

Independent Third-Party Verification of Design and Validation of Electrical Installations in Australia



Experienced **fit-for-purpose** team possessing both theoretical and practical knowledge is required to deliver accurate engineering deliverables. Engineering team dealing with electrical installations must have thorough knowledge of safety in design and must have keen eye on quality. **Competency and expertise** are essential when dealing with the subject of Functional Safety and the subject of EEHA (Electrical Equipment installed in Hazardous Areas) requirements.

Founded in 2013, ELSE Engineering Company acts as **Independent Third-Party Organization** delivers **Verification of Design and Validation of Electrical Installations**. ELSE support clients to develop and implement solutions meet their technical requirements and financial restrictions. ELSE provides high standard engineering services and technical supports to oil & gas and mining industries in Australia. We assist with project improvement and continuing development to assure compliance with specifications and Australian standards.

ELSE supports your project team with valuable inputs and **constructability reviews** to identify **cost savings solutions** or alternative designs. With keen eye on **quality, schedule and safety in design**, ELSE engineering team manages development and implementation of electrical systems, control systems and safety instrumented systems (SIS).

Our services encompass design, implementation and commissioning through to **operations support**.

HOW WE ADD VALUE

Expertise, Logic, Safety and Ethics (ELSE) are our core values. At ELSE we are committed to the health and safety of our employees and everyone who works in our facilities and lives in the communities where we operate.

- Keen eye on **Quality, Schedule and Safety** standards
- **Complete life-cycle services**; engineering, implementation, maintenance, and decommissioning
- In-depth knowledge of relevant national and international codes and standards (IEC, AUS/NZ)
- In-depth knowledge and experience of testing, commissioning, start-up, operation and turnover practices
- Effective coordination and communication with client technical and commercial teams
- Taking initiative and managing time to meet deadlines
- Support in estimating, creating and implementing budgets



Although the cost assigned for the engineering phase of a project is about 5% - 15% of the project total cost, the quality of the engineering deliverables has direct impact on the overall cost of the implementation. Engineering team delivering design must have expertise in all aspects of design and have in-depth knowledge of standards. Proper design review procedures must be in place to avoid occurrence of unexpected costly modifications during installation and commissioning.

Listed below are a few instances in several projects outcome of engineering delivered with a poor quality caused costly modifications and had huge financial consequences.



- Instance 1- Commissioning team was dealing with an issue of undersized cable feeding a stacker in a cement plant. All efforts made to avoid the costly exercise of pulling a new underground cable in parallel with the main cable. They tried implementation of a capacitor bank into the end of the line to improve the power factor (PF) and to reduce the heat dissipation of the main cable. Eventually, they could not achieve the power quality requirements and had to pull a parallel cable in a long trench in parallel with the main cable. The reason which caused all these expenses was a simple mistake in sizing of the main cable. This could be avoided by having proper design review procedures in place in early stage of the project.

- Instance 2- Inevitable modifications in PCS code in an Advance Waste Treatment plant caused commissioning delays for more than six months. The implementation company was relying merely on one engineer to deliver the PCS coding. Delivered code failed during the commissioning. The implementation company which had ignored the necessary of the third-party reviews in the early stages of the project had to lately hire three control system (PCS) experts and one safety system (SIS) expert to implement the required modifications. They had to keep those experts in project team for more than one year and pay for their costs just to avoid more commissioning delays.

- Instance 3- The validation team identified number of instruments installed in hazardous areas are not proper explosion-protection type and therefore not suitable for that application. This happened during the commissioning stage of the project. The implementation company had to go through the expensive practice of ordering new instruments, expediting the shipment, fitting new instruments in place, and accomplish all EEHA inspections. Plant had been energized and gas had been introduced to the part of the system when modifications happened. Therefore, all site activities had to be performed under the strict hot-work permits. The cost of the team involved in modifications and the cost of start-up delays would have not been comparable with the cost of a competent EEHA expert as a third-party verification body if he was involved in the early stages of the project to review the equipment EEHA conformity requirements.

- Instance 4- The turnover task became hold while handing over a system by the construction team to the commissioning team in a LNG plant project. The EEHA inspection team identified number of installed flow switches were not complying with technical requirements obligated by local regulations. The engineering team had neglected the fact that some Ex certifications are not acceptable in Australia. Great efforts made in project management team to expedite the shipment of the new ordered instruments to avoid commissioning delays.

Contact **ELSE** for **Independent Third-Party Verification of Design** and Validation of Electrical Installations to avoid costly modifications during installation and commissioning.

PROJECTS INVOLVED

Shenton Park Advanced Waste Treatment (AWT) plant

The WMRC Project involved the design, construction and commissioning of a 60,000 tpa AnaeCo™ Plant at the JFR McGeough Resource Recovery Facility (RRF) in Shenton Park, WA. ELSE Engineering Company directly involved in this project delivered Modification, Commissioning, FAT and SAT of Process Control System (ABB 800xA) and Safety Instrumented System (PILZ PSS 4000). ELSE as an Independent Third-Party Entity also had responsibility of **Verification of Design** and **Validation of**

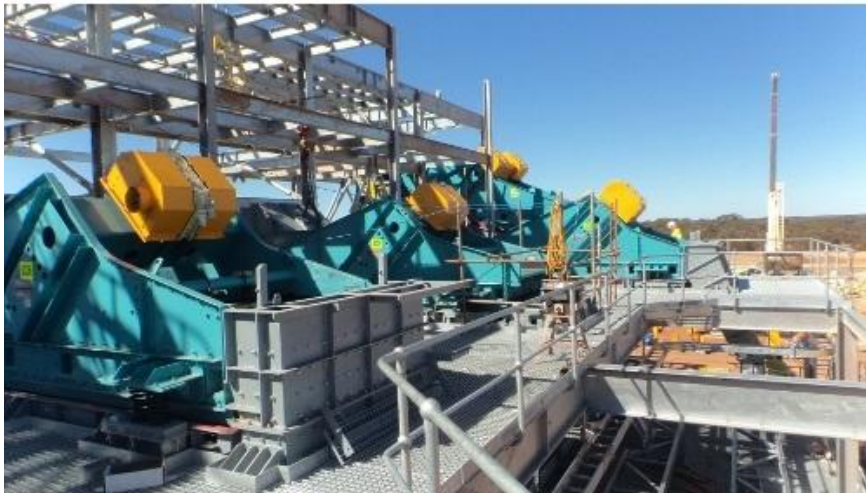


Modifications to assure compliance with specifications and Australian standards. We assisted with project improvement and continuing development and delivered annual Proof Test Procedures.

Process phase change requirements were causing introduction of different gas combinations to the system during processing a batch of organics in vessels. Process transitions were including four separate phases: Aerobic, Transient to Anaerobic, Anaerobic, Transition to Aerobic. Each phase had its own process conditions and definitions. Therefore, Integration of Process Control System (PCS) and Safety Instrumented System (SIS) was a vital requirement and must have been controlled under the process predefined procedures, and through the PCS-DCS-Handshaking sequence. PCS-DCS Integration gave capability to system to transit between different process phases while assuring all functional safety requirements are in place.

Altura Mining Limited - Pilgangoora Lithium Project

Altura Mining Pilgangoora Lithium Project is located at Pilgangoora WA. It is planned to develop infrastructure to commence mining and processing of 1.4Mtpa of ore to produce approximately 215,000 tonnes of lithium spodumene concentrate per annum. ELSE engineering company involved in end-to-end implementation and development of Process Control System (PCS) based on Schneider Modicon 580 PLCs. Five number of PLCs have been implemented to cover project technical requirements. Wonderware software utilized for SCADA system, and used for creating HMI pages.



ELSE Engineering Company is committed to ensuring the clients are completely satisfied with the quality of the services. Our commitment is to provide the clients with the best technical solution meeting the project financial restrictions and technical requirements.