


| | | |
|-------------|--|---|
| Requirement | The Statkraft Way |  |
| Open | Live working - Arbeid Under Spenning (AUS) | |

Innhold

| | | |
|----------|--|----------|
| 1 | PURPOSE | 1 |
| 2 | SCOPE | 1 |
| 3 | RESPONSIBILITIES | 1 |
| 4 | DESCRIPTION OF THE PROCEDURE | 1 |
| | 4.1 Validity | 2 |
| | 4.2 About live working..... | 2 |
| | 4.3 Qualifications | 3 |
| | 4.4 Planning..... | 3 |
| | 4.5 Safety measures | 3 |
| | 4.6 Establishing safety measures | 3 |
| | 4.7 Removal of safety measures | 3 |
| 5 | REFERENCES AND DEFINITIONS | 4 |
| | 5.1 Internal references, Skagerak Kraft AS | 4 |
| | 5.2 Internal references, Statkraft Energi AS | 4 |
| | ProsExternal references..... | 5 |

1 PURPOSE

To ensure safety when live working on low-voltage installations and when voltage testing in high voltage installations.

2 SCOPE

Applies to all live working on low-voltage installations and when voltage testing in high voltage installations in Norway where Skagerak Kraft AS (SK) or Statkraft Energi AS (SE) have operational responsibility.

Persons approved as Safety Supervisor LV (SSLV, AFA in Norwegian) and Safety Supervisor LV Nominator (those who appoint AFAs) are regulated through safety cards for electrical installations.

3 RESPONSIBILITIES


The person who is appointed SSLV, SSHV and Switching Assistant is responsible for compliance with these instructions. The Operations Manager shall ensure that activities regulated by these instructions are carried out appropriately.

The Operations Manager LV is responsible for the preparation and updating of these instructions.

Only the Operations Manager LV has the authority to give deviation permit from this instruction.

4 DESCRIPTION OF THE PROCEDURE

The appointed SSLV shall ensure that the work is carried out in accordance with the Norwegian Regulations on safety in connection with work on and operation of electrical installations (FSE 2006) and this document. The section numbers (§) refer to FSE 2006 .

| | | |
|-------------|---|---|
| Requirement | The Statkraft Way |  |
| Open | Live working - Arbeid Under Spenning (AUS) | |

4.1 Validity

This instruction applies to all types of live working on low-voltage installations (§ 16).

4.2 About live working

Every effort should be made to avoid live working. If disconnecting the installation creates major inconveniences for operations, then live working may be used as a working method.

There must be at least two people present at Live works, unless a risk assessment indicates that SSLV can do the work alone without danger. (Eg. simple measurement of voltage in the electrical outlet using isolation gloves, measuring instrument minimum cat 3 with insulated measuring pins, helmet with visor, etc.).

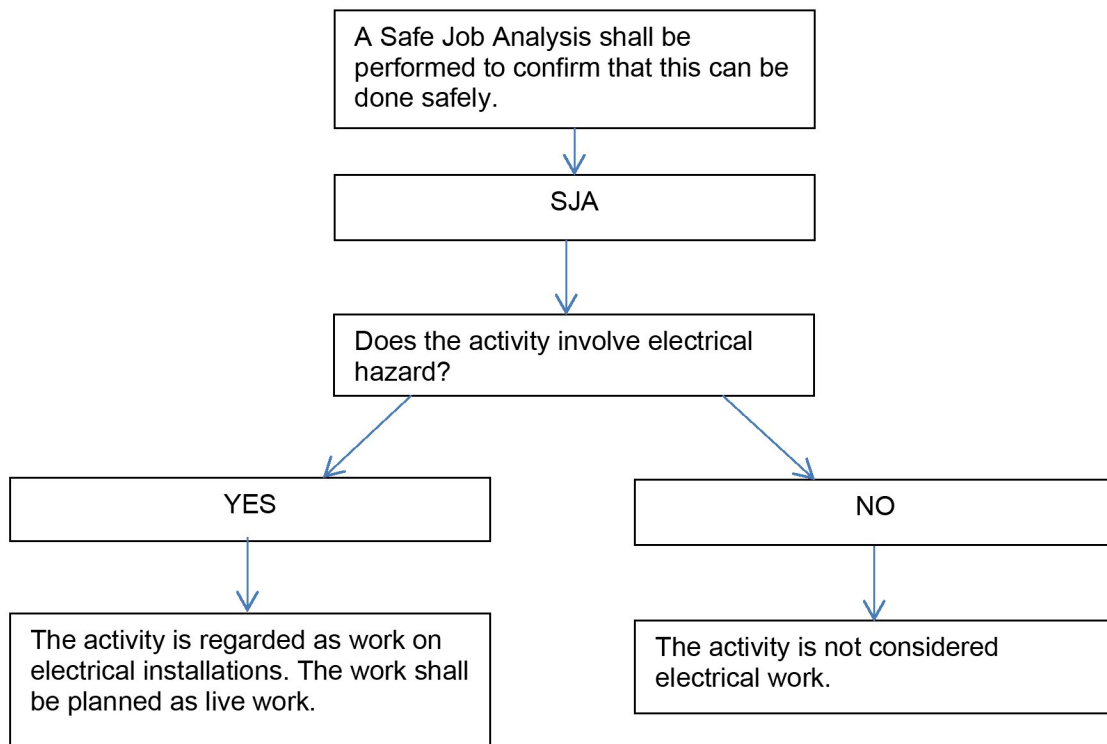
Voltage testing in high voltage systems shall be performed with approved and controlled equipment adapted for voltage level.

By troubleshooting, testing, measurement and refilling of water in battery installations a SJA shall be performed to confirm that this can be done safely.


Extra care must be taken to non-isolated batteries.

SJA shall always be performed by a person with electrical expertise. Additional work on battery installations shall always follow the procedure for live working.

Flowchart for further reviews for troubleshooting, testing and measurement of low voltage equipment and refilling of water on battery installations.



Any type of electrical and non-electrical activity that implies the possibility of electrical danger is to be considered as work in an electrical installation.

| | | |
|-------------------------|---|--|
| Requirement Open | <p style="text-align: center;">The Statkraft Way</p> <p style="text-align: center;">Live working - Arbeid Under Spenning (AUS)</p> |  Statkraft |
|-------------------------|---|--|

4.3 Qualifications

For live working, at least one person must be an electrical skilled worker, and everyone in the work crew must have adequate training in live working. The training must be documented.

4.4 Planning

In conjunction with the SSLV Nominator and the job's planner, the SSLV must ensure that the plan is consistent with performance of the work (§10). A safe job analysis (SJA) must be performed before work starts.

The work must be performed in accordance with approved methods and relevant work instructions; see § 16 in the Safety regulations related to the maintenance and operation of electrical installations (FSE 2006). This means that a work procedure must be prepared for each individual worktask based on the work method selected.

4.5 Safety measures

For live working, two safety barriers must always be established. The live working procedure must ensure that personnel do not come in contact with energised parts and that no earthing or short-circuit is established with tools or materials. This is to be achieved by establishing the following safety barriers:

Personal protective equipment: Insulating gloves, clothing, footwear, hardhat and visor.

Equipment protection: Totally insulated or operationally insulated tools.

Insulating covers with clips are to be used for shielding non-isolated energised parts that are not being worked on and which parts of the body or tools could come into contact with (above, below, to the sides).

For live working, the job planner must ensure that an extra risk assessment is performed before the work is started with regard to whether there are other hazardous energised parts nearby. If there remains a risk after the planned safety barriers have been established, or there is doubt about this, such energised parts must be shielded or else a method for working on disconnected installations must be used.

4.6 Establishing safety measures

Wearing personal protective equipment.

Shielding of all energized parts that are not being worked on.

Only totally insulated or operationally insulated tools may be used. Handle-insulated tools are not permitted.


Measuring instruments shall as a minimum be of category 3.

4.7 Removal of safety measures

Removal of tools and equipment etc.

Removal of all shielding.

Cleaning insulating covers and Live working tools after use.

| | | |
|-------------|---|---|
| Requirement | The Statkraft Way |  |
| Open | Live working - Arbeid Under Spenning (AUS) | |


5 REFERENCES AND DEFINITIONS

5.1 Internal references, Skagerak Kraft AS

- | | | |
|--------|--|---|
| 5.1.1 | Losen, Kraft, HMS, Elsikkerhet | Instruks el-sikkerhet |
| 5.1.2 | Losen, Kraft, HMS, Elsikkerhet | Ansvarlig For Arbeid (AFA) og utpeker av AFA. |
| 5.1.8 | Losen, Kraft, HMS, Elsikkerhet | Inspeksjon og kontroll av lavspenningsanlegg |
| 5.1.9 | Losen, Kraft, HMS, Elsikkerhet | Risikovurdering – samsvarserklæring – innmelding til systemansvarlig. |
| 5.1.13 | Losen, Kraft, HMS, Sikkert arbeid | Bruk av personlig verneutstyr. |
| 5.1.14 | Vedlikeholdssystem JobTech, Skagerak Kraft AS. | |

5.2 Internal references, Statkraft Energi AS

| | | | |
|-------|--|-------|---|
| 5.2.1 | Governing document P-23 Inspection – operation and maintenance of electrical installations | 5.2.1 | Styrende dokument P-23 Tilsyn – drift og vedlikehold av elektriske anlegg |
| 5.2.2 | Governing document P-23/120 Guidelines on electrical safety). | 5.2.2 | Styrende dokument P-23/120 Instruks for el-sikkerhet. |
| 5.2.3 | Governing document P-23/135 Safety Manager LV and Safety Manager Nominator | 5.2.3 | Styrende dokument P-23/135 Ansvarlig For Arbeid (AFA) og utpeker av AFA. |
| 5.2.4 | Maintenance System in Statkraft | 5.2.4 | Vedlikeholdssystem Statkraft |
| 5.2.5 | Procedure for Work Permit | 5.2.5 | Prosess for Arbeidstillatelse i Norge for P |

| | | |
|-------------|---|---|
| Requirement | The Statkraft Way |  |
| Open | Live working - Arbeid Under Spenning (AUS) | |

ProsExternal references

| | | | |
|-------|---|-------|--|
| 5.3.1 | FSE 2006 Regulation on safety in connection with work in and operation of electrical installations | 5.3.1 | FSE 2006 Forskrift om sikkerhet ved arbeid i og drift av elektriske anlegg |
| 5.3.2 | FEF 2006 Regulation on electrical supply installations | 5.3.2 | FEF 2006 Forskrift om elektriske forsyningsanlegg |
| 5.3.3 | FEL 1999 Regulation on electrical low-voltage installations | 5.3.3 | FEL 1999 forskrift om elektriske lavspenningsanlegg |
| 5.3.4 | FEK 2013 Regulations for electrical enterprises and qualification requirements for work related to electrical installations and electrical equipment. | 5.3.4 | FEK 2013 Forskrift om elektroforetak og kvalifikasjonskrav for arbeid knyttet til elektriske anlegg og elektrisk utstyr. |
| 5.3.5 | NEK 400:2018 | 5.3.5 | NEK 400:2018. |