	<p><b>NOTE DE SÉCURITÉ</b> <b>SAFETY NOTE</b></p> <p>Information – advice – summary of rules in force</p>	<p><b>TIS</b> <b>NS 24</b> <b>Rev.</b></p>
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## **REMOVING UNBURIED ELV AND LVA ELECTRIC CONDUITS**

### **1. DOMAINS OF APPLICATION**

The following domains: extra low voltage (ELV) and low voltage A (LVA), i.e. from 0 to 500 V in alternating current and from 0 to 750 V in smooth direct current.

### **2. PURPOSE**

This note summarises the risks connected with conduit dismantling and removal work and various means of preventing accidents. These remarks do not excuse the different agents from their own responsibilities.

### **3. RISKS**

There are different types of risk, viz.:

#### **3.1. Electrical**

**for example, electrical shock, electrocution (except from SELV and PELV)**

- from direct contact with parts of stripped cables (wire ends) or where insulation has been accidentally damaged,
- from direct contact with live parts located in racks or distribution panels,
- connected with the proximity of cables or accessories in the LVB or HV domains,
- from low voltage in cables usually intended to carry signals belonging to domain ELV;

**or burns and spattering**

- following **short circuits** due, for example, to accidental cutting of live cables;

## 3.2. Non-electrical

- from fires, explosions (caused by sparking), individuals falling, inadvertent powering off of equipment due to error.

In areas where there are **risks of explosion**, even with ELV, every precaution should be taken to avoid such hazards.

## 4. PERSONNEL

When electrical work is entrusted to an outside firm, the latter must be qualified for electrical works.

**"Habilitation<sup>1</sup>":** When work of an electrical nature is being conducted, it can only be entrusted to personnel with qualifications recognised under CERN regulations, namely the Electrical Safety Code C1. This regulation corresponds to the document listed as UTE C 18 510 and the French Decree of 14 November 1988.

A work team shall be formed, consisting of at least one **person in charge of isolation and energy dissipation** and a **work supervisor**, though both responsibilities can be born by the same person. The **work supervisor** is assisted by **staff** carrying out the work. All those engaged in such work shall be authorised to work in the vicinity of LV and HV.

## 5. WORKING CONDITIONS

The procedure to be followed will be that of working under "**isolation and energy dissipation**" conditions.

### 5.1. General case (see Fig. 1)

The designated **person in charge of equipment** shall mark the cables to be removed and identify them on a **cable inventory** by category (SELV - PELV or SELV - LVA). He/she shall sign this list and pass it to the **person in charge of isolation and energy dissipation**.

Before the works begin the **person in charge of isolation and energy dissipation** will give the **work supervisor** (member of CERN personnel or contractor) an **isolation and energy dissipation certificate**. This certificate with the cable inventory in annex, contains all the information necessary for safety at work.

Even if the **person in charge of isolation and energy dissipation** and the **work supervisor** are one and the same person, the **isolation and energy dissipation certificate** must still be drawn up and signed.

Then the **work supervisor** should take special care in identifying the cables to be dismantled<sup>2</sup>, check that the voltage is off<sup>3</sup>, disconnect the cables at both starting point and terminal, earth the cables and put their ends in short circuit.

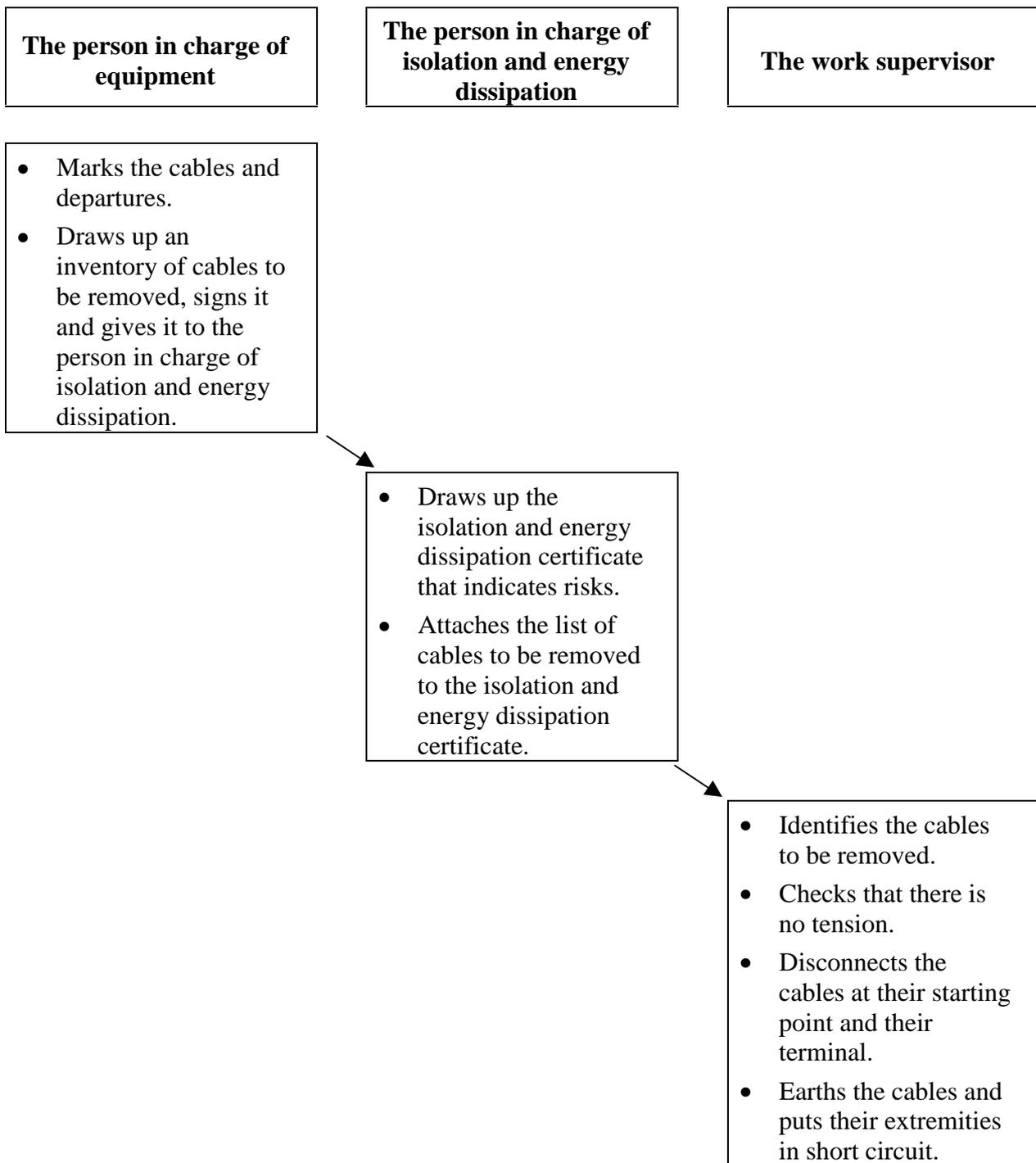
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<sup>1</sup> French term for electrical safety qualification according to publication UTE C 18 510.

<sup>2</sup> Reliable and safe equipment exists on the market for identifying specific individual cables from one extremity to the other (e.g. FC2000 SIBILLE and FAMECA).

<sup>3</sup> Note: the standardised gauge for verifying the absence of tension is a specialised instrument and not a simple multimeter (meeting French standard NF C 18 310).

Figure 1: Order of work



**Note:** earthing and short circuiting is not required in the case of LVA unless there is a risk:

- of induced voltage,
- of a restart,
- due to condensers or very long cables.

## 5.2. Particular case of unlisted and unmarked cabling

This kind of work "makes room" by removing cabling that has remained unused for a long time. These are cables that are no longer listed and often unidentified. They have no known owner and the electrical service takes the decision to remove them. They have been shut down and disconnected at least from their departure point, but this fact has not been recorded in any documentation.

**In such cases the removal procedure will remain the same as in section 5.1 above EXCEPT:**

The **ST-EL operations supervisor** or his representative shall make the identification of the cables to be removed in conjunction with the **person in charge of isolation and energy dissipation**. Together they will undertake joint marking of the cables. If the work is entrusted to an outside firm, the "Notice of Start of Works"<sup>4</sup> should include all necessary information to clearly define the work to be done.

The follow-up is the responsibility of the **person in charge of isolation and energy dissipation** and the **work supervisor**. If the two activities are carried out by one and the same person, an isolation and energy dissipation certificate will not be needed.

In both cases, risks mainly due to error remain great. For that reason, **compensatory measures** based on methods for work with equipment under tension will have to be systematically employed, in particular as far as worker protection is concerned.

## 6. PROTECTION OF WORKERS

Workers must wear insulating gloves with over-gloves, goggles or an anti UV facial screen and insulating shoes.

The use of insulating tools (in particular wire cutters) in line with IEC standard 900 (EN 60900) has also been made mandatory.

## 7. GLOSSARY

<b>ELV</b>	Extra Low Voltage ( $U < 50 \text{ VAC}$ , $U < 120 \text{ VDC}$ , voltage domain in general)
<b>SELV</b>	Safe Extra Low Voltage ( $U < 50 \text{ VAC}$ , $U < 120 \text{ VDC}$ , no earthing)
<b>PELV</b>	Protected Extra Low Voltage ( $U < 50 \text{ VAC}$ , $U < 120 \text{ VDC}$ , earthed)
<b>FELV</b>	Functional Extra Low Voltage ( $U < 50 \text{ VAC}$ , $U < 120 \text{ VDC}$ , no other condition)
<b>LVA</b>	Low Voltage A ( $50 \leq U < 500 \text{ VAC}$ , $120 \leq U < 750 \text{ VDC}$ )
<b>LVB</b>	Low Voltage B ( $500 \leq U < 1000 \text{ VAC}$ , $750 \leq U < 1500 \text{ VDC}$ )
<b>HV</b>	High Voltage ( $U \geq 1000 \text{ VAC}$ , $U \geq 1500 \text{ VDC}$ )
<b>EN</b>	European Standard
<b>NF</b>	French Standard
<b>IEC</b>	International Electrotechnical Commission
<b>UTE</b>	Union Technique de l'Electricité (French national body)

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<sup>4</sup> Following CERN Safety Instruction IS39.