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| Joint operation between the Norwegian and Finnish subsystems |
| Appendix 3 to SOA Annex OS (FI and NO) |
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# Background

The subsystems of Norway, Sweden, Finland and Eastern Denmark are synchronously interconnected. The subsystem of Western Denmark is linked to Norway, Sweden and Eastern Denmark using DC links. This Appendix governs the special circumstances resulting from no separate trade being conducted via the Ivalo-Varangerbotn line. The capacity will instead be included in the day-ahead and intraday trading scope between Norway-Sweden and Sweden-Finland.

# Transmission facilities linking the subsystems Norway – Finland

Transmission facilities owned/held at both ends by system operators:

|  |  |  |
| --- | --- | --- |
| **Facility** | **Voltage level** | **Settlement point** |
| Ivalo-Varangerbotn | 220 kV AC | Varangerbotn |

## Ownership

Statnett SF owns and operates the 220 kV line from Varangerbotn to the border (up to and including tower no. 130, numbered from Varangerbotn). Statnett owns Varangerbotn (VN) substation: 132 kV switchgear, 22 kV compensation equipment connected to T4, T4 and 220Iv1E, 220Iv1S and 220Iv1j.

Fingrid Oyj (hereafter referred to as “Fingrid”) owns and operates the 220 kV line from Ivalo to the border (up to and including tower no. 954, numbered from Ivalo). Fingrid owns the Vaisjänkä (VK) T-branch and underlying substation Utsjoki (UK) including T1 and 22 kV switchgear. Fingrid owns the Ivalo IV substation.

# Operation of facilities under section 2

## General

The common ground for the electrical safety work of the system operator companies within the Nordic countries is constituted by the European standard for managing electrical high-voltage facilities EN 50 110 which governs the organisation and working methods. In addition to the standard, there are national regulations and special instructions which entail certain mutual differences between the system operators as regards dealing with operational issues from an electrical safety point of view.

## Responsibility for operation/

Responsible for the electrical operation on the Norwegian side is Statnett, while on the Finnish side it is Fingrid. The power operation responsibility boundary lies at the border in Pulmanki (PU) between tower 130 (Norwegian side) and 954 (Finnish side).

## Switching responsible operator

Statnett’s regional control centre in Alta has switching operations authority, and has been designated as switching responsible operator for Varangerbotn 220 kV bay towards Ivalo. This also applies to the 220 kV line from Varangerbotn up to and including tower no.130 (Norwegian side) according to paragraph 2.1.

## Operations monitoring and control

In accordance with section 3.3.

## Electrical safety supervisor

For the work on the Norwegian side (up to and including tower 130), Statnett’s regional control centre in Alta is responsible for designating a safety supervisor after necessary safety measures have been implemented at both transmission line terminals, Vaisjänkä and Varangerbotn.

For the work on the Finnish side (up to and including tower 954), Fingrid’s main grid control centre in Helsinki is responsible for designating a safety supervisor after necessary safety measures have been implemented at both transmission line terminals, Vaisjänkä and Ivalo.

## Switching schedule

Switchings on the Ivalo-Varangerbotn line are carried out in accordance with a switching schedule drawn up by Fingrid.

In case of forced outage, pre-made switching schedule for disconnecting and earthing the concerned line shall be applied.

## Switching confirmation

Switching responsible operators shall exchange signed switching confirmation to other party before work preparation permit can be given. Digitally signed confirmations are legitimate

Signed repealment of switching confirmation from both parties shall be issued to the other party before safety measures can be removed.

Switching confirmation is applicable in such case where safety measures is done with other switchgear than stated in the switching confirmation.

## Disturbance management

### Cross-border line trips – management

During operational disturbances, measures in accordance with issued instructions shall, as soon as possible, restore the line to normal state.

### Switching schedule in emergency situations

Statnett or Fingrid may perform switching which will affect the cross-border line without coordination, in exceptional circum­stances implying a violation of the operational security limits, to prevent endangering personnel safety or damaging equipment, in accordance with Article 14 of the Network Code Emergency & Restoration.

### Fault finding

Initial fault finding is conducted differently from case to case. Generally speaking, the respective facility owner will be responsible for fault finding.

### Fault clearance, remaining faults

Once the fault has been localized, the respective facility owner will attend to clearing the fault.

# System operation for facilities under section 2

## Total Transmission Capacity (TTC)

### From Norway to Finland

The transmission capacity varies between 40 and 120 MW depending on where the sectioning point in Norway is located and the transmission situation in Finland.

### From Finland to Norway

The transmission capacity is 100 MW from Finland to Norway.

## Routines for determining the transmission capacity

In a normal transmission situation, the transmission capacity depends on Ivalo-Varangerbotn, on production and on the network sectioning in Northern Norway. Statnett manages the transmissions on the cross-border line by redistributing production and sectioning in Norway so that the transmission capacity is not exceeded. Statnett draws up a daily transit plan and Fingrid confirms it.

For planned outages, Fingrid and Statnett agree in advance on the transmission capacity.

## Trading capacity (Net Transmission Capacity - NTC)

Statnett and Fingrid shall inform Svenska kraftnät in each case of how much of the trading to and from Sweden shall be reserved for transit on the Ivalo-Varangerbotn line. The reservation may be a maximum of the transmission capacity on the line.

The trading capacity (Net Transmission Capacity - NTC) for the Ivalo-Varangerbotn line is included in the day-ahead and intra-day trading scope between Norway - Sweden and between Sweden - Finland.

## Operations monitoring and control in respect of system operation

In Finland, operations monitoring and control are carried out from the Main Grid Control Centre in Helsinki.

In Norway, operations monitoring and control are carried out from the Regional Centre at Alta following permission from the National Centre in Oslo.

## Voltage regulation

The basic principle for voltage regulation is governed by section 2.5 of the SOA Annex Operational Security.

### Voltage regulation on the Norwegian side

At Varangerbotn, the target voltage level is 220 kV in normal operation, but the voltage can range between 205 and 235 kV.

### Voltage regulation on the Finnish side

The normal operation range of voltage is 230 – 243 kV, but the voltage can range between 215 and 245 kV. At Utsjoki, there is a stationary reactor of 20 MVA.

### Co-ordination of voltage regulation

The line is long and sensitive to voltage variations. The voltage is monitored in co-operation between the relevant control centres.

## Outage planning

Statnett and Fingrid shall plan, in consultation with each other, outages on the line and on their own networks when such outages will impact upon the transmission capacities of the line in accordance to SOA Annex Operational Planning (OP)” Section 4.4.

## Disturbance management

The term disturbance situation here means that the operational security limits have been violated due to, for instance, long-term line faults or the loss of production. If the transmission capacities have not been exceeded during the faults, the situation will be deemed normal.

In the event of disturbances, measures in accordance with issued instructions shall, as quickly as possible, restore the line to operation within defined security limits.

# Miscellaneous

## Settlement

The settlement of transmitted electricity on the Ivalo-Varangerbotn line takes place in accordance with a separate agreement between Fingrid and Statnett.

Balance energy for the Ivalo-Varangerbotn line is the measured exchange minus exchange plans. Balance Energy is settled between Statnett and Fingrid.

The plan for transit via Svenska kraftnät is adjusted with the transit plan for Ivalo-Varangerbotn line. The transit plan is included in the daily maximum volume between Norway and Sweden, and between Sweden and Finland.

## Information exchange

Statnett is responsible for Fingrid and Svenska kraftnät obtaining calendar day forecasts for transmissions on the Ivalo – Varangerbotn line.