

Safety regulations related to the maintenance and operation of electrical installations

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Preface

The Safety regulations related to the maintenance and operation of electrical installations are laid down by the Directorate for Civil Protection, 28 April 2006, pursuant to the Act of 24 May 1929 No. 4 relating to the supervision of electrical installations and equipment § 2, cf. delegation resolution from the Ministry of Justice and Police of 1 September 2003 No. 1161.

Primary responsibility for fulfilling the requirements of the Regulations rests with the owner/manager of the electrical installation, and the owner of the enterprise conducting activities covered by the Regulations. This responsibility may require the owner/manager to employ persons whose qualifications meet the requirements of the Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment, in order to be capable of operating, maintaining and repairing high voltage and low voltage installations, and to ensure that satisfactory routines for work on the installation are established.

These guidelines to the Regulations provide more detailed information related to the Regulations. The Regulations are framework regulations based on the principle that well-established international standards form the basis of the safety requirements of the Regulations. The Directorate for Civil Protection regard the Norwegian electro-technical standard NEK EN 50110-1 as satisfying the safety requirements in these Regulations. If the conditions of the Regulations, guidelines and standards are met, the safety requirements of the Regulations may be considered as being satisfied.

Solutions that deviate from those given in the guidelines and standards may be acceptable, assuming the safety intentions of the Regulations are maintained. Where the term "must" is used, it should be assumed that the solution presented in the Regulations is the only solution that fully meets the requirements. Any reasons for choosing any other solution must be documented and proven as achieving an equivalent or higher level of safety than that given in the guidelines and standards. In such cases, this must be documented in the Internal Control System (regarding HSE) of the enterprise and be available for examination by the inspection authorities. Where the term "should", "may" or "can" is used, the proposed solution should be considered as being one of several possible acceptable ways of meeting the requirements. In such cases, the reasons for the alternative choice do not need to be documented.

One of the aims of the Regulations is to work towards common requirements throughout the

EØS region. The aim is that all member countries will implement EN 50110-1 in their national regulations. On this basis, the Directorate for Civil Protection regards the methods given in NEK EN 50110-1 to be those that best meet the safety requirements in the Regulations.

The use of common methods for establishing safety measures will contribute to reducing the risk of unwanted incidents, associated with the import of services across national boundaries and the increasing use of external subcontractors in Norway.

Via normative references, NEK EN 50110-1 refers to other relevant standards and publications that may be applicable. These are listed in an informative annex to the standard.

This translation is for information purposes only. Legal authenticity remains with the official Norwegian version as published in Norsk Lovtidend.

Safety regulations related to the maintenance and operation of electrical installations.

Decreed by the Directorate for Civil Protection, 28 April 2006 pursuant to Act of 24 May 1929 No. 4 relating to inspection of electrical installations and electrical equipment § 2, cf. delegation decision 1 September 2003 No. 1161.

Chapter I – Introductory provisions and definitions

§ 1. Purpose

The purpose of the Regulations is to maintain a high level of safety during operation and work on or in the vicinity of electrical installations, by requiring that all activities be adequately planned and necessary safety precautions taken in order to avoid risk to life or health or damage to materials or property.

Re § 1

The Regulations apply to work on or in the vicinity of electrical installations that are either energised or designed to be energised, and to the operation of electrical installations.

The Regulations also apply to electrical installations under construction or being dismantled if there is any possibility of becoming energised, even if this is not intended.

The Regulations do not apply to:

- a. Electrical installations on facilities engaged in the exploitation of petroleum deposits in Norwegian inland waters, Norwegian sea territory and the Norwegian part of the continental shelf.
- b. Certain integrated petroleum installations and associated onshore pipeline systems.
- c. Electrical installations on aircraft.
- d. Electronic communications and information systems that are not established and used solely for the operation of electrical distribution systems.
- e. Electrical installations in which the power is so low that there is no possibility of causing injury.
- f. Operation of installations or equipment that meet relevant installation and equipment standards and are designed for use by ordinary persons.

§ 2. Scope

The Regulations also apply to practical electrical training and teaching, and also to laboratory-based research and development.

Since electrical installations are designed to carry electricity, they may become live if a switch, fuse, live-working clamp or a link/blade is operated. Live working clamps are designed for making connections in live high voltage overhead lines by means of insulated tools.

An installation may inadvertently become energised during construction or dismantling, caused by:

- atmospheric conditions,
- flashover or contact with another installation, or
- induction from another installation.

The inspection of electrical installations mentioned in a) is the responsibility of the Petroleum Safety Authority. The Petroleum Safety Authority's duties also include inspection of safety, emergency planning and the work environment at certain integrated petroleum installations and associated onshore pipeline systems cf. b). These are installations for transferring petroleum products to land for processing. This does not apply to downstream installations, i.e. installations for distributing petroleum products to suppliers and end users. The Petroleum Safety Authority can provide specific information regarding which installations this applies to at any time.

The Civil Aviation Authority is responsible for inspection of electric installations on aircraft, mentioned in c).

The Norwegian Post and Telecommunications Authority is responsible for inspecting electronic telecommunications and information systems, mentioned in d).

Power that is too low to be capable of causing injury, mentioned in e), means that direct contact would not result in dangerous currents (usually less than 30 mA), and that dangerous flashover would not occur in the event of a short circuit. The limit values for dangerous currents are given in IEC TR 60 479-1.

The definition of installation, mentioned in f), includes all types of installations where electrical professionals are not needed for normal operation, such as residential properties and enterprises without electrically qualified employees. An "instructed person" is a person who has received adequate instruction to be able to safely conduct simple operational tasks related to electricity. The term "ordinary person" does not include instructed persons. This means that relevant requirements in these regulations also apply to instructed persons.

§ 3. Who the Regulations are intended for

Company owners and owners/managing directors of installations covered by these regulations are responsible for ensuring that activities regulated by these regulations are conducted in an acceptable manner.

Re § 3 Responsibility – Who the regulations are intended for

Pursuant to the Regulations relating to systematic health, environment and safety activities in enterprises (the Internal Control Regulations), a person responsible for an enterprise must ensure that the enterprise has an operative internal control system, and that the employees and their representatives participate in its development. This also means that the owner of an enterprise must ensure that all who participate in activities covered by the Regulations do so under conditions that enable the activity to be conducted safely and in accordance with the Regulations. This requirement entails the provision of necessary funds by the owner.

The Regulations apply to all activities where professional electrical competence is required, as defined in the Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment.

In this context, the “owner” of the enterprise is defined as being the owner of the enterprise that conducts and is responsible for the operation and maintenance of an electrical installation and the employment of electrical professionals. Examples include power grid companies, electrical contractors, industrial enterprises and other enterprises employing electrical professionals according to the requirements of the Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment. The owner of the enterprise where electrical professionals are employed is responsible for ensuring that employees have received adequate training and instruction and have the necessary competence and experience in the requirements pursuant to the Regulations.

Where the owner of an enterprise, cf. the above, is also owner of the electrical installation, this person has complete responsibility for ensuring that the requirements of these regulations are met.

If the owner of the installation has delegated its operation and management to another enterprise, the enterprise running the installation is responsible for ensuring that the regulation requirements are met. However, the owner of the enterprise is responsible for ensuring that the operating and managing enterprise receives sufficient economic

provision to be able to fulfil this responsibility.

For both high voltage and low voltage installations, the Operations Manager is a function that is associated with a specific installation. The owner/manager of the installation is responsible for employing/nominating a suitable person to fill this function. The Operations Manager receives the authority and responsibility to ensure that the installation is constructed, operated and maintained according to the requirements of the Regulations. However, this does not release the owner/manager from overall responsibility.

If services are purchased from an external enterprise, the owner maintains responsibility and is not permitted to delegate responsibility. The owner/manager of the installation is responsible for ensuring that the internal control system is coordinated with that of the external enterprise as far as this is necessary, cf. Internal Control Regulations on HSE.

The owner/manager of an electrical installation will always maintain overall responsibility for ensuring that the safety requirements in the Regulations are satisfied regardless of whether the work is conducted by internal employees or by an external supplier of services. An external supplier of services will, however, also hold independent responsibility for ensuring that the requirements of the Regulations are met, also with respect to the guidelines issued by the owner/manager through the Operations Manager of the enterprise purchasing the services.

If the nature of the work is such that it is covered by the Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment, only external suppliers of services may be used that are registered in the Directorate for Civil Protection's central register of enterprises that plan, conduct and maintain electrical installations, cf. Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment. The enterprise's competent electrical manager will normally be delegated the authority to oversee the responsibilities of the external enterprise. A competent electrical manager must satisfy the requirements of the Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment and must manage the work in person.

In certain cases, the owner/operational manager of a high voltage installation may delegate certain areas of authority to the owner of an external enterprise, such as the authority to nominate a Safety Supervisor from the external enterprise's own employees. However, such delegation of authority does not release the owner/operational manager from overall responsibility.

The owner of an installation or equipment that satisfies relevant installation and equipment standards, and which is designed for use by ordinary persons, is responsible for ensuring that these are constructed and maintained only by enterprises that are registered in the Directorate for Civil Protection's central Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment. Beyond this, responsibility is limited to fulfilling requirements presented by the enterprise conducting the work, and providing the necessary conditions to enable the enterprise to meet the safety requirements of the Regulations.

Enterprises employing only instructed persons for conducting simple operational tasks are not covered by the Regulations. However, the owner of such an enterprise is responsible for ensuring that instructions are developed by suitably qualified electrical professionals and that the instructed person receives adequate training to maintain their own personal safety. Instruction must be based on the requirements of the Regulations.

Although the owner/manager of an enterprise has primary responsibility, the employees also have certain duties and therefore also responsibilities. Refer to the Working Environment Act for further information.

§ 4. Dispensation

The authorities may grant dispensation from these regulations if special conditions deem this necessary.

Re § 4 Dispensation

The Directorate for Civil Protection considers the safety requirements given in the Regulations to be so fundamental that dispensation is only granted in extremely unusual circumstances.

§ 5. Definitions

Temporary earthing for work

Fully-dimensioned earthing and short circuiting of installation parts where work is being conducted.

Protective shielding or shrouding

Part providing protection from direct contact from any usual approach or access point.

Boundary barrier

Demarcation of the minimum safe distance or other boundaries which must be respected.

Terminal earthing

Fully-dimensioned earthing and short-circuiting of all isolation points from which an installation may be energised.

De-energising

A safety function for de-energising all or a discrete section of an electrical installation by disconnecting the electrical installation or section from every source of electrical energy.

High voltage

Voltage which is normally in excess of 1000 V a.c. or 1500 V d.c.

Low voltage

Voltage which normally does not exceed 1000 V a.c. or 1500 V d.c.

Switching Supervisor

Nominated person in control of switching operations who is responsible for ensuring that switching of high voltage installations is conducted in a safe manner.

Safety Supervisor (high voltage)/ Safety Supervisor (low voltage)

Nominated person in control of the work activity who is responsible for safety at the work site.

For work on or in the vicinity of a railway installation, the term Electrical Safety Supervisor is used for this function. When the term Safety Supervisor is used in these regulations, the same requirements apply to the function of Electrical Safety Supervisor involved with work on or in the vicinity of a railway installation.

Less than fully-dimensioned earthing

Earthing and short-circuiting of installation parts with a less than fully-dimensioned earthing device on or in close proximity to the work location.

Outer limit of live working zone

Minimum distance in the air to be maintained between a worker and any installation part having a different potential, or for single-phase work, the minimum distance between the worker and an installation part in a different phase but having the same potential. This

minimum working distance is defined in order to ensure that work on or in the vicinity of an electrical installation is conducted at a safe distance. It defines the outer limit of the live working zone.

The outer limit of the live working zone for difference voltages is given in the table below. Distances of intermediate values may be determined by linear interpolation.

Table 1 Outer limit of live working zone for different voltages

Nominal system voltage (kV)	Outer limit of live working zone (mm)	Nominal system voltage (kV)	Outer limit of live working zone (mm)
< 1	No contact	70	750
3	400	110	1000
6	400	132	1100
10	400	150	1200
15*	400	220	1600
20	400	275	1900
30	400	380	2500
36	400	480	3200
45	500	700	5300
60	650		

* Includes 15 kV – 16 2/3 Hz for railways.

Outer limit of vicinity zone

Closest permitted working position to installation parts and surroundings with a potential that is different from that of the worker, or for single phase work, other phases with the same potential.

The outer limit of the vicinity zone shall be determined and marked for each work task.

Re § 5 Definitions

The Norwegian regulations use two different terms for Safety Supervisor depending on the level of voltage. The English version uses the term Safety Supervisor for both high voltage and low voltage.

Further relevant definitions are given in NEK EN 50110-1. Definitions of other terms may be found in International Electrotechnical Vocabulary (IEC 60050-series).

Chapter II – General provisions

§ 6. Organisation

For every electrical installation, a high voltage or low voltage Operations Manager (nominated person in control of an electrical installation) must be nominated to be responsible for the operation and maintenance of the installation. Administrative measures must be taken to ensure that the distribution of responsibility does not come into conflict with work on the electrical installation or with its operation.

A high voltage / low voltage Safety Supervisor must be nominated for each work task. In high voltage installations, a Switching Supervisor must also be nominated if any switching tasks are required.

Re § 6 Organisation

The owner/manager of the installation is responsible for nominating an Operations Manager.

Specific qualification requirements do not apply to the Operations Manager of a low voltage installation. In enterprises employing their own electrical professionals who satisfy the requirements in the Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment. One of these electrical professionals must be nominated as Operations Manager.

The construction, operation and maintenance of an electrical installation that belongs to a third party, must be managed by an electrical professional who satisfies the requirements in the Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment.

High voltage installations

Concerning the operation and maintenance of high voltage installations, the Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment stipulate that this function must be supervised by a qualified person (Operations Manager). In this context, the term qualified means that this person is sufficiently familiar with the high voltage installation that switching work may be conducted in a safe manner. At any one time, one person must supervise the daily

operation of the installation. This means that a substitute must be nominated if the Operations Manager is not present. The Operations Manager in installations beyond a certain complexity, function and size must be an electrically skilled person in accordance with requirements in the Regulations for electrical enterprises and qualifications to work on electrical installations and electrical equipment.

At any one time, it must be clear who has the authority to nominate and who has been nominated to lead the switching work and safety measures for work on or in the vicinity of a high voltage installation. The functions must be referred to as “Switching Supervisor” and “Safety Supervisor”.

On the basis of individual assessment, the Operations Manager decides who may be authorised as Switching Supervisor or Safety Supervisor. Authorisation is for a limited time period only. This means that the Operations Manager must regularly reassess a person’s suitability for these functions. If the Operations Manager decides that a person is no longer suited to the function of Switching Supervisor or Safety Supervisor, or that this function is no longer necessary, authorisation must be withdrawn.

The Switching Supervisor leading the switching work in a high voltage installation must first have received necessary training and written instructions specifying the authority and responsibility associated with the function, and specific details of the switching work the Switching Supervisor is authorised to Supervise (voltage level, geographic area, switch type, etc.)

The Safety Supervisor, responsible for safety at the worksite, must have received written instructions specifying the authority and responsibility associated with the function, and details of the installations where the Safety Supervisor is authorised to supervise safety work (voltage level, geographic area, installation type, etc.)

It is recommended that it be made clear at the worksite who holds the function of Safety Supervisor.

Low voltage installations

At any one time, it must be clear who has the authority to nominate and who has been nominated to supervise safety measures for work on or in the vicinity of a low voltage installation if more than one person is involved with the work. The function is referred to as Safety Supervisor. Verbal nomination is permitted.

On the basis of individual assessment, the Operations Manager decides who may be

authorised as low voltage Safety Supervisor. Authorisation is for a limited time period only. This means that the Operations Manager must regularly reassess a person's suitability for the function. If the Operations Manager decides that a person is no longer suited to the function of Safety Supervisor, or that this function is no longer necessary, authorisation must be withdrawn.

For work on or in the vicinity of an electrical installation owned by a third party, the Operations Manager nominated by the owner of the installation or person he has authorised, is responsible for nominating a Switching Supervisor and Safety Supervisor for high voltage installations and a Safety Supervisor for low voltage installations. By agreement, however, the owner of an installation may transfer the authority to nominate a Safety Supervisor to the enterprise conducting the work. Responsibility for nominating a Safety Supervisor then rests with the competent electrical manager in that enterprise.

For work on or in the vicinity of an electrical low voltage installation owned by a third party, and where the installation is of such a nature that the owner/ operational manager is not covered by the regulations, and where there is no Operations Manager, the competent electrical manager in the enterprise conducting the work is responsible for nominating the low voltage Safety Supervisor.

§ 7. General overall planning

All enterprises are required to have an operative system for general planning.

Workers must have access to, and be familiar with all relevant provisions in both the Regulations and accompanying guidelines, and receive necessary training, practice and instruction in these.

Re § 7 General overall planning

General planning must at a minimum include the following:

- a) development of instructions,
- b) use of qualified personnel,
- c) necessary authorisation and permits,
- d) organisation and planning in connection with the purchase, use, storage, testing and maintenance of protective equipment and other safety equipment,
- e) establishing routines for standard types of work,
- f) training, practice and instruction, and
- g) necessary first-aid preparations.

The Regulations related to systematic health, environment and safety activities in enterprises (Internal Control Regulations) require the owner of an enterprise to conduct systematic checks concerning health, safety and environment. This means that the owner of an enterprise covered by the Regulations is responsible for systematically checking that the requirements of the Regulations are met and that internal routines are followed. Delegation of authority in connection with planning, is an example of an area where clear routines must exist.

The requirement that personnel must receive necessary training, practice and instruction is considered to be fulfilled, if this is provided at least annually, and more frequently if conditions indicate that this is necessary. No more than 12 months may lapse between training provisions.

Training must be adapted as necessary to fit relevant conditions and problems for the enterprise concerned and the individual employee's function (Safety Supervisor, Switching Supervisor, etc.). It must also cover the enterprise's internal instructions, procedures and guidelines where such exist. Training may also include instruction and practical training in the use of equipment to the extent such is relevant.

Necessary first-aid preparation entails that all personnel receive annual training in first aid and specific training in first aid for electrical accidents. All who work with overhead lines and aerial cables must be trained in emergency rescue operations on poles. Training must be repeated at least every 12 months.

For larger enterprises, necessary first-aid preparation may entail the establishing of a first-aid team either as part of the emergency standby team or the fire and accident team. A prerequisite to this work is the preparation of an organisation plan with associated instructions. This entails developing an emergency plan both for notifying the emergency services (police, fire and medical assistance), and for notifying the standby team.

The requirement that personnel be made aware of relevant provisions in the Regulations indicates that certain provisions are not applicable or relevant to certain types of activities or voltage levels. This means that personnel are not required to be familiar with requirements that are not relevant to their own work.

When purchasing services from an external enterprise, the owner of the enterprise must provide suitable conditions to ensure that those conducting the work receive necessary

training, practice and instruction to enable them to conduct the task at the installation in question.

Training must be documented in the enterprise's Internal Control System (HSE).

General overall planning should also encompass relevant requirements in other regulations, including assessing employees' exposure to electric and magnetic fields. This subject area is the responsibility of the Norwegian Radiation Protection Authority (NRPA).

§ 8. Accident notification

All accidents and injuries or damage to the installation or property caused by electricity or arising from work on or the operation of an electrical installation, must be reported at the earliest opportunity to the applicable authorities.

Re § 8 Reporting accidents and incidents

The intention of the requirement that all accidents and incidents be reported is in order to discover causes and thus help to prevent future similar incidents and accidents. It is essential that reporting occurs quickly, for example by telephone, telefax or email so that necessary steps may be taken to ensure that information that could contribute to discovering the cause of the incident is not removed or destroyed.

Serious accidents must be reported immediately by telephone to the regional branch of the Directorate for Civil Protection in the region in which the accident occurred.

An electronic report system is available on the Directorate for Civil Protection's webpage, <http://www.dsb.no/stromskader>. This should be used for reporting accidents involving injuries.

Accidents must also be reported to other authorities.

§ 9. Access

To prevent unauthorised access to rooms or enclosed spaces containing unprotected electrical installations, all such areas must be kept adequately locked.

Routines must be developed to govern who is permitted to access electrical installations

that are not protected from contact. For high voltage installations, records must be kept of all persons who have access permission.

To prevent inadvertent energising or de-energising of high voltage installations, all switches/operating equipment must be adequately locked.

Re § 9 Access

The requirement that unauthorised persons are not permitted to have access to rooms or enclosures containing electrical installations which are not protected from direct contact, entails that keys to such rooms and areas may only be available to access-permit holders.

Holders of access permits must be aware of the dangers represented by the installation. Documentation of all access-permit holders must be included in the Internal Control System.

High voltage installations

Documentation of those with access authorisation should take the form of checklists and the issuing of access permits to those who have authorisation to access a high voltage installation.

Persons without access permission may be granted access by someone who is authorised to do so. The person must be accompanied by someone who has both access permission and the authority to escort.

This provision also applies to persons who, pursuant to another Act or Regulation, are permitted to access an electric installation to conduct authorised activity (representatives from the Labour Inspection Authority, electrically skilled persons, representatives from a board of enquiry, or similar bodies. This means that such persons must be granted access, but since these are largely electrically unskilled persons, they will normally be escorted by an electrically skilled person (access-permit holder).

The provision concerning the locking of switches and operational equipment requires that high voltage switches/operating equipment that is available to unauthorised persons, must be locked with a cylinder lock or similarly secure locking system. If the formation of ice etc. is a potential problem, line switches may be secured with a triangular key.

Chapter III – General safety requirements

§ 10. Planning of work

Before starting any work task, all necessary information about the electrical installation must be gathered and used as a basis for conducting a risk analysis. The risk analysis must subsequently be used as a basis for the following minimum activities:

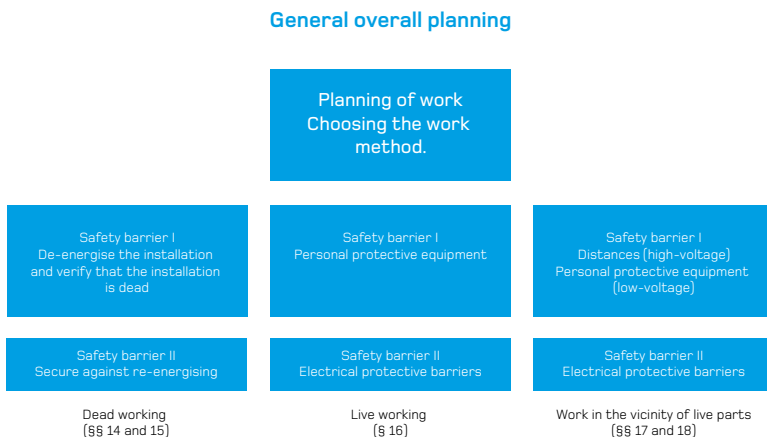
- choosing the work method
- ensuring that all equipment that will be needed is readily available,
- deciding what type of protective equipment is necessary, and
- selecting, evaluating and instructing personnel.

Functional testing of electrical installations must be planned along the same principles as those applying to work planning.

Re § 10 Planning of work

A recurring principle in the Regulations is that for all work on electric installations, there must be at least two safety barriers. If one barrier fails there will still be one barrier providing the worker with complete safety.

The following diagram presents a schematic description of the Regulations' safety policy and system, including a description of the three working methods.



Assuming all safety measures are operative, in principle, the three work methods provide equivalent levels of safety. In other words, if stipulated safety precautions are taken, it should be equally safe to work on a live installation, or in the vicinity of a live installation as on a dead installation.

§ 11. Switching of electrical installations

All switching of electrical installations must be conducted in such a way that there is no danger to life or health, or risk of material damage.

In high voltage installations, it must always be completely clear at any point in time who has switching authority. It must also be clear who has been nominated to supervise the switching operations, including establishing and removing safety measures at the site of the switching operations (Switching Supervisor).

Re § 11 Switching of electrical installations

High voltage installations

Three terms are used in connection with assigning authority and responsibility related to switching work in high voltage installations:

- Switching authority – authority granted to one person to determine how a network shall or can be connected at a specified point in time. Switching authority must be delegated by the Operations Manager or person he has authorised.
- Switching Supervisor – person nominated to be responsible for ensuring that all necessary switching in high voltage installations is conducted in a safe manner.
- Switching operator – a person who carries out the switching operation following orders from the Switching Supervisor.

A Switching Supervisor must be specifically nominated from those with necessary authorisation, to a specific switching task in a high voltage installation. Verbal nomination is permitted.

Switching orders may be issued in writing or dictated via telephone/radio and recorded immediately in writing if at all possible and the order repeated back to the issuer for confirmation. A switching order must refer to a specific switching task involving a uniquely defined switch or device. A list of operations must be used if the high voltage switching task is of a complex nature. The list of operations describes which switching actions are required and in which order these should be carried out.

The Switching Supervisor is also responsible for setting up and subsequently reversing all necessary safety measures at the switching site.

Based on the age of the switching equipment, its design and construction, a risk assessment is required to determine whether two persons must be present during the switching work, or if the installation must be dead before the switching work is carried out.

Reconnection following operational interference must be based on an assessment of the probable cause of the disconnection so as to minimise any risk to life, health or property resulting from a reconnection.

§ 12. Safety at the worksite

At any point in time, it must be clear who is the nominated Safety Supervisor with authority to plan, and responsibility to establish, supervise, and subsequently reverse the safety measures in connection with work on or in the vicinity of electrical installations. The Safety Supervisor must ensure that all activities are conducted in a suitable manner and in accordance with these regulations. The Safety Supervisor must communicate directly with the Operations Manager or authorised substitute and all those involved in the work task.

In relation to work on a high voltage installation, communication between the Safety Supervisor and the Switching Supervisor must always be direct. The Safety Supervisor is the only person authorised to permit work to start on or in the vicinity of a high voltage installation.

During all work on or in the vicinity of a high voltage installation, or on or in the vicinity of an unisolated live low voltage overhead line, there must be at least two persons present in order to be prepared for coping with an accident situation.

Furthermore, at least two persons must be present at the work site when safety precautions are set up and dismantled in connection with work on or in the vicinity of a high voltage installation.

The requirement that two persons must be present when setting up and taking down safety measures may be dropped if the risk analysis indicates that this would not entail increased risk to the person conducting the work.

Re § 12 Safety at the worksite

For work on or in the vicinity of an electrical installation, a Safety Supervisor must be nominated for each specific work task from among those with the required authorisation. Verbal nomination is permitted.

The communication requirement stipulates that the Safety Supervisor must communicate directly with the Operations Manager or authorised substitute and those participating in the work, without the use of a middleman such as an interpreter.

The intention of the requirement that at least two persons must be present when setting up and removing safety measures and when working on or in the vicinity of a high voltage installation, or on or in the vicinity of an uninsulated live low voltage overhead line, is to be able to assist one another in the event of an accident. This means that all members of the work team must have knowledge about the installation, be trained in first-aid, and if relevant, be trained in how to rescue from a height (poles, masts, etc.). Furthermore, the second person on the job must assist in setting up and dismantling safety measures in a satisfactory manner.

The two-person requirement may be waived if the risk assessment indicates that this would not contribute to any increased risk for the worker concerned. This could, for example apply to work on a cable installation where temporary earthing is installed at the ends of the cable by means of an enclosed switching setup, capacitive voltage testing and a fixed earthing system.

High voltage installations

The Safety Supervisor must oversee the work in person, and is only permitted to participate in the work if this in no way interferes with the function of Safety Supervisor. If the Safety Supervisor has to leave the worksite (for example to oversee another job), a safety observer must be nominated. The safety observer has only limited authority, and is only permitted to oversee the work and not make any changes to safety measures that have been set up. The safety observer may halt the work, but work may not be restarted until the Safety Supervisor has checked that safety measures are intact and has issued assent to restart work.

If the duration of a job means that the Safety Supervisor must be replaced, good communication between the two Safety Supervisors is essential. The new Safety Supervisor must be informed of all evaluations and decisions that have been made and what safety measures are necessary. The work team must also be informed of any change of Safety Supervisor.

If the functions of Switching Supervisor and Safety Supervisor are held by two different people, the requirement is that the Safety Supervisor must receive direct notification from the Switching Supervisor that the installation is dead and that necessary safety measures have been set up at all disconnection sites.

§ 13. Halting work on the basis of environmental conditions

If environmental conditions make it impossible to conduct the work task in a safe manner, the work must not be started, or it must be halted if it has already started. Weather conditions are defined as environmental conditions.

To prevent any possibility of injury as a result of lightning surge, work is not permitted on overhead lines if there is any indication of thunderstorms in the neighbourhood of the overhead lines.

Re § 13 Halting work on the basis of external conditions

Overvoltage caused by lightning can spread from overhead cables into other parts of an installation. This implies considering stopping work on parts of an installation that are directly connected to an overhead installation if lightning or thunder is observed in the area of the overhead installation. If the overhead installation covers a large area, mere observation may not be sufficient for registering imminent thunder and lightning and the use of an automatic lightning registration system may be necessary.

Chapter IV – Working methods

§ 14. Dead working – Establishing safety measures

When working on a de-energised installation, the following safety measures must be set up:

- a) de-energise the installation
- b) secure against re-energising
- c) verify that the installation is dead
- d) based on a risk analysis, evaluate the need for earthing and short-circuiting and set this up if necessary, and
- e) if necessary, protect against other live parts in the vicinity of the work position (cf. § 17).

High voltage installations must always be earthed and short-circuited. There are no exceptions to this requirement. Earthing must be in the form of temporary earthing, or a combination of terminal earthing and earthing with a less than fully-dimensioned earthing device. Temporary earthing or earthing with a less than fully-dimensioned earthing device must be visible from the worksite or, based on a risk analysis, be positioned such that an equivalent degree of safety is achieved.

Re § 14 Dead working – Establishing safety measures

For dead working, two safety barriers are always required.

This requirement entails de-energising the part of the installation where work is to be carried out so that both the part of the installation where work is to be conducted is completely dead and also any part of the installation where the worker will encroach upon the live-working zone. All parts that could possibly cause the installation to become energised must be disconnected; this means evaluating the risk of possible differences in potential at locations where:

- there is a risk of energising from the low voltage side of a transformer or other sources
- operational earthing connectors are not directly earthed, e.g. there is a connection between the neutral point of the transformer and the arc extinction coil
- there is a connection with overhead lines

Before setting up safety measures at the worksite, the Safety Supervisor must check that the

installation is dead and that necessary safety measures are in place at the switching sites.

The requirement that the installation must be tested for voltage in a suitable manner entails the following:

- that the voltage test gives reliable information on whether the relevant installation parts are dead, and
- that the voltage test does not put the worker in any danger

If there are live parts in the vicinity of the worksite, these must be protected by means of safety barriers as specified in § 17 – Work in the vicinity of live parts – Setting up safety measures.

High voltage installations

A risk assessment must also take into consideration the possibility of induced voltages and overvoltage from lightning in the installation between the earthing and the worksite.

§ 15. Dead working – removing safety measures

Before removing safety measures that were established before working on the installation, all those involved with the work and any others who could be affected by it, must be informed that there will no longer be safety measures in effect, and that the installation should be regarded as energised.

Before the installation can be declared ready for being re-energised, all safety measures that were set up must be removed, and all those involved with the work must have left the worksite so that the installation may safely be re-energised.

Re § 15 Dead working – Removing safety measures

The Safety Supervisor is responsible for ensuring that safety measures are removed when work has been completed.

High voltage installations

This provision stipulates that high voltage installations may not be re-energised after work has been finished until:

- the Switching Supervisor has received notification directly from the Safety Supervisor that work has ceased, and
- safety measures that were set up at the worksite and disconnection points, have been removed.

Communication between the Safety Supervisor and the Switching Supervisor must always be direct, to eliminate the possibility of misunderstandings.

§ 16. Live working

Live working may only be conducted by those with sufficient training in live working, and the work must follow approved methods and applicable work procedures.

Before live working may commence, any possible fire and explosions hazards must be eliminated.

Re § 16 Live working

For live working, two safety barriers are always required.

When working on objects that are located inside the live-working zone, including direct work on live installation parts (known as live working), additional training is required. Training must be documented.

The requirement that work must follow relevant work procedures implies the development of a procedure for each work task, based on the selected working method.

§ 17. Work in the vicinity of live parts – establishing safety measures

For work in the vicinity of a live electrical installation, the following safety measures must be set up:

- a) the outer limit of the vicinity zone must be defined and marked, and
- b) electrically protective barriers and/or boundary barriers must be set up.

To ensure that tools or materials cannot possibly result in short-circuiting and earthing, and that no person can come into contact with live parts, suitable protective barriers must be used where necessary.

It is important that these protective barriers are suited to the type of work involved and the correct voltage level, and that they are in good condition.

If the safety measures mentioned above cannot be used in full, another working method must be employed.

Re§ 17 – Working in the vicinity of live parts – Establishing safety measures

For working in the vicinity of live parts, two safety barriers are always required.

The outer limit of the live working zone and other relevant limits must be demarcated by boundary barriers.

Suitable equipment for demarcation of boundaries includes barrier gates, cordons etc. The requirement also entails blocking access to live parts in adjacent fields, even if barriers or doors between fields are closed.

To protect personnel from contact with live parts or from coming dangerously close to live parts if there is a possibility that work may encroach on the live working zone, live parts must be suitably protected.

§ 18. Working in the vicinity of live parts – dismantling safety measures

Before removing safety measures, all those who have been involved in the work must be informed that the work has finished and that safety measures will no longer be in effect.

Chapter V – Maintenance of electrical installations

§ 19. Conducting maintenance work

In order to understand the general layout of the installation, a single-line diagram is required in all high voltage installations and complex low voltage installations. Updated documentation of the installation must always be available.

To prevent the possibility of injury, all maintenance work must be conducted according to fixed work procedures and by using one or several of the working methods described in Chapter IV.

Re § 19 Conducting maintenance work

Complex low voltage installations refers to installations in industrial and trade buildings.

When testing and taking measurements in existing installations, if it is not practical to maintain the requirements in Chapter IV these may be deviated from. Procedures for troubleshooting and testing must, however, ensure that personal safety is maintained.

§ 20. Operating fuses

To ensure protection from injury, fuses must be operated in accordance with safe practice and using technical safety precautions or suitable insulating tools.

In order to be adequately prepared for all eventualities when working with high voltage fuses, two persons must be present when operating live fuses from platforms.

Re § 20 Operation of fuses

This provision is applicable for example when operating exposed knife blade fuses in a live installation.

§ 21. Energising an installation

To prevent possible injury or material damage when a new electrical installation is energised or an installation that has been de-energised is re-energised, all those involved with the installation must be suitably informed that it will become live.

Re § 21 Energising an installation

The requirement that notification of the imminent energising of an installation must occur in a suitable manner means that all affected areas must be notified. Notification must take the form of spoken announcements, signs, written information, advertising etc.

Chapter VI – Final provisions

§ 22. Inspection

The supervisory authority, or other body authorised by the supervisory authority, verifies compliance with these Regulations.

Re § 22 Inspection

The local electricity inspection authority is also authorised by the Directorate for Civil Protection to inspect low voltage installations, and high voltage installations integrated in low voltage installations, to check that the Regulations are adhered to.

§ 23. Individual decisions

The supervisory authority or those they authorise may issue orders or impose individual decisions necessary for implementing provisions in, or based on, the Regulations.

§ 24. Right of appeal

Individual decisions issued on the basis of these Regulations may be appealed against in accordance with the Act of 10 February 1967 relating to procedures in cases concerning the public administration (Public Administration Act).

Re § 24 Right of appeal

In accordance with the Act of 10 February 1967 relating to procedure in cases concerning the public administration (Public Administration Act), Chapter VI, the deadline for appealing an order is 3 weeks from the date the recipient received the order. Complaints should be directed to the administrative body that issued the order.

For orders issued by bodies under the Directorate for Civil Protection, appeals should be sent to the Directorate.

For orders issued by the Directorate for Civil Protection, appeals should be directed to the Ministry of Justice and Police.

§ 25. Reactions to violations

If these Regulations, or individual decisions issued on their basis are violated, applicable sanctions include orders, coercive penalties, enforced shutdown, and other sanctions as set out in the Act of 24 May 1929 No. 4 relating to the supervision of electrical installations and equipment.

§ 26. Penal provisions

Violation of these Regulations or individual decisions issued on their basis may be penalised in accordance with the Act of 24 May 1929 No. 4 relating to the supervision of electrical installations and equipment § 14.

§ 27. Entry into force – Repeal of other regulations

These Regulations enter into force as of July 1 2006.

As of the same date, these Regulations supersede the Regulation of 30 October 1998 No. 1048 concerning safety related to working on and operating low voltage installations with annexes, and Regulations of 30 October 1998 No. 1047 concerning safety when working on and operating high voltage installations, with annexes.

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