TenneT TSO B.V.

Offshore Electrical Safety Standard

TenneT standard for operation of electrical high and low voltage installations on offshore platforms. (Supplement to NEN 3140 and NEN 3840)

Publication by TenneT TSO B.V.

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TenneT management statement

The objective of this TenneT supplement is to provide its own employees and contractors with guidelines for operating on, and safely working on and in the vicinity of, the electrical infrastructure under the management of TenneT TSO B.V.

TenneT TSO B.V. attaches great importance to safety and for this reason chooses to work according to the highest safety standards.

Interpretation is provided in detail by means of this Framework Document of the way in which the articles contained in the NEN 3140 and NEN 3840 must be implemented for the grid components under management by TenneT TSO B.V.

This Framework Document represents a system of agreements and decisions on the basis of which TenneT TSO B.V. will be able to assess its own policy and that of its contractors (beforehand) and the implementation of policy (afterwards) for conformity to the standards and frameworks set. The basic principle is that employees of TenneT TSO B.V. and also (structurally) contracted staff with whom there is a relationship of authority will carry out electrical work to infrastructure under the management of TenneT TSO B.V. only if they are certified at personal level and are in possession of a valid TenneT nomination.

If any questions or ambiguities arise regarding sections of this Framework Document, address the questions or ambiguities in writing via the e-mail address oess@tennet.eu.

Arnhem,

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COO
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Foreword/Guide

You have in front of you the offshore electrical safety standard high voltage (OESS) published by TenneT TSO B.V.

The OESS is a company-specific elaboration of the Dutch standard NEN 3840 ‘Operation of electrical installations high voltage’ and NEN 3140 ‘Operation of electrical installations low voltage’ published by the Nederlands Elektrotechnisch Comité (Dutch Electrical Engineering Committee), Standards Committee 363 623. The OESS is thus not a separate document, but should be read in conjunction with NEN 3140 and NEN 3840.

The OESS applies to anyone who intends to work on:

1. The electrical installations on board the offshore platforms of TenneT TSO B.V.
2. The export cable that links the platform with the high voltage substation on land.

For working on the other assets under management by TenneT TSO B.V., the Framework Document electrical operations (KEB) will apply. Certain documents in the KEB also apply to the OESS. Appendix 08 states which documents this applies to.

The OESS shows the texts that have been taken directly from NEN 3140 and NEN 3840 in blue. The additions to these are printed in black.

The OESS is re-evaluated every year, with the date of the new edition set as 15 April every year. All amendments will be communicated by means of a transitional document. Any interim amendments will be communicated in writing via an SNPcEI decision.

The OESS can be viewed via the website https://keb.tennet.eu/ and can be downloaded as a PDF document.

If you have any questions regarding the contents of the OESS, please address them to your NPcEI or NPcWA of TenneT TSO B.V.

You may address questions in writing via the e-mail address oess@tennet.eu. The intention is to provide a reaction within two weeks.
1 Subject and scope of application

The standards NEN 3140 and NEN 3840, including this offshore electrical safety standard (OESS), applies to all electrical engineering and non-electrical engineering work to the offshore installations (platforms) and the so-called export cable to the land station under management by TenneT TSO B.V. The OESS does not apply in the following situations:

- Infrastructure and installations under management by TenneT TSO B.V. on land. Here the BEI-BHS and KEB apply.
- Newly installed infrastructure and installations not linked to the existing electricity grid of TenneT, where it is impossible for it to receive voltage via the electricity grid of TenneT.
- Existing infrastructure or installations that have been formally transferred to the contractor. This formal transfer can only occur if it has been approved by the Installation Manager and takes place whenever an installation component is no longer part of the installation permanently or for a lengthy period. For example for:
  - demolition of an installation component
  - a long maintenance or refurbishment period.

A precondition is that the installation component transferred no longer has any physical link with the high voltage grid.
2 Normative references

NEN-EN 50110-1: Operation of electrical installations - Part 1: General requirements
NEN-EN 50110-2: Operation of electrical installations - Part 2: National annexes
NEN 3140+A3:2019: Operation of electrical installations – Low voltage
NEN 3840+A3:2019: Operation of electrical installations – High voltage
NEN-EN-IEC 61472/C1: Live working - Minimum approach distances for AC systems in the voltage range 72.5 kV to 800 kV - A method of calculation (IEC 61472:2013,IDT)
NEN 1010: Safety regulations for low voltage installations
NEN-EN-IEC 61936-1: Safety regulations for high voltage installations
NEN-EN 50522: Earthing of high voltage installations of more than 1 kV alternating current

TenneT: Offshore Maintenance Guidelines
ONL-SHE-0003: TenneT Offshore Basic Health Safety Environment Rules
3 Terms and definitions

3.1 General

3.1.201 Electrical operating room
Appendix 03 specifies all the electrical operating rooms on the platform, including the authorisation to enter the room. Electrical operating rooms may be entered only in connection with a work plan. An electrical operating room with an insufficiently shielded system must be entered by at least two nominated persons.

3.1.204 Work plan
A work plan describes all the work that has to be done. Everything important in this regard is set out in the work plan, including applying and removing safety measures, a task-risk analysis and a reference to the underlying electrical safety instructions. A work plan is valid for at most three weeks and must be in the possession of the persons involved 24 hours beforehand. A work plan must be kept for two years after execution.

3.1.205 Controls plan
A controls plan contains all the control actions that must be implemented. A controls plan is valid for at most three weeks and is necessary only:
- as part of the plan of execution (work plan + controls plan)
- for switchings for managing load, a controls plan at grid connection level is necessary.

3.1.206 Plan of execution
A plan of execution is a combination of a work plan, a controls plan and the signed instruction form. A plan of execution is valid for at most three weeks and must be in the possession of the persons involved 24 hours beforehand. A plan of execution must be kept for two years following execution.

3.1.207 Electrical Safety Instruction (ESI)
An Electrical Safety Instruction is a description of the execution of an activity with the focus on safety.
It includes in any event:
- the assignment
- the minimum nomination for carrying out the work
- the sequence of the steps
- the preconditions
- the (possible) risks
- the safety measures to be taken
- the work equipment/tools to be used
- the personal protection equipment that must be used.

An ESI must be used as well as the existing controls manual(s) and/or assembly instruction(s).
3.1.208 Safety measures
Safety measures (SM) are aimed at managing risks in carrying out electrical work, non-electrical work and control actions.
There are two types of safety measure:
- safety measures for the surroundings and the worksite
- safety measures for executing electrical work.

Both applying and removing safety measures (with reference to the execution of electrical work) fall under the electrical work activities.

3.1.209 Team
A team is a group of employees that carry out work under the leadership of a Team Leader. A team must meet the following conditions:
- All the employees are working on the same project.
- All the employees are within earshot of the Team Leader.
- The Team Leader is able to influence the situation immediately.

If the conditions above cannot be met (for example if the worksites are too far apart), a Team Leader must be nominated for each worksite.

3.1.210 Risk analysis and evaluation
A risk analysis sets out all the risks that might be present in an operation. This involves all the factors that could lead to unwanted effects for the employee and the surroundings. The checklist must be drawn up in accordance with the Dutch Working Conditions Act. The checklist includes the buildings, the infrastructure and installations under management and the activities carried out in them. When assessing (evaluating) the risks, the probability that an unwanted effect arises is determined. This evaluation forms the basis for the action plan to control these risks.

3.1.211 Task-risk analysis
A task-risk analysis analyses the specific risks that may arise in connection with certain tasks or activities, and identifies the measures to be taken. The outcomes of TRAs must be included in the ESIIs or in work plans.

3.1.212 Last-minute risk analysis (LMRA)
A last-minute risk analysis is conducted immediately before the start of the activities. The analysis includes the employee determining once more whether:
- all the risks (risks to the surroundings as well) that are present, or may be expected, have been taken into consideration
- all the measures (for controlling the risks) have been agreed and have been taken
- the protection equipment is present and (will be) used
- the activities can be carried out safely.
3.1.213 Emergency plan
A plan that must be drawn up in the event of work with higher than usual risk for the electricity supply or the use of components. An emergency plan is drawn up by the Nominated person in control of an electrical installation and checked by the Senior nominated person in control of an electrical installation.

3.1.214 Adequately protected installation
Adequately protected installation (also referred to as closed installations): with these installations, the zone in the immediate vicinity and the danger zone cannot be accessed; in this case entering the room by one person with a nomination is planted.

3.1.215 Inadequately protected installation
Inadequately protected installations (also referred to as open installations): these installations have a freely accessible danger zone; accessibility can also not be prevented by means of procedural measures. In this case, entering the room with two persons with a nomination is required.

3.1.216 Grid connection
A grid connection is the entire chain between two busbar systems.

3.1.217 Malfunction
Disruption to the operational status that can finally be restored within 24 hours and, as a result, once again meets the design requirements.

3.1.218 Disruption
Disruption to the operational status that cannot be finally restored within 24 hours and, as a result, no longer meets the design requirements.

3.1.219 Worksite
The actual physical location where the work is carried out.

3.1.220 To electrical isolate (isolation from Grid)
To complete disconnect, ground, block disconnectors and apply of a ‘do not switch TAG’ by the CO of an electrical installation.

3.1.221 Normalize (connection to Grid)
To remove the ‘do not switch TAG’ by the CO, remove the blockages against reconnection, remove grounding, unblock disconnectors and re-energize.
3.2 Personnel, organisation and communication

NOTE: Combined nominations (for example, a combined (S)NPcEI/NPcWA nomination) are not allowed. This applies both to high voltage nominations and low voltage nominations.

3.2.1 Senior nominated person in control of an electrical installation SNPCEI

Some of the tasks, responsibilities and authorisations have been delegated to the Nominated person in control of an electrical installation (NPcEI) and the Control Operator (CO). The tasks, responsibilities and authorisations are described in appendix 06.

3.2.2 Nominated person in control of an electrical installation NPcEI

In contrast with the NEN 3140 and NEN 3840, TenneT has the nomination: Nominated person in control of an electrical installation (NPcEI). The NPcEI is a person nominated as the person directly responsible for the safe operational and availability of the electrical installation and the safety of electrical work equipment. The NPcEI receives the tasks, responsibilities and authorisations directly delegated from the SNPCEI and may not delegate these tasks. The tasks, responsibilities and authorisations are described in appendix 06.

NOTE: Where the SNPCEI is shown in the standard, the Nominated person in control of an electrical installation (NPcEI) is meant. If this is not the case, this is specifically stated in the corresponding chapter.

3.2.3 Nominated person in control of a work activity NPcWA

The tasks, responsibilities and authorisations are described in appendix 06.

3.2.4 Skilled person SP

The tasks, responsibilities and authorisations are described in appendix 06.

3.2.5 Instructed Person IP

The tasks, responsibilities and authorisations are described in appendix 06.

3.2.202 Framework contract

The Framework Contract is awarded annually by the NPcWA and is valid for one year from the date of issue. The work that may be carried out under a Framework Contract is shown in the ESIs.

3.2.203 Team Leader TL

Person who has been instructed for specific tasks or work and is competent to take over the leadership of a team of employees. The Team Leader is not a nomination, but is appointed for each job by a Nominated person in control of a work activity. The Team Leader has at least an SP nomination.

The NPcWA transfers the worksite to the TL on the work plan. Where there is no TL, the NPcWA transfers the worksite to the Supervisor. All those concerned must be informed of this by means of an instruction.
The tasks, responsibilities and authorisations are described in appendix 06.

3.2.204 Control Operator CO
Person who has been nominated as a person directly responsible for control actions, these actions being coordinated from a single point. The CO receives the tasks, responsibilities and authorisations directly delegated from the SNPcEI and may not delegate these tasks.

The tasks, responsibilities and authorisations are described in appendix 06.

3.2.205 Offshore Installation Manager OIM
In contrast with the NEN 3140 and NEN 3840, TenneT has the Offshore Installation Manager (OIM). The OIM is the safety coordinator on the platform. The OIM maintains oversight of the activities and the possible influencing of those activities that are carried out on the platform separate from the content of tasks connected to the works activities. In the event of an emergency, the OIM takes over the leadership and is the contact person for the Marine Control Centre. The OIM coordinates the Platform Emergency Response Team (ERT), decides on evacuating the platform and maintains communication with the mainland. Instructions and assignments from the OIM must be followed at all times.

3.201 Supervision
As soon as Ordinary Persons are employed, supervision must be maintained by a Supervisor. A Supervisor is an employee with at least IP nomination.

The Supervisor is appointed by the Nominated person in control of a work activity and ensures that:
- no electrical or other hazards can arise,
- no safety measures are reversed or removed,
- the activities are carried out safely.

The Supervisor must be present at the start of the activities. Changing the Supervisor must be prevented. If a change is necessary, then a transfer must take place on the worksite before the change between the current Supervisor, the new Supervisor and the NPcWA. In addition, the new Supervisor must be introduced to the employees who are being overseen.

On appointment, the Supervisor takes over the above-mentioned tasks from the NPcWA, but not the final responsibility.

As a basic principle, the Supervisor must oversee at most 4 Ordinary Persons. If this principle can be deviated from in the assessment of the NPcWA, this must be stated on the works schedule.

The tasks, responsibilities and authorisations are described in appendix 06.
4 Basic principles

4.1 Safe operation

This document is supplementary to the Dutch standard NEN 3140 ‘Operation of Electrical Installations – Low voltage’ and the NEN 3840 ‘Operation of Electrical Installations – High voltage’. These supplements describe how the award of contract, nominations, communication, procedures and processes are regulated in order to ensure safe operation. It is expected of the persons who have received a nomination that they act accordingly. In addition, we also expect the following:

- The basic principle is: work is done safely, or no work is done. If a dangerous situation occurs, then the dangerous situation must immediately, and if possible, be removed or screened off. At first the OIM and then the NPCWA must be informed. The NPCWA decides along with the NPcEI how to proceed.

- Always ensure that your nomination is valid. You bear the responsibility yourself for this, and if the nomination has expired, you may no longer work on the installations under management by TenneT TSO B.V.

4.2 Personnel

4.2.201 The following persons must be nominated in writing by or on behalf of the organisation’s highest manager for compliance with the Dutch Working Conditions Act.

In contrast with the NEN 3140 and NEN 3840, the chief operating officer (COO) of TenneT appoints the SNPcEI, and the SNPcEI appoints the other nominations (NPcEI, NPcWA, SP, IP and CO).

In addition to the persons mentioned in the NEN standards, the Nominated person in control of an electrical installation (NPcEI) must also be nominated in writing.

The applicant must be 18 years or older in order to be considered for a nomination.

A nomination is issued on:
- A valid personal NEN 3140 / NEN 3840 certificate or Stipel-Tr(ansport)
- A valid OESS certificate\(^1\)
- A completed and approved training programme
- A valid SCC Basic (IP, SP) or an SCC Safety for Operational Supervisors (NPCWA, NPCEI) certificate. A Supervisor or Team Leader must be in possession of a valid SCC Safety for Operational Supervisors (VCA-VOL) certificate
- A valid BHV (Company Emergency Response) or equivalent certificate showing that the bearer is able to carry out life-saving actions.

The last two documents mentioned do not have to be submitted, but if the certificate expires within the nomination period, the nomination expires.

The format and the contents of the training programme for IP, SP, NPCWA and NPCEI will be drawn up by the service provider. The training programme template must be approved by the Installation Manager of TenneT. The expert training into nominated persons is the responsibility of the Grid Services Offshore (GSO) department of TenneT.

The format and the contents of the training programme for the CO will be drawn up by System Operations Nederland (SON). The training programme template must be approved by the SNPcEI of TenneT.

A nomination can be applied for by filling in the nomination, keys and blue vest application form (T3-TFRM-001).

A nomination has validity for at most three years or up to expiry of the first expiring certificate. A nomination can be withdrawn early at the behest of the SNPcEI.

**4.2.202** An organisation that hires in persons must nominate these persons in writing.
In contrast with the NEN 3140 and NEN3840, TenneT issues a nomination to everyone who works independently on TenneT assets. Personnel not in the service of TenneT may at most be nominated up to SP.

**4.2.203** Nominated person in control of a work activity and the nominated person in control of the electrical installation will have gained at least an intermediate electrical engineering level through training and/or experience. They are responsible for the execution of their own duties and must be able to account for this. Planning, administration, management and/or development may be part of their responsibility. The work is usually done independently and without supervision.
In contrast with the NEN 3140 and NEN 3840, the Nominated person in control of a work activity, Nominated person in control of an electrical installations and Senior nominated person in control of an electrical installations must have gained their intermediate electrical engineering level through training. For this, see the requirements mentioned in appendix 02.

REMARK 2: Sharing of the SNPcEI responsibilities and those of the NPCWA may be delegated.

\(^1\) An OESS certificate is valid for three years.
Sharing of the SNPCeEI responsibilities can be delegated to the NPcEI and the CO. Sharing of the NPcWA responsibilities can be delegated to the TL and/or the Supervisor.

REMARK 3: The SNPCeEI, NPcEI and NPcWA can be nominated as Skilled Persons.

In contrast with the NEN 3140 and NEN3840, this is not admissible. Within the OESS, it is only possible to have one nomination. However, it is possible to apply for an SP nomination with a NPcWA certificate.

4.2.204 Skilled Persons will have at least a lower electrical engineering level gained through training and/or experience. They are responsible for the execution of their own duties and must be able to account for this. They usually work independently, but on occasion under supervision.

In contrast with the NEN 3140 and NEN3840, an SP must have gained their lower electrical engineering level through training. For this, see the requirements described in appendix 02.

4.2.205 Following instruction, Instructed Persons are capable of avoiding electrical hazards in their work. They are able, following instruction, to carry out company-specific work of which the electrical risks are limited.

In contrast with the NEN 3140 and NEN3840, carrying out control activities on the electrical engineering installation by an IP is not planned. The work that an IP may carry out is described in appendix 01.

4.3 Organisation

Interface between two managerial areas

Appendix 09 is a document that must be used to determine the dividing line between the installation responsibility of one party and of another.

Access to the operating rooms

Access to all rooms where Ordinary Persons are exposed to a source of electrical hazard must be governed by rules. The manner of access arrangements and control are the responsibility of the SNPCeEI.

Appendix 03 describes the authorisation needed to enter an electrical operating room.

Reporting in

Before entering the platform, a contact person must report to the National Operations Centre of TenneT. In most cases, this is the Offshore Installation Manager (OIM). If the OIM is not present, the first person entering the platform must report in to the National Operations Centre. Reporting in can be done by making contact by telephone with the National Operations Centre (NOC) of TenneT.
Reporting out
On leaving the platform, the contact person must report out at the National Operations Centre (NOC).

If the contact person reports out at the NOC while persons remain behind, then a person in the group must be submitted as contact person.

All the work is under the responsibility of the NPCWA. In the event the work is shared, it may be necessary to appoint someone who is responsible for the safety of each section, with the whole falling under the responsibility of a single coordinator. This coordinator has the role of coordinating Nominated person in control of a work activity, has the nomination NPCWA and is appointed by the NPcEI.

Preparation of complicated work must be done in writing. Complicated work cannot be awarded via a Framework Contract.

At all times, work is awarded with a written Approved Contract (AC) or a Framework Contract (FC). Malfunctions and emergencies always fall under an AC, and a contract may be issued orally to implement a controls plan and/or work plan. The following rules apply here:
- the NPCWA coordinates the work plan with the NPcEI.
- On the basis of the agreed works schedule, the NPcEI coordinates the controls plan with the CO.
- Both the work plan and the controls plan must be stipulated in writing within 24 hours.

4.3.1.1 All electrical installations and work equipment must be placed under the responsibility of the senior authorized person in control of an electrical installation.

NOTE The senior authorized person in control of an electrical installation may be a member of the personnel of his own organisation or of another organisation.
In contrast to NEN 3140 and NEN 3840, the senior authorized person in control of an electrical installation, the authorized person in control of an electrical installation belong to the personnel of TenneT TSO B.V.

4.3.1.8 The nominated person in control of a work activity (NPCWA) and the (senior) authorized person in control of an electrical installation ((S)NPcEI) can be the same person.

In contrast to NEN 3140 and NEN 3840 the nominated person in control of a work activity (NPCWA) and the (senior) authorized person in control of an electrical installation ((S)NPcEI) cannot be one the same person.

4.3.201 In the case of work on the basis of an agreement for service provision, how the responsibility for safety is arranged between the parties must be laid down in writing before the work may start.
In contrast with the NEN 3140 and NEN 3840, this does not apply.
4.3.206 The following persons have independent access to electrical operating rooms provided that they are in possession of a nomination issued in writing by or on behalf of the employer:

Chapter 4.2.203 sets out the nomination policy.

In contrast with the NEN 3140 and NEN 3840, the Control Operator does not have independent access to an electrical operating room. Keys for independent access will be issued to the SNPcEI, NPCcEI and NPcWA, based on their nomination. The SP and the IP will be looked at individually to check whether independent access is necessary. This will be determined by the NPcEI along with the NPcWA.

4.3.207 If the sections of an electrical high voltage installation are not, or only inadequately, protected against direct or indirect contact or approaching too closely, then the room concerned must be entered in the presence of a second authorised person.

An electrical operating room may only be entered by at least one Skilled Person in the presence of a second nominated person. If it is impossible to get into the vicinity zone of the source(s) of electrical hazard without tools/aids, this room may be entered by a single person in possession of a nomination.

In contrast with the NEN 3140 and NEN3840, an electrical operating room with an electrical installation that is not, or only inadequately, protected against direct or indirect contact or approaching too closely, must be entered by at least two persons with a nomination of at least SP. The maximum number of persons must also be restricted. This will be determined by the NPcWA and stipulated in the workplan.

Appendix 03 describes the authorisation needed to enter an electrical operating room.

4.3.208 A Framework Contract may be issued:
- by an Senior nominated person in control of an electrical installation to a Control Operator, Nominated person in control of a work activity, Skilled Person or Instructed Person;

In contrast with the NEN 3140 and NEN3840, the Framework Contracts are valid for one year and are issued only by the NPcWA to an SP or IP. The electrical safety instructions (ESIs) describes the work that may be carried out under a Framework Contract.

The NPcEI and the CO carry out their tasks, responsibilities and authorisations under a delegated task from the SNPcEI. A NPcWA carries out their tasks, responsibilities and authorisations by order of the NPcEI.

4.3.209 If deficiencies to an electrical installation are observed resulting in hazard, the SNPcEI must be informed immediately. The SNPcEI must decide on measures and a suitable deadline for them with all anomalies that are found on the basis of a risk assessment. In line with the Working Conditions Decree, deficiencies that could influence safety or health must be repaired as quickly as possible.
In contrast with the NEN 3140 and NEN3840, on detection of deficiencies to an electrical installation, the OIM must be informed first. Immediately thereafter, the OIM will inform the NPcEI. Determining a (temporary) measure is the responsibility of the NPcEI. Here, the NPcEI will consult the OIM.

4.3.210 If operating conditions change, an assessment must be made whether the electrical installation can still be used safely. Where necessary, the electrical installation must be adapted.

REMARG: Examples of changes in the operating conditions are:
- change in the use function
- change in the production process
- introduction of fire or explosion hazard, moisture or dust.

The assessment whether the electrical installation can still be used safely is the responsibility of the NPcEI. Here, the NPcEI will consult the OIM.

4.4 Communication
Standardised use of language will be implemented for communication in accordance with the ENTSO-E (European Network of Transport System Operators of Electricity) guidelines. Communication between TenneT and other parties will be conducted in Dutch.

4.6 Tools, aids and protective equipment
In contrast with the NEN 3140 and NEN 3840, the nominations and/or guidelines must be provided by the manufacturer or supplier in a language known to their own personnel. In addition, these nominations and guidelines must at least be available in Dutch and English for the sake of the user.

The situations in which personal protective equipment must be used must be stipulated in company-specific instructions. The (personal) protective equipment to be used is stipulated in the ESIs.

4.7 Drawings and documents
Information on the electrical installation must be up-to-date and available.

The drawings and documents that are available without the intervention of third parties in real time and 24/7 for SNPcEI, NPcEI and NPcWA must comply with NEN-EN-IEC 61936-1, Chapter 7.1.2 'Documentation'.

The following information on the electrical installation must be present in single copy on paper:
- projection drawings
- electrical circuit diagrams
- cabinet subdivision diagrams
- terminals and cable diagrams
- material lists
- assembly/installation instructions
- directions for use
- control actions.

These documents must be stored in a fireproof cabinet or drawer.

4.8 Warning signs
An overview of the warning signs is included in appendix 07.

4.9 Provisions for emergencies
Various provisions for emergencies have been installed on the platform and procedures have been developed. Attention will be devoted to this during the instruction and the OESS training.
5 Operation procedures

5.2 Control actions

- control actions intended for changing the electrical status of an electrical installation,
- to use (electrical) equipment,
- to connect or disconnect equipment designed for use without risk or to switch it on or off, insofar as this is reasonably possible in practice,
- control actions intended for changing the status of the auxiliaries (cooling machines, air conditioning, etc).

Control actions can be carried out on location or remote.

We have four (4) control points for carrying out control actions intended for changing the electrical status of an electrical installation:

- Long-distance control (control by the CO from the National Operations Centre)
- Remote (control from the land station)
- Local (control from the platform)
- Manual (control of the component outside the switching fault locking device)

The VBS / Bay Controller is not a control point but for maintenance purpose only.

All the components that can be controlled by long-distance control must be controlled by the CO at the National Operations Centre. This applies to the circuit breakers, circuit disconnectors, earths and (adjustable) compensation aids.

Before controlling, the CO must ensure that there is no one present in the electrical operating room. If that is in fact the case, then the CO makes contact with the contact person. The CO waits with executing the control actions until they have received a report back from the contact person that everyone has left the electrical operating room.

In the event of a malfunction where the safety system has been activated, the location of the fault must be isolated from the rest of the installation. Once the location of the fault has been determined without doubt, the rest of the installation may possibly be switched on again. The location of the fault may be switched on again only after it has been determined after visual inspection by at least one SP that there is no operational risk.

Additional PPE requirements with manual control may apply. For this, see the current Electrical Safety Instructions (ESIs).

5.2.1.203 Control actions in uncomplicated installations, where electrical hazards are only present under exceptional circumstances, may be carried out by Skilled or Instructed Persons.
An IP may not carry out control actions. The activities in combination with the nomination are described in appendix 01.

5.2.1.203 These control actions must be carried out in accordance with operating instructions that have been approved by the Senior nominated person in control of an electrical installation.

Controls experts may in the context of this instruction also give orders for control actions that cannot be executed remotely. The CO may give this order to minimally an SP.

5.2.2 Switching off before or switching on after working when disconnected must be executed by a Skilled or Instructed Person, as laid down in 6.2.
Instructed Persons may not carry out control actions. The activities in combination with the nomination are described in appendix 01.

5.2.3 Suitable tools must be available for interrupting the supply voltage in case of an emergency. Chapter 536.4 'Emergency Switching' in NEN 1010 applies with respect to the above.

5.2.4 In an emergency situation, only Skilled or Instructed persons may carry out actions on electrical distribution systems.
In the event of an emergency, anyone is authorised to make use of the emergency controls as set out in Chapter 5.2.4. An emergency situation is understood to mean:

- Immediate danger to persons with respect to electrocution, fire or explosion
- Immediate danger to the surroundings with respect to electrocution, fire or explosion
- Immediate (destructive) danger to the installation with respect to fire or explosion.

5.2.4.201 The actions mentioned in 5.2.2 and 5.2.4 may also be carried out by the (Senior) nominated person in control of an electrical installation, the Control Operator or the Nominated person in control of a work activity.

Note: This addition does not apply to article 5.2.4.

In contrast with the NEN 3140 and NEN3840, the actions mentioned in 5.2.2 may also be carried out by the NPcWA and the CO. The SNPcEI and the NPcEI may not execute these mentioned actions.

5.2.5 If an earth fault in an electrical installation with a nominal voltage of more than 1 kV is not disconnected, measures must be taken to localise the earth fault and suitable protective measures must be taken to protect the personnel. Earth faults must be disconnected immediately selectively by the safety systems.

5.3 Functional inspection

5.3.1.1 Measurements include all the activities needed to determine electrical values.
Measurements must be conducted by:
Nominated persons in control of an electrical installation
- Nominated person in control of a work activity
- Skilled Persons
- Instructed Persons
- Ordinary Persons, only under supervision of at least a Skilled Person.

In contrast with the NEN 3140 and NEN 3840, the SNPcEI, NPcEI, CO and the IP are not allowed to carry out measurements.

The activities in combination with the nomination are described in appendix 01.

5.3.2 Testing

5.3.2.1 Testing comprises checking the safe operation of an electrical installation.
Testing must be conducted by:
- Nominated person in control of an electrical installation
- Nominated person in control of a work activity
- Skilled Persons
- Instructed Persons
- Ordinary Persons, only under supervision of at least a Skilled Person.

In contrast with the NEN 3140 and NEN 3840, the SNPcEI, NPcEI, CO and the IP are not allowed to carry out measurements.

The activities in combination with the nomination are described in appendix 01.

5.3.2.2 The testing of an installation that has been disconnected must be conducted in accordance with the rules that apply to working on disconnected installations. If it is necessary to remove earthing and short-circuit devices, suitable precautions must be taken to protect the personnel against the danger of direct contact.
See the relevant electrical safety instructions (ESIs) for more information.

5.3.3 Inspection

5.3.3.1.201 When inspecting existing installations, the safety provisions for installing electrical installations that were in place at the time of installation must be observed on assessing the installation, unless otherwise stipulated by the competent authorities or laid down in our own company-specific procedures or work instructions.
The requirements/execution with respect to the inspection of new or altered high voltage installations are shown in NEN 1041, for instance. The results/data of an inspection of this kind may serve as reference for subsequent inspections.
NEN 1041 has been replaced by NEN-EN-IEC 61936-1 and NEN-EN 50522.

5.3.3.1.204 The inspection interval will be substantiated and laid down by the Senior nominated person in control of an electrical installation in a maintenance concept.
The inspection interval must be determined on the basis of:
The general inspection interval and inspection policy are laid down in the Offshore Maintenance Guide.

5.3.3.2.201 The SNPCEI determines and lays down how often a visual check should be carried out. If this is not documented, the deadline is annual. A visual check must include the following:

(a) there are no signs of discharges, leaks, contaminants or vermin;
(b) measuring instruments, signal lamps and similar are functioning;
(c) the visible earth connections are in good condition;
(d) drawings and documents are present;
(e) the various (installation) parts are unambiguously recognizable (name);
(f) the free spaces and escape routes are accessible and the electrical premises are lockable;
(g) the necessary tools, (personal) protective equipment and aids are present and in good condition.

The visual inspection policy is described in the Offshore Maintenance Guide.

5.3.3.6 The results of an inspection must be recorded and kept.

The policy on logging the test, inspection and maintenance results is set out in the Offshore Maintenance Guide. Possible (temporary) deviations on the basis of status and the consequences thereto can be stipulated by the NPcEI. The NPcEI stipulates this as a temporary measure (TME). The TMEs are published and communicated via e-mail and the website.
6 Working procedures

6.1 General

In contrast with the NEN 3140 and NEN 3840, the work activities are prepared by the NPcWA in a written work plan. This work plan is submitted to the NPcEI for approval. See appendix 04.

6.1.201 Before any work activity is started a plan shall be presented to the nominated person in control of the electrical installation indicating:

Use is made at TenneT of a standard work plan. Use of this work plan is mandatory.

6.1.204 No work may be done on cables that have not been made safe in accordance with 6.2, other than shifting these cables, provided that:

For low voltage cables the requirements in 6.1.1.204 of the NEN 3840 are applicable.

6.1.3 Weather conditions

In addition to the standard, rain and high winds must be taken into account when working outside. If it is unsafe to start work as a result of rain or high winds, or to allow work to continue, the work must immediately be stopped and the fact reported to the NPcWA. On sight of lightning or sound of thunder, or if a thunderstorm is approaching, all work to the high voltage installation must be halted.

6.2 Dead Working

6.2.1.201 If the nominated person in control of a work activity is not present at the work location, the leadership is delegated to a Team Leader. This must be reported to the nominated person in control of an electrical installation before the start of the work activities.

A Team Leader has the leadership on the worksite. The Team Leader may give orders that fall within his own assignment.

A NPcWA appoints a TL if the work is being carried out by several persons. No work may be carried out in a team without a TL.

The TL has the following responsibilities:

- Leadership role on the worksite. He may give orders that fall within his own assignment.
- Ensuring that the team members act correctly and safely, and that the safety measures are observed.
- Instructing the team members on the worksite regarding:
  - the safety measures to be employed
  - the planned activities and the task of each in this regard
- the sub-assignments.

This also happens with team members who join the team later. Each team member must be aware of the tasks and the current state of affairs.

More than one Team Leader
On occasion, more than one Team Leader is involved in the work, for example if the worksites are far apart from each other. In that event, the NPCWA must be present operationally. This implies that he is regularly present at the various worksites.

6.2.3 Securing against switching on again
The lock-out/tag-out procedure for the low voltage installation is described in ESI-001. The lock-out/tag-out procedure for high voltage installations is described in ESI-100.

6.2.3.202 Wherever a cable or cable joint has to be worked on, care must be taken to ensure that the correct cable or cable joint has been selected, and that the cable concerned has been disconnected.

Appendix 08 gives an overview of all the electrical safety instructions (ESI's).

6.2.4 Checking the installation for the absence of operating voltage
Appendix 08 gives an overview of all the electrical safety instructions (ESI's).

6.2.5.1.203 Earths must be installed by two nominated persons, with one doing the work and the other supervising. Both persons must be convinced that the work has been done correctly.
Appendix 01 describes the activities in relation to the nomination

If the Nominated person in control of a work activity is not on site, the Team Leader will install the earths or have them installed, and then report this to the Nominated person in control of a work activity.

6.2.4.1.202 When installing an earth connection, the Nominated person in control of a work activity or the Team Leader nominated by him must be present.

The installation of the earth connection is done by the TL along with an SP from the same team. See appendix 04.

6.2.7 Switching on after the work
Appendix 06 sets out the process with respect to executing maintenance, inspection, measurements and test work. Following malfunctions, new-build or replacement work, switching on may only take place after the NPCWA has received approval from the NPCEI.
6.2.7.201 Removing safety measures must be done by the Nominated person in control of a work activity or by two persons on the instructions of the Nominated person in control of a work activity. See Appendix F.

In contrast with the NEN 3140 and NEN 3840, removing safety measures is done on the instructions of the NPcWA and is carried out by two (2) persons nominated for the purpose (see appendix 02).

6.4.1.5 Before work starts, the Nominated person in control of a work activity must instruct the personnel, especially those not used to working in the vicinity of live parts, regarding keeping safe distances, regarding the safety measures taken and regarding the need for constant awareness of safe working. The limits of the worksite must be indicated accurately and clearly (see 6.4.1.5), and attention must be given to exceptions and unusual circumstances. These instructions must be repeated regularly or after the working conditions have been changed.

In contrast with the NEN 3140 and NEN 3840, the instruction may also be given by the TL. During this instruction, the employees must at least be informed about the following issues:
- the work that has to be carried out
- who has been nominated as safety supervisor (when working with Ordinary Persons)
- risks with respect to the work and the installation
- measures taken to prevent or manage risks
- how emergencies are dealt with (explanation of Emergency Plan)
- maintaining safe distances
- additional risks resulting from other work.

The instruction must be recorded in writing on the Instructions Registration Form (in duplicate, see Appendix 10). The instructor and the candidate or candidates sign agreement. The candidate receives a copy of the form. The other copy is archived with the work plan/plan of execution. Instruction may be given to more than one candidate at the same time. But the candidates must sign the instruction form individually.

6.4.1.6 The worksite must be marked with barriers, warning tape or flags, ropes, lamps, warning signs, etc. Switchboards under voltage in the vicinity can also be marked with additional, clearly visible aids, for example by clear warning signs on doors.

Creating a safe working area is described for the low voltage installation in ESI-001 and for the high voltage installation in ESI-100.
7 Maintenance procedures

7.3 Repair work

7.3.201 If a disused cable is not removed immediately, all the cores at both ends must be shorted and earthed, or made contact safe. In contrast with the NEN 3140 and NEN 3840, decommissioned cables must be removed immediately if they have lost their function permanently or are not going to be used for another function in the short term. This is to ensure the clarity of the installation.

7.4 Replacements

7.4.1.201 If the installation has been designed for this, replacement of fuses can be done by a single person. These cases should be approved in advance by the Senior Authorized Person in control of an Electrical Installation and recorded in writing. This article is not applicable.

7.5 Temporary interruption

If, for whatever reason, the work plan cannot, or can no longer, be followed, the work must be halted and the NPcWA must be informed immediately. The NPcWA decides on how to proceed in consultation with the NPcEI.
8 Amendments with respect to 15 April 20XX

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