT Project, Kuala Lumpur, Malaysia | Elenser Engineering India Private Limited | July 2015 | Completed | ATP |
| 65 | On-site consultancy for protection setting review for HPCL Mumbai refinery | HPCL, Mumbai, India, INDIA | January 2015 | Completed | ETAP |
| 66 | On-site consultancy for power system modification to allow parallel operation with the grid at Gujarat Refinery of Indian Oil Corporation Limited | IOCL Gujarat Refinery, Vadodara, INDIA | January 2015 | Completed | None |
| 67 | Power system and protection study for Rabab Harweel Integrated Project of Petroleum Development of Oman | Petrofac, Sharjah | October 2014 | Completed | Digsilent |
| 68 | Multiple power system studies to improve the reliability of the electrical power system at the Bongaigaon refinery of Indian Oil Corporation Limited. | IOCL, Bongaigaon Refinery, INDIA | September, 2014 | Completed | ETAP |
| 69 | Protection study update for Blackwell substation | ABB Pty, Australia | October, 2014 | Completed | None |
| 70 | Protection setting review for the electrical system of Chennai Petroleum Corporation Limited at Nagapattinam, Tamil Nadu, India | CPCL, Nagapattinam, Tamil Nadu, INDIA | June 2014 | Completed | ETAP |
| 71 | Protection setting review for the electrical power system at the Al-Jalamid plant of Ma'aden Phosphate Company, Kingdom of Saudi Arabia | Ma'aden Phosphate Company, Kingdom of Saudi Arabia | May 2014 | Completed | ETAP |
| 72 | Protection setting review for the 11kV generator switchboard, of K44 Water Pump & Treatment Plant at Rumaila Oil Field, Southern Iraq | Petrofac, Sharjah | April 2014 | Completed | ETAP |
| 73 | Protection study for the 275kV Lachau substation of Sarawak Energy Berhad, Malaysia | ALSTOM Services Bhd, Malaysia | Jan 2014 | Completed | None |
| 74 | Protection study for the upgraded protection system of the Existing circuits of Hope Downs Substation of Rio Tinto, Australia | ABB Pty, Australia | May, 2013 | Completed | Digsilent |
| 75 | Protection study for the 220kV Cape Lambert Substation of RTIO, Australia | ABB Pty, Australia | May, 2013 | Completed | Digsilent |
| 76 | Power system study for the electrical system at the PVC plant of Chemaplast Sanmar at Cuddalore, India | Chemaplast Sanmar Pvt. Ltd., Cuddalore, Tamil Nadu, INDIA | April, 2013 | Completed | ETAP |
| 77 | Power system protection and CT adequacy study for Dugald River Mine Project of MMG Dugald River, Australia | SMEC, Australia | February, 2013 | Completed | None |
| 78 | Power system study for reactive power compensation analysis for Chennai Petroleum Corporation Limited, Chennai | CPCL, Chennai, INDIA | December, 2012 | Completed | ETAP |

Power System Study Jobs Executed by PEARL

| S. NO. | JOB DESCRIPTION | CUSTOMER | ORDER RECEIVED | STATUS | SOFTWARE |
|--------|--|--|-----------------|-----------|-----------|
| 79 | Power system protection and CT adequacy study for Nowergup Traction Project of Public Transport Authority of Western Australia | ABB Pty, Australia | November, 2012 | Completed | Digsilent |
| 80 | Protection study for 230kV GIS Switchyard of Sembcogen at Banyan, Singapore | ALSTOM Grid, Pte., Singapore | October, 2012 | Completed | None |
| 81 | Power system study for YMPS substation of Rio Tinto, Australia | ABB Pty, Australia | September, 2012 | Completed | Digsilent |
| 82 | Power system study for West Angelas substation of Rio Tinto, Australia | ABB Pty, Australia | May, 2012 | Completed | Digsilent |
| 83 | Protection system study for the 2 x 35MW power plant of Kamachi Sponge and Power Limited, Chennai, India | Kamachi Sponge and Power Limited, Chennai, INDIA | March, 2012 | Completed | ETAP |
| 84 | Power system study for CA33SS switchboard at Cape Lambert substation of Rio Tinto, Australia | ABB Pty, Australia | January, 2012 | Completed | Digsilent |
| 85 | Protection system study and relay coordination for the DHDT project of Indian Oil Corporation Bongaigaon Refinery | IOCL, Bongaigaon Refinery, INDIA | December, 2011 | Completed | ETAP |
| 86 | Protection study for 230kV GIS Switchyard of Keppel Merlimau Cogen II, of Keppel Merlimau Cogen Pte Ltd., Singapore | ALSTOM Grid, Pte., Singapore | October, 2011 | Completed | None |
| 87 | Power system study for CLSS switchboard at Cape Lambert substation of Rio Tinto, Australia | ABB Pty, Australia | October, 2011 | Completed | Digsilent |
| 88 | Protection study for Patikari Power house, Himachal Pradesh, India | Energy Infratech Pvt. Ltd., INDIA | August, 2011 | Completed | None |
| 89 | Power system study for Hope Downs and Hope Downs 4 substations of Rio Tinto, Australia | ABB Pty, Australia | August, 2011 | Completed | Digsilent |
| 90 | Protection system study for Borouge substation of Abu Dhabi Polymers, Abu Dhabi, | ALSTOM Grid, Dubai | August, 2011 | Completed | ETAP |
| 91 | Protection system study for the power system at Tom Price substation of Rio Tinto, Australia | ABB Pty, Australia | May, 2011 | Completed | Digsilent |
| 92 | Feasibility study for implementing circuit breaker failure protection at IOCL Digboi refinery | Indian Oil Corporation Limited, Digboi Refinery, INDIA | April, 2011 | Completed | ETAP |
| 93 | Protection Study and relay setting calculation for EHV transmission grid of Delhi Transmission Company Limited | Central Power Research Institute, Bangalore, INDIA | August, 2010 | Completed | None |
| 94 | Protection Study and relay coordination for the plant of Chemaplast Sanmar Limited, Metur Dam | M N Dastur & Company, Chennai, INDIA | July, 2010 | Completed | ETAP |
| 95 | Protection system study and relay coordination for Indian Oil Corporation Bongaigaon Refinery | IOCL, Bongaigaon Refinery, INDIA | March, 2010 | Completed | ETAP |
| 96 | Protection system study and relay coordination for Indian Oil Corporation Guwahati Refinery | IOCL, Guwahati Refinery, INDIA | November, 2009 | Completed | ETAP |
| 97 | Power system protection setting calculation for 132 & 11kV, JHRC and INVR substations of Dubai Electricity And Water Authority | ETA, Dubai | October, 2009 | Completed | None |
| 98 | Power system study for India Cements plant at, Sankarnagar, Tamil Nadu | India Cements, INDIA | September, 2009 | Completed | None |
| 99 | Protection system study and relay coordination for Indian Oil Corporation Digboi Refinery | AREVA T&D, Chennai, INDIA | April, 2009 | Completed | ETAP |
| 100 | Protection system study and relay setting calculation for traction power supply system of South Eastern Pennsylvania Transportation Authority, Philadelphia, Pennsylvania, USA | AREVA T&D, France | February, 2009 | Completed | None |
| 101 | Protection study for 3.3kV switchboard of Quatar Petroleum at Mesaieed | Tadmur Contracting & Trading Est. | November, 2008 | Completed | None |

Power System Study Jobs Executed by PEARL

| S. NO. | JOB DESCRIPTION | CUSTOMER | ORDER RECEIVED | STATUS | SOFTWARE |
|--------|--|--|----------------|-----------|----------|
| 102 | Power System protection relay setting and co-ordination for Chattisgarh Steel and Power Limited, Champa, India | INEL Power systems (P) Ltd, INDIA | November, 2008 | Completed | None |
| 103 | Protection setting calculation for Raichur Thermal Power Plant system of Karnataka Power Corporation Ltd. | Central Power Research Institute, Bangalore, INDIA | August, 2007 | Completed | None |
| 104 | Protection setting calculation of 220 kV grid of Delhi TRANSCO Ltd | Central Power Research Institute, Bangalore, INDIA | March, 2007 | Completed | None |

Trainings Conducted by PEARL

| S. NO | TRAINING PROGRAM DETAILS | DATES | DURATION (DAYS) | CONTENT | NUMBER OF PARTICIPANTS |
|-------|--|--|-----------------|--|------------------------|
| 1 | Training for the engineers of India Oil Corporation Ltd | 24th to 27th February 2025 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 24 |
| 2 | Training conducted for engineers of the Distribution division of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 3rd to 6th December 2024 | 4 | Protection of Distribution Network installed with Distributed Energy Resources | 19 |
| 3 | Training conducted for engineers of the Distribution division of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 12th to 15th November 2024 | 4 | Protection of Distribution Network installed with Distributed Energy Resources | 20 |
| 4 | Training for the engineers of Tata Steel Jamshedpur at the Tata Steel plant in Jamshedpur, Jharkhand. | 10th to 12th September 2024 | 3 | Selected topics in INDUSTRIAL POWER SYSTEM PROTECTION | 26 |
| 5 | Training for the engineers of India Oil Corporation | 26th July 2024 | 1 | Protection system for grid parallel operation | 20 |
| 6 | Training for the engineers of Tata Steel Jamshedpur at the Tata Steel plant in Jamshedpur, Jharkhand. | 08th to 12th January 2024 | 5 | Power system protection for INDUSTRIAL POWER SYSTEM SYSTEMS | 27 |
| 7 | Training for the engineers of Tata Steel Jamshedpur at the Tata Steel plant in Jamshedpur, Jharkhand. | 25th to 29th September 2023 | 5 | Power system protection for INDUSTRIAL POWER SYSTEM SYSTEMS | 24 |
| 8 | Training conducted for engineers of Grid System Operation department of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 17th August 2023 | 1 | Overview of power system protection | 35 |
| 9 | Training for the engineers of Tata Steel Jamshedpur at the Tata Steel plant in Jamshedpur, Jharkhand. | 27th to 29th June 2023 | 3 | Selected topics in INDUSTRIAL POWER SYSTEM PROTECTION | 23 |
| 10 | Training for the engineers of About Power Corporation, Philippines at Visayan Electric Co., Cebu City, Philippines. | 22nd to 27th may 2023 | 6 | Advanced power system protection application | 33 |
| 11 | Online training conducted for the engineers of India Oil Corporation Limited | 28th February 2022 | 1 | Power System Protection Fundamentals – Over Current & Earth Fault Protection | 64 |
| 12 | Online training conducted for the engineers of India Oil Corporation Limited | 11th December 2020 | 1 | Over current and Earth Fault Protection Application and Co-ordination | 83 |
| 13 | Training conducted for the engineers of Indian Oil Corporation Limited, IMA, Haldia, WEST BENGAL, INDIA | 26th & 27th February 2020 | 1.5 | Selected topics in INDUSTRIAL POWER SYSTEM PROTECTION | 25 |
| 14 | Training conducted for the engineers of Indian Oil Corporation Limited, at Refinery Head Quarters, New Delhi, INDIA | 26th & 27th Nov, 2019 | 2 | Power system protection for INDUSTRIAL POWER SYSTEMS | 25 |
| 15 | Training conducted for the engineers of Indian Oil Corporation Limited, at Paradip Refinery, Orissa, INDIA | 21st to 24th October 2019 | 4 | Power system protection for INDUSTRIAL POWER SYSTEM SYSTEMS | 30 |
| 16 | Training conducted for the engineers of Indian Oil Corporation Limited, IMA, Haldia, WEST BENGAL, INDIA | 30th & 31st January, 1st February 2019 | 1.5 | Selected topics in INDUSTRIAL POWER SYSTEM PROTECTION | 23 |

Trainings Conducted by PEARL

| S. NO | TRAINING PROGRAM DETAILS | DATES | DURATION (DAYS) | CONTENT | NUMBER OF PARTICIPANTS |
|-------|--|--|-----------------|--|------------------------|
| 17 | Training conducted for engineers of the Distribution division of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 17th to 20th December, 2018 | 4 | Power system protection for POWER DISTRIBUTION SYSTEMS | 27 |
| 18 | Training conducted for engineers of Grid System Operation department of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 26th to 30th November 2018 | 5 | Power system protection - Intermediate level | 29 |
| 19 | Training conducted for engineers of Grid System Operation department of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 6th Aug, 29th Oct to 1st November 2018 | 5 | Power system protection - Fundamental level | 33 |
| 20 | OPEN course conducted at Mahindra World Club, Mahindra World City, INDIA | 24th to 28th September, 2018 | 5 | Power system protection for INDUSTRIAL POWER SYSTEM SYSTEMS | 7 |
| 21 | Training for the engineers of Mangalore Refinery and Petrochemicals at Mangalore, KARNATAKA, INDIA - Batch 2 | 05th to 07th February 2018 | 3 | Power system protection for INDUSTRIAL POWER SYSTEM SYSTEMS | 24 |
| 22 | Training for the engineers of Mangalore Refinery and Petrochemicals at Mangalore, KARNATAKA, INDIA - Batch 1 | 22nd to 24th January 2018 | 3 | Power system protection for INDUSTRIAL POWER SYSTEM SYSTEMS | 17 |
| 23 | Training for the engineers of GE Grid Solutions, at Jakarta, INDONESIA | 20th to 23rd November 2017 | 4 | Power system protection for POWER TRANSMISSION SYSTEMS | 23 |
| 24 | OPEN course conducted at Mahindra World Club, Mahindra World City, INDIA | 30th October to 03rd November, 2017 | 5 | Power system protection for INDUSTRIAL POWER SYSTEM SYSTEMS | 22 |
| 25 | Training conducted for engineers of the Transmission division of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 24th to 29th September, 2016 | 5 | Power system protection for POWER TRANSMISSION SYSTEMS | 30 |
| 26 | Training for the engineers of VECO, DLPC, CLPC, SEZC, MEZC & BEZC at the VECO Office in Cebu City, Philippines | 12th to 16th December, 2016 | 5 | Power system protection for POWER DISTRIBUTION SYSTEMS | 30 |
| 27 | Training for the engineers of Alstom Grid, Singapore at Alstom Grid office in Singapore | 23rd & 24th June 2016 | 2 | Power system protection for POWER TRANSMISSION SYSTEMS | 14 |
| 28 | Training conducted for the engineers of North Eastern Electric Power Company, at NEEPCO's Agartala Gas Turbine Power Plant, TRIPURA, INDIA | 28th to 30th December 2015 | 3 | Power system protection for POWER GENERATION SYSTEMS | 19 |
| 29 | Training conducted for the engineers of EDFC Project, Ethiopia, on behalf of ALSTOM Grid, Singapore at TOA Industries Corp. SEOUL, KOREA. | 5th to 9th October 2015 | 5 | Power system protection for POWER TRANSMISSION SYSTEMS | 8 |
| 30 | OPEN Course conducted on behalf of Total Power Solutions Malaysia, at Hotel Boulevard, KUALA LUMPUR | 13th & 14th August, 2015 | 2 | Current and Voltage Transformers for Protection and Metering Systems | 10 |
| 31 | Training conducted for engineers Transmission division of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 10th to 12th August, 2015 | 3 | Understanding PROTECTION & METERING SYSTEM SCHEMATIC DIAGRAMS | 16 |
| 32 | Training conducted for engineers of Sabah Electricity Sdn. Bhd., Malaysia on behalf of Total Power Solutions, Malaysia, at KOTA KINABALU MALAYSIA | 3rd to 7th August, 2015 | 5 | Power system protection for POWER GENERATION SYSTEMS & Understanding PROTECTION & METERING SYSTEM SCHEMATIC DIAGRAMS | 35 |

Trainings Conducted by PEARL

| S. NO | TRAINING PROGRAM DETAILS | DATES | DURATION (DAYS) | CONTENT | NUMBER OF PARTICIPANTS |
|-------|--|-----------------------------|-----------------|--|------------------------|
| 33 | Training conducted for engineers of Sarawak Energy Sdn. Bhd., Malaysia on behalf of Total Power Solutions, Malaysia, at KUCHING, MALAYSIA | 27th to 31st July 2015 | 5 | Power system protection for POWER TRANSMISSION SYSTEMS & Understanding PROTECTION & METERING SYSTEM SCHEMATIC DIAGRAMS | 25 |
| 34 | Training conducted for engineers of Sabah Electricity Sdn. Bhd., Malaysia on behalf of Total Power Solutions, Malaysia, at KOTA KINABALU MALAYSIA | 11th to 15th May 2015 | 5 | Power system protection for POWER TRANSMISSION SYSTEMS | 30 |
| 35 | Training conducted for engineers Transmission division of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 5th to 8th May 2015 | 4 | Understanding PROTECTION & METERING SYSTEM SCHEMATIC DIAGRAMS | 20 |
| 36 | OPEN course conducted at Hotel RADISSON BLU, CHENNAI, INDIA | 6th to 10th October, 2014 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 12 |
| 37 | Training conducted for the customers of ALSTOM, Australia on their behalf at BRISBANE, AUSTRALIA | 18th to 29th August, 2014 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 17 |
| 38 | Training conducted for engineers of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 4th to 8th August, 2014 | 5 | Power system protection for POWER DISTRIBUTION SYSTEMS | 29 |
| 39 | Training conducted for the engineers of Indian Oil Corporation Limited, at IIPM, GURGAON, INDIA | 14th to 17th July, 2014 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 25 |
| 40 | Training conducted for the engineers of National Grid Corporation of Philippines, on behalf of AREVA, Singapore at MANILA, PHILIPPINES. | 2nd to 6th June, 2014 | 5 | Power system protection for POWER TRANSMISSION SYSTEMS | 32 |
| 41 | Training conducted for the customers of ALSTOM, Singapore on their behalf at SINGAPORE | 10th to 14th March, 2014 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 14 |
| 42 | Training conducted for the engineers of Meghnaghat & Haripur Power Plants, Bangladesh, in BANGLADESH | 24th to 26th February, 2014 | 3 | Power system protection for POWER GENERATION SYSTEMS | 19 |
| 43 | Training conducted for engineers of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 17th to 21st February, 2014 | 5 | Power system protection for POWER GENERATION SYSTEMS | 17 |
| 44 | Training conducted for engineers of Sarawak Energy Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUCHING, MALAYSIA | 11th to 13th February, 2014 | 3 | Understanding PROTECTION & METERING SYSTEM SCHEMATIC DIAGRAMS | 20 |
| 45 | Training conducted for engineers of Tenaga Nasional Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUALA LUMPUR, MALAYSIA | 19th to 23rd August, 2013 | 5 | Power system protection for POWER GENERATION SYSTEMS | 25 |
| 46 | Training conducted for engineers of Sarawak Energy Berhad, Malaysia on behalf of Total Power Solutions, Malaysia, at KUCHING, MALAYSIA | 18th to 20th June, 2013 | 3 | Understanding PROTECTION & METERING SYSTEM SCHEMATIC DIAGRAMS | 20 |
| 47 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 12th to 14th June, 2013 | 3 | Power TRANSMISSION system protection for NON-PROTECTION ENGINEERS | 18 |

Trainings Conducted by PEARL

| S. NO | TRAINING PROGRAM DETAILS | DATES | DURATION (DAYS) | CONTENT | NUMBER OF PARTICIPANTS |
|-------|--|---|-----------------|--|------------------------|
| 48 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 10th & 11th June, 2013 | 2 | Understanding PROTECTION & METERING SYSTEM SCHEMATIC DIAGRAMS | 13 |
| 49 | Training conducted for the customers of ALSTOM, Australia on their behalf at MELBOURNE, AUSTRALIA | 20th May to 31st May, 2013 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 17 |
| 50 | Training conducted for the engineers of PTTEP, Thailand, on behalf of AREVA, Singapore at BANGKOK, THAILAND | 18th March to 22nd March | 5 | Power system protection for INDUSTRIAL POWER SYSTEMS | 24 |
| 51 | Training conducted for the engineers of Indian Oil Corporation Limited, at IOCL, Bongaigaon Refinery | 26th to 28th February, 2013 | 3 | Power system protection for INDUSTRIAL POWER SYSTEMS & SYSTEM MODELLING | 21 |
| 52 | Training conducted for the engineers of Indian Oil Corporation Limited, at IOCL, Noida | 7th to 10th January, 2013 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 22 |
| 53 | Training conducted for the engineers of Visayas Electric Company, Philippines, on behalf of ALSTOM Singapore at CEBU CITY, PHILIPPINES | 17th to 20th December, 2012 | 4 | Power system protection for POWER DISTRIBUTION SYSTEMS | 24 |
| 54 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 5th to 7th December, 2012 | 3 | Power GENERATION system protection for NON-PROTECTION ENGINEERS | 9 |
| 55 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 3rd to 5th December, 2012 | 3 | Power TRANSMISSION system protection for NON-PROTECTION ENGINEERS | 8 |
| 56 | Training conducted for the engineers of Ministry of Electricity and Water, Kuwait, on behalf of ALSTOM Middle-east at DUBAI, UAE | 11th to 22nd November, 2012 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 10 |
| 57 | Training conducted for the customers of ALSTOM, Singapore on their behalf at SINGAPORE | 8th to 19th October, 2012 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 10 |
| 58 | Training conducted for the engineers of Tenaga Nasional Berhad, Malaysia, on behalf of ALSTOM Singapore at KUALA LUMPUR, MALAYSIA | 4th to 8th June & 2nd July to 6th July 2012 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 40 |
| 59 | Training conducted for the engineers of Tenaga Nasional Berhad, Malaysia, on behalf of ALSTOM Singapore at KUALA LUMPUR, MALAYSIA | 18th to 29th June, 2012 | 10 | Power system protection for POWER DISTRIBUTION SYSTEMS | 29 |
| 60 | Training conducted for the engineers of Tenaga Nasional Berhad, Malaysia, on behalf of ALSTOM Singapore at KUALA LUMPUR, MALAYSIA | 14th to 18th May & 11th to 15th June, 2012 | 10 | Power system protection for POWER TRANSMISSION & SYSTEMS | 25 |
| 61 | Training conducted for the engineers of Tenaga Nasional Berhad, Malaysia, on behalf of ALSTOM Singapore at KUALA LUMPUR, MALAYSIA | 7th to 11th & 21st to 25th May, 2012 | 10 | Power system protection for POWER DISTRIBUTION SYSTEMS | 39 |
| 62 | Training conducted for the customers of ALSTOM, Australia on their behalf at MELBOURNE, AUSTRALIA | 30th April to 4th May, 2012 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 15 |
| 63 | Training conducted for the engineers of Indian Oil Corporation Limited, at IOCL, Gujarat Refinery | 9th to 12th January, 2012 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 29 |

Trainings Conducted by PEARL

| S. NO | TRAINING PROGRAM DETAILS | DATES | DURATION (DAYS) | CONTENT | NUMBER OF PARTICIPANTS |
|-------|---|---|-----------------|--|------------------------|
| 64 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 30th November to 2nd December, 2011 | 3 | Power TRANSMISSION system protection for NON-PROTECTION ENGINEERS | 8 |
| 65 | Training conducted for the customers of AREVA, Singapore on their behalf at SINGAPORE | 14th to 25th November, 2011 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 14 |
| 66 | Training conducted for the customers of AREVA, Middle-east on their behalf at DUBAI, UAE | 23rd to 27th October, 2011 | 5 | Power system protection for INDUSTRIAL POWER SYSTEMS | 5 |
| 67 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 18th to 21st July, 2011 | 3 | Power GENERATION system protection for NON-PROTECTION ENGINEERS | 5 |
| 68 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 13th to 15th July, 2011 | 3 | Power TRANSMISSION system protection for NON-PROTECTION ENGINEERS | 11 |
| 69 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 11th & 12th July, 2011 | 2 | Power DISTRIBUTION system protection for NON-PROTECTION ENGINEERS | 7 |
| 70 | Training conducted for the customers of AREVA, Singapore on their behalf at KUALA LUMPUR, MALAYSIA | 20th to 24th June, 2011 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 5 |
| 71 | Training conducted for the engineers of TENAGA NATIONAL BERHAD, Malaysia, on behalf of AREVA, Singapore at KUALA LUMPUR, MALAYSIA. | 13th to 17th June & 4th to 8th July, 2011 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 41 |
| 72 | Training conducted for the engineers of MEA, Bangkok Thailand, on behalf of AREVA, Singapore at THAILAND | 28th May to 6th June, 2011 | 8 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 31 |
| 73 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 21st to 23rd March, 2011 | 3 | Power GENERATION system protection for NON-PROTECTION ENGINEERS | 16 |
| 74 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 16th to 18th March, 2011 | 3 | Power TRANSMISSION system protection for NON-PROTECTION ENGINEERS | 11 |
| 75 | Training conducted for the customers of Total Power Solutions, Malaysia on their behalf at KUALA LUMPUR, MALAYSIA | 14th & 15th March 2011 | 2 | Power DISTRIBUTION system protection for NON-PROTECTION ENGINEERS | 7 |
| 76 | Training conducted for the engineers from AFPC, Syria, on behalf of AREVA, Middle-east in SYRIA | 9th to 16th February, 2011 | 8 | Power system protection for INDUSTRIAL POWER SYSTEMS | 24 |
| 77 | Training conducted for the engineers of Indian Oil Corporation Limited, at IOCL, Noida | 10th to 12th January, 2011 | 3 | Power system protection for INDUSTRIAL POWER SYSTEMS | 24 |
| 78 | Training conducted for the customers of AREVA, Singapore on their behalf at SINGAPORE | 6th to 17th December, 2010 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 9 |
| 79 | Training conducted for the engineers of National Grid Corporation of Philippines, on behalf of AREVA, Singapore at MANILA, PHILIPPINES. | 23rd November to 3rd December, 2010 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 24 |

Trainings Conducted by PEARL

| S. NO | TRAINING PROGRAM DETAILS | DATES | DURATION (DAYS) | CONTENT | NUMBER OF PARTICIPANTS |
|-------|---|-------------------------------------|-----------------|--|------------------------|
| 80 | Training conducted for the engineers of National Grid Corporation of Philippines, on behalf of AREVA, Singapore at MANILA, PHILIPPINES. | 15th to 19th November, 2010 | 5 | Power system protection for POWER TRANSMISSION SYSTEMS | 29 |
| 81 | Training conducted for the engineers of National Grid Corporation of Philippines, on behalf of AREVA, Singapore at MANILA, PHILIPPINES. | 8th to 12th November, 2010 | 5 | Power system protection for POWER TRANSMISSION SYSTEMS | 29 |
| 82 | Training conducted for the customers of AREVA, Singapore on their behalf at KUALA LUMPUR, MALAYSIA | 12th to 17th July, 2010 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 13 |
| 83 | Training conducted for the engineers of TENAGA NATIONAL BERHAD, Malaysia, on behalf of AREVA, Singapore at KUALA LUMPUR, MALAYSIA. | 5th to 9th & 22nd to 28th July 2010 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 42 |
| 84 | Training conducted for the engineers of PETROFAC, Mumbai at their office in MUMBAI, INDIA | 19th, 20th, 26th & 27th March 2010 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 28 |
| 85 | Training conducted for the customers of AREVA, Singapore on their behalf at JAKARTA, INDONESIA | 14th to 17th December, 2009 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 13 |
| 86 | Training conducted for the engineers of National Grid Corporation of Philippines, on behalf of AREVA, Singapore at MANILA, PHILIPPINES. | 9th November to 20th November, 2009 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 26 |
| 87 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 19th to 23rd October, 2009 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 11 |
| 88 | Training conducted for the engineers of National Grid Corporation of Philippines, on behalf of AREVA, Singapore at MANILA, PHILIPPINES. | 28th September to 9th October, 2009 | 10 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 25 |
| 89 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 24th to 28th August, 2009 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 14 |
| 90 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 22nd to 26th June, 2009 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 9 |
| 91 | Training conducted for the engineers of Indian Oil Corporation Limited, at IOCL, HALDIA, WEST BENGAL, INDIA | 25th to 29th May, 2009 | 5 | Power system protection for INDUSTRIAL POWER SYSTEMS | 20 |
| 92 | Training conducted for the customers of AREVA, Singapore on their behalf at SINGAPORE | 18th to 22nd May, 2009 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 10 |
| 93 | Training conducted for the engineers of PTTEP, Thailand, on behalf of AREVA, Singapore at BANGKOK, THAILAND | 23rd to 27th March 2009 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 24 |
| 94 | Training conducted for the engineers from PETROFAC, Sharjah, on behalf of AREVA, Middle-east at Sharjah, UAE | 21st to 24th February, 2009 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 15 |
| 95 | Training conducted for the engineers of AREVA Automation group at AREVA's Pallavaram Factory, Chennai, INDIA | 2nd to 7th February, 2009 | 6 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 21 |

Trainings Conducted by PEARL

| S. NO | TRAINING PROGRAM DETAILS | DATES | DURATION (DAYS) | CONTENT | NUMBER OF PARTICIPANTS |
|-------|--|------------------------------|-----------------|--|------------------------|
| 96 | Training conducted for the engineers of Meghnaghat & Haripur Power Plants, Bangladesh, in BANGLADESH | 13th January, 2009 | 1 | Operation of POWER GENERATORS and TRANSFORMERS | 14 |
| 97 | Training conducted for the engineers of Meghnaghat & Haripur Power Plants, Bangladesh, in BANGLADESH | 12th January, 2009 | 1 | Operation of POWER GENERATORS and TRANSFORMERS | 15 |
| 98 | Training conducted for the engineers from GASCO, AbuDhabi, on behalf of AREVA, Middle-east in DUBAI, UAE | 21st to 24th December, 2008 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 4 |
| 99 | Training conducted for the engineers from GASCO, AbuDhabi, on behalf of AREVA, Middle-east in DUBAI, UAE | 15th to 18th December, 2008 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 3 |
| 100 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 1st to 5th December, 2008 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 13 |
| 101 | Training conducted for the customers of AREVA, Singapore on their behalf at SINGAPORE | 24th to 28th November, 2008 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 14 |
| 102 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 6th to 10th October, 2008 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 5 |
| 103 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 15th to 19th September, 2008 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 11 |
| 104 | Training conducted for the engineers of Indian Oil Corporation Ltd, on behalf of AREVA, INDIA at Kolkatta | 8th to 10th September, 2008 | 3 | Power system protection for INDUSTRIAL POWER SYSTEMS | 21 |
| 105 | Training conducted for the customers of AREVA, Singapore on their behalf at SINGAPORE | 25th to 29th August, 2008 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 18 |
| 106 | Training conducted for the engineers of Meghnaghat & Haripur Power Plants, Bangladesh, on behalf of AREVA, Singapore at BANGLADESH | 18th to 20th August, 2008 | 3 | Power system protection for POWER GENERATION SYSTEMS | 20 |
| 107 | Training conducted for the customers of AREVA, Middle-east on their behalf at DUBAI, UAE | 10th to 13th August, 2008 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 11 |
| 108 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 16th to 20th June, 2008 | 5 | Power system protection for INDUSTRIAL POWER SYSTEMS | 11 |
| 109 | Training conducted for the customers of AREVA, Singapore on their behalf at SINGAPORE | 2nd to 6th June, 2008 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 22 |
| 110 | Training conducted for the engineers of Indian Oil Corporation Ltd, on behalf of AREVA, INDIA at IOCL, Noida | 28th to 30th May, 2008 | 3 | Power system protection for INDUSTRIAL POWER SYSTEMS | 18 |
| 111 | Training conducted for the customers of AREVA, Middle-east on their behalf at DUBAI, UAE | 12th to 14th May, 2008 | 3 | Power system protection for INDUSTRIAL POWER SYSTEMS | 7 |

Trainings Conducted by PEARL

| S. NO | TRAINING PROGRAM DETAILS | DATES | DURATION (DAYS) | CONTENT | NUMBER OF PARTICIPANTS |
|-------|---|------------------------------|-----------------|---|------------------------|
| 112 | Training conducted for the engineers of TNB, Distribution, Malaysia, on behalf of AREVA, Singapore at KUALA LUMPUR, MALAYSIA | 5th to 9th May, 2008 | 5 | Power system protection for POWER DISTRIBUTION SYSTEMS | 22 |
| 113 | Training conducted for the engineers of MEA, Bangkok Thailand, on behalf of AREVA, Singapore at THAILAND | 24th April to 2nd May 2008 | 8 | Power system protection for POWER GENERATION, TRANSMISSION & DISTRIBUTION SYSTEMS | 28 |
| 114 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 13th to 15th March, 2008 | 3 | Power system protection for INDUSTRIAL POWER SYSTEMS | 17 |
| 115 | Training conducted for the engineers of National Thermal Power Corporation, on behalf of AREVA, INDIA at NTPC, Noida | 25th to 28th February, 2008 | 4 | Power system protection for POWER GENERATION, TRANSMISSION & DISTRIBUTION SYSTEMS | 41 |
| 116 | Training conducted for the engineers of Rourkela Steel Plant, Rourkela, on behalf of AREVA, INDIA at RSP, Rourkela | 18th to 21st February, 2008 | 4 | Power system protection for INDUSTRIAL POWER SYSTEMS | 30 |
| 117 | Training conducted for the engineers of Tata Iron and Steel Company, Jamshedpur, on behalf of AREVA, INDIA at TSICO JAMSHEDPUR | 14th to 16th February, 2008 | 3 | Power system protection for INDUSTRIAL POWER SYSTEMS | 21 |
| 118 | Training conducted for the engineers of Tata Iron and Steel Company, Jamshedpur, on behalf of AREVA, INDIA at TSICO JAMSHEDPUR | 11th to 13th February, 2008 | 3 | Power system protection for INDUSTRIAL POWER SYSTEMS | 16 |
| 119 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 5th & 6th December, 2007 | 2 | Power system protection for POWER TRANSMISSION SYSTEMS | 18 |
| 120 | Training conducted for the engineers from Ministry of Electricity, IRAQ, on behalf of AREVA, Middle-east in AMMAN, JORDAN | 18th to 21st November, 2007 | 4 | Power system protection for POWER TRANSMISSION SYSTEMS | 10 |
| 121 | Training conducted for the engineers from Ministry of Electricity, IRAQ, on behalf of AREVA, Middle-east in AMMAN, JORDAN | 14th to 17th November, 2007 | 4 | Power system protection for POWER GENERATION SYSTEMS | 12 |
| 122 | Training conducted for the engineers from Ministry of Electricity, IRAQ, on behalf of AREVA, Middle-east in AMMAN, JORDAN | 11th to 13th November, 2007 | 3 | Power system protection for POWER TRANSMISSION SYSTEMS | 12 |
| 123 | Training conducted for the engineers from Ministry of Electricity, IRAQ, on behalf of AREVA, Middle-east in AMMAN, JORDAN | 10th November, 2007 | 1 | Power system protection for POWER DISTRIBUTION SYSTEMS | 10 |
| 124 | Training conducted for the customers of AREVA, Middle-east on their behalf at DUBAI, UAE | 22nd to 24th October, 2007 | 3 | Power system protection for POWER TRANSMISSION SYSTEMS | 15 |
| 125 | Training conducted for the engineers of Power Grid Corporation of India on behalf of AREVA, INDIA at HVDC Substation at Pusauli | 8th to 12th October, 2007 | 5 | Power system protection for POWER TRANSMISSION SYSTEMS | 13 |
| 126 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 18th to 21st September, 2007 | 4 | Power system protection for POWER GENERATION & TRANSMISSION SYSTEMS | 13 |
| 127 | Training conducted for the customers of AREVA, Singapore on their behalf at SINGAPORE | 6th to 10th August, 2007 | 5 | Power system protection for POWER GENERATION TRANSMISSION & DISTRIBUTION SYSTEMS | 20 |

Trainings Conducted by PEARL

| S. NO | TRAINING PROGRAM DETAILS | DATES | DURATION (DAYS) | CONTENT | NUMBER OF PARTICIPANTS |
|-------|---|---|-----------------|--|------------------------|
| 128 | Training conducted for the customers of AREVA, Middle-east on their behalf at DUBAI, UAE | 2nd to 4th July, 2007 | 3 | Power system protection for POWER TRANSMISSION SYSTEMS | 15 |
| 129 | Training conducted for the customers of AREVA, Middle-east on their behalf at DUBAI, UAE | 14th to 16th May, 2007 | 3 | Power system protection for POWER TRANSMISSION SYSTEMS | 21 |
| 130 | Training conducted for the customers of AREVA, INDIA on their behalf at Pallavaram Factory of AREVA | 10th, 12th & 13th April 2007 | 3 | Power system protection for INDUSTRIAL POWER SYSTEMS | 10 |
| 131 | Training conducted at L&T ECC, Chennai for their engineers | 9th March, 17th March & 11th April 2007 | 3 | Power system protection for POWER TRANSMISSION SYSTEMS | 7 |
| TOTAL | | | 599 | | 2632 |



For enquiries please contact us at,

Protection Engineering And Research Laboratories

No 77, First Floor, Bharathiyar street, Veerapuram, Mahindra World City,
Chengalpet - 603004, Tamil Nadu, INDIA

E-mail: pearl@pearlabs.com

www.pearlabs.com