



iEngineering

idea + intelligence + integration



iEngineering Power System Studies Design and Consulting

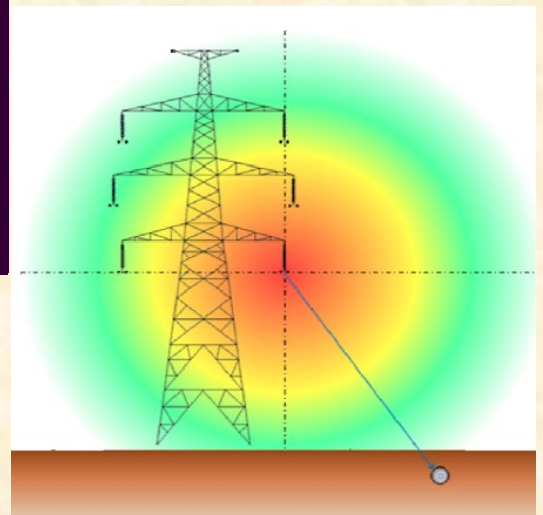
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iEngineering Design & Consultancy

Overview

In today's competitive and fast paced environment, utilities and industries constantly pursue ways of optimizing Power system and Process performance and capabilities, simultaneously ensuring safety and reliability of the system. iEngineering Australia is well-versed in performing design works and consulting studies to optimize power system performance and investigate system events.

iEngineering Australia is also accredited with the NSW Department of Planning and Environment and authorized with different Utilities as an Accredited Service Provider (ASP) for Level 3 Design.

Power System Analysis and Network Studies

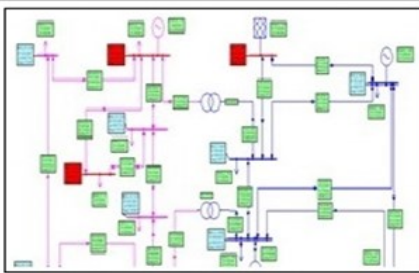
iEngineering Australia has quality engineering professionals and is able to satisfy the requirements of comprehensive power system analysis and network studies using following list of software.

- NEPLAN*
- Substation Design Suite (SDS)*
- XGSLab*
- ETAP
- Power Factory
- PSS/E
- PSCAD
- HOMER PRO
- EMTP
- ElecDes

Note: * iEngineering is an authorized distributor for the software.

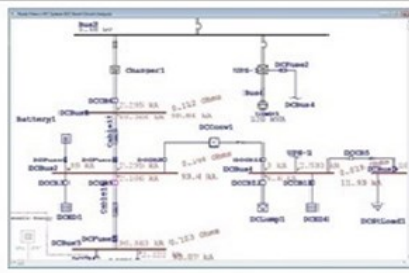
The following studies are carried out for Renewables, Power Plants, Oil and Gas, Process Industries etc. with the help of powerful software tools and experienced engineering expertise.

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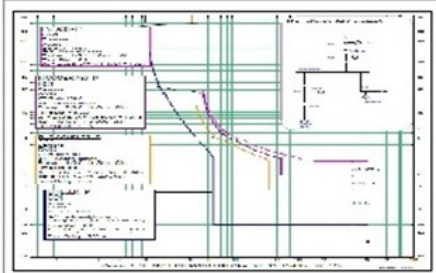
LOAD FLOW ANALYSIS

Power Factor Correction, Equipment Loading, Voltage Profile, Reactive power compensation



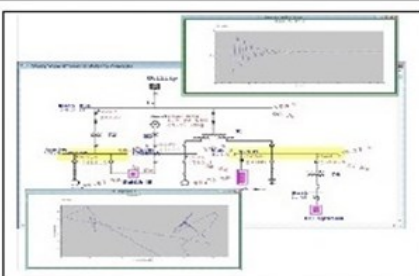
SHORT CIRCUIT STUDIES

IEC 60909, ANSI, GOST Standards, Equipment Short Time Ratings



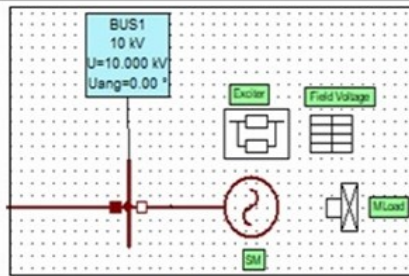
RELAY SETTING AND COORDINATION STUDIES

IEEE 242. Over-current and Earth fault Coordination, Unit Protection



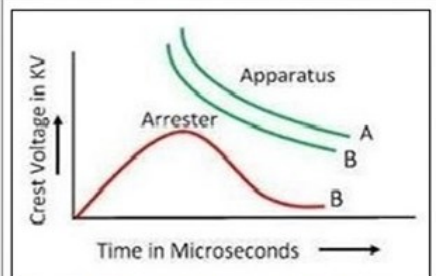
TRANSIENT STABILITY ANALYSIS

Angular Stability, Critical Clearing Time, Voltage Stability



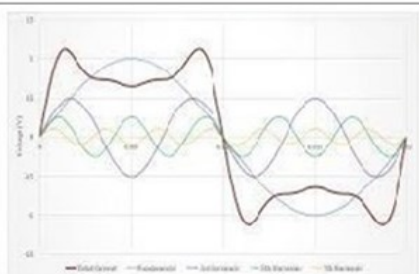
MOTOR ACCELERATION STUDIES

Static Motor Starting, Dynamic Motor Starting studies



INSULATION COORDINATION

Switching Over voltages, Lightning Overvoltages, Ferro Resonance



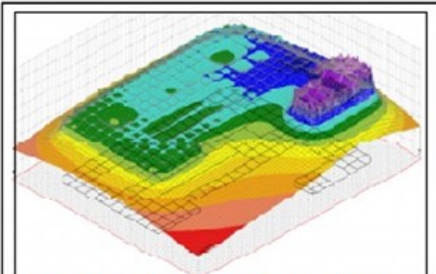
HARMONIC ANALYSIS

IEEE 519, VTHD, ITHD, Power Quality



ARC FLASH STUDIES

IEEE 1584, Incident Energy, Arc Flash Boundary, Label Generation



EARTHING, EMFI AND LIGHTNING STUDIES

IEC 60479, IEC 62305, IEEE-80, IEEE-81, EG-0,1 Step and Touch Potential, Earthing and Bonding Studies, EMC Control Plan, Induced EMF and Lightning Rolling sphere Method



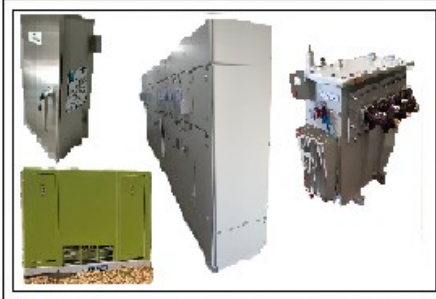
DETAIL ENGINEERING

Cable Tray and Trench Layout, Single Line Diagram, Cable and Equipment Sizing, Substation 3D Modelling



TECHNICAL AND SAFETY AUDITS

IEC 61000, IEEE 519, IEEE 1159, IEEE 1250, IEEE 1453, IEEE 80 Electromagnetic Compatibility, Power Quality, Earthing and Safety Audits

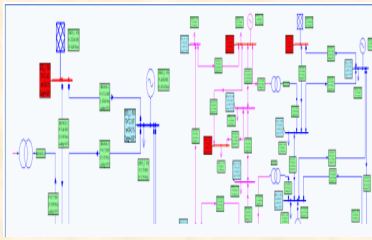


PANEL, EQUIPMENT AND HARDWARE SUPPLY

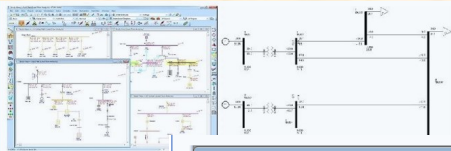
Electrical Panels, Transformers, Compact Substations, Harmonic Filter Circuit Breakers, PLC Panels.,

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Load Flow Studies



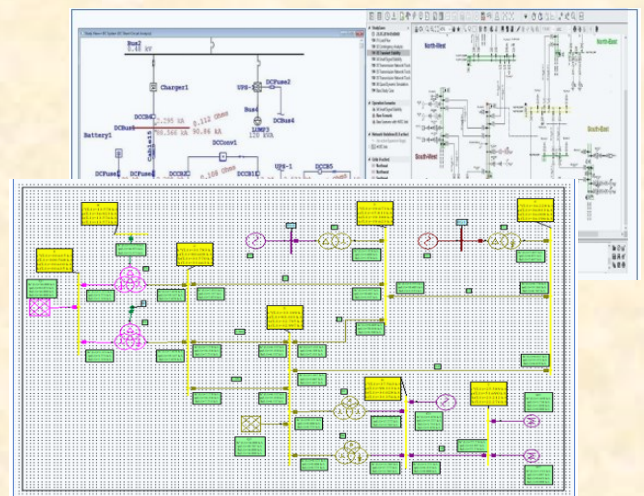
- Equipment Loading
- Voltage Profile
- Reactive power compensation
- Voltage Control
- Power Factor Correction
- Contingency Analysis



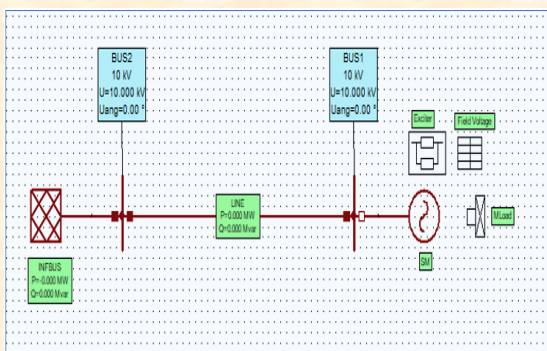
ID	Name	U	u	U ang	P Load	Q Load	P Gen	Q Gen	Q Shunt
		kV	%	°	MW	MVar	MW	MVar	MVar
1	409 BUS_1_69	73.14	100	0	0	14.86	232.587	0	0
2	410 BUS_19_13	14.226	100.00	-10	0	0.0	0	0	0
3	412 BUS_11_13	14.444	100.00	-14.9	5.5	1.9	0	0	0
4	414 BUS_12_13	14.536	100.33	-15.3	6.1	1.6	0	0	0
5	413 BUS_13_13	14.446	100.00	-15.3	0.5	0.8	0	0	0
6	410 BUS_14_13	14.076	100	-16.1	14.9	5	0	0	0
7	407 BUS_2_69	72.105	104.5	-5	21.7	12.7	45	48.157	0
8	408 BUS_3_69	69.89	101	-12.9	14.2	19	0	27.378	0
9	411 BUS_4_69	69.803	101.16	-10.2	47.6	4	0	0	0
10	410 BUS_5_69	70.59	101.58	-8.7	7.6	1.6	0	0	0
11	412 BUS_6_13	14.766	100	-14.4	11.2	7.5	0	22.979	0
12	419 BUS_7_13	14.46	104.79	-13.2	0	0	0	0	0
13	420 BUS_8_13	18.501	100.07	-12.2	0	0	0	24	0
14	417 BUS_9_13	14.238	100.17	-14.8	26.5	16.6	0	0	0

Short Circuit Studies

- Equipment short circuit rating
- Circuit breaker selection
- Insulation withstanding capability
- Relay setting calculation
- System conditions under fault occurrence
- Optimization of grounding techniques
- Short circuit mitigation technique recommendations



Motor Acceleration Studies

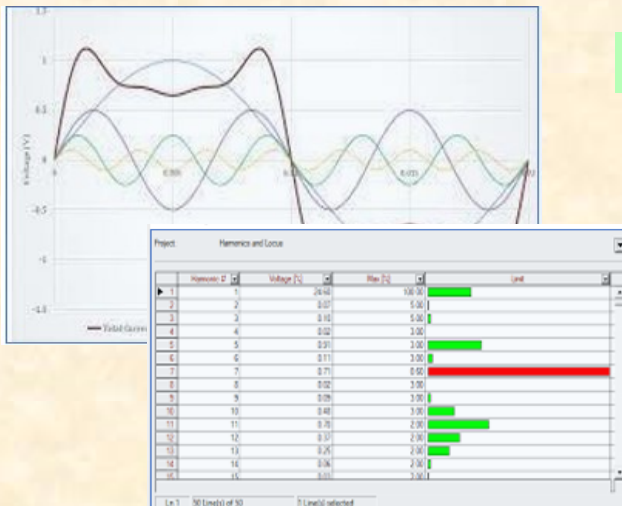
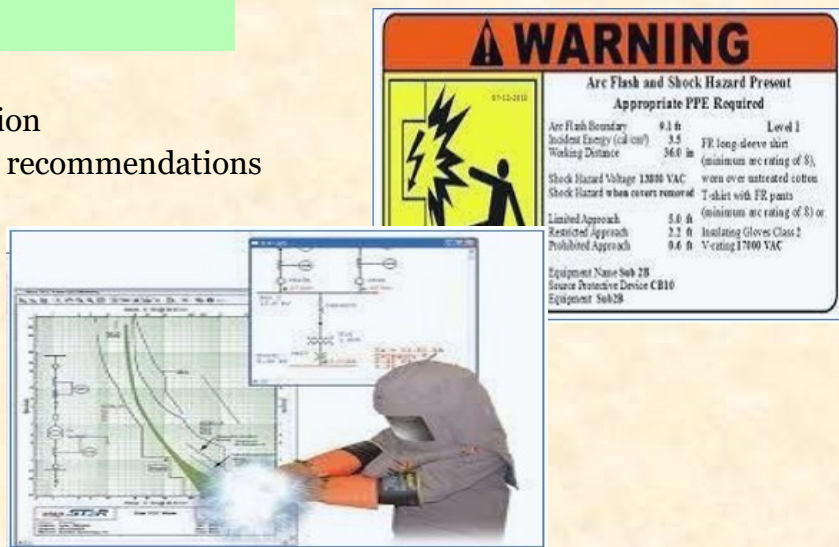


- Static motor acceleration studies
- Dynamic motor acceleration studies
- Starter recommendations

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Arc Flash Studies

- Incident energy calculation
- Arc flash boundary level recommendations
- Label generation

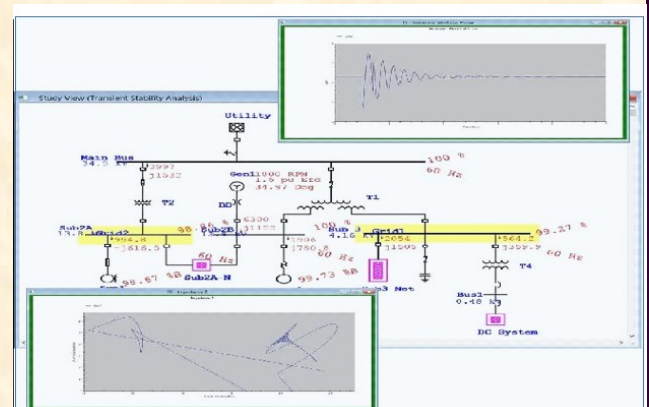


Harmonic Analysis

- VTHD and ITHD inference
- Filtering design and dimensioning recommendations
- Power quality enhancement

Transient Stability Analysis

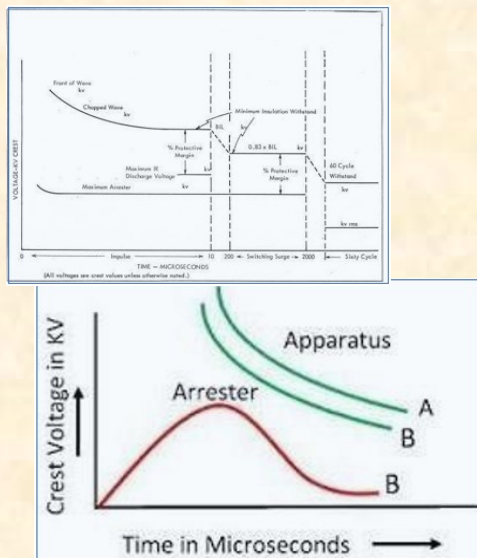
- Angular and voltage stability analysis
- Critical clearing time
- Mitigation technique recommendations



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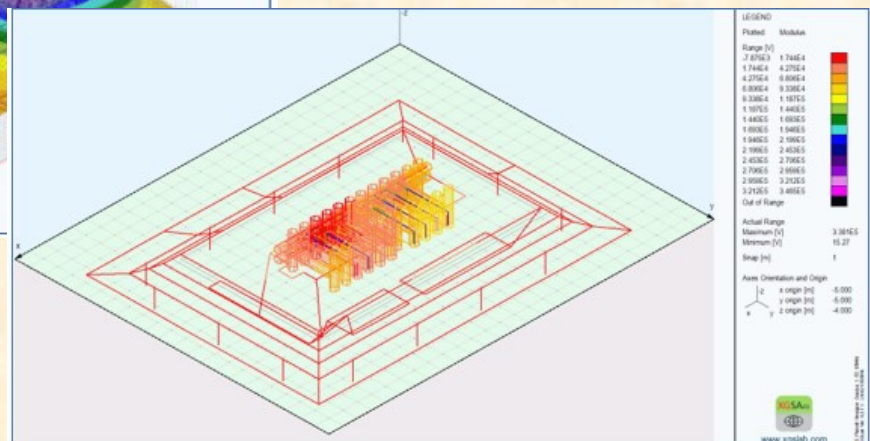
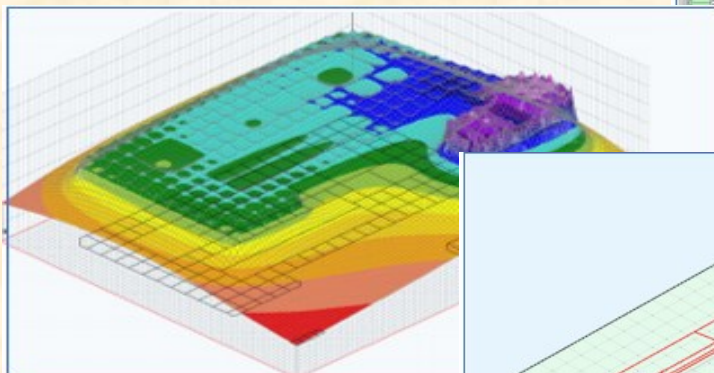
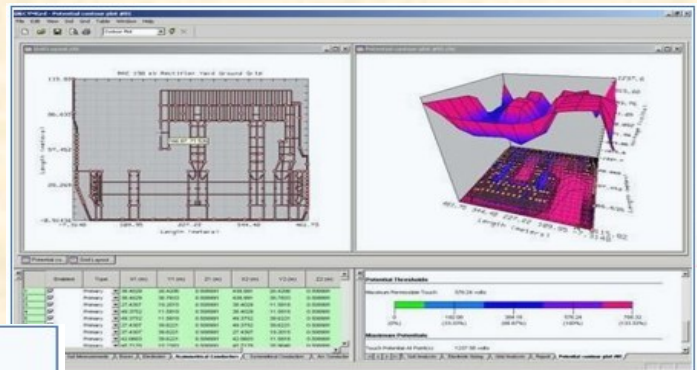
Insulation Coordination

- Insulation level selection coordination
- Surge arrester placing suggestion
- Investigation of over voltages in case of switching actions
- Transient modeling of Power Systems components
- Study on Lightning impulse overvoltage conditions



Earthing, EMFI and Lightning Studies

- Step and Touch Potential calculations
- Earth grid designing
- Lightning Protection Studies (Vertical Angle Method, Rolling Sphere Method)
- Lightning Risk Analysis
- TGPR Analysis for GIS
- Induced EMF studies
- EMI EMC Compatibility measurement and studies
- Earthing and Bonding Design
- Inter and Intra System Risk Analysis



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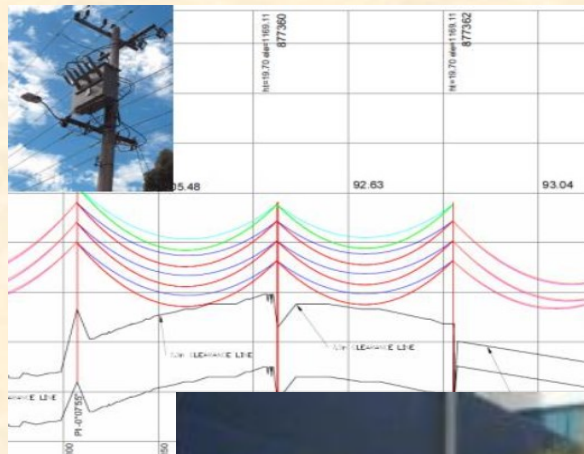
Technical and Safety Audits



- Electromagnetic Interference and Compatibility Audits
- Safety Audits
- Power Quality Measurement and Audit
- Earthing and Lightning Audit
- Power System and Relay Protection Audit
- Technical Assessment Audits for the Power and Rotating Equipment

ASP Level 3 Design

- Line Design and Augmentation
- Land Development (URD)
- Substation Design
- OPGW / ADSS / NBN
- Earthing Design
- Contestable Design
- Surveying
- Power factor corrections
- Asset Relocation
- Pole Asset / Integrity
- Lighting Design
- Design & Drafting .



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Standards Expertise

Load Flow Analysis

- *IEEE 399 - 1997 - IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis*

Short Circuit Analysis

- *IEC 60909 - 2016 - Short circuit currents in three-phase ACS systems*
- *IEC 61363 - 1998 - Electrical installations of ships and mobile and fixed offshore units*
- *ANSI C37*

Motor Acceleration Studies

- *IEEE 399 - 1997 - IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis*
- *NEMA - 2016 - National Electrical Manufacturers Association*

Relay Co-ordination

- *IEEE 242 - 2001 - IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems*
- *IEC 60255 - 2018 - International Standard for Measuring Relays and Protection Equipment*

Arc Flash Studies

- *IEEE 1584-2018-Guide for performing Arc-Flash Hazard Calculations*
- *NFPA 70E - 2018 - Standard for Electrical Safety in the workplace*
- *OSHA - Occupational Safety and Health Administration*

Harmonic Analysis

- *IEEE 519 - 2014 - IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems*
- *IEC 61400 - Standard for testing and assessing power quality characteristics of grid-connected wind energy converters*

Insulation Co-ordination

- *IEC 60071 - 2018 - Standard for Insulation Coordination*
- *IEEE C62.82.1 – IEEE Standard for Insulation Coordination - Definitions, Principles and Rules*

Earthing Studies

- *EG 0, EG-1*
- *IE C60479-2018 Effects of current on human beings and livestock*
- *IEEE 80 - 2013 - Guide for Safety in AC Substation Grounding*
- *IEEE 81 - 2012 - Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System*
- *IEC 60364 - 2009 - Standard on Electrical Installations of buildings*
- *IS 3043 - 2018 - Code of practice for Earthing*

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Key Projects Executed

Power System Studies (Load Flow, Short-circuit, relay co-ordination and Arc Flash Studies)

- Cockatoo Mine Power System Project
- Gencom – Mt Sugar Loaf SWER including Protection Setting
- three 7MW Mildura Solar Generator in VIC
- Abu Hamour Mall and Doha Mall , Qatar
- FRA 54.4 Data Centre , Ireland
- BUWAIB Water treatment, Riyadh, Kingdom of Saudi Arabia
- Hero R&D and Production, India.
- Tasek Cement Plant, Malaysia
- 2 * 660MW Thermal Power Plant TPCIL, India.



Contingency Analysis and Power Evacuation Studies

- Uniten 50 MW Solar Power Plant, Malaysia.
- Interconnection of 30MWAC PV Power Plant, Malaysia
- 98MW Hydro Power Plant , Kandi Malaysia
- Senvion Wind Farm, India.

Transformer Energization Studies

- Dubin Gas Plant, Ireland.

Safety Audit

- Terrafam of 50MWAC PV Power Plant, India



ASP L3 Earthing and Lightning Protection Studies

- Vast Solar (NSW) – ASP L3 Design, Earthing and Protection Studies
- Sydney Water (NSW) – Turner Road ASP L3 Design, Earthing Studies
- Mays Hill & Yagoona (NSW) – Substation Design & Earthing Studies.
- Drayton South Switching Station Project - Primary Design, Earthing & Lightning Study
- 22kV new OH Twin Hill Silver Mine- ASP3 Design including Power System and Earthing Study
- 132/22kV 180MVA Moree Solar Farm Substation- Primary Design including Earthing Study
- 33kV new OH Boral Peppertree Quarry- ASP3 Design including Power System & Earthing Study
- 66/11kV 15MVA Angus Place East – Switchyard, UG Mains, Mobile Sub and Switch Room plus Power System study
- 11kV new OH for Lidsdale Siding- ASP3 Design including Power System and Earthing Study

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Site Inductions, Daily Pre-Starts & Risk Assessments, Toolbox Meeting, Safety in Design, Electrical Safety, Site Check List (Vehicles, Plant & Equipment, Plant Competency, Lifting Equipment), Work Safety Permits (Confined Spaces, Hot Work, Excavations), Certificates of Competency & Licenses/High Risk Work, Health Monitoring, Fatigue Management, Heat or Cold Stress Management, Smoking, Alcohol & Other Drugs, Hazardous Chemicals & Dangerous Goods, Monthly Communication, JSA, SWMS, WI, WHSMP, WHS Act 2011 & WHS Regulation 2011, Work Safe Australia Codes of Practice, Australian/New Zealand & International Standards



Valid Licenses, Qualifications, Appropriate Training, Experience, and Certificates of Competency (CoC). Check & Test Sheets, Engineering & Design Procedure, Design & Commissioning ITPs, Document Control, Inspections & Audits, ensure all monitoring and measuring devices are controlled, calibrated and maintained. QMP, PMP, DMP, Australian/New Zealand & International Standards



Environmental legislation & project specific conditions or licenses, Achieving a high level of environmental compliance, Identifying & managing our risks and impacts on the environment, Fostering environmental awareness and encouraging a genuine respect for environmental protection among our staff. EMP are made site specific & takes into account issues identified in the Project Specification, other Environmental Management Plans and Environmental Impact Assessment (EIA) or Review of Environmental Factors (REF), Environmental Risk Management, Waste Management, Flora & Fauna, Weed Control, Soil Contamination, Soil and Water Management, Erosion and Sediment Controls, Storm Water Management, Hazardous Substances (Oil, Fuel & Chemicals), Cultural Heritage



Engineering Group takes pride in establishing industry benchmarks as vibrant and innovative leaders, aiming for top quality workmanship embraced with safe working standards and superior customer service.

Given a chance, iEngineering assures of its utmost attention in quality of works and services.

