

An Electrical Hazard Assessment (ELHAZ) is an electrical review methodology developed from principles applied in the well-known Hazard and Operational reviews (HAZOP) for the oil & gas industry. The quality assessment method aims at uncovering possible design errors in such systems while they can still be corrected and remedied.

A systematic review of the design and layout of the system in question is conducted in order to optimise safety for personnel and property. Further the assessment aims at improving reliability of the electrical system and reduce risks of operator errors which may lead to dangerous conditions. For plants in operation, shortcomings in instructions, training and procedures may be identified by means of an ELHAZ review.

### ELHAZ methodology:

The electrical network is divided into elements (i.e. switchboards, transformers, generators etc.) and locations (i.e. equipment rooms, control rooms, machine rooms etc.). Using hint words for each element/system/location in the subject system, the following three types of assessments may be carried out:

#### 1) **Functionality Assessment (FA)**

E.g. will the system work as intended during all operational modes, including hazardous and emergency situations? This is a critical assessment of the electrical system design and the interaction with other plant systems such as process control, ESD, F&G and HVAC.

#### 2) **Safety Assessment (SA)**

E.g. are there any hazards to operators in the various locations due to possible electrical shock, fire, explosion and toxicity, or any physical danger?

#### 3) **Operability Assessment (OA)**

E.g. does the control room and field operators have sufficient authority, written information, control facilities and training to carry out monitoring and checking in order to decide action (or no action) during normal, switching/maintenance and emergency situations?

In principle the FA appraises how the electrical supply/distribution/control system performs its intended purpose under all operational conditions. SA and OA, on the other hand, addresses the operator interfaces and risks associated with the system if not being fully understood.

Thus: **ELHAZ = FA + SA + OA**

An ELHAZ may be carried out during different phases of a project, from the conceptual phase through to operation. Recognising that the cost for modifications increase dramatically after equipment have been placed on order, an early ELHAZ may uncover errors which later would be expensive to correct. On the other hand, if such an assessment is carried out too early, operational philosophies and procedures may not yet be in place to be reviewed. The ELHAZ will, in any case, be conducted on the basis of available documents.

### Practical execution of an ELHAZ:

The ELHAZ uses pre-made check-lists containing subjects/questions applicable for the actual system. These check-lists are applied in round-table discussions conducted by a review team consisting of members with the relevant knowledge and experience. All members are present in capacity of reviewers, irrespective of rank, seniority and project role. No discussions about contractual responsibilities or cost will be part of an ELHAZ. No conclusive actions are decided, but the agreed observations/recommendations are recorded in the check-lists for further close-out by the project through its appropriate channels/systems.



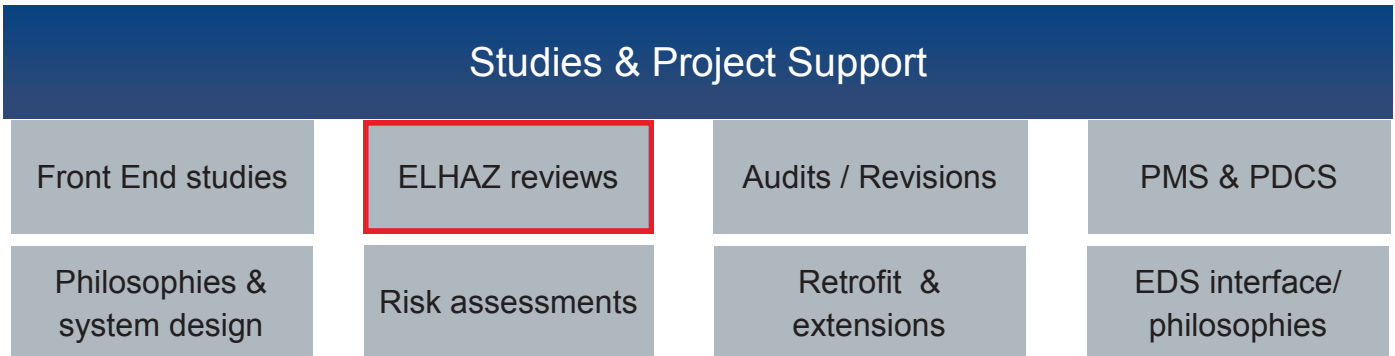
An extensive ELHAZ guideline, as well as examples of check lists containing typical subjects and questionnaires for different parts of electrical systems, are available to customers upon request.

Contact us for more information and to discuss how we can serve your needs.

Contact person:

Arild Larsen  
 Sales and Marketing Manager  
 E-mail: [larsen@unitech.no](mailto:larsen@unitech.no)  
 Phone: +47 932 26 425

## Business area overview



## Selected project references

**Year: 2015**

**Customer: Statoil**

**Johan Sverdrup Field Centre Phase 1**

ELHAZ review of technical functionality for the electrical power generation, distribution and control systems for the 4 platforms being part of the Phase 1 development.

**Year: 2014**

**Customer: Total**

**Martin Linge Field Development**

ELHAZ review of onshore sub-station, submarine cable and topside system functionality.

**Year: 2015**

**Customer: Total**

**Martin Linge topside**

ELHAZ review of technical functionality for selected topside systems, including protective relay selection & settings, electrical control system, emergency power, essential power and UPS systems.

**Year: 2013**

**Customer: ConocoPhillips**

**Tor II (2/4 U)**

ELHAZ review of electrical systems for the Tor II redevelopment project, including subsea cable and feeding platform 2/4 M.

**Year: 2015**

**Customer: ConocoPhillips**

**Greater Ekofisk Area (GEA) power system**

ELHAZ review of the Power Management System functionality and associated technical documentation for the interconnection between Ekofisk and Eldfisk.

**Year: 2012**

**Customer: Eni Norge**

**Goliat project**

Technical operability review of the overall electrical system, including onshore sub-station, subsea cable and FPSO.

**Year: 2014**

**Customer: Det Norske Oljeselskap**

**Ivar Aasen**

ELHAZ review of the electrical systems on the Ivar Aasen project, including the feeding subsea cable and relevant systems at the Edvard Grieg facility.

**Year: 2005**

**Customer: Statoil**

**Snøhvit/ Hammerfest LNG**

Design review of electrical power balance and system capacity. Review of electrical system studies. Review of PMS/PDCS and associated signal interfaces.