

ANRE Code 51.1.112.01.27/08/04

# **TECHNICAL TRANSMISSION GRID CODE**

**of the Romanian Power System**

**Review I**

**Approved by ANRE Order no. 20/27.08.2004**

*Edited by: Romanian Power Grid Company TRANSELECTRICA S.A.*

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TECHNICAL TRANSMISSION

GRID CODE

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## Acronyms

ANRE	National Heat and Power Regulatory Authority
ALSF	Automatic load shedding upon low frequency
AR	Auto reclosure
AS	Ancillary services
ASC	Automatic speed controller
AVC	Automatic voltage controller
CPD	Central Power Dispatcher
DCR	Dispatcher control regulation
DO	Distribution Operator
EDG	Electricity Distribution Grid
EGO	Emergency governmental ordinance
ETG	Electricity Transmission Grid
TPD	Territorial Power Dispatcher
DMS	Distribution Management System
EMS	Energy Management System
ETSO	European Transmission and System Operators
LPN/ETD	Specific labour protection norms in electricity transmission and distribution
NPD	National Power Grid Company – Operational Unit National Power Dispatcher
NTC	Net Transfer Capacity
OSS	Operational system services
PE	Energy Guidelines
RPS	Romanian Power System
SCADA	Supervisory control and data acquisition
SPAR	Single phase auto-reclosure
TSO	Transmission and system operator
UCTE	Union for the Coordination of Transmission of Electricity

## Definitions

Ancillary services	System services provided by network users, usually by generators upon Trans-eletrica's request. They make the resource usually purchased by Trans-eletrica on a competitive market
Applicant	Legal person, current or potential electricity transmission network user that requests a technical connection approval of grid connection
Available power	Gross lasting maximum active power that a generating unit can provide under safe mechanical and electric conditions
Average disconnection time	Average time of electricity supply disconnection calculated on a multi-annual basis
Average disconnection time (TMI)	<p>Performance parameter calculated as follows:</p> $TMI = 8760 \times 60 \times \frac{EN}{EC} \text{ [minutes/year]}$ <p>where EN is the power undelivered because of disconnections of transmission services [MWh/year], and EC is the net annual consumption of the electric power system (without its own technological consumption) [MWh/year]</p>
Co-generation	Combined heat and power generation
Competent authority	National Heat and Power Regulatory Authority
Confidentiality agreement	A document jointly signed by Trans-eletrica and the grid access applicant with respect to their mutual obligations each one assumes to observe the confidentiality of certain data and information
Congestions (grid restrictions)	Operational circumstances when electricity transmission between two system nodes or areas leads to the failure to observe the

	safe operational parameters of RPS and there is need to deviate from the merit order of dispatchable units
Connection point	Physical place in the electricity network where the electricity meter is installed
Connection request	Document requesting access to the electricity grid and issuance of connection approval
Critical state	Permanent regime when the electric installation or electric power system operates at parameters beyond normal limits
Defence plan of RPS against major disturbances	Document with technical and organisational measures meant to prevent failure spreading within RPS and to limit their consequences
Dispatchable consumer	Consumer that, in accordance with contractual agreements, reduces its load or is disconnected either directly by the TSO or by its own act upon the TSO request
Dispatchable unit	Generating unit that can be scheduled on the wholesale market and whose power falls under the following categories: <ul style="list-style-type: none"> <li>• hydro generating units greater than 10 MW</li> <li>• thermal generating units greater than 20 MW</li> </ul>
Dispatcher centre	Organisational structure vested with dispatcher control authority over certain RPS equipment and installations
Dispatcher control	Technical activity specific to the power sector performed by special units with authority over the electricity market participants in view of a coordinated operation of RPS installations and equipment requiring a uniform control
Distribution	Electricity transmission through distribution networks from the transmission grid or from generators to electricity consumers' installations

Distribution operator (distributor)	Legal person, holder of a distribution licence that owns, operate, maintains, refurbishes and develops the electricity distribution grid
Disturbed operational condition	Any condition different from the normal operational one
Electric power plant	Ensemble of installations, constructions and equipment meant for electricity generation
Electric power system	Ensemble of interconnected electric installations by means of which the electricity generation, transmission, operational control, distribution, supply and utilisation are carried out
(Electricity) consumer	Natural or legal person purchasing electricity for his/her own consumption and possibly for a sub-consumer connected to his/her installations
Electricity distribution grid	Electricity network with rated line voltage up to including 110 kV
(Electricity) generator	Natural or legal person holder of a licence, whose specific activity is electricity generation, including under co-generation
(Electricity) network/grid	Ensemble of lines, including their support and protection items, electric substations and other electric power equipment that are inter-connected. The electricity network can be for transmission or for distribution
Electricity supplier	Legal person holder of a supply licence that delivers electricity to one or several consumers under a supply contract
Electricity transmission grid	Electricity network of national and strategic interest with rated line voltage higher than 110 kV
Electricity transmission network users	Generators, consumers, distribution operators, suppliers, system and transmission service end-users
Eligible consumer	Consumer that may select its supplier and directly contract its consumption with the

	latter, having a direct access to the transmission/distribution grid
Establishment authorisation	Technical and legal document issued by ANRE under which, upon request of a Romanian or foreign person, permission is granted to set up or refurbish and commission electricity generation, transmission or distribution capacities
Failure (hazard)	Accidental event occurred within electricity generation facilities, electricity transmission and distribution networks of over 1 kV, which brings about a change in the previous operational condition of equipment by deviations of functional parameters from the regulation or contractual values or by decreasing the power generated by power plants or units, regardless of its outcomes to the consumers and irrespective of its occurrence time
Fast tertiary reserve	Power reserve provided by generating units qualified to take up the load in maximum 15 min
Fluctuating power	It is calculated using the formula $P_f = 1.4 \times \sqrt{P_c}$ , where $P_c$ is the power consumed in the area with the smallest consumption on one side or the other of the section
Functional system services	Services provided by Transelectrica and are the current TSO activity, as well as a monopoly
(Generating) unit	Set of rotating machines meant to change another form of energy into electricity
Grid access	Right of economic agents generating and/or supplying electricity, as well as of electricity consumers, to be connected and to legally use the electricity transmission and distribution grids
Grid transmission capacity	Maximum apparent power that can be circulated within the grid under safe and stable conditions while observing the rated

quality parameters	
Installed capacity	Nominal active power indicated in the technical documentation of the manufacturer, marked on the equipment plate or given by the manufacturer
Interconnection	Piece of equipment (e.g. line or transformer) by which two control areas or two power systems are connected
Licence	Legal and technical document issued by the competent authority and granting to a legal Romanian or foreign person the permission to: <ul style="list-style-type: none"> <li>- commercially operate the authorised electricity generation, transmission, distribution and metering installations</li> <li>- supply (trade) electricity</li> </ul>
Limit point	A place in which the grid user's installations are delimited as its ownership from the installations of Transelectrica/grid operator
Limit steady-state stability power in a RPS section ( $P_{limit}$ ) [MW]	Maximum active power transferable through a RPS section for which steady-state stability is preserved
Location approval	Written answer of the grid operation to an applicant's demand, specifying the former's viewpoint on the applicant's location proposal
Maintenance	Sum of all technical and organisational activities carried out to structures, installations (systems), ensembles, equipment and components in order to maintain or restore their design function
Major disturbance	Short-circuits, lines, transformer or generating units tripping, which generate significant deviations in the RPS operational parameters
Maximum admissible power ( $P_{max adm}$ )	Maximum active power transferable through a RPS section for which the rated steady-state stability reserves are observed
Merit order	Sequence under which an electricity

	generator is taken into consideration based on its bid price to cover the electricity demand within the RPS
Metering point	Point of an electricity network where the electricity metering unit is installed
N-1	<p>Rule as per, when a single grid item fails (electric line, transformer, generating unit, substation bus bar) the items remaining in operation must have the capacity to manage the changes in the current flows in the grid triggered by this single failure. This principle is satisfied if a simple contingency does not result in:</p> <ul style="list-style-type: none"> <li>• disconnections of consumers' supply</li> <li>• a stationary operational regime with exceeding of admissible current and voltage limits (set for an indefinite period) leading to equipment damage</li> <li>• a stationary operational regime where voltage values do not observe the admissible range</li> <li>• exceeding the admissible limits of short-circuit power within nodes</li> <li>• loss of RPS stability</li> <li>• tripping other grid elements, except for the equipment tripping by automations specially provided to prevent damage spreading under such circumstances</li> <li>• loss of RPS uniformity</li> </ul>
National electric power system- RPS	The electric power system located on the national territory. The Romanian Power System is the basic infrastructure jointly used by the electricity market participants
Net power	Active power that a unit can input into the electricity network. It results by deducting the consumption for the auxiliary services of the unit from the available power
Normal operational condition	Operational condition complying to the following criteria:

	<ul style="list-style-type: none"> <li>◆ operational parameters are normal functional ones;</li> <li>◆ it is a safe operational state;</li> </ul>
Normal operational diagram	Operational diagram approved by the dispatcher centre with decision-making authority for a preset time interval
Normal operational parameters of the RPS	Parameters observing the following limit values: voltage: within admissible ranges current: under the lasting maximum admissible values in grid elements frequency: 49.95 – 50.05 Hz
Norms	Standards, codes, rules, regulations, directions, technical guidelines, decisions, other legal acts, contract or official documents
Operational diagram	Electric connections diagram of equipment and primary outfits in an installation, network or power system, including the condition of relay protections and system automations
Operational planning	Transelectrica planning the normal operational diagram of the power transmission grid and the 110 kV network it manages, the operational diagram by various time horizons (month, year etc.) and reviewing the RPS operational safety
Operational scheduling	Activity of Transelectrica consisting in scheduling for a week at most the operational diagram of the electricity transmission network and of its managed 110 kV network, as well as the balance of output/consumption
Order vesting dispatcher centres with dispatcher control competence over installations (vesting order)	Document determining the dispatcher control authority over the installations and the manner in which it is exercised
Own technical consumption	Time integral over a pre-defined interval of the difference between the total active



	power upon input/output from a network from one network side or one network item
Parallel operation (under synchronism)	Operational condition of a set of a network-interconnected generating units, network where the electromotor voltages of all generating units are turning synchronously
Peak consumption (load)	Maximum value of the load recorded within a certain time interval
Plan to restore RPS operation after partial or total voltage drop (Plan to restore RPS operation)	Document with all technical and organisational measures taken in view of returning to the normal operational condition after a RPS or RPS area outage
Power objective	Set of installations, constructions and related equipment designed to generate/consume, transmit and/or distribute electricity
Power under failure	Multi-annual average value at RPS level of the unavailable power because of unplanned unit withdrawals from operation
Power under repair	Total power at RPS level of the units planned for maintenance
Primary control (frequency control, primary frequency control)	Automatic fast (<30 sec) regulation of active power of generating units from their own speed controllers with a view to keep the output consumption balance at a frequency value close to the set point one, thus providing network safety under solidarity of generator partners
Primary control reserve	Power reserve that, upon frequency deviation from set point value, can be automatically obtained in 30 seconds and can stay in operation for minimum 15 minutes
Primary voltage control band	Area in the P-Q operational diagram of a synchronous generation unit where the output/input reactive power is not paid for
Probability of load non-covering	Probability of failure to cover the consumption peak in the power system with the existing available power calculated for a year

Public (transmission) service	Activity by which the licence holder is obliged to provide indiscriminating regulated access to the transmission network to all electricity market participants as well as to other consumers directly connected to the transmission grid
Qualified supplier of ancillary services	Legal person providing one or several kinds of ancillary services qualified to this effect by Tranelectrica
RPS adequacy	Capacity of the power system to permanently cover the consumers' power and energy demands taking into account the planned or unforeseen outages
RPS operational control	Component of RPS dispatcher control consisting of a real time hierarchically exercised control by a dispatcher centre and all its subordinate units with respect to coordinating the RPS equipment and installations and to its maintaining a normal operational condition
RPS operational safety	Performance of the electric power system in provide electricity to consumers under legal limits and within required amounts. Transmission safety can be quantified by the frequency, length, probability and size of certain negative outcomes over electricity supply/transmission/generation. RPS safety can be described taking into account two basic functional sides of a power system: <ul style="list-style-type: none"> <li>• adequacy, and</li> <li>• security</li> </ul>
(RPS) section	All the lines connecting two RPS zones
RPS security	RPS capacity to manage certain sudden disturbances such as short-circuits or unforeseen loss of system elements
Safe operational condition	An operational state when the safety (N-1) principle, steady-state stability and transient stability conditions are satisfied

SCADA	Monitoring, control and data acquisition IT system
Scheduled operational diagram	Operational diagram approved by the dispatcher centre with decision-making authority for the next week-day and, as the case may be, for the weekend days preceding it taking into account the power sector circumstances, withdrawals from operation and RPS unavailability
Scheduled power	Active power planned to be generated to cover the forecasted consumption
Secondary control (frequency-power control)	Automatic centralised regulation of active power of certain designated generating units with a view to reduce frequency and the RPS balance to the set point values within 15 minutes at the most
Secondary control reserve	Power reserve that, upon deviation of frequency and/or RPS balance from set point value, can be automatically obtained within maximum 15 min
Secondary voltage control band	Areas in the P-Q operational diagrams of a synchronous generation unit where the output/input reactive power is performed at additional costs and great unit stresses, output/input reactive power being paid for
Severity indicator	<p>Performance parameter of the transmission service estimating the average disconnection time (ADT) of transmission service using the average disconnection time:</p> $SI = \frac{ADT}{NI} \text{ [minutes/disconnection]}$ <p>where:  NI is the annual number of incidents occurred within the transmission grid together with disconnections of consumers' supply</p>
Simple contingency	Outage of a single item (line, transformer, auto-transformer, generating unit) within the RPS under the proper operation of

	switching, protection and automation RPS equipment
Slow tertiary reserve	Power reserve provided by generating units whose start-up and load take-over times are lower than 7 hours
Statism (of a generating unit)	Ratio between the quasi-stationary relative frequency deviation and the relative power deviation of the unit when the speed controller operates. Such parameter is adjustable at controller level
Steady-state stability	<p>Sizing and checking principle used for observance of maximum admissible powers within RPS sections so as to provide a rated steady-state stability reserve of:</p> <ol style="list-style-type: none"> <li>1. <math>k_{res} = 20\%</math> of the limit steady-state stability power for each section, under the diagram with N items in operation</li> <li>2. <math>k_{res} = 8\%</math> of the limit steady-state stability power for each section, in case of a simple contingency, taking into consideration the fluctuating power as well.</li> </ol> <p>The maximum admissible power (<math>P_{max adm}</math>) in the sections providing a certain steady-state stability reserve is calculated using the formula:</p> $P_{max adm} = \frac{P_{limit} - P_f}{1 + \frac{k_{res} [\%]}{100}}$ <p>where:</p> <ul style="list-style-type: none"> <li>- <math>P_{limit}</math> is the limit steady-state stability power within the section</li> <li>- <math>k_{res}</math> is the rated reserve percentage (8% or 20%) of steady-state stability within the section</li> <li>- <math>P_f</math> is the fluctuating power</li> </ul>
Steady-state stability (stability)	Capacity of an electric power system to reach a state of permanent regime,

upon small disturbances)	identical to the initial one or very close to it, after any small disturbance
Steady-state stability limit within sections (see limit steady-state stability power)	Transferable maximum active power through a RPS section for which the steady-state stability is preserved
Steady-state stability reserve in a section $R_{st}$ [%]	It is calculated using the formula: $R_{st} = \{(P_{limit} - P_f - P_{operation})/P_{operation}\} \times 100\%$ where $P_{limit}$ is the limit steady-state stability power in a RPS section; $P_{operation}$ is the power transiting a RPS section in the moment of assessment; $P_f$ is the fluctuating power;
'System minutes' indicator	Performance parameter of the transmission service estimating the average annual disconnection time against the annual consumption peak: $MS = \frac{EN[MWh/year] \times 60}{PV[MW]} \text{ [system min]}$ where: EN is the energy [MWh/year] non-supplied to consumers because of transmission grid incidents PV is the annual consumption peak [MW]
System service	Service provided in order to maintain a safe operational level within the RPS, as well as good quality electricity according to applicable norms
(System) zone	Significant part of an electric power system consisting of an ensemble of lines and substations grouped according to a preset (administrative, geographical, operational etc.) principle
Technical connection approval	Written approval valid for a certain location only, to be issued by Transelectrica upon request from an user about the possibilities and conditions of transmission grid

	connection while meeting the user's requirements as specified in the request
Tele-control	Remote operation of switching and control instrumentation from another place than the control room of a substation/power plant
Tele-management	Monitoring and tele-control of a personnel free substation/power plant
Transformer and/or connection service	Provision of a change in the voltage level and/or amount of electricity transmitted to the end-user by means of the components of the provider's substation
Transient stability	Capacity of an electric power system to come back to a synchronous operational condition after one or several major disturbances
Transmission and system operator	Legal person, holder of a licence for electricity transmission and system services
Transmission service	Service provided by Transelectrica consisting in transmission of electricity amounts between two or more points of the transmission network under quality parameters
Unusable power	A part of the installed capacity that cannot be generated at a certain moment because of- lack of primary energy; temporary limitations; no discharge capacity; co-generation; insufficient sizing of cooling systems; environmental restrictions etc.

## CHAPTER 1 INTRODUCTION

### 1.1. Authority

- Art. 1. The Technical Code of the Transmission Network (hereinafter referred to as the Code) has been elaborated by the Romanian Power Grid Company TRANSELECTRICA S.A., hereinafter called Transelectrica, in compliance with the provisions of the Electricity Law no. 318/July 8<sup>th</sup>, 2003, art. 34, published in Romania's Official Gazette no. 511/July 16<sup>th</sup>, 2003, Governmental Decision (GD) no. 627/July 13<sup>th</sup>, 2000, art. 1, 6, 7, 8 and 9, published in Romania's Official Gazette no. 357/July 31<sup>st</sup>, 2000.
- Art. 2. The *Code* is approved by order of the *Competent Authority*.
- Art. 3. The *Code* is a regulatory act which is part of the system of regulations specific for electricity transmission and RPS dispatcher control.
- Art. 4. The provisions of this *Code* are in compliance with the UCTE provisions and those of Commercial Code of the Electricity Market and prevail over the economic or financial individual interests of *the transmission network* users.

### 1.2. Goal

- Art. 5. The goal of the *Code* is to determine the minimum technical rules and requirements for the electricity market participants, meant to ensure the safe, stable and cost-effective operation of the Romanian Power System.
- Art. 6. Objectives of the Code:
- a) To establish a set of rules and regulations for the users' access to the electricity transmission grid (ETG);
  - b) To determine a set of regulations and norms for the RPS dispatcher control;
  - c) To set up the responsibilities and obligations of Transelectrica and of all the ETG users;
  - d) To determine the quality technical parameters for the ETG operation;

- e) To set up the scheduling and dispatching control procedures of *generating units*, according to the electricity market rules;
- f) To set up the technical requirements for the connection to the ETG;
- g) To establish the technical requirements for dispatchable units connected to the *distribution network*;
- h) To set up the principles for the ETG development;
- i) To set up the interfaces and information flows between Traselectrica and the ETG users.

### **1.3. Field of Application**

- Art. 7. The *Code* regulates Traselectrica's activities and those of the dispatcher centres and it is indiscriminately applied to the ETG users.
- Art. 8. The users of the ETG are obliged to observe the provisions of the *Code*.

### **1.4. Attributions and Competencies**

- Art. 9. In compliance with the Electricity Law no. 318/July 16<sup>th</sup>, 203 and GD no. 627/July 13<sup>th</sup>, 2000, Traselectrica is a national interest trading company performing the following characteristic activities:
- a) *Electricity transmission service and transmission services* as the *Transmission Operator*;
  - b) Management of the Electricity Market, as the *Commercial Operator*;
  - c) Coordinator of the RPS planning and development based on the national energy policy;
  - d) Electricity metering traded on the wholesale market as metering operator;
- Art. 10. Traselectrica as the *Transmission Operator*, provides a public service to all the ETG users, enabling the indiscriminating legal access to the transmission network for any applicant observing the *Code* technical requirements.
- Art. 11. In compliance with Electricity Law no. 318/July 16<sup>th</sup>, 2003, the GD no. 627/July 13<sup>th</sup>, 2000 and this *Code*, Traselectrica as TSO carries out:



- a) The technical operation, maintenance, modernisation and development of the ETG;
  - b) The regulation and coordination of the connection services to the ETG in order to establish the technical conditions for the users' installations;
  - c) The agreements on the required electrical links and equipment for the interconnection with other power systems;
  - d) Coordinating the operation of RPS installations with a view to managing the RPS integrated operation to secure the electricity consumption under safe and qualitative conditions;
  - e) Determining the adequacy requirements for RPS under mid- and long-term studies;
  - f) Determining, contracting and managing the ancillary services;
  - g) Managing the *RPS* interconnections with other power systems;
  - h) The coordination of export, import or transit activities;
- Art. 12. Transelectrica, upon request of the competent authority and in compliance with its regulatory schedule or upon its own initiative with the competent authority's approval, reviews, updates, modifies and develops the text of the *Code* and its implementation after having also consulted other *license holders* interested in the *electricity sector*.

### **1.5. Code Administration**

- Art. 13 Transelectrica is the administrator of the *Code*.
- Art. 14 Transelectrica is entitled as *Code* Administrator to ask the ETG users to prove their observance of the *Code* provisions.
- Art. 15 Transelectrica is obliged to annually notify the *Competent Authority* about its *Code* administration in its Annual report.

**1.6. Other regulations**

- Art. 16 The *Code* application needs to observe, as the case may be, the provisions of the regulations, specifications and technical guidelines given in Appendix no. 1.
- Art. 17 The documents taken into account when elaborating this Code are:
- a) The technical code of the electricity distribution networks;
  - b) The specific labour protection norms for electricity transmission and distribution;
  - c) The general manoeuvre regulation for electric installations;
  - d) The commercial code of the wholesale electricity market;
  - e) The UCTE operation manual;

**CHAPTER 2 TRANSMISSION AND SYSTEM SERVICES****2.1. Transmission service**

- Art. 18 The transmission service is public according to the Electricity Law.
- Art. 19 Transelectrica provides the transmission service under indiscriminating conditions for the electricity network users, while observing the norms and performance indicators given in this Code.

**2.2. Activities**

- Art. 20 Transelectrica carries out the following activities under the transmission licence:
- a) It manages, operates, maintains, upgrades and develops:
    - the ETG installations (lines, equipment in connection and transformer substations, protection and automation devices etc.);

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- the metering installations for electricity wheeling through the ETG and at the interface with the transmission network users;
  - the IT and telecom installations within the RPS;
  - b) It provides the transmission service for transmission grid users through the ETG according to contracts;
  - c) It draws up:
    - the optimum development plan for the ETG using the prospective studies in accordance with the provisions of this Code;
    - the revision/repair plans for the transmission network installations;
    - the specific study and research plans for the transmission network installations;
  - d) It proposes tariffs for the transmission service according to the methodology approved by the competent authority;
  - e) It reviews and approves the compliance with the technical connection conditions by the transmission network users according to the Regulation for users' connection to the public interest electric networks and to the provisions of this Code;
  - f) It determines the tests required for network connection and for the dispatchable units connected to the distribution network and it participates into the performance of such tests according to the provisions of this Code;
  - g) It carries out, upgrades, develops, checks and periodically maintains the electricity metering systems as per the regulations in force; it sends the recorded readings to the Commercial operator; it provides access to the transmission service users to such system to check out their metering units;
  - h) It carries out, operates, upgrades and develops the protection and automation systems within the transmission network;

- i) It carries out, maintains, upgrades and develops its own IT and telecom infrastructures and provides IT and telecom services for its own needs, for the Commercial operator and third parties under specific contracts while also observing the legal provisions in force;
  - j) It carries out, maintains, upgrades and develops a centralised SCADA system and IT systems interfacing with the local SCADA ones to allow the RPS monitoring and operational control;
  - k) It monitors and evaluates the operational safety of the transmission network installations;
  - l) It evaluates the reliability indicators of installations in accordance with the provisions of applicable norms with a view to lay the grounds for the ETG development and modernisation;
  - m) It ensures the transforming and/or connection service for the ETG users.
- Art. 21 Transelectrica is obliged, within maximum 15 week days from the receipt of a contracting request for *transmission services* sent by a *licence holder* or an *eligible consumer* connected to ETG, to make an offer and, if accepted, to conclude the specific contract.
- Art. 22 Transelectrica has to provide the *transmission service* so as to fully comply with the technical conditions required for the synchronous *interconnected operation* under UCTE requirements by:
- a) providing an interconnection capacity meeting the 'N-1' safety principle under the *scheduled operational diagram*, with no negative technical or economic impact on the operation of *neighbouring electric power systems*,
  - b) an ETG equipped with protection, automation, transmission and primary switching facilities allowing a fast and efficient isolation of network hazards and avoiding their spreading;

- c) providing voltage control systems with a view to maintaining it within the limits given in this Code and performing reacting power exchanges with the neighbouring power systems;
- Art. 23 Transelectrica is responsible for the administration of technical documentations and of the *norms* regulating the design, operation, maintenance and development of the ETG installations. In this context Transelectrica has to periodically review the *norms* and submit revision proposals, when need be.

### **2.3. Technical power losses within ETG**

- Art. 24 Transelectrica manages electricity to cover the power losses within the ETG.
- Art. 25 Power losses within the ETG are covered by the generators/suppliers that have concluded contracts to that effect with Transelectrica.

### **2.4. System services**

- Art. 26 (1) Transelectrica is the single supplier of system services.  
(2) System services are performed to the benefit of all ETG users with a view to provide:
- a) a safe operation of the RPS;
  - b) an efficient running of the electricity market;
  - c) continuous electricity rated parameters to all market participants;
  - d) RPS restoration after a total black-out or a partial one.
- Art. 27 To carry out the system service Transelectrica is using:
- a) its own resources consisting of functional system services supplied using specific competencies and technical means;
  - b) purchased resources consisting of ancillary services.
- Art. 28 (1) Functional system services mean Transelectrica's operational activity and are intended to provide the following functions:
- a) operational control
  - b) operational scheduling, and
  - c) operational planning of the RPS

- (2) The rules regarding the activities in item (1) above are given in the Regulation to schedule the operation of dispatchable units- Part II and in the Regulation for dispatcher control of the RPS- Part III.
- Art. 29 Ancillary services are provided by the ETG users and are used by Tranelectrica with a view to:
- a) set-off the load variation within the RPS, respectively frequency and RPS balance control;
  - b) set-off the differences from the RPS operational schedule, respectively maintaining an active power reserve;
  - c) regulate voltage levels within the ETG;
  - d) set-off the power losses within the ETG;
  - e) restore the RPS operation after a total black-out or that of an area;
- Art. 30 Ancillary services are provided by the following means (resources):
- a) primary frequency control systems;
  - b) secondary frequency-power control system;
  - c) power reserves;
  - d) local systems of voltage control;
  - e) automation systems islanding the auxiliary services and the self-start-up of units with a view to restore the RPS operation after a total or partial black-out;
  - f) dispatchable consumers that reduce their load or can be disconnected upon Tranelectrica's discretion.
- Art. 31 Tranelectrica is liable for the safe RPS operation and therefore it controls and is unconditionally entitled to use all ancillary services.
- Art. 32 All the ETG users are obliged to provide ancillary services upon Tranelectrica's request, in accordance with the technical performance of their own installations in view of ensuring the safe RPS operation.
- Art. 33 Suppliers of ancillary services are qualified by Tranelectrica by means of specific procedures. Such procedures include the possibility to grant a short-term derogation to allow the compliance with certain qualification conditions.
- Art. 34 The ETG users that have been qualified to this respect can conclude contracts to provide ancillary services.

- Art. 35 Transelectrica requests the unconditional provision of ancillary services with a view to ensure the safe RPS operation, first from the ancillary service suppliers that have submitted bids under ancillary service contracts, than from the ETG users that are not under contracts.
- Art. 36 Ancillary services that are not contracted but are requested by Transelectrica and are delivered by the respective ancillary service suppliers will be paid for according to the specific regulations of the electricity market.

## **2.5. Ancillary services for frequency stability**

### **2.5.1. Power reserves**

- Art. 37 Power reserves are classified, depending on the time and (manual or automated) manner of actuation, as follows:
- a) primary control reserves;
  - b) secondary control reserves;
  - c) fast tertiary control reserve ('one-minute' reserve);
  - d) slow tertiary control.
- Art. 38 The main settings of the speed controller (insensitivity, permanent statism, frequency set point) and of the local convener of units participating to secondary control (unit loading/unloading rate, frequency set point, simultaneous or not simultaneous operation under primary and secondary control) are at Transelectrica's disposal within stated limits proven upon start-up.

### **2.5.2. Primary control reserve**

- Art. 39 The primary control reserve has to be called up automatically and fully within maximum 30 s upon a quasi-stationary frequency deviation of  $\pm 200$  mHz from the set point value and has to stay operational for minimum 15 minutes if the deviation lasts.
- Art. 40 All electricity generators are obliged to provide primary control as per Transelectrica's request by means of their own dispatchable units or in cooperation with other generators.

- Art. 41 The primary control reserve has to be distributed as uniformly as possible within the RPS.
- Art. 42 The producers' generation offers will take into account the obligation to maintain the primary control reserve available, in accordance with the technical performance of each generating unit.

### **2.5.3. Secondary control reserve**

- Art. 43 The secondary control reserve is the backup amount of power which, upon frequency and/or RPS balance deviation from the set point value, can be fully automatically obtained within maximum 15 minutes.
- Art. 44 The secondary control reserve is meant to participate to restoring the primary control reserve and to reduce frequency and the RPS balance to the scheduled value.
- Art. 45 Transelectrica determines the required secondary control reserve and its distribution by units both with respect to units scheduling and planning and to their dispatching.
- Art. 46 Generators provide the secondary control reserve as per Transelectrica's request, within the technical limits of their units.

### **2.5.4. Tertiary control reserve ('one-minute' reserve)**

- Art. 47 The tertiary control reserve ('one-minute' reserve) is meant to rapidly restore (max. 15 minutes) the secondary control reserve and to participate into the control of the scheduled frequency and RPS balance.
- Art. 48 The 'one-minute' reserve is supplied as revolving reserve or as fast tertiary reserve.
- Art. 49 The 'one-minute' reserve is loaded by generators upon Transelectrica's request, for a certain time interval.

### **2.5.5. Slow tertiary control**

- Art. 50 The slow tertiary control is meant to restore the 'one-minute' reserve thus providing the output – consumption balance in case lasting deviations from the preset schedule occur.
- Art. 51 The slow tertiary control is loaded by generators upon Transelectrica's request, for a certain time interval.



## **2.6. Ancillary services for voltage stability**

- Art. 52 Transelectrica coordinates voltage stability by participating with its own installations controlling the generators, Transelectrica and the consumers. Voltage stability within border nodes is achieved in cooperation with the TSOs of neighbouring power systems.
- Art. 53 Generators are obliged to provide reactive power output/input by generating units upon Transelectrica's request according to the ETG connection conditions.
- Art. 54 Transelectrica, the distributors and consumers connected to the ETG have to set-off their reactive power consumption/output from their own network. Exchanges of reactive power can be admitted between the ETG and the distribution networks or the users connected to the ETG provided this does not impact the operational safety of the RPS.
- Art. 55 Reactive power exchanges between the ETG and distribution networks or the users connected to the ETG that impact the economic operation of the respective partners can be carried out under agreements between them.

## **2.7. Ancillary services for restoration of RPS operation upon black-out**

- Art. 56 The fast restoration of RPS operation is performed using voltage sources that can be:
- a) generating units with self-start-up;
  - b) isolated generating units for auxiliary services;
  - c) islanded generating units to a consumption area;
  - d) interconnections with the neighbouring power systems.
- Art. 57 Voltage sources have to allow re-feeding the auxiliary services of generating units that could not be isolated on theirs, as well as of power plants and substations included within the restoration routes.
- Art. 58 Participation of generating units to restoring the RPS operation is provided under the connection conditions and/or the Plan for RPS operational restoration, depending on the RPS requirements.
- Art. 59 Generators have to provide isolation in each power plant of at least a generating unit for auxiliary services.

- Art. 60 Transelectrica elaborates and periodically reviews the Plan for RPS operational restoration.
- Art. 61 Transelectrica coordinates the plans to restore the operation of interconnected power systems in cooperation with the operators of neighbouring systems.
- Art. 62 Transelectrica together with the ETG users determines the right to resort to auxiliary service isolation; to islanding onto a consumption area, and to self-starting of generating units in order to provide the 'operational restoration' function as per the connection conditions.
- Art. 63 ETG users are obliged to cooperate with Transelectrica in elaborating the Plan for RPS operational restoration and in testing it.
- Art. 64 The measures for RPS operational restoring are taken by Transelectrica, generators and distributors under Transelectrica's coordination according to the Plans for RPS operational restoration, depending on the actual circumstances of each case.
- Art. 65 ETG users are obliged to take action in order to restore the RPS operation and to prove to Transelectrica their capacity to meet the qualification conditions.
- Art. 66 During RPS operational restoration each distributor and consumer complies with Transelectrica's orders regarding the time staging of consumption restoration and its size.

### **2.8. Consumers' availability to automatically or manually reduce their load**

- Art. 67 Manual or automatic consumption disconnection is required in order to allow RPS operation under exceptional conditions when temporary energy or power deficits occur.
- Art. 68 Consumption is disconnected according to specific procedures approved by the competent authority.

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- Art. 69 Half-annually Transelectrica reviews the lists from the *Norm of manual disconnections for certain categories of electricity consumers* and the *Norm for electricity consumption limiting by stages under particular circumstance within RPS*. To this effect Transelectrica receives from distribution operators the data required about the consumers connected to the distribution network.

## **2.9. Requirements for the tele-information system need for system services within RPS (dispatcher control)**

- Art. 70 The IT system comprises all the technical equipment- hardware and software- providing in real time and outside the real time information as required for the dispatcher control of electric installations (measures, signals, warnings, instructions, settings etc.).
- Art. 71 The IT system corresponds to the centralised hierarchical structure of RPS dispatcher control.
- Art. 72 The IT system comprises data acquisition, transmission and processing equipment in electric installations and/or dispatcher centres: their own IT process system, voice and data telecom system, remote control and telemanagement systems, including the protections and other technical means.
- Art. 73 IT systems used for dispatcher control are supplied from uninterruptible sources.

### **2.9.1 System of automatic data acquisition and processing (EMS SCADA)**

- Art. 74 Transelectrica's dispatcher centres have to be equipped with their own automatic data acquisition and processing system (EMS SCADA) for the transmission network and hydropower plants/developments comprising dispatchable units.
- Art. 75 Dispatcher centres of distribution operators have to be equipped with their own automatic data acquisition and processing system (DMS SCADA) for the 110 kV network that can operate in loops, as well as for the non-dispatchable generating units discharging into the electricity distribution network.

- Art. 76 Real time exchanges of data are performed between the EMS SCADA systems of Transelectrica and the DMS SCADA ones from distribution operators, in accordance with the RPS dispatcher control requirements. Such exchanges are performed under agreements concluded between the parties.
- Art. 77 The information upgrading type, volume and rate of each EMS/DMS SCADA system and installation are determined taking into account the dispatcher control requirements.
- Art. 78 EMS/DMS SCADA systems have to allow archiving the information required in the review of RPS operation according to the dispatcher control requirements.
- Art. 79 EMS/DMS SCADA systems have to provide data validation and their manual insertion in case of need.
- Art. 80 The manager of each installation connected to the electricity transmission or distribution network has to provide information gathering and transmission to the EMS/DMS SCADA systems according to Transelectrica's demands and to those of the distribution operators.
- Art. 81 The user will ask for the requirements of the previous article from the very design stages. Their implementation is a pre-requisite for granting the connection approval.

**2.9.2. Voice telecommunication system**

- Art. 82 Voice telecommunication connections for dispatcher control are performed by their own and/or rented transmission paths.
- Art. 83 All dispatcher centres have to be equipped with their own telephone exchanges and installations to automatically record the operational calls.
- Art. 84 Power plants with dispatchable units and electric substations within the ETG have to be equipped with their own telephone exchanges.
- Art. 85 The NPD has to dispose of direct telephone connections with the TSOs of neighbouring power systems.
- Art. 86 Power plants with non-dispatchable and electric substations from the distribution network have to be provided with direct telephone connections to dispatching centres.

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- Art. 87 Electric substations from the ETG that also operate at 110 kV and below have to be provided with telephone connections also to the dispatcher centres of direct control into such substations.
- Art. 88 Dispatcher centres with operational/functional subordination relations have to be provided with telephone connections between them by means of two independent paths, of which at least a direct one.
- Art. 89 All dispatcher centres will be compulsorily provided with a telephone connection to a public network.
- Art. 90 Dispatcher centres non-subordinated in operational terms but with operation relations among them are provided with direct telephone connections, as the case may be, depending on the significance and volume of operational relations between them or on the need to have backup connections.
- Art. 91 Power plants and electric substations under the direct control of CPD and TPD have to be provided with at least two direct voice telecom circuits to the respective dispatcher.
- Art. 92 The building of telephone connections to dispatcher centres is the obligation of the respective power plant and substation managers.
- Art. 93 The operators and operational control personnel are given priority when making telecom connections with a view to allow them to make operational calls. To this effect, all telecom connections are performed by means of dispatcher telephone exchanges- if they also serve other departments- provided with the technical possibility for the dispatcher to take over the telephone connection in case of need.
- Art. 94 Managerial units are obliged to provide building, leasing, maintenance and payment for the telecom and tele-mechanical connections required between their own installations and the dispatcher centre with direct control over them and between their own dispatcher centre and the higher one. Connections provided through the NPD own telecom network are made and maintained under agreement with it.

Art. 95 Interventions to remedy the failures of telecom connections under the operational control activity are performed within as short as possible an interval, with a view to provide a normal operation of dispatcher control.

### **2.9.3 Central frequency-power regulator**

Art. 96 CPD is equipped with a central frequency-power regulator whose technical performance complies with UCTE requirements.

Art. 97 The central frequency-power regulator has to allow connecting all qualified units for secondary control services.

### **2.9.4 Tele-information system for data exchange with the TSOs within UCTE**

Art. 98 Transelectrica is connected to the electronic bus of TSOs from UCTE by means of an ETSO node while observing the technical and organisational conditions required by UCTE.

Art. 99 Real time data exchanges are performed between the EMS SCADA system and the ETSO node.

## **CHAPTER 3 QUALITY REQUIREMENTS FOR TRANSMISSION AND SYSTEM SERVICES**

### **3.1. RPS frequency**

Art.100 The rated frequency within RPS is of 50 Hz.

Art.101 The frequency rated variation limits are as follows:

- a) 47.00 – 52.00 Hz for 100% of the year;
- b) 49.50 – 50.50 Hz for 99,5% of the year;
- c) 49.75 – 50.25 Hz for 95% of the week;
- d) 49.90 – 50.10 Hz for 90% of the week.

Art.102 The set point frequencies are 49.99, 50.00, 50.01 Hz. Exceptionally, these can be 49.95 and 50.05 Hz.

Art.103 Upon interconnected operation to other power systems ALSF automations have no conditions to operate in case the greatest generating unit is tripping, and frequency returns to a quasi-stationary value falling within rated limits by using the primary, secondary and tertiary control reserves.

### 3.2. Voltage within the transmission grid and the 110 kV network

Art.104 Rated voltage values within the ETG and the 110 kV networks are as follows- 750 kV, 400 kV, 220 kV and 110 kV.

Art.105 Normal voltage values are considered those falling within the admissible voltage ranges as follows:

- a) in any point of the 750 kV network, the admissible voltage range is between 735 and 765 kV;
- b) in any point of the 400 kV network, the admissible voltage range is between 380 and 420 kV;
- c) in any point of the 220 kV network, the admissible voltage range is between 198 and 242 kV;
- d) in any point of the 110 kV network, the admissible voltage range is between 99 and 121 kV.

### 3.3. Quality of voltage and current curves

Art.106 The quality of voltage and current curves corresponds to the applicable technical regulations according to what is given in Table 1.

**Table no. 1: Quality requirements of voltage and current curves**

<b>Object of regulation</b>	<b>Provision</b>
Shape of voltage curve	Total harmonic distortion factor: 3% (at high voltage*). The admissible values for harmonic level are indicated
The ratio between negative and positive sequences	Non-symmetry factor of negative sequence: 1% high voltage*

\* high voltage  $\geq$  110 kV

**3.4. Operational safety**

- Art. 107 The ETG is sized and operated such as to observe the (N-1) safety, *the steady-state stability* and the transient stability conditions.
- Art. 108 Exceptions from this rule are the cases of consumers or of consumption areas that are in radial supply under the scheduled diagram through a single network item (line, transformer or auto-transformer) without a backup in another network item, as well as the cases of generating units connected to the RPS by means of a single network item.
- Art. 109 A probable event resulting in disconnection of RPS elements (generating units, ETG items, by-pass installations etc.) must not impact the safety of interconnected operation, determining cascade tripping or the loss of a great consumption amount; grid items remaining in operation have to be able to withstand the resulting additional load, the voltage deviation and the transient regime produced by the initial fault.
- Art. 110 Transelectrica defines the set of probable contingencies taken into account when planning and operationally scheduling in real time as well with a view to meet the above condition.
- Art. 111 In case of major disturbances that endanger the RPS operation in its whole or an important part of it, automatic and/or manual measures are at Transelectrica's disposal for conformity with the Norm of manual disconnection of certain types of electricity consumers, Norm of electricity consumption limitation by levels under particular events within the RPS, RPS Defence plan against major disturbances and the Plan for RPS operation restoring.
- Art. 112 Transelectrica is responsible for the assessment of performance indicators at ETG level in accordance with applicable provisions aligned to European norms.
- Art. 113 The performance indicators calculated are:
- a) *average disconnection time*;
  - b) *severity indicator*;
  - c) *'system minutes' indicator*.
- Art. 114 The safety indicators calculated for each node of ETG are:
- a) average disconnection duration;



- b) average number of disconnections followed by repair works;
- c) average number of disconnections followed by switching.

### **3.5. N-1 applied in the dispatcher control of the transmission grid**

Art. 115 (N-1) applied in ETG operation is complied with if a simple contingency does not result in:

- a) disconnections of electricity consumers' supply;
- b) passing into a steady-state operational regime exceeding the admissible current limits (set for an indefinite interval and respectively for a limited time interval) and the voltage limits resulting in equipment damage;
- c) passing into a steady-state operational regime where the voltage levels do not fall within admissible ranges, a voltage drop to 360 kV is admitted as observant of the safety principle (in the 400 kV network), to 180 kV (in the 220 kV network), 90 kV (in the 110 kV network) after a contingency, if by loading/unloading measures to certain units and/or by changing the network configuration, the normal values are returned to within 15 minutes;
- d) exceeding the admissible limits of short-circuit power within nodes;
- e) loss of RPS stability;
- f) tripping other ETG equipment, except for those with automatic tripping especially provided against failure spreading under the respective circumstances;
- g) loosing the unitary feature of ETG

Art. 116 A simple contingency means the tripping of a single RPS element, which may be:

- a) a line circuit;
- b) both circuits of a double circuit line on common poles, if the joint segment length is bigger than 10 km;
- c) a transformer or an auto-transformer;

- d) a (capacitive or inductive) set-off piece of equipment;
- e) one or several generating units in case they are grid connected through one element;
- f) a concentrated consumption when RPS protections and automations are operating accurately.

## **CHAPTER 4 PLANNING THE POWER GRID DEVELOPMENT**

### **4.1. Tasks and competencies**

- Art. 117 The planning activity for ETG development within the RPS is carried out by Tranelectrica in compliance with the competencies and tasks established through the Electricity Law no. 318/July 16<sup>th</sup>, 2003.
- Art. 118 (1) In accordance with the Electricity Law no. 318/July 16<sup>th</sup>, 2003 Tranelectrica is obliged to draw up a prospective plan for each successive decade, updated every 2 years, regarding electricity transmission according to the current state and future development of electricity consumption, including the financing and investment methods taking into account also the land development plans with crossings of transmission installations. This plan will be carried out taking into account the present stage and future evolution of electricity consumption, the financing possibilities and investment development included; the development and systematization plans of the territory crossed by electricity transmission equipment will be also considered.  
(2) The technical design criteria as well as the procedures and norms applied when planning the ETG development have to be observed by all ETG users in designing the development of their own grid connection installations.
- Art. 119 The ETG development planning is carried out in accordance with the national energy strategy and policy.
- Art. 120 The data required for ETG development planning must be supplied to Tranelectrica by the ETG users as follows:

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- a) All the *generators* which are authorised and/or licensed or which are to be authorised by the competent authority;
- b) All the *distributors* and *eligible consumers* which are authorised and/or licensed, or underway, by the *competent authority*;
- c) All the *suppliers* licensed by the *competent authority*.
- Art. 121 The future development plan is submitted for acknowledgement to the *competent authority* and for approval to the ministry in charge. The plan is a public document which is loaded on Transelectrica's web page.
- Art. 122 The ETG future development plan has to provide:
- a) Covering the electricity consumption at least-costs, under reliable conditions, by observing the state energy policy;
- b) Correlation of the activities undertaken by Transelectrica with those of the market participants related to any requested service which may impact the RPS safe operation;
- c) Zone opportunities for new ETG connection and utilisation depending on the consumption forecast and the need of new installed capacities for an efficient and reliable operation;
- d) Setting up the reserve level within the RPS for the *electricity generation* and *transmission* under *peak load* conditions, according to the sizing requirements;

#### **4.2. Planning goals for grid development**

- Art. 123 ETG planning development activity aims at achieving the following goals:
- a) providing ETG development so as to be properly sized for the *transmission* of electricity forecasted to be generated, imported, exported and transited and to develop a long-run development plan;
- b) providing RPS safe and reliable operation and enabling electricity *transmission* at the required frequency and voltage quality levels according to the provisions of this Code;
- c) putting to value the outcomes of the RPS development planning by means of:

- i) procedures to promote new investments in the ETG;
- ii) assessing long-term marginal costs for each ETG node;
- iii) providing information for the transmission tariff development.

### **4.3 Drawing up the grid development plan**

Art. 124 Drawing up the ETG development plan is based on the following input data:

- a) actual consumption forecast provided by National Forecast Commission as per GD no. 757/2003 published in Romania's Official Gazette no. 570/July 10<sup>th</sup>, 2003;
- b) current situation and that for future 10 years of consumption demand, provided by suppliers and eligible consumers, holders of a licence or underway;
- c) electricity generation offers of the *generators* for minimum 10 years, actual or prospective licence holders;
- d) technical data required for ETG development planning provided by the DO at Transelectrica's request in accordance with applicable norms;
- e) safety operation level of the RPS in its whole and in each node, according to the regulations in force;
- f) probability of load non-coverage;
- g) development strategy of the telecommunication infrastructure;

Art. 125 Other categories of data, necessary for planning the *transmission network* development will be provided at the special request of Transelectrica.

### **4.4. N-1 applied in the grid development planning**

Art. 126 ETG sizing is performed in compliance with the (N-1) principle.

Art. 127 (N-1) is used to technically justify the ETG development proposals.

Art. 128 Checking the (N-1) principle is performed for the maximum forecasted power transfer through the ETG.

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- Art. 129 (N-1) is applied to the 400 kV and 220 kV networks while sizing a RPS section for a time interval corresponding to the most difficult operating conditions, by taking into consideration:
- a) an unplanned outage of the biggest generating unit in an area with a power deficit;
  - b) the maximum power generated in an excess area;
- Art. 130 N-2 is used in order to size the system discharge of power generated in nuclear power plants.

#### **4.5. Technical criteria to check the grid sizing in terms of RPS stability**

- Art. 131 Technical criteria to check up the ETG sizing at the maximum allowable loading established under steady-state stability criteria:
- a) The ETG verification at the maximum load admitted by the steady-state stability criteria is performed for 10 years ahead for the *network* configuration technically and economically considered as optimum.
  - b) At the annual peak load, the ETG has to provide a *steady-state stability reserve* of at least 20% in a configuration with all electric lines in operation and a reserve of at least 8% under an operating mode with (N-1) elements in operation.
- Art. 132 Technical criteria to check up the ETG sizing under *transient stability* conditions:
- a) The ETG verification under *transient stability* conditions is carried out over a less than 5 years' horizon for a configuration meeting the *steady-state stability criteria*;
  - b) Verification of the *transient stability* conditions is performed for the following types of *disturbances*:
    - within a configuration with (n) elements in operation: multi-phase permanent *short-circuit* (two-phase to earth or three-phase) on a 400 kV or 220 kV electric line, isolated by appropriate operation of the basic protections and circuit breakers;

- within the configuration with (N-1) elements in operation:
  - One-phase short-circuit on a 400 kV or 220 kV electric line, eliminated by properly driving the basic protections and breakers, followed by a successful AR;
  - Multi-phase permanent *short-circuit* (two-phase to earth or three-phase) on a 400 kV or 220 kV electric line, isolated by the correct operation of the basic protections and breakers for the summer *peak load*.

#### **4.6. Technical criteria to size the facilities setting off reactive power**

- Art. 133 Reactive power set-off installations are sized by observing the admissible voltage ranges within all ETG nodes, under all operating conditions, within configurations with (n) and (n-1) elements in operation.
- Art. 134 Sizing the reactive power installations as required by optimum RPS operation with a view to keep voltage within the admissible range and to reduce power losses under normal operation is performed for a 5 years' time horizon under maximum ETG loading regimes.
- Art. 135 Sizing the reactive power intake installations with a view to maintain voltage within admissible ranges is carried out for a 5 years' time horizon under minimum ETG loading regimes.

#### **4.7 Checking and determining the short-circuit ceiling and the rated equipment current**

- Art. 136 Determining and checking the short-circuit currents and the rated current of primary switching equipment in ETG nodes is performed by RPS development stages under the future development plan.

#### **4.8 Other provisions**

- Art. 137 The efficiency of the short and medium term investments in ETG has to be justified in the planning stage, using at least the updated payback time.

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Art. 138 The ETG long-run planning studies (10 years) have to provide hierarchical development solutions based on economic criteria.

## **CHAPTER 5 CONNECTION CONDITIONS TO THE POWER GRID**

### **5.1. Introduction**

Art. 139 Transelectrica has to ensure the regulated access to the ETN.

### **5.2. Stages of grid connection**

Art. 140 The ETG connection process is regulated under the following documents:

- a. Regulation for users' connection to public interest electricity networks (approved by GD no. 867/2003);
- b. Regulation for electricity supply to consumers (approved by GD no. 1007/2003);
- c. Methodology for issuance of location approvals by network operators (approved by ANRE order no. 38/2003);
- d. Procedure regarding the cooperation of distribution, transmission and system operators with a view to approve users' connection to electricity networks (approved by ANRE decision no. 245/2003);
- e. Procedure to solve disputes regarding users' connection to public interest electricity networks and issuance of location approvals (approved by ANRE decision no. 18/2004);

Art. 141 The stages of ETG connection are as follows:

- g) approval of location;
- h) issuance of technical connection approval;
- i) concluding the connection contract;
- j) making the actual connection operations;
- k) making tests to the users' installations with a view to prepare their start-up;

- l) commissioning the connection installations;
  - m) energising the installations.
- Art. 142 To get the location approval, the applicant submits attached to its application the documentation depending on the construction/objective/installation class for which the approval is issued. According to each case, this includes:
- a) coexistence study to determine the compatibility degree and conditions between the ETG and construction/objective/installation;
  - b) copy urbanism certificate;
  - c) plan for area fitting;
  - d) situation plan with the objective location, approved as-built by the certificate issuer, including the appendixes if need be for line routes, profile and/or sections; these have to clearly show the coordinates of the future construction or installation in horizontal and vertical plans against the landmarks, and to allow determining the position against the ETG installations in the area;
  - e) proof of tariff payment for the location approval issuance.
- Art. 143 Upon the request of any applicant (electricity generator, distributor, supplier, eligible consumer) for a new connection or for modification of an existing ETG connection, Transelectrica proceeds as follows:
- a) analysis of the connection application and the attached technical documentation using its own procedure; the procedure includes the modality and terms for the issuance of technical connection approval, the content of technical documentation, as well as a list of other documents required while observing the provisions of documents given in art. 140;
  - b) issuance of the technical connection approval;
  - c) proposes the connection contract (using a framework connection contract, the technical connection approval given by Transelectrica and the establishment authorisation issued by the competent authority), comprising at least the following:
    - the work to be carried out to make the ETG connection



- the work needed to extend or consolidate the ETG as required by the work for the respective connection
- variants for connection staging
- services that Transelectrica provides for the operation of the connection
- connection tariff

The work execution contract for the proper connection and/or the consolidation work or ETG development upstream has to specify the conditions for access and work execution.

Art. 144 The connection application requires specifying at least the following data:

- a) the applicant holder of a licence for its activity (name, address and telephone, fax nos. and e-mail address);
- b) the subject matter of the connection application (generating units, distribution installations, consumer installations etc. including the location);
- c) the applicant's commitment to comply with the Code;
- d) the list of documents attached to the connection application.

Art. 145 The documentation relating to the connection application will comprise:

- a) solution study for ETG connection;
- b) for generating units- the data given in appendix no. 2 (tables 1 and 3);
- c) for distribution installations, consumer installations- the data given in appendix no. 2 (tables 2, 3 and 4);
- d) for reactive power offset installations- the data given in appendix no. 2 (table 4);
- e) for other installations, Transelectrica determines the technical data upon submission of the connection application;
- f) for all types of installations:
  - the safety level of supply requested by the applicant

- the staging proposal with respect to the following project stages: design, execution, tests, commissioning.
- Art. 146 Transelectrica will request additional data any time this is needed.
- Art. 147 With a view to issue the technical connection approval, Transelectrica reviews:
- a) whether the connection falls within the transmission capacity of the ETG;
  - b) the connection possibilities;
  - c) solutions of connection in the requested location in terms of:
    - safety level
    - short-circuit current
    - impacts over the technical losses within ETG
    - supply to auxiliary services of generating units
  - d) the evaluation of the manner in which the existing ETG transmission capacity is used;
  - e) the selection of the best solution in terms of ETG ensemble;
  - f) identifying the needs for ETG strengthening;
  - g) evaluating the costs for ETG upon the applicants' requests;
  - h) compliance with the connection conditions;
  - i) compliance with the Code provisions.
- Art. 148 If after such review it follows the best connection solution is for 110 kV or less, into the distribution network installations, then the connection request is submitted to the DO with a licence for that distribution network area.
- Art. 149 The *technical connection approval* issued by the *Transelectrica* includes:
- a) terms and general conditions for the connection;
  - b) description of the connection solution also including the works to be carried out for the ETG extension or strengthening, required by the development or modification of the respective connection;
  - c) the specific connection conditions;
  - d) conformity to the *Code*;

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- e) Transelectrica's requirements concerning the connecting installations of the ETG users;
  - f) monitoring and control requirements, including the interface with SCADA and telecommunications systems;
  - g) the registered data, to be verified during operation;
  - h) assessment of the costs for:
    - ETG strengthening work
    - Works to make the installations between the connection point and the delimiting one outside Transelectrica's responsibility, which are on behalf of the applicant;
  - i) the ETG safety level in the *connection point*;
  - j) obligations related to the *applicant's* participation in the *RPS Protection Plan against major disturbances* and the *Plan to Restore RPS Operation*;
  - k) specific requirements and conditions for the *ancillary services* supplied to Transelectrica;
  - l) requirements related to protections and automation to ETG interface;
  - m) conditions when the user can be disconnected from the ETG by Transelectrica;
  - n) requirements for the main metering, control, protection and automation equipment within the *user's* installations;
  - o) approved connection power and its development;
  - p) validity term of the technical connection approval;
  - q) nomination of other approvals and agreements, as the case may be.
- Art. 150 The technical connection approval is granted within maximum 90 calendar days from Transelectrica's registration date of the *connection application* and its complete related documentation.
- Art. 151 Getting the establishment authorisation from the *competent authority* based the *technical connection approval* obliges Transelectrica to take the authorised legal person into account within the long-term Plan, considering the communicated standard planning data (appendix 2).

**5.3. Grid technical connection requirements**

- Art. 152 (1) The technical requirements for connection are:
- a) the technical conditions provided by Transelectrica in the *connection points* in agreement with the *norms* of this *Code*;
  - b) the connection, design and operation technical requirements for the *ETG users*.
- (2) The connection technical requirements are similar for all the *ETG users* of the same category (generators, consumers and distributors).
- (3) The equipment and outfits in the substations connecting the *ETG users* installations and the *ETG* have to meet the applicable technical *norms* in Romania.
- (4) The connections between the *users'* installations and the *ETG* have to be controlled by means of circuit breakers able to disconnect the maximum short-circuit current in the connection point without generating switching over-voltages beyond the admitted technical *norms* in force;
- (5) The analyses to determine the *short-circuit* stress and the rated current in the primary switching equipment within the *connection points* are carried out by Transelectrica for each *connection application*.
- (6) The installation protections within the *connection points* between the *users* and *ETG* have to observe the minimum requirements according to the technical *norms* in force, such as to minimise the impact of the failures in the *users'* installations upon the *ETG*.
- (7) The time to eliminate the faults by means of the user's basic and back-up protections are determined by Transelectrica and will be specified in the technical connection approval.
- (8) The minimum technical conditions for grounding the users' installations have to comply with the technical requirements from the applicable technical norms.

## 5.4. Requirements for grid users

### 5.4.1 Dispatchable generating units connected to public interest grids

- Art. 153 Any *generating unit* has to be able to generate the rated active power at RPS frequencies ranging between 49.5 and 50.5 Hz.
- Art. 154 Any *generating unit* has to be able to simultaneously generate the rated active and reactive powers, according to their operational diagram P-Q, within the frequency range 49.5 - 50.5 Hz for the entire voltage range as provided in this Code.
- Art. 155 Any *generating unit* has to be able to generate the reactive power required by Transelectrica, according to its P-Q operating diagram.
- Art 156 In case of the stability loss, the *generating units* should be provided with the necessary devices for the automatic disconnection from the system.
- Art. 157 Dispatchable units have to be able to contribute to the primary frequency control by permanently varying the supplied active power. Excepted are the backpressure turbine units.
- Art. 158 Each *generating unit* should be equipped with an automatic speed controller able to provide every moment turbine safety and to acquire the power of primary control at high response rate (in less than 30 seconds).
- Art. 159 When a *generating unit* is insulated from the rest of RPS on local consumption, the speed controller has to be able to control frequency within 49-52 Hz.
- Art. 160 The power variation controlled by the ASC of thermal dispatchable units has to be withstand by the boiler upon automatic operation of the load control loop under the regime 'turbine governs boiler'. The set point of the main boiler control loops takes into account the ASC-requested power variation upon frequency deviation.

- Art. 161 The automatic speed controller of the *generating units* in art. 157 should enable an adjustable value of statism between 2% ÷ 12%, the dead band of the entire control system should be less than  $\pm 10$  mHz, and the frequency set point should be adjustable within the 47.5 and 52 Hz range.
- Art. 162 Dispatchable units have to be able to operate stably for indefinite time upon a power ranging at least 40%-100% from the rated value. Co-generation units are excepted.
- Art. 163 For each generating unit specified in art. 157, the statism, insensitivity- for digital controllers, primary control reserve values as well as the frequency set point are set according to Transelectrica's orders.
- Art. 164 Transelectrica determines the load/unload rate in secondary control, the control range within the set and applied secondary control limits for the generating units provided to operate under secondary control.
- Art. 165 Generating units operating under secondary control must be able to operate under primary control at the same time.
- Art. 166 Each *generating unit* has to be able to load/unload the *primary control reserve* in less than 30 seconds when a  $\pm 200$  mHz quasi-stationary frequency deviation occurs and to maintain it at least 15 minutes.
- Art. 167 Each *dispatchable generating unit* has to be equipped with an excitation control system, able to contribute to voltage control through the continuous variation of the input/output reactive power.
- Art. 168 Each *dispatchable generating unit* has to be equipped with an automatic voltage controller permanently in operation.
- Art. 169 The excitation control system, including the automatic voltage controller and the stabilising systems that dampen active power oscillations when required out of system conditions consideration will be specified in the technical connection approval. Stabilisation systems are set according to Transelectrica's guidelines.

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- Art. 170 New *generating units* should be able to separate from RPS from any operation point of their P-Q diagram and operate onto auxiliary supply at least for 1 hour and under islanding conditions exceeding the technical minimum- at least 3 hours with a view to restore the RPS operation. Gas and backpressure turbine units are excepted.
- Art. 171 The ETG is obliged to incorporate *generating units* with black-start capability. Transelectrica can impose this requirement in the *technical connection approval* if the *generating unit* location requires this service.
- Art. 172 The *generators*, which are considered technically able to supply *ancillary services*, have to supply such services at Transelectrica's request even if they have not been contracted.
- Art. 173 On-line monitoring equipment is requested by Transelectrica for certain *generating units* in order to ensure in real time (or short delayed ) information on:
- a) state indicators;
  - b) protection operation;
  - c) measurable quantities;
- Art. 174 On-line control equipment is requested by Transelectrica for certain *generating units* in order to control the generated active and reactive power, load/unload, start-up/shut-down, passing from compensation into generation regime and reverse.
- Art. 175 The generator connected to the RPS is obliged to notify Transelectrica about each updating or replacement of its automatic voltage and speed controllers and to submit the technical documents of the new regulators from the very contracting stage, as well as the detailed schedules of performance tests.
- 5.4.2. Requirements for the telecommunication equipment**
- Art. 176 *Generating units* should ensure the electricity supply for monitoring and control installations, such as they may be available at least 3 hours after de-energising in the *connection point* of the respective *generating units*.

- Art. 177 The *generator* should ensure at performance levels requested by Traselectrica, back-up communication paths from the monitoring and *secondary control* installations of any of the *generating units* towards the interface with Traselectrica in a location accepted by it. Construction and maintenance of the communication path between the user and Traselectrica's interface is on behalf of the user.
- Art. 178 The telecommunications system on the *generating unit* interface with Traselectrica is provided under the responsibility of the latter.

#### **5.4.3 Installations of the DO and consumers**

- Art. 179 The higher voltage windings of the three-phase transformers connected to ETG at 110 kV rated voltages or higher should be star-connected with either accessible neutral (null point) or to a neutral rigidly earthed.
- Art. 180 The group of connections for the transformers connected to the ETG has to be specified by Traselectrica in the *technical connection approval*.
- Art. 181 Each ETN-connected *distribution operator* and *eligible consumer* has to ensure the automatic disconnection of a consumption amount established by Traselectrica at low frequency and/or voltage. The *technical connection approval* and the operation agreement will establish the way in which the consumption can be disconnected at low frequency and/or voltage.
- Art. 182 In accordance with the Traselectrica-elaborated RPS Protection Plan against major disturbances, DO and consumers connected to the ETG (as the case may be) are obliged to ensure and maintain operational installations providing:
- a) automatic disconnection of a consumption amount upon frequency drop;
  - b) automatic disconnection of a consumption upon voltage drop;
  - c) automatic disconnection of a consumption using other considerations, as per Traselectrica's requirements.



- Art. 183 The *distributor operators* and *eligible consumers* connected to the ETG are obliged, at Transelectrica's request, to apply the provisions of the manual disconnection norm for some categories of electricity consumers.
- Art. 184 The *distributor operators* and *eligible consumers* connected to the ETG are obliged, at Transelectrica's request, to apply the provisions of the norm limiting the electricity consumption under particular RPS circumstances, which is approved by the competent ministry.
- Art. 185 The DO and consumers connected to the ETG are obliged to participate into voltage control into the connection nodes.
- Art. 186 Transelectrica is entitled to request justifiably certain users to install active and reactive power control equipment with a view to provide a safe RPS operation.

#### **5.4.4 Telecom, data acquisition and tele-metering systems**

- Art. 187 In order to manage and control the installations within the RPS, the telecommunications installations between the ETG users and ETG operators will observe the specific *norms* in force. The technical connection approval determines the details of the telecommunication system connection.
- Art. 188 The *users* are obliged to give full access to the outputs of their own voltage, current, frequency, active and reactive power metering systems and also to the information regarding the switching equipment indicating the condition of installations and warning signals, in order to transfer such information towards the SCADA and tele-metering system interface/ETG.
- Art. 189 The *technical connection approval* establishes the data control and acquisition installations as interface systems between the user and the ETG.
- Art. 190 The *users* will make compatible their data exchange equipment at the level of the interface with Transelectrica's tele-information system characteristics.

## CHAPTER 6            TESTING, CONTROL, MONITORING

### 6.1            Introduction

Art. 191    The testing, check up and monitoring activity is carried out in agreement with the procedures for:

- a) making the performance, check and technical parameter tests as declared upon qualification as ancillary service providers;
- b) checking up and monitoring the way the *dispatchable units* observe the recorded parameters according to Appendix 2;
- c) testing, checking up and monitoring the way all the ETG *users* and ancillary service providers observe Transelectrica's operational and control instructions;
- d) testing and checking up installations connecting the users to the ETG upon start-up after capital repairs;
- e) test, control and monitoring of the users' telecom and electricity metering installations at the interface to the RPS under commissioning and during operation;

### 6.2.            Goal and scope

Art. 192    The objective of the above-mentioned procedures mentioned is to establish whether:

- a) the *dispatchable units* are working in agreement with the recorded technical parameters, according to Appendix 2;
- b) the ancillary service suppliers provide such services for which they have been qualified, while observing the technical supply characteristics stated in the qualification documents as well as the control parameters set by Transelectrica; generators are qualified as ancillary service providers by units;
- c) the future ETG *users* observe the ETG connection requirements provided in the *technical connection approval*;

### **6.3 Control and monitoring principles**

Art. 193 Transelectrica carries out the control and monitoring operations under the conditions of the present Code.

Art. 194 In case:

- a) a *dispatchable unit* does not observe the recorded operating parameters, or
- b) an *ETG user* does not observe Transelectrica's instructions, or
- c) an *ETG user* does not supply *ancillary services* required by Transelectrica upon the parameters set upon qualification, Transelectrica is entitled and obliged to require the relevant information for the respective *ETG user*. The latter are obliged to supply the required information as soon as possible, including at the same time a concrete plan of solving the matter.

Art. 195 Transelectrica and the respective *ETG user* will jointly establish the actions to be taken in order to remedy the situation and the time intervals when such actions are estimated to bring the expected results.

Art. 196 If in ten days' time since Transelectrica's notification an agreement to remedy the situation is not reached at, both Transelectrica and the *ETG user* can require a test in agreement with the provisions in this *Code*.

### **6.4 Testing the response capacity to Transelectrica's requirements and to supply *ancillary services***

#### **6.4.1 Testing the capacity to output/input reactive power**

Art. 197 The increase in the P-Q operational diagram and determination of primary and secondary voltage control ranges are compulsory when a *dispatchable unit* is commissioned.

Art. 198 Transelectrica can anytime (but no more than twice a year for each *generating unit*) require a *dispatchable unit* to carry out a test to prove that such *unit* has the reactive power output/input capacity according to its recorded parameters. The request will be submitted at least 48 hours before the test is to be carried out.

- Art. 199 Transelectrica can perform the test mentioned in the previous paragraph only during the time intervals when the *generator* declared that the capacity of reactive power output/input of the *dispatchable unit* is available.
- Art. 200 If the *generating unit* does not pass the test, the respective *generator* must send to Transelectrica (in 3 working days time) a detailed report specifying the reasons why this *generating unit* does not meet the availability declarations.
- Art. 201 The disputes that may arise will be settled in agreement with the contractual terms and the regulations in force.

#### **6.4.2 Testing the primary and secondary control capacity**

- Art. 202 The *primary* and *secondary control* capacity will be compulsorily tested during the commissioning of a *dispatchable unit* as well as after updating, refurbishment and retrofitting.
- Art. 203 Transelectrica can request testing the primary and secondary control operation also in other circumstances than those mentioned in the previous article. The secondary control operation testing is performed without notifying the generator beforehand.
- Art. 204 In case the generating unit does not pass the test, the respective generator has to send to Transelectrica within 3 weekdays a detailed report specifying the reasons why such unit did not pass the test.

#### **6.4.3 Testing the fast start-up capacity**

- Art. 205 The quick start capacity testing will be compulsorily carried out during the *dispatchable unit* commissioning.
- Art. 206 Transelectrica can require testing of a *dispatchable unit* to certify that the respective *generating unit* quick start capacity parameters agree with those declared at registration.
- Art. 207 Transelectrica can carry out the testing request mentioned in the previous paragraph only during the periods of time when the *dispatchable unit* has been declared available.

Art. 208 In case the *generating unit* does not pass the test, the respective *generator* will send to Transelectrica in three working days at the most a detailed report specifying the reasons the *generating unit* does not correspond to the availability declarations.

#### **6.4.4 Testing the capacity to participate into RPS restoration**

Art. 209 Transelectrica can require a *dispatchable unit* participating to the *Plan for supply restoration in RPS* to be tested (no more than once a year for each *generating unit*) until it proves that its start-up capacity agrees with the requirements of the *Plan for restoration of supply in RPS*.

Art. 210 The testing can be performed in one of the following situations:

- a) starting the *generating unit* in isolation from any other external electricity supply source in the system;
- b) insulation of the *generating unit* on auxiliary supplies.

Art. 211 The testing request mentioned in art. 209 should be made by Transelectrica at least 7 days before the test carrying out.

Art. 212 In case the *generating unit* does not pass the test, the respective *generator* will send (in no more than 3 days time) to Transelectrica a detailed report specifying the reasons the *generating unit* does not correspond to the availability declarations.

#### **6.4.5 Other ancillary services**

Art. 213 The availability of the other *ancillary services* will be monitored.

## **CHAPTER 7 ENVIRONMENTAL PROTECTION**

Art. 214 It is compulsory to comply with both the technical power norms and the environmental protection ones (Appendix 1) with a view to reduce/limit/remove the mutual impact between transmission installations and environment.

**CHAPTER 8                    EXCHANGE OF INFORMATION****8.1            Exchange of information between Transelectrica and the grid users**

- Art. 215 The exchange of information among the ETG users and Transelectrica will be carried out in agreement with the procedure for data acquisition and circulation between the among sector entities and observing all the other norms in force.
- Art. 216 ETG users will make sure that the confidential information they obtained while performing the activities specified in their *licence* will not be disseminated to non-authorised persons to get such information, the deed being considered contravention according to the Electricity Law no. 318/2003. Excepted are the circumstances when:
- a) the person whose interests can be jeopardised by the information dissemination has consented in writing;
  - b) the information is already public;
  - c) the licence holder is obliged or has the permission to disclose the information in order to observe the licence conditions, an order of the competent authority or a law in force;
  - d) the information should be transmitted during the normal carrying out of the activities authorised under the licence.
- Art. 217 Transelectrica issues a framework *confidentiality agreement* representing the basis for the standard agreements with all the ETG users. This provision will not be applied when the information has already been made public.
- Art. 218 The ETG users are obliged to provide, upon Transelectrica's request, any relevant technical information with a view to provide the safe and qualitative operation of the RPS.
- Art. 219 ETG users are obliged to provide, upon request, all relevant technical information as required by Transelectrica in order to review the ETG failures according to the licences issued and with the competent authority's agreement.

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- Art. 220 Transelectrica sends to and receives the information needed in order to allow a safe operation and the interoperability of the interconnected power system from the TSOs of other power systems with which the RPS is interconnected.
- Art. 221 ETG users are obliged to provide, upon Transelectrica's request, data and information needed for reporting about the entire RPS operation and development, as required by international organisations to which Transelectrica has affiliated, according to applicable procedures.
- Art. 222 Transelectrica assesses the performance indicators at RPS level as well as the safety indexes in the ETG nodes in accordance with the applicable technical norms, with a view to justify the development and modernisation of the ETG; to this end ETG users have to provide the data that Transelectrica requires in accordance with applicable procedures.
- Art. 223 ETG users have to periodically send to Transelectrica the technical data needed for the evaluation of reliability indicators of their managed installations, according to the Procedure regarding data acquisition and circulation between the entities in the power sector.

## **8.2 Notifying the competent authority**

- Art. 224 Transelectrica as licence holder will provide the competent authority with the data and information needed to exercise its tasks, in agreement with the licence requirements in the and the regulations in force.
- Art. 225 Transelectrica as licence holder will annually draw up and submit the competent authority an annual report regarding the activities developed during the previous year. According to the specific activity, this report will include:
- a) an abstract and an analysis of:
    - the activities carried out under of the respective licence;
    - observance of the performance standard of the service and actions undertaken to improve its quality;
    - the main incidents and failures;
    - the special problems within RPS;

- the complaints and claims that were submitted and not solved at its level;
  - the modifications of its own installations and in the assets of the company;
  - the modifications in the personnel structure by special training categories;
- b) statistic surveys relating to the licence holder's activity;
- c) a medium term and the current year strategy relating to the evolution of its own installations, with details regarding the intention to install new capacities, to partially or entirely transfer or to cancel the activity.
- Art. 226 The competent authority can require half-yearly, quarterly, monthly or daily reports on the activity of the licence holders in the electricity sector, as the case may be. The information in art. 224 and 225 is considered public and Transelectrica as licence holder is obliged to publish it at the request of the competent authority.
- Art. 227 Transelectrica as licence holder will draw up a report to the competent authority anytime events leading to considerable material damages, casualties or significant interruptions in service occur in their installations.
- Art. 228 The manner in which the report is to be drawn up, as well as the detailed content of the reports will be established in a reporting procedure approved by the competent authority.
- Art. 229 The competent authority can require, examine and copy any information, recordings and documents of the licence holders that it considers to be related in any way to license holders' activities or business in the electricity sector. The information requested may include state, office or business secrets.
- Art. 230 The competent authority will use such information only to the purpose it has been provided and will not disclose to any unauthorised person its content.
- Art. 231 Any communication, acceptance, confirmation, approval or any other requested piece of information will be put in writing and can be sent by fax provided the original is sent by messenger or mail services to the addressee headquarters in all instances.
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## CHAPTER 9                      FINAL AND TRANSITORY PROVISIONS

### 9.1 Legal grounds

Art. 232    Transelectrica will verify the observance of Code provisions by all the ETG users. In case it is not observed, Transelectrica will notify the competent authority about any deviation from Code provisions and will undertake actions in agreement with the norms in force.

Art. 233    Transelectrica will ensure the review of all the technical norms relating to RPS operation and will propose new ones, based on the review and completion of the programmes for technical regulations, approved by the competent authority.

### 9.2 Circumstances unforeseen in this Code

Art. 234    Any measure that Transelectrica has to apply in instances that are not considered in the Code which impact the other ETG users will be undertaken in such a manner to affect their technical operating parameters in the least possible way, obtaining afterwards the agreement of all the parties involved.



On the date of this version issuance, the first review of the Technical Electricity Transmission Grid Code, the *Regulation on ETG scheduling and dispatching* was in force as being approved by ANRE Decision no.18/10.06.1999, published in the Official Gazette of Romania no. 350/23.07.1999 with the later on modifications.

The Regulation was reviewed and approved by the ANRE Order no. 35/06.12.2004 and is a component part of the Technical Electricity Transmission Grid Code

### **Acronyms**

AAC	Already Allocated Capacity
ATC	Available Transfer Capacity
BMO	Balancing Market Operator
BRP	Balance Responsible Party
DAM	Day-Ahead Market
ETSO	European Transmission and System Operators
MO	Market Operator
MCP	Market Clearing Price
NTC	Net Transfer Capacity
RPS	Romanian Power System
TRM	Transmission Reliability Margin
TSO	Transmission System Operator
TTC	Total Transmission Capacity

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## Definitions

Approved Physical Notification	Physical notification approved by the TSO
Availability Declaration	A document sent to the Transmission and System Operator and specifying the availability of the respective generator's dispatchable units in the following calendar week
Balance Responsibility	The responsibility of each licence holder towards the TSO to maintain a balance between the achieved and the contracted values of the production, consumption and exchanges of own electricity amounts, as the case may be
Balance Responsible Party	Licence holder that was recorded as a balancing responsible party by the TSO according to the provisions of section 10; a balance responsible party can also assume the balancing responsibility for other licence holders
Balancing Market	Centralised market that the TSO organises and manages in order to collect the delivery offers of balancing power from the BM participants and to use them in view of providing operational safety and stability within the RPS as well as to solve the network restrictions
Balancing Market System	IT system set and maintained by the TSO, which is also used by the BM Operator in order to manage such market
Block Exchange	Exchange of electricity between two balancing responsible parties
Border Trading Zone	All the transaction zones that are different from the national trading area
Business Day	Calendar day, except for Saturdays, Sundays and any declared legal holidays in Romania
BM Closing Time	Time by which the balancing market offers can be sent to the BM Operator, it being 17:00 h in the transacting day preceding the

	delivery day
BM Identification Code	Alphanumeric code allotted to each participant to the balancing market by the balancing market operator
BRP Identification Code	Alphanumeric code allotted to each balancing responsible party by the Transmission and System Operator
BRP Physical Notification	Physical notification sent by a balancing responsible party, which determines the operating schedule of the generation, exchanges and electricity consumption, as well as of the import and export operations of market participants, for which the balancing responsible party assumed a balancing responsibility
Calendar week	An interval of seven calendar consecutive days, the first of which is Monday
Commercial Code	Collection of documents regulating the participation into and the trading relations on the wholesale electricity market
Consumer	Natural or legal person that buys or consumes electricity for its own consumption and possibly for a sub-consumer connected to its installations
Delivery Day	Calendar day immediately following a transaction day
Dispatch Command	An order given by the TSO in accordance with the technical code of the electricity grid to the contact person of an electricity generator to change the generated power or the mode of operation of a production unit
Dispatch Interval	Interval of one (1) hour for which each electricity generator with dispatchable units, each dispatchable consumer or balancing responsible party, as the case may be, has to send physical notifications as per the provisions of section 6
Dispatchable Consumer	A consumer whose consumption points have been recorded as dispatchable consumption

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Dispatchable Load	Consumption point where the consumed power can be modified upon request from the Transmission and System Operator
Dispatchable Production (Generation) Unit	Generation unit that can fall under a dispatcher order
Distribution Code	Collection of technical regulations determining compulsory rules and procedures for all participants on the electricity market in order to plan, develop, operate, manage and maintain the electricity distribution networks
DAM Closing Time	Time by which the day-ahead market offers can be sent to the electricity market operator, it being 11:00 h in the transacting day preceding the delivery day
DAM Identification	Alphanumeric code allotted to each day-ahead market participant by the electricity market operator
Emergency	Any unusual event in the operation of the RPS that requires immediate automatic or manual remedies in order to prevent or restrict the situations that might impact the system or the electricity supply to consumers
Export	Physical or commercial delivery of electricity from the RPS into other countries
Financial Day	A day when commercial banks are open for financial operations
Grid Code	Normative act from the regulation system specific to electricity transmission and dispatcher control of the RPS
Hydropower Unit	Generation unit relying on the utilisation of hydropower, including HPP on running water courses, HPP with cascade and dam (accumulation) and HPP with pumping accumulation
Import	Physical or commercial delivery of electricity from other countries into the RPS
Interconnection	A piece of equipment (e.g. line or

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	transformer) connecting two control areas or two electric power systems
Market Operator	Legal person transacting the energy amounts on the electricity market and determining the prices for the day-ahead market, performing the functions established in the Commercial Code. The electricity market operator is Co. Opcom S.A.
Measurement Regulations	Technical regulation from the specific electricity legislation determining the obligation and metering principles for the electricity exchanged between the installations of legal or natural persons that carry out generation, transmission, distribution, supply or utilisation activities
Merit Order	Sequencing the price-quantity pairs in the validated daily offers, an order set and used by the Transmission and System Operator in order to determine the price-quantity pairs that will be accepted for the supply of balancing electricity
National Trading Zone	That part of the RPS which the electricity consumers and electricity generators of Romania are connected to
Net Production	Electric power delivered by a generating unit into the Romanian Power System
Non-Dispatchable Unit	Generation unit that is not dispatchable
Network Operator	The Transmission and System Operator or a distributor, as the case may be
Non-Working Day	Saturdays, Sundays and any other declared legal holidays in Romania
Physical Notification	Document determining the operating schedule of net output, of exchanges and of the electricity consumption in the RPS, as well as of the export or import amounts, according to the bilateral transactions made by market participants
Priority Production	The output of any generation unit hold by a licence holder, for which preferential sale

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	rights are granted as per the provisions of section 13
Producer	Natural or legal person holder of a licence, whose specific activity is electricity generation, including under co-generation
Production (Generation) Unit	A single assembly of rotary machines meant to change different forms of energy into electricity
Reserve	Availability guaranteed for certain system services, including secondary and tertiary control, which has been contracted by the TSO
Schedule Submission Time	Time by which a physical notification can be sent to the TSO, it being 15:00 h in the transacting day preceding the delivery day
Scheduling System	IT system set and maintained by the TSO with a view to receive, check and process the physical notifications
Secondary Regulation	Centralised automatic control of frequency (exchange power with frequency correction) in order to bring frequency/exchange power to the preset values within 15 minutes at the most
Settlement Administrator	Distinct department set up within Co. Opcom S.A. to carry out the disconnection functions assigned to it by this Commercial Code
Submission Time	Time when an offer or physical notification, as the case may be, has entered into the proper transaction system or into the scheduling system, as per its time stamp registration
System Services	Services provided to the network users by the TSO to maintain the safe operation of the RPS, as well as the electricity quality as per the norms
Trading Day	Any calendar day
Trading Hours	Time interval from 07:00 h to 20:00 h of each transacting day
Trading System	IT system set and determined by the electricity market operator with a view to

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Trading Zone	manage the day-ahead market A part of the RPS for which separate offers can be sent to the day-ahead market
Transmission System Operator	Legal person, holder of a licence for electricity transmission and system services. The TSO is the Romanian Power Grid Company Transelectrica S.A.

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## CHAPTER 10      AVAILABILITY STATEMENTS FOR THE DISPATCHABLE GENERATION UNITS

### 10.1 Introduction

- Art. 1      The Regulation to schedule the dispatchable generation units aims at setting up the framework to supply data on the generation availability of dispatchable generation units for the Romanian Power System, on the elaboration of the generation and consumption schedule and on determining the availability of system services
- Art. 2      The Regulation to schedule the dispatchable generation units supplements the provisions of the Commercial Code of the wholesale electricity market with respect to the structure and submission of physical notifications and of availability statements.

### 10.2. Submitting the availability declarations

- Art. 3      The electricity generators operating dispatchable generation units have to submit to the TSO their availability declarations for each calendar week, at least three (3) weekdays before its beginning.
- Art. 4      The TSO determines the means of transmission for the availability declarations and notifies the involved parties about them.

### 10.3. Form and contents of availability declarations

- Art. 5      The TSO determines the form and framework-content of availability declarations. Once approved by ANRE, the TSO places the respective information at the disposal of interested parties.
- Art. 6      The availability declaration comprises at least the following data:
- a) the hourly available power of each dispatchable generation unit, separately for each delivery day of the respective calendar week;

- b) reasons and details on the hourly reductions of availability, including any planned maintenance stop approved by the TSO as per the Grid Code, failures, technical restrictions, or putting back in operation.

Art. 7 In case of hydropower generation units, the information sent as per Art. 6 will also include data on the forecasted limitation of electricity output, as resulting from the hydrological and water flow rate restrictions, as well as the maximum variation of the water level in storage lakes.

#### **10.4. Check-up and acceptance of availability declarations**

Art. 8 When an availability declaration has been received, but two (2) weekdays at the latest before the beginning of the following calendar week, the TSO check whether the information in the availability declaration meet the requirements in section 1.3.

Art. 9 If the data in the availability declaration do not comply with the requirements of section 1.3. or whether an electricity generator has failed to submit the availability declaration within the term set in Art. 3, the TSO immediately gets in touch with the respective electricity generator at least two (2) weekdays before the following calendar week.

Art. 10 In case an electricity generator fails to submit within maximum 24 h an availability declaration meeting the requirements of section 1.3 after having been notified by the TSO as per the provisions of Art. 10, then the TSO is entitled to determine an availability declaration for all the dispatchable generation units of the respective electricity producer using the respective producer's availability declaration of the previous week, also taking into consideration all planned maintenance stops.

Art. 11 The TSO sends the availability declarations determined as per Art. 10 to the respective generators.

Art. 12 The capacities in the availability declarations that the TSO has received and accepted or that have been determined by it as per the provisions of section 1.4 have to be compulsorily offered on the balancing market by the respective electricity generators, in accordance with the provisions of the Commercial Code of the wholesale electricity market.

### **10.5. Changing the availability declarations**

- Art.13. An electricity generator has to immediately get in touch with the TSO in case an availability change is found for one or more of the dispatchable generation units it operates after having submitted its availability declaration.
- Art.14. An electricity producer operating one or more hydropower generation units submits a reviewed availability declaration with updated data on the forecasted limitations of the electricity output as resulting from the hydrological and flow rate restrictions, before the beginning time of physical notifications submission for the proper delivery day (10:00 h).
- Art.15. In case the electricity generator records substantial changes in the availability of the dispatchable generation units after the beginning time of physical notifications submission for the delivery day, it sends without delay a new availability declaration even during the very delivery day.
- Art.16. In case the TSO deems necessary to increase the total available capacity and thinks an electricity generator can provide an additional capacity for instance by postponing, suspending or completing in advance a repair operation, the TSO can request the respective generator to make available an additional capacity.
- Art.17. If the electricity producer makes an additional capacity available upon the request of the TSO, then the producer is entitled to sent a reviewed availability declaration even during the delivery day.
- Art.18. The changes made to an availability declaration according to the provisions of section 1.5 become compulsory for the respective electricity generator only if the TSO has confirmed them.

**CHAPTER 11            PHYSICAL NOTIFICATIONS****11.1      Submission, amendment and cancellation of physical notification**

- Art.19. Physical notifications for each delivery day are sent to the TSO by 15:00 h in the trading day previous to the delivery day. The submission of physical notifications can be made by maximum one (1) week before the corresponding delivery day, in case the BRP has no transactions on the day-ahead market during the respective interval, according to the operational procedure for submission of physical notification that Tranelectrica has elaborated and the competent authority has approved.
- Art.20. Physical notifications are sent in electronic form through the communication channels that the TSO has established.
- Art.21. A physical notification is considered to have been sent the moment it enters the scheduling system. The sending time is expressed through the time stamp.
- Art.22. The TSO will electronically confirm the receipt of a new physical notification to the party that submitted it as soon as the notification has entered the scheduling system.
- Art.23. The issuer of physical notifications can modify them any time before 15:00 h of the trading day preceding the delivery day. All changes are marked with the time stamp and are registered into the scheduling system. Any amendment determines a new physical notification and cancels all preceding notifications of the same party that have been previously accepted for the same delivery day.
- Art.24. In case a party does not receive from the TSO the confirmation of receipt of a new physical notification within thirty (30) minutes from its sending, that party will immediately get in touch with the TSO.
- Art.25. Each balancing responsible party (BRP) and the market operator send physical notifications.

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## **11.2. Content and form of physical notifications**

- Art.26. The TSO determines the form and framework-content of physical notifications. When these have been approved by ANRE, the TSO places the respective data to the disposal of all interested parties.
- Art.27. Physical notifications comprise the identification code of the party that has sent it, the delivery day and separate data for each dispatch interval of the respective delivery day.
- Art.28. Physical notifications of BRP include at least the following technical data:
- The aggregate planned output of all generation units for which the respective BRP assumed balancing responsibility, of which the aggregate planned output of dispatchable units shall be indicated separately;
  - The planned output of each dispatchable unit of the respective generator/generators;
  - The pumping schedule planned for each pumping storage power plan of the respective generator/generators;
  - The aggregated consumption forecast for all electricity consumers for whom the respective BRP has assumed balancing responsibility, of which the aggregated consumption forecast for dispatchable consumptions will be given separately;
  - The consumption planned for each dispatchable consumption of the respective consumer;
  - Block exchanges with other BRP in the National trading zone, separately for each BRP with whom block exchanges have been established;
  - Block exchanges in the border trading zones, separately for each border trading zone;
  - Exports and imports determined with other countries, separately for each border trading zone.
- Art. 29. The physical notifications of the market operator comprise at least the following four technical data:

- The total aggregated output of each participant to the day-ahead market corresponding to the sale transactions concluded by the participant on the day-ahead market;
- The total aggregated consumption of each participant to the day-ahead market corresponding to the purchase transactions it has concluded on the day-ahead market;
- The electricity exchange between the National trading zone and each border trading zone;
- The difference between the priority production offered on the day-ahead market validated by the market operator and the priority output actually transacted on the day-ahead market, for each generator.

### **11.3. Validation of physical notifications**

- Art.30. The TSO elaborates the validation procedure for physical notifications in accordance with the provisions of section 2.3. When ANRE has approved it, the TSO will place this procedure at the disposal of all involved parties.
- Art.31. Immediately after 15:00 h, the TSO checks up all physical notifications that have entered the scheduling system.
- Art.32. In case a party has failed to submit its physical notification before the schedule submission time, the TSO immediately notifies that party within maximum fifteen (15) minutes after the schedule submission time.
- Art.33. When it has received the TSO notification as per Art. 32, the respective party submits its physical notification within the shortest interval possible, no later than thirty (30) minutes after the time when the TSO has sent its notification.
- Art.34. In case a party fails to submit a physical notification until expiry of the deadline set in Art. 33, the TSO determines an implicit physical notification, usually based on the last physical notification approved of the respective party, for an equivalent day.
- Art.35. The TSO will send the implicit physical notifications determined as per Art. 34 to the corresponding parties, for notification.



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- Art.36. The TSO checks up each physical notification in terms of entirety, accuracy, coherence and feasibility, in accordance with:
- a) the information comprised in the other physical notifications for the same delivery day and the same dispatching interval;
  - b) availability declarations that have been submitted for the dispatchable generation units of the same delivery day and the same dispatching interval;
  - c) the capacity of the international interconnection lines allocated to the party that belongs to the BRP that has sent the physical notification;
  - d) the obligations of reserves and/or other system services provision as assumed by the generator or consumer that has sent the physical notification;
  - e) the limits defined by the technical characteristics of the dispatchable generation units and/or the dispatchable consumptions.
- Art.37. A physical notification complying with the requirements in the validation procedure of physical notifications becomes a physical notification approved.
- Art.38. In case a physical notification is in imbalance, the TSO will notify the respective party no later than 16:30 h on the trading day. A physical notification is considered as imbalanced when the sum of the output, imports and block exchanges received is not equal to the amount of consumption, exports and block exchanges delivered, separately for each trading zone and dispatching interval.
- Art.39. The TSO accepts a physical notification with imbalance in case:
- a) according to the availability declaration, the obligations to provide the reserves and the limits defined by the technical characteristics, there is no other feasible operational diagram leading to reducing/eliminating the imbalance, or

- b) of the generators qualified for priority production, if the imbalance is lower or equal to the difference between the priority production offered on the day-ahead market and validated by the market operator and the priority production actually transacted on the day-ahead market as notified in the market operator's physical notification;
- Art.40. A physical notification which does not comply with the requirements of the validation procedure for physical notifications becomes an invalidated physical notification.
- Art.41. The TSO immediately notifies the party that has sent the invalidated physical notification, no later than 16:00 h of the trading day. The notification will include the registration number of the physical notification, the time when such physical notification has been denied and the reasons of such denial.
- Art.42. When the TSO notification has been received as per Art. 41, the respective party will immediately send an amended physical notification within (30) minutes after the time when the TSO has sent its notification. In case it fails to do so, the TSO will apply the provisions with respect to correcting physical notifications from the validation procedure of such notifications.
- Art.43. The TSO is entitled to correct the invalidated physical notifications after the check-up stage, in accordance with the provisions of section 2.3.
- Art.44. In case an invalidated physical notification does not comprise, fully or partially, the information needed about the planned output or consumption (including the pumping schedule), the TSO will determine the proper missing values for output or consumption using the approved physical notifications of the respective party, for an equivalent day.
- Art.45. In case the physical notification comes from a BRP, the following measures will be applied:  
in case of contradictory data regarding the block exchange between the market operator and the respective BRP, the amount sent in the market operator's physical notification will be accepted;

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in case of contradictory data regarding the block exchanges between two BRP, the TSO can request such BRP to re-send new physical notifications with amendments. In case such imbalance persists, the TSO can take the following steps:

the amount corresponding to the block exchange between the two BRP will be adjusted to the lowest of the two values sent in the two physical notifications of the two BRP, if both notifications of both parties provide a block exchange in the same direction;

the amount corresponding to the block exchange between the two BRP will be reduced to zero if the physical notifications of the two BRP provide a block exchange between them in opposite directions or if only one of the BRP provided a block exchange in its physical notification.

- Art.46. The party responsible for submission of a physical notification to be amended will be liable to the TSO for any direct cost generated by the correction of the respective physical notification.
- Art.47. When amending an invalidated physical notification the TSO will attempt to minimise as much as possible the cost induced by any correction for the party responsible for submission of the respective physical notification.
- Art.48. When the correction has been made as per section 2.3, the invalidated physical notification becomes an approved physical notification.
- Art.49. The physical notifications approved constitute firm obligations for the respective party. In case of a physical notification from a BRP, the approved physical notification constitute a firm obligation for all the market participants for whom the respective BRP assumed the balancing responsibility.

- Art.50. The TSO will acknowledge the approval of a physical notification to the party that has sent it no later than 16:30 h in the trading day. The confirmation will comprise also the registration number of the respective physical notification and the time it has been approved at. If the TSO has amended the approved physical notification as per 2.3, the TSO will send the approved physical notification to the involved party, for information.
- Art.51. In case a party has not received the TSO confirmation on the approval of the physical notification by 16:45 h, it will immediately get in touch with the TSO
- Art.52. The modification of approved physical notifications is allowed only under the circumstances provided in section 2.4.

#### **11.4. Changes into the approved physical notifications**

- Art.53. The modification of physical notifications is allowed only in the following circumstances:
- in case the TSO has issued a dispatch command on the balancing market;
  - in case of accidental stops of dispatchable generation units notified to the TSO by the electricity generators.
- Art.54. The dispatch commands of the TSO issued on the balancing market will be considered as amendments of the approved physical notifications and will determine new such notifications. Such changes are applied both to the balancing market participant that has received the dispatch command and to the BRP that has assumed the balancing responsibility for the respective participant.
- Art.55. An electricity generator can modify its own approved physical notification only in case an output restriction has occurred which could not have been foreseen in due time and if this is technical in nature. The electricity generator has to send a written justification to the TSO on the generation restriction occurred no later than two (2) weekdays after the event.

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- Art.56. In case a dispatchable generation unit faces a generation restriction as defined in Art. 55, which the respective electricity generator notifies to the TSO, the generator is entitled to reduce the planned production for the respective dispatchable generation unit by the amount that cannot be generated as a result of the restriction that has occurred. This change will determine a new physical notification approved that will be applied both to the respective generator and to the BRP that has assumed the balancing responsibility for such dispatchable generation unit, but only with respect to settling the imbalances from notification.
- Art.57. The notice by which the electricity generator notifies the TSO about the production restriction occurred will comprise at least the following data:
- identification of the respective dispatchable generation unit;
  - the amount by which the availability and planned output are reduced;
  - the period foreseen for the restriction to last.
- Art. 58 Any change in the physical notification in accordance with the provisions of section 2.4 will be considered:
- a) to have immediate effect in case of changes made following the TSO-issued dispatch commands on the balancing market; and
  - b) to have effect from the beginning of the following dispatch interval after the generator's notification to the TSO, in case of changes occurred as per Art. 55.
- Art.59. Any change as per Art. 55 of an approved physical notification will be confirmed by the TSO within the shortest interval possible, within one hour from the receipt of the notification from the electricity generator.
- Art.60. Physical notifications modified according to the provisions of section 2.4 will replace the previous physical notifications approved, will be applied to the proper delivery day and will constitute firm obligations for the respective party.
- Art.61. The TSO will send the approved physical notifications to the settlement operator in the day immediately following the delivery day.
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## **CHAPTER 12            SELF-SCHEDULING OF ELECTRICITY GENERATORS**

### **12.1. General provisions**

- Art.62. The electricity generator is obliged to provide reserves and other system services according to the contracts concluded with the TSO when determining the operational schedule of dispatchable generation units.
- Art.63. The scheduling of dispatchable generation units able to operate under secondary control will be made so as to provide both the secondary control reserve contracted by the respective producer with the TSO and the possibility to use it.
- Art.64. The generators notify the operation schedule of dispatchable generation units to the TSO by means of the physical notifications of the BRP.
- Art.65. The TSO will solve the possible network restrictions in the operation of the RPS under the generators' self-scheduling by means of the balancing market, according to the provisions of the Commercial Code of the wholesale electricity market.

### **12.2. Unrealistic operational diagrams**

- Art.66. Electricity generators can optimise the operation of dispatchable generation units and they can avoid unrealistic operational diagrams on the delivery day by concluding bilateral agreements with respect to generating electricity amounts by a producer corresponding to the obligations of another producer.
- Art.67. (1) The bilateral agreements between electricity generators provided in Art. 66 are voluntary and can be negotiated in the trading day preceding the delivery day, after the closure of the day-ahead market.  
(2) The bilateral agreements have to be finalised before sending the physical notifications by both BRP involved.

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- Art.68. The amounts of electricity corresponding to the bilateral agreements as per Art. 66 are notified to the TSO as block exchanges under the physical notifications of the BRP that has assumed balancing responsibility for the electricity generators involved.

## **CHAPTER 13 OTHER PROVISIONS**

### **13.1. Emergency procedures**

- Art.69. The TSO elaborates the emergency procedures for scheduling. When ANRE has approved them, the TSO will place such procedures at the disposal of all interested parties.
- Art.70. The emergency procedures for scheduling provide utilisation of alternative communication means as well as the extension or lagging of any deadlines that have to be observed by the parties sending physical notifications to the TSO, including the postponement of the closing time for the day-ahead market.
- Art.71. Both the TSO and each party that has to submit physical notifications will specify one or several contact persons in case emergency events occur, as well as the proper phone and fax numbers. Both the TSO and the respective parties will mutually inform one another in case such information is changed.





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## CHAPTER 14 INTRODUCTION

### 14.1. Goal

Art. 1 The dispatcher control regulation of RPS, hereinafter called DCR, aims at establishing the norms for the organisation and operation of dispatcher control within the RPS. The DCR sets up the procedures for system services.

### 14.2. Field of application

Art. 2 (1) The DCR provisions are compulsory and the operational control personnel in all dispatch centres will apply them, as well as the operational personnel from power plants, electric substations, users' installations and system areas, regardless of the manager, whose installations belong to the RPS.  
(2) The DCR provisions prevail over the individual or group economic or financial interests of the ETG and/or distribution network users.  
(3) Local rules, procedures and guidelines of dispatcher control and RPS equipment & installations operation are elaborated in accordance with the DCR provisions.

### 14.3. Reference documents

Art. 3 Transelectrica draws up the DCR in accordance with the provisions of the Electricity no. 318/July 16<sup>th</sup>, 2003, those of GD no. 627/July 13<sup>th</sup>, 2000, art. 1, 6, 7, 8 and 9 published in Romania's Official Gazette no. 357/July 31<sup>st</sup>, 2000.

Art. 4 The documents taken into account when elaborating the DCR are:

- a) Specific labour protection norms for electricity transmission and distribution;
- b) General regulation for manoeuvres in electric installations;
- c) the Commercial Code of the wholesale electricity market.

Art. 5 The documents mentioned are used to the applicable edition.

## **CHAPTER 15            GENERAL FRAMEWORK.                                   BASIC TERMS**

- Art. 6     RPS dispatcher control is an activity characteristic to the electricity sector, carried out by specialised units called dispatcher centres, which have hierarchical authority relationships between them and with the electricity market participants. Such relations are different from the administrative ones.
- Art. 7     RPS dispatcher control is performed in a uniform manner, being hierarchically structured at central, territorial, zone and local levels.
- Art. 8     The objective of RPS dispatcher control is to provide its operation as per the norms under safe, qualitative and cost-efficient conditions, by means of the coordinated operation of RPS installations and equipment requiring a unitary management and control.
- Art. 9     The dispatcher control carries out:
- a) a safe and uniform RPS operation;
  - b) a permanent electricity output/consumption balance with a view to maintain frequency within rated operational limits, in case of RPS isolated operation;
  - c) regulation of electricity exchanges with other countries' power systems, taking into consideration the frequency correction in case of interconnected operation;
  - d) coordination of operational regimes and manoeuvres within RPS installations;
  - e) coordination, execution and tele-management manoeuvres;
  - f) utilisation of hydropower resources and electricity-generating fuels in accordance with the applicable regulations;
  - g) coordination of electricity and heat outputs in the co-generation plants according to applicable regulations.
- Art. 10    Electricity generation in hydropower plants is correlated with the water demand for other utilities.

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- Art. 11 RPS dispatcher control upon interconnected operation is performed in accordance with the enforceable agreements and covenants.
- Art. 12 The decisions and operations of dispatcher control personnel in order to prevent failures, limit their spreading, and resuming the normal operation prevail over the individual and/or group interests of electricity market participants.
- Art. 13 The main functions of RPS dispatcher control are as follows:
- a) operational planning
  - b) operational management
- Art. 14 **Operational planning** is the activity performed by a dispatcher centre within its authoritative limits of dispatcher control under different time horizons- yearly, half-yearly, monthly- over the manner in which the output/consumption balance is ensured, the electricity operational diagram etc.
- Art. 15 **Operational management** consists of operational scheduling and operational control.
- Art. 16 **Operational scheduling** is the activity of a dispatcher centre scheduling the business day ahead and, as the case may be the non-working days preceding it, within the its authoritative limits of dispatcher control over the manner in which the output/consumption balance is provided, the electricity operational diagram etc.
- Art. 17 **Operational control** is a component of the RPS dispatcher control and means the operational control personnel in dispatcher centres supervise in real time and in a hierarchical manner the safe and economic operation of RPS equipment and installations.

## CHAPTER 16            SPECIFIC NOTIONS OF DISPATCHER CONTROL

- Art. 18 The **dispatcher centre** is the organisational structure vested with dispatcher control competencies over RPS equipment and installations as stipulated in the assignment order.

- Art. 19 A dispatcher centre includes at least two structures:
- a) A real time operational control structure over the installations by coordinating their regimes and manoeuvres according to the assignment order.  
To this effect, it carries out the decisions of the higher dispatcher centre, makes its own decisions and issues orders accordingly to the subordinate dispatcher centres or operational personnel.  
The personnel in this structure is called 'operational control personnel' and works in shifts in a special enclosure called 'control room' where access is regulated.
  - b) A functional control structure providing operational scheduling, while supervising and reviewing the operation of equipment under dispatcher control authority of the respective centre.  
Depending on needs, such structure will provide also the operational planning, specific dispatcher regulations etc.  
The term 'structure' used above aims at delimiting the distinct responsibilities and activities performed within the dispatcher centre. The organisational forms of such structures can be different from one dispatcher centre to another, depending on the volume, significance and specificity of their activity.
- Art. 20 Dispatcher centres on the same hierarchical level make up a dispatcher control level.

## **CHAPTER 17            AUTHORITY OF DISPATCHER CONTROL**

- Art. 21 The dispatcher control authority consists in a set of tasks with which a dispatcher centre is assigned with a view to efficiently manage the RPS: decision-making, coordination control, competence, direct control that are specified in the assignment order.

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- Art. 22 The **decision-making authority** is the right and obligation with which a single dispatcher centre is assigned in order to decide upon the operational condition of equipment, the regime and safety in operation to the installations and equipment specified in the assignment order.
- Art. 23 **Coordination control** is an activity by which distinct groups of operations or distinct operations are coordinated in time, whose succession is mutually conditioned. It is carried out under a manoeuvre performed within installations or different network areas by two or several operational teams, two or several dispatcher centres that carry out the above operations and/or by remote control, mixed operational teams & dispatcher centres that carry out the operations by remote control. Coordination control is assigned to a single dispatcher level under the assignment order.
- Art. 24 **Competence** is the right and obligation of dispatcher centres to express their viewpoint on the operational condition of equipment, regime and safety in operation to certain equipment or installations under the decision-making authority of other dispatcher centres but whose operation impacts the operational regime of the equipment and installations under its decision-making authority.
- Art. 25 All dispatcher centres with competence have to be included in the informational flow relating to the operational control of the respective equipment.
- Art. 26 The operational personnel has got the right and obligation to express their viewpoints on the operational condition of equipment, operational regimes and safety for the installations and equipment they manage.
- Art. 27 **Direct control** is the operational management whereby the dispatcher control authority of the respective dispatcher centre is exercised or the authority of higher dispatcher levels over the equipment provided in the assignment order, by remote control and/or by direct calls between the direct control personnel of the respective dispatcher centre and the operational personnel in installations or network areas.

- Art. 28 The remote control of equipment and installations performed by the speciality operational control personnel in a dispatcher centre is considered as direct control.
- Art. 29 The control of equipment and installations from the control rooms of substations or of power plants by the operational control personnel is not remote control in the spirit of the DCR.
- Art. 30 Direct control in an installation- power plant, electric substation- is usually granted to two dispatcher control centres at the most.
- Art. 31 The managerial **unit** is the natural or legal person with the obligation to make administration and maintenance works as well as to provide dispatcher control of electric installations managed or taken over under operation agreement or otherwise.
- Art. 32 **Operational personnel** means the staff whose activity consists of operating electric installations by monitoring their running, direct parameter regulation and manoeuvres made into an installation or network area.
- Art. 33 Usually operational personnel are included in the organisational diagram of the managerial unit and perform their activity in the respective installations and network areas.
- Art. 34 Installations and equipment to be operated by a team are nominated under a decision from the managerial unit.
- Art. 35 Remote control (tele-control) is usually performed by the speciality operational control personnel from a dispatcher centre.
- Art. 36 Managerial units are responsible to take all required measures for a safe operation of installations at preset parameters, to provide maintenance work according to applicable norms, to ensure a prompt intervention in case of failures (incidents) with equipment made available in the shortest delay possible according to the requirements of the decision-making dispatcher centre.

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- Art. 37 Managerial units are obliged to provide operational personnel training and qualification for a proper operation of equipment and installations, in accordance with applicable technical regulations and norms, as well as to elaborate the required procedures and guidelines and provide labour discipline in their relations to other dispatcher centres.
- Art. 38 The dispatcher centre of the managerial unit with no competence over some equipment from the respective unit (this being under the decision-making authority or competence of higher dispatcher centres) has got assignments, responsibilities and rights with respect to:
- a) equipment regime and safety in terms of their operation within the installations from the respective unit over which it expresses its viewpoint in its relations to the dispatcher centres with competence and respectively with decision-making authority;
  - b) receiving, reviewing at its level, expressing its viewpoint, endorsing and submitting the applications, as well as receiving/sending the answers;
  - c) handing over the equipment to subcontractors for work, receiving and giving confirmations.
- Art. 39 The **assignment order** of dispatcher centres with dispatcher control tasks is the document determining the dispatcher control authority over the installations and the manner in which such authority is exercised.
- Art. 40 Assignment orders are hierarchically issued by each dispatcher centre for the equipment taken under its decision-making authority.
- Art. 41 The criteria used in elaborating the assignment orders are determined by the National Power Dispatcher as a written procedure upon consulting the managerial units.
- Art. 42 In case of the equipment found on the border between two dispatcher centres that are not operationally subordinated and have decision-making authority over the end bays, the assignment order is determined by joint agreement between the two dispatcher centres.

- Art. 43 The equipment that is not assigned to the decision-making authority of a dispatcher centre under the assignment orders issued remains under the authority of the managerial unit that issues the assignment order for such equipment, which is called 'internal assignment order'. Managerial units exercise this decision-making authority by means of their own control and operational personnel (head dispatcher of a power plant shift, engineer on duty in the power plant or the head of shift in electric substations etc.).
- Art. 44 **Dispatcher subordination** consists in establishing hierarchical relations between dispatcher centres as well as between dispatcher centres and the operational personnel in power plants, electric substations and network areas when dispatcher authority is exercised.
- Art. 45 **Dispatcher subordination** is independent and has got priority over the technical-administrative or other subordination. Technical-administrative subordination consists in subordination relations in technical and administrative terms between the operational control/operational personnel and their hierarchical superiors.
- Art. 46 **Operation agreement** is the legal document concluded between managerial units and specifying the legal aspects of installations delimiting, dispatcher control, mutual operation and maintenance conditions for installations, protections control, manoeuvres, interventions in case of incidents etc.
- Art. 47 Operational agreements are also concluded between the NPD and TSOs in neighbouring countries for interconnections to other electric power systems.

## CHAPTER 18 ORGANISING THE DISPATCHER CONTROL OF THE RPS

- Art. 48 Dispatching control of the RPS is carried out in a uniform and hierarchical manner regardless of the administrative subordination of the units operating the installations.



- Art. 49 The levels of dispatcher control within the RPS are:
- a) The central power dispatcher (CPD);
  - b) Territorial power dispatchers (TPD);
  - c) Distribution power dispatchers (DPD);  
Hydropower plant dispatchers (HPPD);  
Local power plants dispatchers (LPPD);  
Local power dispatchers of consumers (LPDC);
  - d) Local power distribution dispatchers (LPDD);
- Art. 50 The Central Power Dispatcher (CPD) and the territorial ones (TPD) operate under the NPD. This one manages the RPS operation and performs the system service.
- Art. 51 According to the previous article, the director of the NPD is the head dispatcher of the RPS.
- Art. 52 The other dispatcher centres provided above operate under the managerial units that are a part of the RPS.
- Art. 53 According to the above, the manager of a dispatcher centre (TPD, DPD and LPDD) is the head dispatcher of the area under its dispatcher control authority.

## **CHAPTER 19            MAIN ACTIVITIES OF DISPATCHER CENTRES**

- Art. 54 Transelectrica is the only provider of system services which consists in maintaining the safe RPS operation, the output/consumption balance at rated quality parameters for electricity and while observing the rules of power exchanges with neighbouring power systems.
- Art. 55 With a view to performing the system service, Transelectrica is using resources such as- functional system services, ancillary services, its own technical means.
- Art. 56 CPD is providing a permanent balance between electricity output/consumption within the RPS while observing the rated quality parameters and the Commercial Code of the wholesale electricity market, is making power exchanges with the power systems of other countries, is managing the operational regimes within the RPS and its protection & automation systems, is coordi-

- nating the RPS manoeuvres and is exercising a direct control into electric power plants and substations as per the assignment order.
- Art. 57 TPD provide the operational regimes and the manoeuvres coordinated by the CPD, manage the operational regimes and coordinate manoeuvres in electric power installations set under the assignment order.
- Art. 58 DPD are organised under the electricity distribution operators and exercise dispatcher control tasks in the distribution network at voltage levels up to 110 kV included, in accordance with their assignment order.
- Art. 59 Each electricity distribution operator has got a proper number of dispatcher centres depending on the amount of installations.
- Art. 60 Operational control of the distribution network will be determined by the respective DO taking into account the amount and specificity of installations, equipment level, and applicable regulations, and will be approved at the higher administrative level as well as by the NPD in terms of dispatcher control.
- Art. 61 HPPD centres organised under managerial units of HPP developments provide dispatcher control of the installations and equipment in the respective development in accordance with the assignment order.
- Art. 62 LPPD centres organised under electric power plants provide dispatcher control of the installations and equipment of the respective power plant in accordance with the assignment order issued by dispatcher centres, as well as with the internal assignment order issued by the managerial team of such power plant.
- Art. 63 LPDC centres organised under big consumers with or without their own power plants provide dispatcher control of the power installations of the respective managerial unit in accordance with the provisions of this regulations, of the agreements concluded with DOs, as well as with the internal rules of managerial units they belong to.
- Art. 64 LPDD centres are organised under the DOs and provide dispatcher control of MV installations and distribution networks according to the assignment order.

- Art. 65 Depending on the particular features of the MV electricity distribution network and on the consumers' significance, several LPDD centres are organised under the same DO.
- Art. 66 The organisational principles determining the dispatcher control authority and the subordination relations under RPS dispatcher control are approved by the NPD.
- Art. 67 The organisation of dispatcher centres is endorsed by the NPD depending on the structure of installations, their amount and significance, their own tele-information system and other means, so that an efficient dispatcher control can be provided. Depending on the level of a dispatcher centre and its assignments, the functional managerial structure can also include other activities: IT, telecommunications etc.
- Art. 68 Dispatcher centres must be equipped with special control rooms, IT systems and other technical means required for dispatcher control.

## **CHAPTER 20 OPERATIONAL PLANNING OF RPS RUNNING**

- Art. 69 The operational planning activity covers the following components:
- a) Planning the normal operational diagram;
  - b) Planning the withdrawing from operation of generation, transmission and distribution installations within the RPS;
  - c) Planning the protection and automation systems;
  - d) Voltage levels planning;

### **20.1. Planning the normal operational diagram**

- Art. 70 Normal operational diagram means the electric connection diagram of primary equipment and instrumentation in an installation, network or electric power system, including the condition of relay protections and related automation, approved by the dispatcher centre with decision-making authority for a pre-defined time in-

- terval. The graphical representation of the normal operational diagram will include the automations whose operational condition is important for manoeuvres.
- Art. 71 The graphical representation of the normal operational diagram is made according to UCTE agreements and applicable norms.
- Art. 72 Installations have to operate according to the normal diagram. The operation under another diagram is done only under approval of operational control personnel from the dispatcher centre with decision-making authority thereto and is recorded in the operational registers as deviation from the normal one, specifying also what the deviation consist of.
- Art. 73 Normal operational diagrams have to allow and to provide a safe and economic operation of the RPS within the performance limits of available equipment.
- Art. 74 The criteria used in establishing the normal diagram are as follows:
- a) the steady-state and transitory stability of the RPS operation;
  - b) continuity in consumers' supply, and in case the operation of various RPS equipment is disconnected- a fast supply to consumers;
  - c) possible fast removal of disturbances by the operation of relay protections and of automations;
  - d) possible quick delimiting and remedial of failures as well as the fast automatic and manual unloading in case of need;
  - e) reducing the short-circuit power to the admitted limits to the equipment installed within the RPS networks;
  - f) possible utilisation at maximum available capacity of the active and reactive power sources;
  - g) maintaining the voltage levels within normal limits;
  - h) safe supply of auxiliary services in power plants and electric substations.

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- Art. 75 The normal operational diagram is elaborated using calculations checking: the power flows and voltage levels, the RPS stability limits and of its component parts, the short-circuit powers, the neutral treatment in electric networks and the operation conditions of protection relays and automations.
- Art. 76 The normal operational diagram of electric networks under the dispatcher control authority of a dispatcher centre is elaborated by it and approved by the dispatcher centre manager as per the applicable norms and procedures.
- Art. 77 At installation level proposals of normal operational diagrams are elaborated for each power plant, electric substation and network area, in accordance with the normal diagrams of the network under the dispatcher control authority of dispatcher centres.
- Art. 78 Normal operational diagrams submitted for approval of dispatcher centres with decision-making authority are 'proposals of normal diagrams' and are valid only after their approval.
- Art. 79 Any change in the normal operational diagram during its validity period can be performed only with the approval of the dispatcher centre that has approved it initially.

## **20.2. Planning the withdrawal from operation of generation, transmission and distribution facilities within the RPS**

- Art. 80 Managerial units elaborate annual withdrawal plans that will be detailed under monthly programmes. Such programmes are submitted through competent dispatcher centres towards the decision-making ones for approval. Such approval takes into account first of all the safe operation of the RPS.
- Art. 81 The equipment managed by several managerial units have got withdrawal dates and intervals correlated beforehand by such units.
- Art. 82 Managerial units issue under the approved monthly programmes the applications for operational withdrawal and submit them to the decision-making dispatcher centre by means of the intermediate dispatcher centres.

**20.3. Operational planning of relay protections and automations**

- Art. 83 Operational planning of relay protections and automations is a component part of the normal diagram planning.
- Art. 84 Control, protection and automation systems for RPS equipment fall under the decision-making authority of the CPD.
- Art. 85 The control, protection and automation systems of the ETG users: distributors, generators, consumers whose settings or operational condition requires coordination with the settings or the operational condition of relay protection and automation systems of certain pieces of equipment within RPS, usually fall under the decision-making authority of TPD and, as the case may be, of CPD.
- Art. 86 Managerial units are obliged to provide in due time the settings and periodical check-ups or whenever improper operations have been ascertained to the relay protection and automation devices.
- Art. 87 The situation of the main settings of equipment relay protections and automations have to be kept within control centres of power plants, electric substations and dispatcher centres.
- Art. 88 Assigning the decision-making authority over the control, protection and automation systems, the calculation of settings, parameter-setting, coordination of settings and controls, IT flow, registration of controls, supervision of their operation etc. are performed according to the criteria set within NPD-issued guidelines and procedures.
- Art. 89 Calculation of relay protection and automation settings is performed every time there is need, or at least once every four years.

**20.4. Planning the voltage levels**

- Art. 90 Voltage ranges in electric substations of the ETG are planned each semester (summer/winter) by the dispatcher centre with decision-making authority, so that normal voltage levels can be maintained in all network nodes, the steady-state stability of the RPS operational regime and reduction of transmission losses.

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- Art. 91 Voltage ranges for substations operation in interconnection with other power systems are planned with observance of agreements and covenants concluded with the interconnection partners.

## **CHAPTER 21 OPERATIONAL SCHEDULING OF THE RPS**

- Art. 92 Dispatcher centres by means of their functional control structures elaborate each day the operational schedule of equipment and installations under their decision-making authority, for the week day ahead and, as the case may be, for the non-working days preceding it.
- Art. 93 The operational schedule includes fully or partially, depending on the hierarchical level of the respective centre, the following components:
- a) forecast of active power
  - b) withdrawal schedule for generating units
  - c) withdrawal schedule of network equipment
  - d) operational schedule of power plants/generating units
  - e) scheduling the active power reserves
  - f) plan for consumption frequency
  - g) schedule of power exchanges with neighbouring power systems
  - h) scheduled operational diagram
  - i) operational scheduling of protections and automations
  - j) operational scheduling of voltage levels in control nodes
  - k) merit order of dispatchable units
  - l) operational regime of equipment
  - m) performance of planned manoeuvres
  - n) guidelines on the utilisation of planned reserved
  - o) other programmes provided in applicable procedures and norms

Art. 94 The operational schedule has to provide a safe operation of the RPS observing the safety principle (N-1), within the performance limit of available equipment.

Art. 95 Transelectrica can take into consideration also multiple contingencies (N-k) when elaborating the operational schedule in case, from its experience, it can reasonable estimate that such incidence are highly likely to occur with important outcomes.

### **21.1. Forecast of active power consumption within the RPS**

Art. 96 The forecast of active power consumption is elaborated for each basic scheduling interval determined according to applicable regulations using the statistical analysis of consumption, of weather forecasts, and of the estimations upon the impact of foreseeable social or other events.

### **21.2. Schedule to withdraw the generating units from operation**

Art. 97 Generating units are withdrawn from operation upon application from managerial units in this respect that are approved by decision-making dispatcher centres.

Art. 98 Managerial units and dispatcher centres with decision-making authority will observe the monthly and yearly withdrawal plans approved.

### **21.3. Schedule to take grid equipment out of operation**

Art. 99 Network equipment is withdrawn from operation upon application from managerial units in this respect that are approved by decision-making dispatcher centres.

Art. 100 Managerial units and dispatcher centres with decision-making authority will observe the monthly and yearly withdrawal plans approved.

### **21.4. Operational schedule of power plants**

Art. 101 Specific regulations issued by ANRE are applied when elaborating the operational schedule of power plants, taking into account the following:



- a) forecast of active power consumption;
- b) schedule of power exchanges with other power systems;
- c) merit order of dispatchable generating units;
- d) operational diagram of non-dispatchable units;
- e) network congestions (limitations);
- f) economic operation of the entire RPS;
- g) reasonable utilisation of fuels and hydropower resources.

Art. 102 Generators have to place the entire available power to the dispatchers' disposal, including the amount of power not included in the operational diagram, with a view to solve the deviations from the schedule or RPS incidents.

### **21.5. Scheduling the active power reserves**

Art. 103 The NPD schedules the active power reserves (primary control reserve; secondary control reserve; tertiary control reserve and slow tertiary reserve) so that the qualitative technical parameters of electricity can be provided according to the ETG Code.

Art. 104 The NPD observes the interconnected operation agreements and covenants relating to frequency control and reserve scheduling according to UCTE requirements and solidarity principles of the interconnected system.

Art. 105 When generation availability and offers are submitted for scheduling, generators take into account the obligation to provide the primary control reserve.

Art. 106 When generation availability and offers are submitted for scheduling, generators take into account to provide the primary energy source: water or fuel during the entire scheduling interval.

### **21.6. Scheduling the set point frequency**

Art. 107 The NPD schedules the operational frequency of the RPS so that the rated frequency limits can be observed.

- Art. 108 NPD sets daily the scheduled value of operational frequency in the RPS for each basic scheduling interval, taking into account also the correlation between the synchronous time with the astronomic time. The scheduled frequency level becomes a set point value for the secondary frequency-power control.
- Art. 109 NPD agrees the set point frequency level together with the TSOs of interconnected systems, according to the applicable agreements and covenants in case of interconnected operation.
- Art. 110 NPD determines the set point frequency value for the automatic speed controllers of dispatchable units.

### **21.7. Scheduling the power exchanges with neighbouring systems**

- Art. 111 NPD determines the schedule of power exchanges with the neighbouring electric power systems taking into account the following:
- a) import-export plans received from companies in accordance with the provisions of transmission contracts they concluded with Transelectrica;
  - b) plans to off-set the unplanned electricity exchanges calculated by the settlement coordination centre to which Transelectrica is affiliated;
  - c) bilateral off-set plans for unplanned power exchanges with the neighbouring systems under the applicable agreements and covenants concluded with their TSOs;
  - d) failure assistance plans or aid returning plans agreed with the TSOs of interconnected systems under the applicable agreements and covenants in case of interconnected operation;
  - e) net transfer capacity of the interconnections..
- Art. 112 NPD notifies to economic agents the agreed import-export plans in accordance with the provisions of transmission contracts that such agents have concluded with Transelectrica.
- Art. 113 NPD agrees upon the power exchange plans with the TSOs of neighbouring systems as per the applicable agreements and covenants.

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Art. 114 NPD notifies the power exchange plans to the settlement coordination centre as agreed with it.

**21.8. Scheduled operational diagram**

Art. 115 The dispatcher centre schedules the operational diagram for the equipment under its decision-making authority.

Art. 116 When the operational diagram is scheduled the withdrawals from operation of equipment approved by other dispatcher centres as well are taken into account.

Art. 117 Dispatcher centres will coordinate the operational diagrams they determine with the operational diagrams of other dispatcher centres, while observing the safe operation principle.

Art. 118 The NPD and the TSOs of neighbouring power systems operating in interconnection to the RPS will coordinate their scheduled operational diagrams to the extent in which such coordination is required for a safe operation.

Art. 119 The scheduled operational diagram of the ETG and of 110 kV looped networks should meet the following conditions:

- a) to observe the (N-1) criterion, considering that the diagram with (N) elements is the scheduled operational diagram; radial supply circumstances to certain areas by means of a single network equipment are excepted;
- b) the temporary deviation from the (N-1) criterion in agreement with the regulations in force is admitted;
- c) the steady-state stability reserve should be at least 20% in the diagram with (N) elements in operation and at least 8% in the diagram with (N-1) elements in operation considering that the diagram with N elements is the scheduled operational diagram;
- d) to comply in a satisfactory manner with the transient stability conditions;
- e) the breaking currents of circuit breakers are not surpassed by the short-circuit current;
- f) all the conditions for the neutral treatment are observed;

- g) normal operation conditions for protection and automation systems are provided;
- h) voltage levels are within admissible ranges in all electric substations and, as much as possible, within the economic range limits;

### **21.9. Operational scheduling of protections and automations**

- Art. 120 Dispatcher centres with decision-making authority schedule the operational condition and relay protection and automation controls in correlation with the scheduled operational diagram and regime.

### **21.10. Operational scheduling of voltage levels in control nodes**

- Art. 121 Voltage scheduling in electric network nodes is performed as much as possible within the economic ranges and control is made to the compliance with admissible ranges in case of a simple contingency, while observing the agreements and covenants concluded with the partners in border electric substations.
- Art. 122 Dispatcher centres with decision-making authority determine the schedules of voltage levels (ranges) for each bus bar in electric substations and power plants of the distribution network for characteristic day intervals (morning peak, evening peak, daytime off-peak, nighttime off-peak) both for week days and for holidays. Schedules will include both the normal voltage ranges and the minimum, respectively maximum admissible ones.
- Art. 123 Admitted operational voltage ranges, economic operation voltage ranges and manual/sacrificial disconnection of consumers are determined for the bus bars of ETG control nodes.

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## **CHAPTER 22                    EXCHANGE OF DATA UNDER OPERATIONAL SCHEDULING – REGIME OF DEMANDS**

- Art. 124 A piece of equipment can have its operational condition changed regardless of a previously-approved schedule based on a request from the managerial unit approved by the dispatcher centre with decision-making authority there upon.
- Art. 125 Applications are issued by the managerial unit and are recorded in the application register kept with the respective unit. The same register will include as well the approvals or answers received. Such register can be also kept in electronic (file) format etc. with a regulated access and protection regime.
- Art. 126 Managerial units submit the requests for changes in the operational condition of equipment to the dispatcher centre with decision-making authority by means of their own dispatcher centre and/or those with competence over such equipment.
- Art. 127 In case an outfit is under the managerial regime of two or several managerial units, the unit initiating the change request for the equipment condition, a normally scheduled request, it is obliged to notify this to the other managerial units in order to correlate works, and sends afterwards such request to the dispatcher centre with dispatcher control authority over the respective equipment.
- Art. 128 Deadlines for change request submission towards dispatch centres with decision-making authority, as well as the terms for approvals/answers sending are determined under specific procedures.
- Art. 129 Internal regulations of managerial units determine the methods and deadlines of request submission to their subunits in correlation to the terms provided for application submission to decision-making dispatcher centres. The requests submitted by managerial units to higher dispatch centres are signed by the managerial team of the respective unit.

- Art. 130 The requests arriving to dispatcher centres will be recorded in the 'application register'. Such application has to comprise the following:
- a) current application number in the dispatcher centre register;
  - b) current application number from the managerial unit submitting it;
  - c) name of managerial unit submitting it;
  - d) name of signatory person from the managerial team of submitting unit;
  - e) name of competent person from the dispatch centre who approves the application;
  - f) name of the persons who send/receive the application;
  - g) date and time of application submission/reception;
  - h) interval requested (including the time needed for the manoeuvres to be performed with such equipment);
  - i) the equipment requested (its accurate name, and in case of electricity and heat generating installations or of their components- the deducted power, as well as the available power remaining within the respective power plant);
  - j) the purpose of the change requested in the operational condition;
  - k) the operational condition where the equipment has to be changed to;
  - l) the maximum interval during which the equipment can be returned back to operation in case of need/the maximum period until returning to operation;
  - m) the impacted consumers'/suppliers'/generators agreement;
  - n) observations on the subsequent operation: changes made; change in operational parameters etc.
  - o) the name of each person/subcontractor: position, managerial unit to which the equipment will be provided by the operational control person; their names will be sent only to the dispatcher centre that will hand over the equipment;

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- p) in case of withdrawals from operation for tests, measurements etc. the name of the responsible person with their performance will be also mentioned;
- q) the observations and viewpoints of intermediate dispatcher centres.
- Art. 131 The application register will also include:
- a) the approvals or answers sent to the applicant (name of the person sending/receiving it, date and time, content of approval/answer and the name of the signatory person);
  - b) notification of interested managerial units or of dispatcher centres.
- Art. 132 The dispatcher centre with decision-making authority will take into account the application review and solution as well as the viewpoints of dispatcher centres managing the respective equipment.
- Art. 133 The application review means, according to each case, an analysis of the power balance of the regime and operational safety resulting after the operational change to the equipment, as well as of the provisions for change in the operational regime and diagram, while correlating the relay protection and automation controls etc. in view of a normal operation.
- Art. 134 The approvals of dispatcher centres with decision-making authority are given in principle. Such approvals are applied depending on the actual operational regime of installations or electric networks at that time, by the operational approval of the application given by the operational control personnel on duty from the dispatcher centre with decision-making authority.
- Art. 135 In case the actual circumstances within the RPS do not allow the change of operational conditions of requested/approved equipment, the operational control personnel/shift dispatcher with decision-making authority will cancel such approval, writing it down in the operational register together with the reason of cancellation.

- Art. 136 In case one knows in due time (e.g. following some incidents) that the operational regime will not allow changing the operational condition of the equipment for which the approval was sent, the dispatcher centre having issued such approval is obliged to decide upon canceling it and notifying this to the applicant.
- Art. 137 In case an approval is cancelled, the applicant will re-submit its application, except for the circumstances when the dispatcher centre with decision-making authority approves the respective application for a different date proposed by the applicant.
- Art. 138 The applications submitted to dispatcher centres later than provided in applicable regulations will not be taken into consideration. The one who sent the application late is responsible for the non-execution of works.
- Art. 139 In exceptional cases: prevention of incidents, accidents or fires, or the need to remove them, the applications can be submitted any time and will be marked with 'incident prevention'. The application is quickly solved by the dispatcher centre with decision-making authority.
- Art. 140 In case the withdrawal from operation is urgent and there is no time to make a written application, the request is made directly through dispatcher centres up to the decision-making one by means of an operational application that is recorded in the applicant's and dispatcher centres' registers.
- Art. 141 The managerial unit keeps the responsibility to notify the 'incident prevention' or operational application and provides the compliance to the labour protection norms, similarly to the written applications.



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## CHAPTER 23      OPERATIONAL CONTROL    WITHIN RPS

### 23.1. Operational subordination relations

Art. 142 The operational control personnel on duty of the dispatcher centre has got functional subordinates according to the assignment order:

- a) the operational control personnel on duty from subordinated dispatcher control centres;
- b) the operational control personnel on duty from power plants, the operational personnel in electric substations and network areas operating equipment under the dispatcher control authority of the respective centre.

Art. 143 The operational control personnel's activity within dispatcher centre is managed and controlled by the head of the dispatcher centre.

Art. 144 The administrative managers have to send to the dispatcher on duty the required orders by means of the head of operational control department or his deputy. In case this one is absent and the dispatcher on duty receives instructions from the administrative personnel, he is obliged to notify this immediately after complying with such instructions to the head of operational control department. Such instructions relating to the equipment under the dispatcher control authority of a higher dispatch centre will be carried out with the approval of this centre.

Art. 145 The operational control personnel on duty in a dispatcher centre issues the operational instructions as follows:

- a) directly to the operational control personnel of the subordinate dispatch centre;
- b) directly to the operational personnel on duty over whose equipment the respective dispatch centre exercises direct control;

c) directly to the operational personnel on duty by the operational control personnel exercising the decision-making authority for the equipment in the electric substations, power plants or network areas where the direct control is exercised by a subordinate dispatch centre, but only in case emergency operations are required to prevent the occurrence or spreading of failures and to remove them. Under such circumstances the operational personnel is obliged to carry out the instructions and report on their execution, including to the dispatch centre exercising direct control over restoring the telecommunication connections, otherwise immediately when is possible and before performing any instruction issued by such dispatch centre they should notify about the manoeuvres performed and the situation arrived at.

Art. 146 The dispatcher centre that received operational instruction from a higher dispatch centre is obliged to apply it immediately, in accordance with the duties and responsibilities it has from the dispatcher control authority over the respective equipment, as well as to send the required instructions to this effect to the operational personnel, if it has got direct control into such installations.

Art. 147 Dispatcher centres with no competence over equipment, as well as the operational personnel can be used by higher dispatcher centres as intermediates for transmission of instructions, and such intermediates are obliged to send over the instructions also specifying where it comes from. Dispatcher centres used as intermediates are responsible only for the accurate transmission in due time of the instruction and for its recording in the operational register.

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- Art. 148 The subordinated operational personnel or operational control personnel are obliged to carry out accurately and in due time the instructions of operational control personnel, except for those that endanger the personnel safety, the equipment integrity or engender circumstances for the occurrence of failures.
- Art. 149 In case the unit receiving the dispatcher instruction considers it to be incorrect, it has to immediately draw the dispatcher's attention over this. In case the operational control personnel repeats the same instruction, the subordinated operational personnel and operational control personnel are obliged to immediately execute it if personnel safety or equipment integrity are not endangered and no circumstances facilitating failures are produced. In such cases he is obliged to refuse to execute the instruction and to notify this to his administrative superiors. Any unjustified refusal to execute the instruction and any unjustified delay in the execution both the persons having failed to execute and those who approved such non execution are responsible.
- Art. 150 The instructions of administrative control personnel from power plants, substations and network areas referring to the equipment that, according to the assignment order for installations, fall under the dispatcher control authority of higher dispatch centres are performed by the operational personnel with the approval of operational control personnel with decision-making authority over such equipment.
- Art. 151 The procedures, guidelines, instructions and decisions within the managerial units of the RPS that impact the dispatch control have to be in compliance with the similar ones from the dispatcher centre with dispatcher control authority over such equipment.
- Art. 152 The dispatcher control personnel is entitled and obliged to control the manner in which the operational control activity is carried out within subordinated dispatch centres as well as within managerial units.

- Art. 153 When the failure to observe the dispatch discipline endangers the RPS operation, this has to be immediately removed by the relevant managers. The case will be reported to the administrative managers, who will review the circumstances and the conclusions of such analysis will be submitted to the higher dispatcher centre.
- Art. 154 In case a shift consists of two or several operational control persons in a dispatcher centre (dispatchers), the obligations of the dispatch centre regarding the exercise of operational control go to the operational control team on duty. The shift head has to coordinate the activity of the team.

### **23.2. Exercise of decision-making authority by the operational control personnel**

- Art. 155 The dispatcher on duty in the dispatcher centre with decision-making authority issues instructions or approvals directly to operational personnel whenever he exercises the direct control as well in such installation or to the dispatcher on duty in the competent dispatch centre immediately subordinated.
- Art. 156 Subordinated dispatch centres and the operational personnel are obliged to notify accurately in due time the higher dispatcher centre and remain responsible for the consequences ensuing from their making incorrect decisions following a misinformation or late information to the superior level.
- Art. 157 In case a decision is made, the dispatch centre with decision-making authority will take into account also the viewpoint of dispatcher centres competent for the respective equipment and of dispatch centres with decision-making authority over equipment whose regime and safety in operation can be impacted by the decision made, as well as the viewpoint of managerial units.

### **23.3 Exercising the coordination orders by the operational control personnel**

- Art. 158 Coordination control is exercised:

a) directly through unbiased orders and instructions for operational personnel when the respective dispatch centre exercises direct control over the respective installations;

b) by means of competent dispatcher centre exercising direct control in the respective installations;

Art. 159 The operational control personnel exercising coordination control is answerable both for the correct time sequence of the coordination manoeuvre of distinct operations and distinct operation groups as well as for the sequence of certain operations relating to performing safe operational regimes during and after manoeuvres.

Art. 160 The execution of manoeuvres, the change in the operational configuration, regime or safe operation can be decided or approved by the operational control personnel from the dispatcher centre with coordination control authority only upon approval from the operational control personnel from the dispatch centre with decision-making authority over the respective equipment, except for the cases when there is an imminent risk of human accident, fire, destruction of equipment etc.

#### **23.4. Exercising the competence by the operational control personnel**

Art. 161 The operational control personnel from the competent dispatch centre receives instructions or approvals from the operational control personnel from the hierarchically higher dispatcher centre (which can be a dispatch centre with decision-making, coordination control or competent authority). The latter will issue instructions or approvals detailing them at the required level either directly to operational personnel (when it has got direct control) or to an immediately subordinated dispatch centre.

- Art. 162 The competent dispatch centre receives from the operational personnel or from the immediately subordinated operational control personnel the information about the events occurred, the condition of equipment, the operational regime and parameters of such equipment etc, synthesising the received data and notifying the higher dispatch centre with competence or decision-making authority and, as the case may be, suggesting for approval solutions, expressing its viewpoint on the operational configuration, required manoeuvres, operational regime and safety etc.
- Art. 163 The change in the configuration, regime or manoeuvres or the reduction in the operational safety can be ordered or approved by the competent dispatch centre only upon approval from the dispatcher centre with decision-making authority over the respective equipment, except for the cases when there is an imminent risk of human accidents, fires, natural catastrophes or equipment damage.
- Art. 164 The dispatch centre with competence over a piece of equipment is obliged to notify all dispatcher centres in its area of activity about the decisions made, whether such decisions impact the operational safety of the equipment under the operational control authority of such centres.

### **23.5. Operational control of RPS under normal running conditions**

- Art. 165 The operational control personnel on duty in a dispatch centre- the dispatcher on duty is the operational leader of the running regime of installations from electric power plants and networks, within the limits of dispatcher control limits as determined in the assignment order.
- Art. 166 The dispatcher on duty from dispatch centres provides the safe operation of the RPS and of its component parts (network areas, installations, equipment), for which purpose:

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- a) he makes the scheduled operational regimes, orders or approves the operational change in the running diagrams of installations with a view to increase the safety degree, while observing the preset restrictions and changing accordingly, as the case may be, the condition and settings of relay protection and automation systems;
  - b) he carries out the schedules of withdrawal from and returning to operation of equipment, of new equipment commissioning and of tests & measurements;
  - c) he monitors the operational regimes performed and especially the critical points, taking all the required measures;
  - d) he coordinates the manoeuvres requiring the coordination of the respective dispatch centre;
  - e) he carries out remote control manoeuvres.
- Art. 167 The dispatcher on duty within the CPD provides the electricity output/consumption balance within the RPS or areas within it as well as control over the exchanges with the power systems of other countries, to which purpose:
- a) he regulates the RPS balance with frequency correction upon interconnected operation in accordance with the control procedures and guidelines agreed with interconnection partners;
  - b) he provides the performance of electricity changes/transits between certain RPS areas within the admissible limits of operational parameters;
  - c) he operationally manages the frequency control within the RPS when in isolated operation or within certain areas, when these operate in isolation;
  - d) he monitors the loading/unloading of electric power plants according to merit order provided in the operational schedule;
  - e) he orders the decrease of the power consumption in the ETG as per the applicable procedures, instructions and regulations;

- f) he monitors the provision of ancillary services provided in the operational schedule.
- Art. 168 The dispatcher on duty from dispatch centres provides the quality of electricity supplied, to which purpose:
- a) he monitors the continuity of supply to electricity consumers;
  - b) he controls frequency within preset limits, under isolated operation;
  - c) he controls voltage levels to the preset ranges.
- Art. 169 The dispatcher on duty from dispatch centres provides the acquisition and transmission of information as provided in applicable regulations.
- Art. 170 The dispatcher on duty in the CPD provides the economic operation of the RPS, to which purpose:
- a) he uses reasonably the power resources provided for electricity and heat generation according to the operational schedule;
  - b) he optimises the distribution of active load by electric power plants in case the wholesale electricity market is suspended;
  - b) he optimises the distribution of reactive load by power plants, using the electricity generation and consumption reactive means within the RPS, he controls voltage levels and active and reactive power circulations in the network, he changes in operational terms, as the case may be, the operational diagrams taking into account the running schedule so as to achieve the reduction of technical losses within the RPS networks.
- Art. 171 The dispatcher on duty from dispatch centres provides filling in of documents relating to network operation under its decision-making authority according to applicable regulations.
- Art. 172 The operational personnel in installations and network areas, as well as the operational control personnel are obliged to immediately notify to the higher dispatch centre (dispatcher centre with direct control in case of operational personnel or the immediately higher dispatch centre with competence or decision-making authority in case of operational control personnel) all deviations from



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the normal operational regimes, while proposing also solutions according to each case. The dispatch centre with decision-making authority will approve or decide the required measures in order to restore the normal operational regime.

**23.6. Operational RPS control when taking power equipment out of operation**

- Art. 173 All available equipment under the dispatcher control authority of a dispatch centre for which the dispatcher has not issued the approval to be taken out of operation has to be functional, under back-up or under a non-appointable operational condition.
- Art. 174 A piece of equipment under the dispatcher control authority of a dispatch centre will not have its condition changed without the approval of the decision-making dispatcher, except for the cases when a postponement would endanger the people's safety or that of equipment.
- Art. 175 The operational control personnel receive and usually solve the incident-prevention applications and in exceptional cases they deal with the applications for works not included in the operational/running schedule.
- Art. 176 The approval to withdraw equipment from operation is granted by the operational control personnel from the dispatch centre under whose decision-making authority such equipment is, however only following an application from the managerial unit.
- Art. 177 When work is completed the operational personnel will declare to the operational control staff from the dispatch centre of direct control that the equipment can be put back into operation. The decision-making dispatcher centre determines the operational condition of the equipment.
- Art. 178 In case the operational regime does not allow a scheduled withdrawal from operation of a piece of equipment, the operational control personnel are obliged to decide upon cancelling the approval and to notify it to the applicant.

- Art. 179 If out of any reason the manoeuvres did not begin at the preset date and time, the approved duration is diminished accordingly while the term set for re-start up (putting back to operation and reaching the provided operational condition) remains the same. In such cases upon request from the applicant, the dispatch centre having issued the approval will consider the possibility to postpone the term for such equipment putting back to operation and will notify the answer to the applicant along the operational hierarchical lines. The approved interval cannot be extended unless the dispatcher centre having issued the initial approval allows it.
- Art. 180 The managerial unit issuing the request and organising the work is responsible for the need to perform the work, tests, measurements etc. specified in the application in order to withdraw from operation only the equipment as required to make such work or tests, as well as for the strict observance of terms.

### **23.7. Operational RPS control when commissioning and/or starting up new power objectives (facilities)**

- Art. 181 New power objectives will be commissioned only when the following has been performed:
- a) inserting the new power objectives into the RPS;
  - b) the tests required for the commissioning of the new equipment;
  - c) the assignment order of the dispatcher control authority has been issued;
  - d) the normal operational diagram, including the regulation of control, protection and automation systems both for the new equipment and for the existing one for possible changes following from the commissioning of new equipment; the commissioning of a piece of equipment precedes its start-up.

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- Art. 182 In view of commissioning new objectives (facilities), the managerial units submit to the decision-making dispatch centre upon regulated terms through the intermediate dispatcher centres all information as per items a) and b) as well as the information required in order to get items c) and d) from the previous article. Mention will be also made that work is completed, the equipment corresponds to applicable norms, its reception has been performed and it can be commissioned, the telecom, remote control and tele-metering connections have been made, the operational personnel has been trained and provided with the required documentation.
- Art. 183 Equipment commissioning will take place based on an application that is submitted, approved etc. under the same regime as the normal applications for equipment withdrawal from operation.
- Art. 184 Any piece of equipment or element connected to an installation in operation, even if it has not been started-up, will be considered as an operational equipment in the sense of this regulation and of the labour protection norms, thus falling under the dispatcher centres authorities or of the operational personnel, according to the assignment order.
- Art. 185 The dispatcher on duty from the dispatch centre with decision-making authority will allow manoeuvres to begin for commissioning and starting up new equipment only when he has checked up the following:
- a) the conditions stipulated for application solving have been complied with;
  - b) the conditions of art. 181, art. 182 and art. 183 have been met;
  - c) the settings of control, protection and automation systems are changed as per orders if the commissioning of such new objectives requires it.

**23.8. Operational RPS control upon final withdrawal of operation of the equipment**

- Art. 186 In case of the equipment that will be taken out of operation for good managerial units will submit at least 6 months beforehand to the dispatch centre with decision-making authority a set of documents showing the reasons of such final withdrawal of operation of the equipment and the possible outcomes for the installations remaining in operation.
- Art. 187 The final withdrawal from operation is performed based on an application that is submitted, approved etc. like the requests to take equipment out of operation. The application will be completed with the points in which the disconnection will be made from the installations remaining in operation.
- Art. 188 A piece of equipment withdrawn from operation for good is disconnected from the operational equipment and goes out of the dispatcher control authority of the dispatch centre or operational personnel.

**23.9. Operational RPS control under hazards/failures**

- Art. 189 The operational control personnel of dispatcher centres have to provide in case of failure/incidents:
- a) the continuity of RPS operation in its entirety or by zones that have been insulated, using the RPS power reserves and the failure assistance from the power systems it is interconnected with, as well as a reduction of electricity consumption by ordering manual disconnections or by applying other consumption reduction plans according to the regulations in force;
  - b) the fastest detection of the failure/incident point and taking measures to avoid its spreading;

- c) measures for the fastest possible re-energising of equipment supplying the auxiliary services of power plants and substations and of impacted consumers according to specific procedures, controlling the required manoeuvres and instructing managerial units to organise interventions in the shortest possible time in order to remove such failure/incident;
- d) some operational diagrams and regimes as safe as possible post-failure, depending on the available equipment and its condition;
- e) reporting the failure/incident and the disconnections of consumers according to applicable regulations.

- Art. 190 In case of an extended system failure, restoration is performed in accordance with the principles included in the *Plan for RPS operational restoration*.
- Art. 191 The *Plan for RPS operational restoration* is elaborated and updated every time when needed by Transelectrica in cooperation with the ETG users and with the TSOs of neighbouring systems.
- Art. 192 The fundamental condition of a fast and correct removal of failures/incidents is the rapid accurate information of the higher dispatcher centre by the operational personnel and intermediate dispatch centres up to the one with decision-making authority, about the events occurred, and the resulting configuration and operational regime.
- Art. 193 Operational personnel from installations and electric network areas are obliged to immediately notify the dispatch centre with direct control in an accurate and concise manner providing also concrete operational proposals, and this centre has to immediately inform accurately and concisely the higher dispatcher centre with dispatcher control authority over such equipment and up to the dispatch centre with decision-making authority.

- Art. 194 In case of imminent danger of human accidents, fires, natural catastrophes or equipment destruction, the operational personnel can take out of operation a piece of equipment without the approval of the dispatcher level with decision-making authority over it. Operational personnel are responsible for the decision made and has to notify in the shortest delay the respective dispatcher centre.
- Art. 195 At the same time with the dispatcher notification on the failure/incident, operational personnel have to take measures to remove it within their authority limits, to provide supply to auxiliary services, to determine the condition of equipment that tripped and to prepare it for start-up and restoration of the normal operational diagram or the initial operational diagram, if the normal operation does not function.
- Art. 196 Failures are removed by operational personnel, are coordinated and controlled by the operational control personnel in a correlated and uniform manner using the procedures and guidelines for failure removal elaborated by dispatcher centres with decision-making authority as well as by operational units (using the framework procedures and guidelines and, as the case may be, the procedures and guidelines elaborated by higher dispatch centres).
- Art. 197 Failures removal within the RPS or in its areas is controlled by the dispatcher centre with decision-making authority over the respective equipment. This centre determines the solutions to do away with failures, using the proposals from the subordinated operational personnel, as well as the applicable procedures and guidelines, and issues the required orders to subordinated dispatch centres or directly to the operational personnel.
- Art. 198 Failures on interconnection lines or in the interconnected system are removed in cooperation with the dispatchers of the respective power systems, in accordance with the applicable agreements.

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- Art. 199 The operational control personnel from dispatcher centres of direct control take action in order to remove incidents and failures under the approval granted by the operational control personnel from the dispatch centre with decision-making authority or upon its orders, while observing the specific procedures and guidelines of failures removal.
- Art. 200 The operational control personnel from dispatcher centres of direct control are directly leading the manoeuvres of failure removal from the respective installations, within the limits of their dispatcher control authority and using the failure removal procedures and guidelines and the orders or approvals from the operational control personnel in dispatcher centres with decision-making authority, in a direct manner or through another competent dispatch centre.
- Art. 201 Failure removal manoeuvres to the equipment requiring coordination are performed upon instructions of the operational control personnel from dispatcher centres with coordination control, using the solutions provided or approved by the operational control personnel from the dispatch centre with decision-making authority.
- Art. 202 In case there are no direct telephone/radio connections between the operational personnel in installations and the dispatcher centre exercising direct control, and in case the telephone connection cannot be obtained by side routes within the intervals set in specific procedures, the operational personnel will remove the failures using the procedures and guidelines of failure removal in case of absent telephone connection, which have been elaborated by the dispatch centres with decision-making authority. In case no telephone connection to the higher dispatcher centre can be made available within the preset interval, the incident is removed as decided by such dispatcher centre within its limits of operational control authority.

- Art. 203 In case the telephone connection is broken between various dispatcher centres, the failure will be removed under the control of the higher dispatch centre equipped with a direct telephone connection to the operational personnel from installations or by means of other dispatch centres, within the limits of its dispatcher control authority.
- Art. 204 Failure removal manoeuvres at installations level- power plants, electric substations and network areas- are performed by the operational personnel using the procedures, guidelines and instructions or approvals from the dispatch centre with direct control.
- Art. 205 The detailed manoeuvre of failure removal at installation level is the duty of operational personnel, as the instructions and approvals from dispatcher centres are between the limits of their competence, coordination control and decision-making authority.
- Art. 206 Manoeuvres of failure removal to equipment that is not under the dispatch control authority of a dispatcher centre will be performed by the operational personnel of the respective installation in accordance with their tasks under the 'internal assignment order', as well as with the procedures and guidelines elaborated by operational units.
- Art. 207 During failure removal the operational personnel have to supervise the supply of auxiliary services of power plants and substations and to take the required measures for their re-supply according to local procedures and guidelines.
- Art. 208 The registrations of operational talks with specific instrumentation will be used for review of the failure and of the manner in which the personnel have taken action.
- Art. 209 The dispatcher on duty is obliged to notify the managers nominated under failure procedures and guidelines, as well as the dispatch centres of operational units whose installations have been severely impacted by the failure.



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- Art. 210 Managerial units (regardless of their administrative subordination) draw up information notices when the failure has been removed and submit them to dispatcher centres up to the one with decision-making authority in accordance to applicable regulation.
- Art. 211 The operational control personnel are responsible for the failures occurring within RPS out of their guilt, within the limits of dispatcher control authority assigned to them. Such personnel are not responsible for the failures having occurred because of:
- a) some wrong information from the subordinated operational personnel;
  - b) incorrect execution of instructions received by the subordinated operational personnel;
  - c) certain personal mistakes of the subordinated operational personnel.

### **23.10. Operational RPS control when operational parameters deviate from rated values**

- Art. 212 In case the operational parameters deviate from their rated values, the operational control personnel as well as operational personnel are obliged to take immediate action in order to restore the operation within admitted limits, according to the specific procedures and guidelines.
- Art. 213 In order to avoid a critical state occurring within the RPS or in some of its areas, or in order to come out a critical condition occurred, the operational control as well as the operational personnel are obliged to take action without delay at the disposal or with the approval of the higher dispatch centre or upon their own initiative, according to specific procedures and guidelines, in the following situations:
- a) when frequency falls/increases under/over admitted limits;
  - b) when voltage falls/increases under/beyond admitted limits;
  - c) when overloads or over-temperatures occur;

- d) when active and/or reactive power flows are recorded above the set point values required in order to maintain the stability of the electric power system;
  - e) when fluctuations occur.
- Art. 214 In order to avoid a critical state occurring within the RPS or in some of its areas, or in order to come out a critical condition occurred, the active and reactive power reserves of the RPS will be used, as well as the control possibilities of available equipment, passing some equipment from back-up regime into operation or the other way round, changing configurations and using the failure assistance from power systems with which there is interconnected operation and, if need be, reducing consumption by manual disconnections according to applicable procedures, guidelines and regulations.

## **CHAPTER 24            REGULATION OF RPS OPERATIONAL PARAMETERS**

### **24.1. Frequency control**

- Art. 215 Frequency is controlled according to concluded agreements when there is interconnected operation with other electric power systems; usually frequency control is performed by all system operators in the interconnection using the principle of regulating the RPS balance with frequency correction.
- Art. 216 The set point frequency is of 50 Hz within the RPS or in its areas upon separate operation. To correct the synchronous time the set point frequency can be changed by  $\pm 0.01$  Hz and exceptionally by  $\pm 0.05$  Hz.
- Art. 217 Secondary frequency control under isolated operation of the RPS is automatically performed using the central frequency-power controller, to which a control power will be connected according to regulations. In case the automatic control system does not operate frequency is manually corrected using the specific procedures and guidelines.

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- Art. 218 The task of frequency control within the RPS goes to the Central Power Dispatcher in case of isolated operation, and this one determines which power plants are going to make frequency control. In case an area of the RPS is isolated, the CPD designates the dispatcher centre that will take over frequency control in the respective area.
- Art. 219 In case of isolated operation, if frequency drops under the admitted rated limit or grows over the admitted rated one the CPD has to immediately provide frequency restoration within rated operational limits taking all the required measures in accordance with the specific procedures and guidelines. When frequency increases, if the dispatcher does not dispose of the output reduction reserve (spinning reserve or operational hydropower units) he will require units to be taken out of operation accordingly. When frequency drops and the RPS has no power reserves or if getting such reserves takes a long time, the dispatcher starts preparing the reserves and at the same time he takes measures to reduce consumption by manual disconnections, according to applicable norms, as the case may be.
- Art. 220 In case important fast frequency deviations occur, electric power plants have to automatically step in according to the primary frequency control requirements.
- Art. 221 Transelectrica determines the amount of primary control reserve required within the RPS as follows:
- a) under RPS interconnected operation the primary control reserve is determined by mutual agreement with the operators of interconnected systems so as to observe the equity principle between systems;
  - b) when RPS operates in isolation the minimum primary control reserve is scheduled to about 5% of the total power output.
- Art. 222 Transelectrica determines the 'one-minute' reserve needed to be equal to the highest value among:
- a) the power of the biggest generating unit in operation;
  - b) the highest power in operation connected on the same bus bar section;
  - c) 5% of the total power output in the system.
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- Art. 223 Transelectrica is obliged, under its responsibilities for safe system operation, to provide the reserve power of each category within the limits of available capacities in the system and under concluded contract, as well as in sufficient amount to ensure the rated quality parameters and to observe the covenants with the TSOs power systems to which RPS is interconnected.
- Art. 224 Transelectrica provides both the transmission of the maximum forecasted load and of the reserve power of primary and secondary control and the 'one-minute' reserve, under safe operational conditions within the RPS.
- Art. 225 When regulating the RPS balance with the frequency correction under interconnected operation and deficit balance, the CPD can use, besides the reserves, the failure assistance from the electric power systems to which the RPS is interconnected.

#### **24.2. Voltage control**

- Art. 226 Transelectrica is responsible to provide voltage stability, which is a component part of the measures taken in order to maintain a normal operational condition within the RPS.
- Art. 227 Transelectrica provides, within the possible control limits, the operation with rated voltage levels in any ETG point, according to this regulation;
- Art. 228 The operational personnel in electric power plants and substations are obliged to:
- a) permanently monitor the voltage level;
  - b) notify the dispatcher about the deviation of voltage levels from schedule;
  - c) regulate voltage according to the provisions of procedures and guidelines, schedules and instructions received from dispatcher centres;
  - d) load or unload with reactive power the synchronous generators and compensators and to use also the other control means (sources or consumers of reactive power) according to the procedures, guidelines, schedules and instructions received from dispatcher centres.

- Art. 229 Dispatchers on duty are obliged:
- a) to monitor the voltage level within control nodes determined under the operational control structure;
  - b) to check up the execution of voltage level plans and of received instructions;
  - c) to take the required control measures, according to each case, in accordance with the applicable procedures and guidelines and with the instructions from the higher dispatch centre;
  - d) to notify the higher dispatcher centre about the voltage deviations from scheduled values;
  - e) to maintain voltage in control nodes by loading/unloading generators and synchronous compensators with reactive power, within the limits provided in procedures and guidelines;
  - f) to use the condenser batteries available;
  - g) to use the voltage control possibilities of distribution bus bars in order to increase the voltage level on the bus bars from the transmission network, according to procedures and guidelines;
  - h) to take measures to remove the reactive power deficit and restore voltage within normal limits, according to procedures and guidelines; if the situation so requires, measures are taken to reduce consumption according to norms and to the procedures and guidelines with respect to preventing the loss of system stability.
- Art. 230 Automatic voltage controllers of units are permanently in operation.
- Art. 231 In polluted areas under bad weather conditions voltage drop is admitted to a level that should not endanger the equipment. The voltage level and the manner to control it are determined under specific procedures and guidelines for such circumstances.
- Art. 232 Transelectrica keeps available its own installations of reactive power set-off in a sufficient amount at proper technical characteristics (switching capacity and control), so as to provide the rated technical quality parameters:
- a) when any electric line is connected without consumer consumption;

- b) under maximum load regimes within the ETG while also observing the N-1 principle.

### **24.3. Control of active and reactive power flows**

- Art. 233 Active and reactive power flows within the RPS have to be regulated in such a manner as to provide a safe and economic operation.
- Art. 234 The active and reactive power flows will be controlled in such a manner as to provide:
- a) observance of the admissible limit parameters of equipment (limit thermal current, maximum and minimum admissible voltage levels, limit transmission power of equipment in terms of relay protections and automations, limit thermal current of line traps etc.);
  - b) observance of the safe operation criteria;
  - c) recording low technical losses.
- Art. 235 Operational personnel have to monitor the power flows by equipment and inform the operational personnel of dispatch centres with decision-making authority in case admitted limits are exceeded.
- Art. 236 Operational personnel from dispatch centres with decision-making authority decides the required measures for active and reactive power flows control in accordance with the specific procedures and guidelines.
- Art. 237 In case of need- whenever power reserves are depleted- the operational personnel from dispatch centres with decision-making authority will decide measures to reduce consumption by means of disconnections or limitations, according to specific norms.

### **24.4. Control of exchange power with interconnected power systems**

- Art. 238 Exchange powers with other countries' power systems with which there is interconnected operation are controlled by the NPD in cooperation with the TSOs of respective countries according to the provisions of agreed guidelines and conventions.

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- Art. 239 Depending on the power condition within the RPS or in the neighbouring power systems, the operational control personnel from the CPD can change the exchange schedule with such neighbour systems according to agreed guidelines and conventions.
- Art. 240 The NPD can request failure assistance from the TSOs of interconnected neighbouring power systems with whom there are agreements concluded to that respect in case of power deficits within the RPS or of severe failures.
- Art. 241 The NPD can provide failure assistance on request to the interconnected power systems according to the interconnected operation agreements.

**24.5. Control of active and reactive load of power plants**

- Art. 242 The loading of electric power plants in order to cover consumption and make the agreed exchanges with the interconnected power systems, as well as load distribution by power plants are performed according to the merit order/physical notifications of generators taking into account also the condition of outfits in the power plants, the operational safety of the power system, the fuel policy, the complex utilisation of hydropower resources, the operation of combined heat and power plants and the economic running of the entire RPS.
- Art. 243 The start-ups/shutdowns of thermal power plants are performed only upon request of the dispatcher with decision-making authority or with his approval.
- Art. 244 Thermal power plants will strictly comply with the operational schedule determined using the merit order/physical notifications of generators on day D-1. If there is no express order of the dispatcher with decision-making authority for an operation deviated from schedule, the power plants will be the only ones responsible of the registered deviations.
- Art. 245 Hydropower plants will observe the operational schedule determined using the merit order/generators' physical notifications of D-1 day, but they will request the approval of the dispatcher with decision-making authority for any start-up/shutdown or loading/unloading.

- Art. 246 When the balancing market is operational only the loading/unloading offers on such market will be used in order to cover deviations.
- Art. 247 Operational control personnel from the CPD is entitled under disturbed operational conditions to disregard the set merit order and directly request start-ups/shutdowns and/or changes of power outputs for generating units with a view to restore the normal operational state within the RPS.
- Art. 248 Electric power plants are obliged to achieve accurately the active and reactive load required, and power plants regulating frequency or the power exchanges with inter-connected systems have to observe the preset control limits. Any deviation from the scheduled or ordered load has to be immediately notified to the dispatcher, providing also the reasons there to.
- Art. 249 Upon the dispatcher's request, electric power plants are obliged to load their outfits up to the level of maximum active and reactive load or to unload them to the limits of minimum technically admissible one.
- Art. 250 The load increasing or decreasing rate under normal or under failure conditions, the required time to start-up installations and load them, as well as the minimum technically admissible loads by equipment have to be specified under internal technical procedures and guidelines elaborated by operational units with the approval of the dispatch centre and within its limits of authority.

## **CHAPTER 25            ACTIVITY OF DISPATCHERS ON DUTY**

### **25.1.    The place where dispatchers on duty carry out their work**

- Art. 251 The operational control personnel carries out their activity in the control room.



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- Art. 252 The activity of control rooms in all dispatch centres is permanent, performed in shifts under the monthly schedule approved by the head of department. The change of the monthly schedule is allowed only with the approval of the department head and observing the labour laws.
- Art. 253 Access into the control room is strictly regulated.
- Art. 254 No dispatcher is permitted to work during two successive shifts. In case the following shift do not come to work or they come unfit for the work obligations, the dispatcher who has to hand over the shift will not leave the control centre and will not hand over the duty, specifying this in a report to the head of department who will take the appropriate measures.

## **25.2. Taking over the duty**

- Art. 255 The dispatcher when taking over the duty has the following obligations:
- a) to come to work (the control room) at least 15 minutes before his exact time to go on duty;
  - b) to get acquainted with the deviations from the normal operational diagram, the equipment handed over for works, the unavailable installations, restrictions and conditions occurred or removed, the situation of power plants etc. as specified in the minutes for handing over-taking over the duty;
  - c) to get acquainted with the important events occurred in the time interval from his last shift and their consequences over the RPS operation in the area where his dispatch control authority lies;
  - d) to get acquainted with the regulations issued or cancelled during the time interval from his last shift, as well as with the newly-issued, amended or cancelled procedures, guidelines, documents etc. and to sign for such acknowledgment;

- e) to request information from the dispatcher who is about to hand over the service about the operational condition of the main equipment in his area of dispatcher control authority, about the changes occurred in the normal diagram and normal operational regime as well as about the manoeuvres and/or work to be performed during his shift;
- f) to get acquainted with the decisions made and approvals granted by the dispatcher who is about to hand over the duty and that have not been reported yet as achieved;
- g) to get acquainted with the loading of power plants and the deviations from schedule;
- h) to get briefed about the condition of the IT system;
- i) to make the duty hand over/reception formalities while also specifying the time and signing for reception.

### **25.3. Performing the duty**

- Art. 256 When taking over the shift duty the dispatcher is obliged to request the reports about the situation of electric installations and networks from the directly subordinated dispatch centres and from electric power plants and substations under his direct control, and to inform the higher dispatcher centre about his taking over the shift and about the power and weather circumstances in his operation area.
- Art. 257 The dispatcher on duty is operationally controlling the electric installations and networks according to his dispatch control authority given by the respective dispatch centre, and is responsible for the tasks and assignments distributed to him according to the provisions of this regulation, the organisational and operational regulation of the managerial unit he belongs to and of other applicable norms.
- Art. 258 The dispatcher on duty will also comply with the provisions from:
- a) the General Regulation for manoeuvres in electric installations;

- b) specific Labour protection norms for electricity transmission and distribution;
  - c) the Technical code of the distribution networks;
  - d) the Fire prevention and extinguishing norms.
- Art. 259 The dispatcher on duty is obliged to use efficiently the technical means of the respective dispatch centre and its control room.
- Art. 260 The dispatcher on duty carries out controls during his shift, in line with his control authority.
- Art. 261 The operational control personnel fills in the documents and registers and reports the major events occurred during his shift both in administrative and in operational terms according to the applicable regulations.
- Art. 262 In case the dispatcher on duty acts in a wrong manner, his hierarchical superior present has to step in and give him the required instructions, sending him away if need be and taking over the responsibilities of operational control. The replacement will be recorded in the register with a time stamp and signature.

#### **25.4. Handing over the duty**

- Art. 263 When handing over the duty the dispatcher is obliged:
- a) to fill in the documents and registers of duty handing over;
  - b) to draw up the handing over/taking over minutes;
  - c) to brief the dispatcher who takes over the duty about the operational condition of the main equipment in his authority area, the changes made into the normal diagram and operational regime, the instructions and approvals issued and the deviations from schedule, as well as the manoeuvres that are to be performed in his shift;
  - d) to notify some particular situations to the dispatcher taking over the duty as well as the instructions received from the technical managers about the operation of installations;
  - e) to ask the permission of the department head to leave the control room in case his shift had to solve an incident/failure that has not been clarified until the time of duty handing over;

- f) to make the duty handing over/taking over formalities while signing for handing over.
- Art. 264 The handing over/taking over of duty is forbidden during manoeuvres and during the removal of incidents/failures.
- Art. 265 In case of incidents/failures with a long restoration time, the shift is changed only with the approval of the department head/his deputy and when a clear situation is arrived at, allowing continuity in the operational control exercised by the dispatcher taking over the duty.

## **CHAPTER 26            CONDITIONS TO BE MET BY THE OPERATIONAL AND OPERATIONAL CONTROL PERSONNEL**

### **26.1. Professional training on the job/position**

- Art. 266 For exercising an operational control job within the RPS, the personnel has to meet the requirements on the educational background, experience with the power facilities operation, health and skills needed for achieving the goals of RPS dispatcher control mission
- Art. 267. The personnel that have to exercise operational control jobs or operational jobs shall be first medically and psychologically tested. If following such tests they are declared to be APT for an operational control job or an operational job, shall take course in the job specific to the activity they are to carry.
- Art. 268 The training stage shall be developed as per the training schedule made up by the dispatch head (or similar) and approved by the Unit Management.
- Art. 269 The training program, depending on the job description, shall have three components:

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a) theoretical training- the trainees should acquire the operational prescriptions, norms and regulations, operational procedures and instructions for facilities and networks, job obligations and assignments. The dispatch center head (or similar) is obliged to provide the trainee with the training program, list with applicable regulations, prescriptions, procedures, instructions etc. to be acquired and he will supervise the training program, ensuring the needed conditions for the trainee to receive the needed instructions from specialists in the related departments. In the end of the training course, the trainee will be examined by the head of the dispatch center (or similar);

b) simulator training – such a training is intended to get the trainee acquainted with the operation procedures and for theory application;

c) becoming directly acquainted with installations – this is done in two ways:

i) the trainee is participating into a period of training in a power plant or/and a power substation of a complexity relevant to the trainee job description;

ii) organizing tours in substations, managerial units, dispatch centers.

Within this period of training, the trainee is to acquire the topics specific to those plants, their operation procedures, flows of raw materials as well as flows of information, critical issues etc.

The two ways of performing this training are complementary and, function of the required training level, one of the two trainings or both of them will be organized as the managerial unit or the head of the dispatch center may require.

- Art. 270 The operational control personnel are hired as per the applicable legislation, with the compliance of the educational requirements and if they have been acquainted with the power facilities operation procedures. After passing an authorization exam where the tests are performed to check the psychological and physical conditions needed to carry out the job as well as the technical and labor security knowledge.
- Art. 271 The trainee that is to be hired in a operational control/operational job has to follow at least a 3 month course based on a schedule, in compliance with the applicable legislation and regulation, to get acquainted with: the RPS networks and installations that are under the authority of dispatch control of that center, with the work assignments and tasks, with the operational control execution with controlling, carrying out the manoeuvres and applying the regulations, norms, operational prescriptions, procedures and instructions etc.
- Art. 272 During the training period of time, the trainee shall be planned to make tours on site to get acquainted with installations and at the dispatch centers to accommodate with. Similarly, the case of the dispatch centers controlling power plants, it is necessary to plan a training period at one of the thermo-power plants with complex facilities for becoming acquainted with their specific issues.
- Art. 273. The head of the dispatch center will ensure that the trainee receives the training schedule and the updated list with the regulations, prescriptions, procedures, instructions etc. that have to be acquainted and he will supervise the training process providing the required conditions for receiving the needed advices for the specialists in place.
- Art. 274. During the training period, the trainee is not allowed to develop discussions on the operative side and neither to give/or receive approvals and orders.
- Art. 275. After completing the training course, the trainee shall pass the exam with a commission formed within the managerial unit or the operational unit. The commission shall include also the head of the superior dispatch cen-

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ter or one of his representatives. If following the evaluation, the candidate is considered as not being fitted with the job, the exam commission may suggest to the managerial unit leadership or to the operational control one to extend the training period once by setting the appropriate term.

- Art. 276. The candidates that are not well trained also for the second examination, shall be declared rejected.
- Art. 277. The candidate who passes the exam for having acquired operation knowledge, starts the shift work in parallel with one of the dispatchers on duty/shift head for a period determined by the exam commission who supervises him and is responsible for the trainee's activity during that shift as well as for the procedures related to service receiving and handing over and for the recordings in the operative registers. If the installation/dispatch center where the trainee is to work, is not yet functional, he will activate in a similar work place under the same conditions as mentioned above.
- Art. 278. When completing the training period as a double in the shift work, the dispatch/shift head who supervised the training, makes a written report confirming the practical and theoretical training of the candidate. Based on this report confirmed by the department manager based on his own remarks during the double work period, and on the documentation on skill tests and examination, the managerial unit leadership or the leadership of the operational control authorizes the said person to perform the dispatcher shift work independently and on his own.

- Art. 279. Acceptance of a dispatcher/shift head during the double work period and his appointment as an authorized dispatcher is to be notified in written (fax or telephone note) to the dispatch centers having subordination relationships or operational collaboration and to the managerial units, that on their turn, will notify the operational personnel in the facilities and network areas where that dispatch center carries out the direct control or has dispatch control authority. That dispatch center notifies these assignments to the managerial units that have to make further notifications to their subordinated units and the personnel under their subordination.
- Art. 280. In case the operational and operational control personnel are to take over the activity after an off period longer than 30 days, they have to prior participate in a one day training process and to inform, as the case may be, upon the operation configuration and regime, power balance, politics on fuels and hydro power resources utilized, upon the newly implemented facilities, procedures, instructions, regulations, orders, interdictions etc. newly issued, modified or canceled, upon the newly issued documentation etc.
- Art. 281. In case the operational personnel and the operational control personnel interrupt the shift work for a period longer than 3 months, function of the particularity and the content of the activity he performed within this period, the head of the dispatch center determines the need for a longer training as well as the need for this personnel being examined before restarting the shift work.

## **26.2. Professional up keeping**

- Art. 282. For reaching the goals of the dispatch control, the operational personnel and the operational control personnel should be exempted from tasks and obligations that are not related to the operational control activity and he should be periodically trained with the view of continuously improving the qualification level.



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- Art. 283. The training of the operational control personnel and control personnel as well shall be made by authorized persons every month or semester for a least one work day long.
- Art. 284. The operational personnel and operational control personnel should annually pass the exam for job authorization consisting of:
- a) medical tests
  - b) psychological tests
  - c) technical and labor protection tests
- Art. 285. The operational control personnel shall periodically attend training courses in maintaining and enhancing the professional activity and shall be examined for being authorized as per the applicable legislation. He will also make tours on site and on other dispatch centers to enhance his professional skills and to control the modality of the operational control application as per the topics and schedule made by the department head.

## **CHAPTER 27            EMERGENCY CENTRAL DISPATCHER**

- Art. 286. The Central Power Dispatcher is provided with an emergency reserve called the Central Emergency Dispatcher in case the head office and /or its dispatcher control systems cannot be utilized due to special events: natural calamities, army conflicts, terrorist attacks etc.
- Art. 287. The Central Emergency Dispatcher can technically ensure with no delay, the taking over the total functions of the Central Power Dispatcher.
- Art. 288. In case of emergency, the Central Power Dispatcher ensures from the organizational point of view the transfer of its functions, as a whole and in due time, to the Central Emergency Dispatcher.

**CHAPTER 28      FINAL PROVISIONS**

- Art. 289. Any change occurred in the RPS dispatch control organization may be done only with the approval of the National Power Dispatch Center-NPDC.
- Art. 290. Activity, assignments, tasks and responsibilities of each dispatch center as well as of its personnel, are determined by organizational and functional regulations of the operation and operational control units based on this regulation provisions referring to sharing the dispatcher control authority upon facilities as well as on other applicable regulations.
- Art. 291. Based on this regulation, Transelectrica, jointly with the other entities of the electricity sector, develops procedures and instructions referring to the dispatch control (equipment outages, failure remedies etc.) technical and operational recordings, statistics etc.
- Art. 292. When attribution exercising, the personnel of the dispatching centers have to observe the applicable confidentiality regulation.
- Art. 293. Failure to observe this Regulation shall engage penalties as per the applicable regulations.
- Art. 294. This regulation replaces the energy prescription PE 117/1992 – Regulation on dispatcher control in the RPS.

## Appendix 1: Applicable norms

<b>Code</b>	<b>Title</b>
PE 003	Classified lists of the verification, testing and running tests relating to the mounting, commissioning and putting into operation of the power installations
PE 005/2	Regulations for the analysis and accounting of the failures that accidentally occur in the electricity and heat generation, transmission and distribution installations
PE 011	Norm on the technical-economic comparative calculation of the electricity and heat generation, transmission and distribution installations
PE 013	Norm on the methods and computation elements of reliable operation of the energy installations
PE 022-3	General prescriptions on the electric network design
PE 025	Instructions relating to the insulation on auxiliary supply of the power plant generating units
PE 026/1992	Norm on the principles, criteria and methods for justifying the RPS development strategy and determining the ETG development programs
PE 029	Norm on design of the information systems used in the system management of the power installations within RPS
PE 101	Norm on building the connection and transformer electric installations surpassing 1 kV.
PE 104	Norm on building of the overhead electric lines over 1000 V
PE 107	Norm on designing and execution of the electric cable networks

<b>Code</b>	<b>Title</b>
NTE 001/03/00	Norm on insulation selection, coordination, and power installation protection against over voltages.
PE 111	Instructions for designing the connection and transformer substations
PE 118	General regulations on carrying out on site manoeuvres
PE 120	Instructions relating to the reactive power compensation in the electric networks of energy suppliers and at industrial and similar consumers
PE 124	Norm on establishment the electricity supply solutions for the industrial and similar consumers
PE 134	Norm on the computation methodology of the short-circuit currents in the electric networks over 1 kV
PE 140	Guide to the criteria for the identification of the critical states in the electric power system operation and steps for limiting failure spreading.
PE 143	Norm on asymmetrical and disturbed mode limitation in the electric networks
PE 148	Instructions for the general design conditions for earthquake protection of the technological installations in the electric substations
PE 501	Norm on relay protection and power facilities automation design and on for the electric installations of the power plants and stations
PE 504	Norm on designing the secondary circuit systems within the power substations
	Norm on manual disconnection of certain power consumers categories.
	Program on power consumption limitation by trenches under special conditions within RPS

<b>Code</b>	<b>Title</b>
	Defence plan on major disturbances within RPS.
	RPS restoration plan after total or partial outage
MMPS Order 655/1997	Specific labour protection norms for power distribution and transmission
	Order for assigning the dispatch centres for the power installation control authority
ANRE Decision no. 17/2002	Electricity metering code
ANRE decision no. 61/1999	Technical norms on defining the safety and protection zones within the power capacities.
ANRE Decision no. 720/2001	Regulation on managing the level of the main reservoirs for covering the minimum reserves required for the reliable operation of the RPS.
ANRE Decision no. 35/2002	Regulation on maintenance activity control and organisation
ANRE Order no. 2/2004	Regulation on authorizing electricians who design, execute, check and operate power facilities within the RPS.
TEL-07 V OS-DN/154 ANRE Note no. 1/2001	Qualification of the domestic generators as auxiliary services providers.
TEL-07 IV OP-DN/151 ANRE Note no. 6/2003	Criteria of assigning the dispatch centres for the power installation control authority
TEL-07.36 III-RE-DN/84 ANRE Note no. 7/2003	Checking procedure for the secondary control of power units operation.
ANRE Note no. 4/2004	Elaboration, approval and application of the RPS restoration plan after total or partial outage
TEL 30.02 ANRE Note no.	Reporting to ANRE of events resulting in important material damages, casualties,

<b>Code</b>	<b>Title</b>
4/2002	or significant interruptions of the transmission system.
TEL 03.03 ANRE Note no. 6/2002	Technical data and information exchange between the EPN users and the technical operators with the view of ensuring the RPS functioning and development under safe conditions.
TEL 01.06 Review no. 3 ANRE Note no. 2/2003	Analysing and managing the applications for making use of the service of interconnection lines to the neighbouring power systems.
TEL 09.11 ANRE Note no. 4/2003	Determining the parties access to the counters data and concentrators installed in metering points of A category as well as to the ones installed in the central point of the OMEPA tele-metering system.

To be applied the latest reviews or republishes norms.

## Appendix 2: Technical details to be attached to the grid connection application and data on the grid-connected generators' and consumers' installations

According to the stage referred to, the following information is necessary for the connection to ETN:

- a) standard planning data;
- b) detailed planning data;
- c) recorded planning data.

The standard planning data (S) represent all the technical data characterizing the generators/consumers connected to ETG.

The detailed planning data (D) represent the technical data enabling special analyses of steady-state and transient stability and dimensioning of the automation installations and protection control and other information necessary for the operative scheduling.

Recorded data (R) represent the certified data that can be included in the connection conditions agreed by the generators/consumers/Transmission Operator.

Data resulting from (T) tests a date validated by tests within the testing, monitoring and control activity.

**Table 1: Data on Generating Units**

Data Description	Units	Data category
<b>Power Plant:</b>		
Connection point to network	Text, diagram	S, D
Rated voltage in the connection point	kV	S, D
<b>Generating units:</b>		
Apparent rated power	MVA	S, D, R
Rated power factor ( $\cos \varphi_n$ )		S, D, R
Net power	MW	S, D, R
Rated active power	MW	S, D, R
Maximum active power at terminals	MW	S, D, T
Rated voltage	kV	S, D, R
Maximum/minimum operating frequency at rated parameters	Hz	D, R
Own services consumption at the maximum power output at terminals	MW	S, D, R, T

Data Description	Units	Data category
Maximum reactive power at terminals	MVAr	S, D, R, T
Minimum reactive power at terminals	MVAr	S, D, R, T
Minimum active power output	MW	S, D, R, T
Turbo-generator (H) inertia constant or inertia moment ( $GD^2$ )	MWs/MVA	D, R
Rated rotation	Rpm	S
Short-circuit ratio		D, R
Rated stator current	A	D, R
<b>Saturated and non-saturated reactances of the generating units:</b>		
Rated reactance [rated voltage <sup>2</sup> /rated apparent power]	Ohm	S, D, R
Synchronous longitudinal reactance % of the rated reactance	%	S, D, R
Transient longitudinal reactance % of the rated reactance	%	D, R
Over-transient longitudinal reactance % of the rated reactance	%	S, D, R
Cross synchronous reactance % of the rated reactance	%	D, R
Cross transient reactance % of the rated reactance	%	D, R
Cross over-transient reactance % of the rated reactance	%	S, D, R
Stator leakage reactance % of the rated reactance	%	D, R
Zero-sequence reactance % of the rated reactance	%	D, R
Negative sequence reactance % of the rated reactance	%	D, R
Potier reactance % of the rated reactance	%	D, R
<b>Time constants of generating units:</b>		
Transient of the excitation winding with closed stator ( $T_d'$ )	S	D, R
Over-transient of the damping winding with closed stator ( $T_{d''}$ )	S	D, R
Transient of the excitation winding with open stator ( $T_{d0}'$ )	S	D, R
Over-transient of the damping winding with open stator ( $T_{d0}''$ )	S	D, R
Transient of the excitation winding with open stator, on the q axis ( $T_{d0}'$ )	S	D, R



Data Description	Units	Data category
Over-transient of the damping winding with open stator, on the q axis ( $T_{d0''}$ )	S	D, R
<b>Diagrams for the generating units:</b>		
Capability diagram	Graphic data	D, R
P-Q diagram	Graphic data	D, R, T
Curve of efficiency in operation	Graphic data	D, R
<b>Generating unit capability from the point of view of reactive power:</b>		
Reactive power under inductive mode at maximum generated power	Generated MVar	S, D, R, T
Reactive power under inductive mode at minimum generated power	Generated MVar	D, R, T
Reactive power under short-time inductive mode at rated values for power, voltage and frequency	MVar	D, R, T
Reactive power under capacitive mode at maximum/minimum generated power	Absorbed MVar	S, D, R, T
<b>Generator excitation system:</b>		
Type of excitation system	Text	D, R
Rated rotor voltage (excitation)	V	D, R
Maximum rotor voltage (maximum excitation)	V	D, R
Maximum allowable duration for maximum excitation maintenance	Sec.	D, R
Excitation regulation diagram	V/V	D, R
Maximum rate of excitation voltage increase	V/s	D, R
Maximum rate of excitation voltage decrease	V/s	D, R
Over-excitation characteristics dynamics	Text	D, R
Under-excitation characteristics dynamics	Text	D, R
Excitation limiter	Block Diagram	D, R
<b>Speed regulator (controller):</b>		
Regulator type	Text	S, D
Control functions performed by the regulator (operation diagram, combined control functions, switching times, selection modality and conditions of automation switching of regimes)	Text diagrams	S, D, R
The standardized transfer function with functional block of the regulator, of the execution elements and of the controlled installation (generator, turbine, boiler)	Diagrams	D, R

Data Description	Units	Data category
Permanent system control range	%	S,D,R
Actual offset characteristic $b_p$ between frequency and absorption switch-off position between power and frequency	%	D,R,T
Accord parameters regulation range $K_p$ , $T_d$ and $T_v$	%, s	S,D
Actual rate of accord parameters $K_p$ , $T_d$ and $T_v$	%, s	D, R, T
Frequency set point regulation range	Hz	S, D, R, T
Variation speed of the set point signals of <ul style="list-style-type: none"> <li>♦ frequency</li> <li>♦ power</li> <li>♦ opening</li> </ul>	mHz/s MW/s %/s	S, D, R,
Insensitivity of the whole regulation system in <ul style="list-style-type: none"> <li>♦ frequency</li> <li>♦ power</li> </ul>	±mHz ± MW	S,R,T
Idle time of the regulator	s	S,D,R,T
Closing/opening time of the servomotor	s/s	S,D,R,T
Accuracy of metering the reaction of <ul style="list-style-type: none"> <li>♦ frequency/rotation</li> <li>♦ power</li> <li>♦ servomotor position</li> <li>♦ transducer linearity servomotor position</li> </ul>	%	S
Maximum load shedding over-turning ( $n_{max}$ )	% $n_N$	S,D,R
Time of maintaining the power controlled by automatic speed controller at a maintained frequency stage (for the thermo-power units)	Min.	S,D,R,T
<b>Voltage regulator (controller) (RAT):</b>		
Regulator type	Text	D
Equivalent transfer function, standardized if possible, of the voltage regulator, values and units	Text	D, R
Regulator functions (operation diagram, combined regulation functions, switching times, section and conditions of automation switching between regimes)	Text diagrams	D,R
Accuracy of voltage regulator	%	S,D,R,T
Minimum benchmarking voltage rate that may be set in RAT	% Un	S,D,R,T
Maximum benchmarking voltage rate that may be set in RAT	% Un	S,D,R,T

Data Description	Units	Data category
Maximum excitation voltage	% Un	S,D,R,T
Time of maximum excitation voltage withstand	Sec.	S,D,R,T
Maximum excitation current kept for 10sec.	% in exc.	S,D,R,T
<b>Data on frequency-power secondary regulation</b>		
Max./min secondary regulation range	MW	S,D,R,T
Loading/unloading speed of the secondary regulation unit: ➤ regulation range ➤ real rate	MW/min	S,D,R,T
Operation of RAV	Diagram	S,D
Time of reaching the power set point	s	S,D,R,T
Idle time or the secondary regulation	s	S,D,R,T
For thermo-power units: ✓ diagram with functional units of the block load loop, supply water, fuels, air, temperatures; ✓ accord parameters of the mentioned regulation loops; ✓ transitory functions ✓ main parameters responses (pressure, flow rate, live steam temperature) under the variation of the regulation order of 100%	Recordings diagrams	S,D,R
Protection systems of units and setting rates	Text	S,D
<b>Establishment of the following controls:</b>		
Maximum excitation limiter	Text, diagram	D
Minimum excitation limiter	Text, diagram	D
Stator current limiter	Text, diagram	D
<b>Transforming units</b>		
Number of windings	Text	S,D
Rated power per winding	MVA	S,D,R
Rated transforming ratio	kV/kV	S,D,R
Short-circuit voltages per winding pairs	% of $U_{rated}$	S,D,R
Idle losses	kW	S,D,R
Load losses		
Magnetization current	%	S,D,R
Connection group	Text	S,D
Regulation range	kV-kV	S,D
Regulation diagram (longitudinal or crossed-longitudinal)	Text, diagram	D,R

Data Description	Units	Data category
Regulation step size	%	D
Under load regulation	Yes/No	D
Neutral treatment	Text, diagram	S, D
Saturation curve	Diagram	R

**Table 2: Data for consumers and installations in the connection point<sup>1</sup>**

Data Description	Units	Data category
<b>Voltages:</b>		
Rated voltage	kV	S, D
Maximum/minimum voltage	kV	D
<b>Insulation coordination:</b>		
Flash impulse withstand voltage	kV	D
Withstand voltage to industrial frequency of the network (50 Hz)	kV	D
Switching impulse withstand voltage	kV	D
<b>Currents:</b>		
Maximum current	kA	S, D
Maximum short-term loading current	kA for second time – intervals	D
Environmental conditions requiring application of those currents	Text	S, D
<b>Earthing:</b>		
Way of earthing	Text	D
Insulation performances under pollution conditions – level of pollution	IEC 815	D
<b>Control and data acquisition system:</b>		
Remote control and transmitted data	Text	D
Current measuring transformers	A/A	D
Voltage measuring transformers	kV/V	D
Measuring system characteristics	Text	R
Measuring transformers – details on testing certificates	Text	R
<b>Network configuration:</b>		
The operational diagram of the electric circuits of	Single-wire	S, D, R

<sup>1</sup> The data for the consumers' installations complying with PE 124 standard

Data Description	Units	Data category
the existing and proposed installations, including the bars location, neutral treatment, switching equipment and operating voltages	diagram	
<b>Network impedances:</b>		
Positive, negative and zero sequence impedance	$\Omega$	S, D, R
<b>Short-circuit currents:</b>		
Maximum short-circuit current	kA	S, D, R
<b>Transfer capability (capacity):</b>		
Consumer or groups of consumers supplied from alternative connection points	Text	D, R
Normally supplied consumption from X connection point	MW	D, R
Normally supplied consumption from Y connection point	MW	D, R
Transfer switchings under planned conditions or failure conditions	Text	D
<b>Transformers in the connection point:</b>		
Saturation curve	Diagram	R
Data relating to transforming units	Diagram	S, D, R

**Table 3: Data relating to protections in the connection point**

Data Description	Units	Data category
Number of protections of each type	Text	D
Protection control	ms	D, R
Circuit breaker opening/closing times (including electric arc extinguishing)	ms	D, R
Automation and control installations type (FAR, RAC)	Text, ms	D, R

**Table 4: Data relating to reactive power compensation installations**

Data Description	Units	Data category
Shunt reactors location	Text	S, D, R
Rated reactive power of shunt reactors	MVAr	S, D, R
Rated voltage of shunt reactors	kV	S, D, R
Batteries of capacitors location	Text	S, D, R

<b>Data Description</b>	<b>Units</b>	<b>Data category</b>
Rated power of batteries of capacitors	MVA <sub>r</sub>	S, D, R
Rated voltage of batteries of capacitors	kV	S, D, R
Capacitors location	Text	S, D, R
Rated power of compensators (inductive/capacitive)	+MVA <sub>r</sub>	S, D, R
Rated voltage of compensators	kV	S, D, R
Switching/control mode	Text	S, D, R

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**ROMANIAN ENERGY REGULATORY AUTHORITY**

**Order nr. 20 of August 27<sup>th</sup>, 2004  
for the approval of the Technical Grid Code**

Based on art. 2, letter d), on art. 9, par. (6) and (7) and on art. 11, par. (1) and par. (2) letter a) and o) of Electricity Law no. 318/2003 and based on the Prime Minister's Decision no. 134/12.07.2004 for the assignment of ANRE President, considering the Approval Note drawn up by the Grid Accessing and Authorizing Department and in compliance with the Protocol of ANRE Regulation Committee of August 27<sup>th</sup>, 2004, the President of the Romanian Energy Regulatory Authority issues the following

**ORDER**

**Art. 1** – Approves the Technical Grid Code mentioned in the Annex as integral part of this Order.

**Art. 2** – This Order is published in the Romanian Official Gazette, Part I.

**Art.3** – The grid operators and the grid users apply the provisions in this Order.

**Art. 4** – The Romanian Power Grid Company shall take the responsibility of editing the Technical Grid Code and of making it accessible to all the persons interested in.

**Art. 5** – The specialty departments within ANRE shall oversee the observance of this Order provisions.

**Art 6** – At the effective date of this Order, the following acts are abrogated: ANRE President's Decision no. 51/2000 published in the Official Gazette of Romania Part I, no. 390, of August 22<sup>nd</sup>, 2000.

**President of the Romanian Energy  
Regulatory Authority –ANRE  
Jean Constantinescu**

**Order nr. 35 of December 6<sup>th</sup>, 2004  
for the modification and completion  
of the Technical Grid Code**

Based on art. 2, letter d), on art. 9, par. (6) and (7) and on art. 11, par. (1) and par. (2) letter a) and i) and on art 34 (1) and (3) of the Electricity Law no. 318/2003 and based on the Prime Minister's Decision no. 134/12.072004 for the assignment of ANRE President, considering the Approval Note drawn up by the Energy Market Functioning and Development Department and in compliance with the Protocol of ANRE Regulation Committee of December 6<sup>th</sup>, 2004, the President of the Romanian Energy Regulatory Authority issues the following

**ORDER**

**Art. 7** – (1) The second part of the Technical Grid Code is modified and shall have the content as per Annex 1<sup>\*)</sup> of this Order.

(2) The Glossary of the Technical Grid Code is completed with the terms in Annex 2<sup>\*)</sup> of this order.

**Art. 8** – On the effective date of this Order, ANRE President's Decision no. 18/10.06.1999 published in the Official Gazette of Romania Part I, no. 350, of July 23<sup>rd</sup>, 1999 is abrogated.

**Art. 9** – The grid operators and users shall apply the provisions of this Order.

**Art. 10** – The specialty departments within ANRE shall oversee the observance of this Order provisions.

**Art. 11** – This Order is to be published in the Official Gazette of Romania Part I.

**President of the Romanian Energy  
Regulatory Authority –ANRE  
Jean Constantinescu**