COMPLIANCE AUDIT REPORT
REE - RED ELÉCTRICA DE ESPAÑA: S.A.

2. – 3.10.2012

COMPLIANCE AUDIT CONDUCTED IN MADRID BY THE
ENTSO-E RG CE SG COMPLIANCE MONITORING &
ENFORCEMENT
AT THE CONTROL CENTRE OF THE ENTSO-E MEMBER
REE
DISCLAIMER

The present Compliance Audit Report is based on the information as provided by the audited company. This report is in no way a guarantee that security and reliability on the system of the audited company and/or on the whole synchronously interconnected system of the Regional Group Continental Europe (RGCE) is ensured. This report cannot be considered as a certification of whatever form. Finally, this report does not as such have any impact on the compliance, by the audited company and/or by any other member of ENTSO-E, with the RGCE Operation Handbook and/or any other relevant applicable standard.
Contents

1 EXECUTIVE SUMMARY ................................................................. 4

1.1 COMPLIANCE MONITORING IN ENTSO-E RGCE ........................... 4

1.2 AUDITED TSO ........................................................................ 4

1.3 AUDITED OH STANDARDS ....................................................... 4

1.4 RESULTS ............................................................................. 4

2 AUDIT REPRESENTATIVES ............................................................ 6

3 AUDIT PLAN ............................................................................... 7

3.1 GENERAL PROCEDURES .......................................................... 7

3.2 OBJECTIVES .......................................................................... 8

3.3 SCOPE .................................................................................. 8

3.4 METHODOLOGY ..................................................................... 9

3.5 EVALUATION PRINCIPLES ...................................................... 9

3.6 CONFIDENTIALITY .................................................................. 10

4 AUDIT WORK SHEET .................................................................... 11

4.1 P5-A-S1 APPRECIATION OF TSO SYSTEM STATES ....................... 11

4.2 P5-A-S2 INFORMATION BETWEEN CONTROL ROOMS BY THE CONstrained TSO ......................................................... 13

4.3 P5-A-S3 INTER-TSO CONTACT LISTS FOR SYSTEM OPERATION ... 16

4.4 P5-B-S1 INTER-TSO CO-ORDINATION ....................................... 19

4.5 P5-B-S3.1 BACK-UP OF CONTROL ROOM FUNCTIONS ................ 23

4.6 P5-B-S5.2 TIE LINES OPENING POLICY ..................................... 25

4.7 P5-B-S6.3 MANAGEMENT OF ENTSO-E RG CE OVER-FREQUENCY 28

4.8 P5-B-S6.4 MANAGEMENT OF ENTSO-E RG CE UNDER-FREQUENCY 31

4.9 P5-B-S6.4.1.1 LOAD SHEDDING CAPABILITIES ............................ 33

4.10 P5-B-S6.4.1.2 LOAD SHEDDING CRITERION .............................. 35

4.11 P5-B-S6.4.1.3 LOAD SHEDDING PLAN – CHECKS ....................... 38

4.12 P5-C-S1.2 TSO RESTORATION PLAN ....................................... 40

4.13 P5-C-S1.2.1.1 SUCH PROCEDURES HAVE TO BE PROVED AT LEAST BY SIMULATION OR OFF-LINE CALCULATIONS ................................................................. 42

4.14 P5-C-S1.2.1.2 EACH TSO HAS TO EVALUATE THE NUMBER OF UNITS CAPABLE OF BLACK START AND ISLANDED OPERATION TO CONTRIBUTE TO THE RESTORATION AND TO GET KNOWLEDGE OF UNITS IN HOUSE LOAD OPERATION .......................................................... 44

4.15 P5-C-S1.2.1.3 BLACK START CAPABILITIES OF UNITS SHALL BE TESTED REGULARLY ON-SITE AT LEAST ONCE PER THREE YEARS ................................................. 46

4.16 P5-C-S2.3 CHOICE OF LOAD FREQUENCY CONTROLLER MODES OR STATES IN CASE OF BLACKOUT ........................................ 48

4.17 P5-C-S3.6 COORDINATION WITH DSOs FOR RECONNECTION OF SHED LOAD ........................................................... 50

4.18 P5-C-S3.7 RECONNECTION OF GENERATORS AFTER ABNORMAL FREQUENCY EXCURSION .............................................. 52

5 CONCLUSIONS ............................................................................ 55

6 SIGNATURE PAGE ....................................................................... 56
1 EXECUTIVE SUMMARY

1.1 COMPLIANCE MONITORING IN ENTSO-E RGCE

The mission of the ENTSO-E System Operation Committee Regional Group Continental Europe (RGCE) is to improve the reliability and security of the interconnected power system in the Continental Europe through developing and enforcing RGCE Operation Handbook (OH) standards, monitoring the interconnected power system and assessing its future adequacy. The RGCE member TSOs are subject to compliance with all approved OH standards. The Compliance Monitoring Program (CMP) is the RGCE program that monitors and assesses compliance with these standards via:

- the annual process of self-assessment, which is applied to all TSOs, as well as
- the annual process of mandatory on-site compliance audits, which is applied to a certain number of TSOs chosen on a rotating base either directly (in case of doubts that a certain TSO complies with OH Standards) or by random.

SG Compliance Monitoring & Enforcement (CME) is in charge of performing above mentioned two processes. The 2012 is the third year of conducting mandatory compliance audits. SG CME performed four voluntary compliance audits in 2008-2009 and twelve mandatory audits in 2010-2011.

1.2 AUDITED TSO

The RGCE member TSO REE was chosen for a Compliance Audit in 2012. CME conducted the audit on 2-3.10.2012 at the control centre of REE in Madrid, Spain.

1.3 AUDITED OH STANDARDS

The Compliance Audit encompassed 18 standards of Operation Handbook Policy 5 which are related to Emergency Operations. In 2011 REE made compliance declarations in the self-assessment process for all standards which will be checked against their evidence during the audit.

1.4 RESULTS

The audit team’s findings confirmed that REE is fully compliant in case of 16 of 17 audited standards. For the two standards P5-B-S6.4.1.3 and P5-C-S1.2.1.3 the audit team confirmed REE sufficiently compliant self-declaration. The relative improvement plans with deadlines were agreed among representatives of REE and the audit team.

Necessary documentation was prepared and available at the audit location and the representatives of REE clearly demonstrated that they are familiar with the content of every single document. All explanations were focused to the matter and very well presented. The Audit Team visited the control room at the beginning of the second audit day. Visiting of NCC helped the audit team to better understand organisation and processes in the REE’s system.

The audit team expresses its full satisfaction with the REE approach both in the preparation phase and during the on-site audit.

The table 1 describes REE’s compliance declaration in self assessment questionnaire 2011 and compliance audit questionnaire 2012 with compliance level suggestion by CME audit team after reviewing the evidence for the audited standards. Downgrades are highlighted with red colour. Standards which kept their declaration level are not highlighted.
<table>
<thead>
<tr>
<th>OH Standard</th>
<th>Self assessment questionnaire 2011</th>
<th>Compliance audit questionnaire 2012</th>
<th>On site compliance audit 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>P5-A-S1</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-A-S2</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-A-S3</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-B-S1</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-B-S3.1</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-B-S5.2</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-B-S6.3</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-B-S6.4</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-B-S6.4.1.1</td>
<td>FC</td>
<td>SC</td>
<td>SC</td>
</tr>
<tr>
<td>P5-B-S6.4.1.2</td>
<td>FC</td>
<td>FC</td>
<td>SC</td>
</tr>
<tr>
<td>P5-B-S6.4.1.3</td>
<td>FC</td>
<td>SC</td>
<td>SC</td>
</tr>
<tr>
<td>P5-C-S1.2</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-C-S1.2.1.1</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-C-S1.2.1.2</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-C-S1.2.1.3</td>
<td>NC</td>
<td>SC</td>
<td>SC</td>
</tr>
<tr>
<td>P5-C-S2.3</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-C-S3.6</td>
<td>FC</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>P5-C-S3.7</td>
<td>Compliance level evaluation is not performed by the audit team (see section 4.18)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compliance level evaluation is not performed by the audit team (see section 4.18)
2 Audit Representatives

The Audit Team has the task to prepare and perform the Compliance Audit as well as to develop the corresponding audit report. The audit team composition is given on table 2. The TSO subject to a compliance audit may object any member of the Audit Team on the basis of a conflict of interests or the existence of other circumstances that could interfere with the impartial performance of his or her duties. The audited TSO is obligated to express its concerns with the proposed team member four weeks prior to the team’s arrival on-site. The REE didn’t make any such objection. The REE staff present during the compliance audit is given on table 3.

<table>
<thead>
<tr>
<th>Audit Team role</th>
<th>Company or association</th>
<th>Name</th>
<th>Email address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit team leader</td>
<td>PSE-O</td>
<td>Rafał Kuczynski</td>
<td>rafał<a href="mailto:.kuczynski@pse-operator.pl">.kuczynski@pse-operator.pl</a></td>
</tr>
<tr>
<td>Audit team member</td>
<td>Amprion</td>
<td>Heinz-Dieter Ziesemann</td>
<td><a href="mailto:heinz-dieter.ziesemann@amprion.net">heinz-dieter.ziesemann@amprion.net</a></td>
</tr>
<tr>
<td>Audit team member</td>
<td>TERNA</td>
<td>Silvia Moroni</td>
<td><a href="mailto:silvia.moroni@terna.it">silvia.moroni@terna.it</a></td>
</tr>
<tr>
<td>Compliance Monitoring</td>
<td>ENTSO-E Secretariat</td>
<td>Lasse Konttinen</td>
<td><a href="mailto:lasse.konttinen@entsoe.eu">lasse.konttinen@entsoe.eu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Function in the company</th>
<th>Title</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head of Control Centre</td>
<td>Industrial Engineer</td>
<td>Tomás Domínguez Autrán</td>
</tr>
<tr>
<td>Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of Operational</td>
<td>Industrial Engineer</td>
<td>Mª Concepción Sánchez Pérez</td>
</tr>
<tr>
<td>Planning Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of Support Area of</td>
<td>Industrial Engineer</td>
<td>Miguel de la Torre Rodríguez</td>
</tr>
<tr>
<td>Control Centre Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior engineer of</td>
<td>Industrial Engineer</td>
<td>María de la O Rodríguez González</td>
</tr>
<tr>
<td>Operational Planning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior engineer in the</td>
<td>Industrial Engineer</td>
<td>Gema García Platero</td>
</tr>
<tr>
<td>Support Area of the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Centre Department</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3 Audit Plan

3.1 General Procedures

The purpose of this chapter is to help and provide guidance to your organization regarding the oncoming Compliance Audit. The audit will cover a chosen set of Operation Handbook (OH) standards equivalent to those monitored within the Compliance Monitoring Program 2011 self-assessment process.

Please submit the completed Audit Worksheet by email to the ENTSO-E Secretariat and send carbon copies to all Audit Team members three weeks before the first audit day. On Table 4, you may find the complete schedule of the audit process for your company.

All documentation (evidence) required for the onsite audit of each standard must be available as a hard copy or in electronic format at the audit location. The Control Area Manager and/or other responsible expert personnel must be available during the audit to provide guidance to the Audit Team on where to look in the documentation for compliance to the OH standard and, if requested, to give further explanation on criteria and procedures implemented.

In preparation for the audit, please organise your supporting compliance documentation which is the evidence for your compliance for audited standards. If possible, please try to provide English versions of the documents. Otherwise please translate the main title, index and last update of the document for the Audit Team. Previously mentioned preparations must be completed prior to the start of the audit. The ENTSO-E RGCE SG CME would like to emphasize the importance of preparation for the audit. All documentation will be considered as confidential audit records and treated as such. The Audit Team will prepare a public report of its audit findings.

<table>
<thead>
<tr>
<th>Table 4. Schedule for the Compliance Audit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submittal of the audit material on behalf of the Audit Team</td>
</tr>
<tr>
<td>Objection or concern about audit team personnel</td>
</tr>
<tr>
<td>Submittal of the completed Audit Worksheet to the Audit Team by REE</td>
</tr>
<tr>
<td>Initial draft of the audit report based on the Audit Worksheet sent to REE by the Audit Team</td>
</tr>
<tr>
<td>Opening meeting of the Audit Team and CAM of REE</td>
</tr>
<tr>
<td>(1) Introduction of the Audit Team members, (2) Description of how the on-site audit will be conducted, (3) Discussion on how confidential information will be handled, (4) Discussion on data access required by the Audit Team, (5) Announcement that the REE will be asked to provide feedback on the audit process and results, (6) Presentation of the TSO and TSO’s organization, (7) Visit at the control room</td>
</tr>
<tr>
<td>Start of the OH standards’ review</td>
</tr>
<tr>
<td>Continuation of the OH standards’ review</td>
</tr>
</tbody>
</table>
3.2 **OBJECTIVES**

The objective of Compliance Audits in 2012 is to check chosen set of standards from OH Policy 5. These standards were also monitored in the 2011 regular compliance process via the self-assessment questionnaire. Furthermore, before performing the Compliance Audit, the Audit Team makes recommendations to the audited TSO to prepare the evidence or documentation on compliance with the audited OH standards.

3.3 **SCOPE**

The scope of a compliance audit encompasses issues which are directly related to the compliance of the audited TSO with the investigated RGCE OH standards and issues which make a general background for the implementation of the OH at the audited TSO.

**Directly related issues**

Issues directly related to the audited RGCE OH standards:

- Existence of TSO’s addenda and/or non-compliance declarations/non-compliance self-reports
- Follow-up of the TSO’s mitigation plans to remove the declared non-compliances
- Self-assessment questionnaires of 2011 stored at the ENTSO-E Secretariat related to audited TSO concerning the audited OH standards
- Audit Worksheet (AW) 2012
- Information and explanations which the Audit Team receives on site

**General background**

The compliance audit also encompasses issues of general nature listed below:

- General policies of the audited TSO rules and procedures for the control centre(s) related to the audited standards
- Procedures to control the application of the audited OH standards and their follow-up
• Procedures to improve the compliance with the audited OH standards
• TSO’s internal report related to the implementation of the audited OH standards
• TSO’s internal audits and/or documentation concerning implementation of OH standards
• TSO’s internal bodies (forums, panels) for the implementation of the OH standards

3.4 METHODOLOGY

The CME group prepared an audit schedule defining the chronological order of the compliance audit, which the audited TSO accepted without comment. The audit team reviewed the existing material on the audited TSO and its neighbouring TSOs already collected through the self-assessment process in the 2011 self-assessment questionnaires. It also processed (assessed) the answers in the 2012 Audit Worksheet filled in by the audited TSO.

The methodology includes audit criteria and expectations based on best practices. The adopted criteria are objective, measurable (if possible), complete and relevant to the objectives. At defining the audit methodology, the auditors identify the potential sources of audit evidence and estimate the amount and type of evidence needed.

The audit team uses an Audit Worksheet (see chapter 4) for reviewing the audited OH standards. The purpose of the AW is to ensure consistency and fairness. By using the AW the Audit Team documented the material reviewed and the observations made. One of the main reasons for an on-site visit is to review the existing documentation and to interview the staff. Thus, the auditors obtain “objective evidence” which support the self-assessed declarations of the audited TSO. The audit team determine whether the evidence presented by the TSO is sufficient. They do this by assessing the relevance, validity and reliability of the information and documentation presented.

It is the responsibility of the audited TSO to provide evidence of compliance with all audited OH standards. In most cases the evidence is in written form like documents, plans, programs or records. In some cases the evidence is a review of computerized records or additional supporting material provided at interviews with the staff of the audited TSO.

3.5 EVALUATION PRINCIPLES

Preparatory phase – activities in charge of Audited TSO

• Inspection of the exact wording of each audited OH standard and of additional questions formulated by the CME
• The TSO must fill in the audit questionnaire and submit to the audit team before the audit
• Identification of documents and other material the TSO has to present to the auditors in order to demonstrate its compliance level with each OH standard

Preparatory phase – activities in charge of CME Audit team

• Identification of compliance level declaration inconsistency with neighbouring TSOs (Self-assessment questionnaire 2011 cross-border check regarding compliance level declarations)
• Analysis of the explanations and comments which the audited TSO made in the self-assessment 2011 and audit questionnaires 2012 in written form in order to evaluate the quality of explanations and comments.
• Identification of the missing explanations in the self-assessment 2011 and audit questionnaire 2012
• Analysis of the improvements achieved during the implementation of mitigation and improvement plans declared in the MLA Addendum/Addenda, in the self-assessment questionnaire 2011 and in the Audit Worksheet 2012 in case of non compliance and sufficient compliance
Audit phase

- Request to the audited TSO to give additional explanations, especially related to standards which were not or not fully addressed by documents and other material mentioned in the self-assessment questionnaire 2011 and audit questionnaire 2012.
  - The goal is to improve the quality of the explanations
- Request to the audited TSO to present that evidence and, if necessary, additional evidence, in printed or electronic form
  - The goal is to improve the quality of the presented evidence
  - The presented material must be relevant to the audited OH standard at all,
- Request to the audited TSO to remark the titles of all presented documents, their relevant chapters and even relevant passages
- Request to the audited TSO to provide further written explanations related to the presented material

3.6 CONFIDENTIALITY

By signing this report the audit team members assure that they will maintain the confidentiality of information obtained during the compliance audit and drafting of the audit report. Moreover, they express their readiness to sign a supplementary confidentiality agreement, if the audited TSO assert such a claim.
4 AUDIT WORK SHEET

4.1 P5-A-S1 APPRECIATION OF TSO SYSTEM STATES

PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2011

P5-A-S1
Appreciation of TSO system states. The system state is determined by the constrained TSO according to its N-1 security assessment, based on potential influence on neighbouring systems taking into account the efficiency of remedial actions.

Compliance Level: FC

Explanation for the full compliance declaration:
Automatic real time security analysis is carried out every 5 minutes. In manual can be performed at any time if necessary. If any constraint with potential influence on neighbouring systems is detected, it is reported immediately to involved TSO

Additional Questions
Do you have tools/procedures to assess system state of your own system in real time? yes

AUDIT QUESTIONNAIRE 2012

P5-A-S1 APPRECIATION OF TSO SYSTEM STATES. The system state is determined by the constrained TSO according to its N-1 security assessment, based on potential influence on neighbouring systems taking into account the efficiency of remedial actions.

Compliance level  FC ☒  SC ☐  NC ☐

Concise explanation and list of evidences for declared compliance level:
Automatic real time security analysis is carried out every 5 minutes. Manual analysis can be performed at any time if necessary. If any constraint with potential influence on neighbouring systems is detected, it is reported immediately to involved TSOs.

Do you have a mitigation plan to the standard? Yes ☐ No ☒

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

-------------------------------------------------------------------------------------------------------------------------------------

Do you have tools/procedures to assess system state of your own system in real time?
List of evidences, comments:

Automatic real time security analysis is carried out every 5 minutes. Manual analysis can be performed at any time if necessary. If any constraint with potential influence on neighbouring systems is detected, it is reported immediately to involved TSOs.

All real time analyzed cases are kept and they are available for any further consultation.

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
The appreciation of system states are defined in the Operational Procedure 8.2 "Operation of the production and transmission system" on articles 7.1. - 7.4. (Normal, alert, emergency, blackout) which is part of Spanish legislation approved by the Ministry of Industry and Energy on 30 July 1998.

The REE SCADA system performs (N-1) security calculation every five minutes with possibility to launch manually the calculation. The snapshots are archived with possibility for offline analysis. Audit Team visited REE control room to check previously mentioned SCADA functionalities.
4.2 **P5-A-S2 INFORMATION BETWEEN CONTROL ROOMS BY THE CONSTRAINED TSO**

**PREPARATORY PHASE**

**SELF-ASSESSMENT QUESTIONNAIRE 2011**

<table>
<thead>
<tr>
<th>P5-A-S2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Information between control rooms by the constrained TSO. The constrained TSO has to inform at least all direct neighbouring TSOs about the state of its own system.</td>
<td></td>
</tr>
<tr>
<td>Compliance Level: FC</td>
<td></td>
</tr>
<tr>
<td>RTE</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Explanation for the full compliance declaration:</strong></td>
<td></td>
</tr>
<tr>
<td>According to our Operational Manual, REE will inform all direct neighbouring TSO about the state of its system</td>
<td></td>
</tr>
<tr>
<td><strong>Additional Questions</strong></td>
<td></td>
</tr>
<tr>
<td>Do you have procedures with direct neighbours for information on system states?</td>
<td>yes</td>
</tr>
</tbody>
</table>

**AUDIT QUESTIONNAIRE 2012**

**P5-A-S2 INFORMATION BETWEEN CONTROL ROOMS BY THE CONSTRAINED TSO.**

The constrained TSO has to inform at least all direct neighbouring TSOs about the state of its own system.

**Compliance level**  
FC [ ] SC [ ] NC [ ]

Concise explanation and list of evidences for declared compliance level:

Specific Agreements with the neighbouring TSOs:

- **REE-RTE Agreement:** Common and Coordinated actions done by TSO in case of collapse. Also, a new REE-RTE agreement is under preparation (Common and coordinated actions done by TSO in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems).

- **REE-REN Agreement:** Procedure for the information exchange between REE and REN about the state of the systems. (Procedimiento de intercambio de información entre REE y REN sobre el estado de los sistemas).

Additionally, according to our Operational Manual, REE will inform all direct neighbouring TSOs about the state of the system:

- **GM01:** Emergency Management (Gestión de Emergencias).
- **PRS-0-008:** General procedure for communications after national or zonal incidents (Procedimiento general de comunicaciones ante incidentes de ámbito nacional o zonal).
New Tool for the Communication of the state of the system: EAS

Do you have a mitigation plan to the standard?  Yes ☐   No ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

Do you have procedures with direct neighbours for information on system states?

<table>
<thead>
<tr>
<th>Neighbour</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTE</td>
<td>☒</td>
<td></td>
</tr>
<tr>
<td>REN</td>
<td>☒</td>
<td></td>
</tr>
</tbody>
</table>

List of evidences, comments:

Specific Agreements with the neighbouring TSOs:
- REE-RTE Agreement: Common and Coordinated actions done by TSO in case of collapse. Also, a new REE-RTE agreement is under preparation (Common and coordinated actions done by TSO in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems).
- REE-REN Agreement: Procedure for the information exchange between REE and REN about the state of the systems. (Procedimiento de intercambio de información entre REE y REN sobre el estado de los sistemas).

New Tool for the Communication of the state of the system: EAS

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC
Explanation for the suggested compliance level:
REE has implemented traffic light system in its SCADA system to exchange system states in real time with REN. REE and RTE use telephone to inform each other during constrained system situations. The procedures are described in "Common and Coordinated actions done by TSO in case of collapse" (REE-RTE), 2009 and "Procedure for the information exchange between REE and REN about the state of the systems", 2012. The previously mentioned agreements contain lists on exchanged information with REN and RTE. REN information is implemented in REE SCADA.
4.3 **P5-A-S3 INTER-TSO CONTACT LISTS FOR SYSTEM OPERATION**

**PREPARATORY PHASE**

### SELF-ASSESSMENT QUESTIONNAIRE 2011

**P5-A-S3**

Inter-TSO Contact lists for system operation. Inter-TSO agreements shall include a list of functional positions directly involved in the system operation to be contacted at any time with phone numbers, fax numbers and e-mail addresses that shall be provided by all TSOs and regularly updated. This list includes desks of control rooms and the relevant staff. All critical information about real-time operation shall be sent to these TSO counterparts.

**Compliance Level:** FC

<table>
<thead>
<tr>
<th></th>
<th>RTE</th>
<th>REN</th>
</tr>
</thead>
</table>

**Explanation for the full compliance declaration:**

Regularly updated documents with the telephone numbers, fax numbers, e-mail addresses ... needed for the operation shift. Specific document with the contacts in case of an emergency situation.

**Additional Questions**

Does your control room have contact lists for immediate communication with neighbouring TSOs?

<table>
<thead>
<tr>
<th></th>
<th>RTE</th>
<th>REN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

### AUDIT QUESTIONNAIRE 2012

**P5-A-S3 INTER-TSO CONTACT LISTS FOR SYSTEM OPERATION.** Inter-TSO agreements shall include a list of functional positions directly involved in the system operation to be contacted at any time with phone numbers, fax numbers and e-mail addresses that shall be provided by all TSOs and regularly updated. This list includes desks of control rooms and the relevant staff. All critical information about real-time operation shall be sent to these TSO counterparts.

**Compliance level:** FC ☑ SC ☐ NC ☐

Concise explanation and list of evidences for declared compliance level:

Agreements with the neighbouring TSOs:

- **REE-RTE Agreement:** *Common and Coordinated actions done by TSO in case of collapse.* Also, a new REE-RTE agreement is under preparation (*Common and coordinated actions done by TSO in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems).*
- **REE-REN Agreement:** *Common and coordinated actions to fulfill in case of frequency*
deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems (Acuerdo conjunto REE-REN sobre: Acciones conjuntas y coordinadas a realizar en caso de desvío de frecuencia superior a +/- 200 mHz, pérdida de sincronismo o interrupción significativa de suministro en alguno de los sistemas eléctricos).

- REE-REN Agreement: Procedure for the information exchange between REE and REN about the state of the systems (Procedimiento de intercambio de información entre REE y REN sobre el estado de los sistemas).

Do you have a mitigation plan to the standard?  

Yes ☐  No ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

--------------------------------------------------------------------------------------------------------------------------

Does your control room have contact lists for immediate communication with neighbouring TSOs?

<table>
<thead>
<tr>
<th>Neighbour</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTE</td>
<td>☒</td>
<td></td>
</tr>
<tr>
<td>REN</td>
<td>☒</td>
<td></td>
</tr>
</tbody>
</table>

List of evidences, comments:

Agreements with the neighbouring TSOs:

- REE-RTE Agreement: Common and Coordinated actions done by TSO in case of collapse. Also, a new REE-RTE agreement is under preparation (Common and coordinated actions done by TSO in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems).

- REE-REN Agreement: Common and coordinated actions to fulfill in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems (Acuerdo conjunto REE-REN sobre: Acciones conjuntas y coordinadas a realizar en caso de desvío de frecuencia superior a +/- 200 mHz, pérdida de sincronismo o interrupción significativa de suministro en alguno de los sistemas eléctricos).

- Procedure for the information exchange between REE and REN about the state of the systems (Procedimiento de intercambio de información entre REE y REN sobre el estado de los sistemas).
Do you regularly (e.g. once per year) update your contact list and send it to the neighbouring TSO?

<table>
<thead>
<tr>
<th>Neighbour</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTE</td>
<td>☒</td>
<td></td>
</tr>
<tr>
<td>REN</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>

List of evidences, comments:

Six-Monthly meetings between REE and RTE are held, where the actualization of the contact lists is dealt as a point in the agenda meeting.

NTO-0-029: Revision of documents and equipments to be done periodically by the Electrical Control Center Department (Revisiones de documentos y equipos que deben realizarse periódicamente en el Dpto. Centro de Control Eléctrico). In this document it is stablished that the list of contacts of Procedure for the information exchange between REE and REN about the state of the systems will be updates once a year.

REE-REN Agreement: Common and coordinated actions to fulfill in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems is permanently updated, as it is mentioned in the Agreement.

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
"Common and Coordinated actions done by TSO in case of collapse" (REE-RTE) and "Common and coordinated actions to fulfill in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems" (REE-REN) contain the Inter-TSO contact lists for system operation. The contact lists are available in control room and are updated regularly on need basis.
4.4 **P5-B-S1 INTER-TSO CO-ORDINATION**

**PREPARATORY PHASE**

### SELF-ASSESSMENT QUESTIONNAIRE 2011

<table>
<thead>
<tr>
<th>P5-B-S1</th>
<th>Inter-TSO co-ordination. For emergency issues TSOs have to agree in writing on bilateral/multilateral procedures with all their neighbours.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compliance Level:</strong> FC</td>
<td></td>
</tr>
<tr>
<td>RTE</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation for the full compliance declaration:**

Bilateral agreements with RTE 'Common and coordinated actions done by TSO in case of collapse' and 'Supporting Procedure for restoration of the Spanish and French Systems after general incidents'. Bilateral agreements with REN 'Supporting exchanges in emergency situations' and 'Supporting Procedure for restoration of the Portuguese and Spanish Systems after general incidents'.

**Additional Questions**

Do you have written agreements concluded with all adjacent TSOs which take into consideration emergency procedures?

<table>
<thead>
<tr>
<th>RTE</th>
<th>REN</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

### AUDIT QUESTIONNAIRE 2012

**P5-B-S1 INTER-TSO CO-ORDINATION.** For emergency issues TSOs have to agree in writing on bilateral/multilateral procedures with all their neighbours.

**Compliance level**

FC ☑ SC ☐ NC ☐

Concise explanation and list of evidences for declared compliance level:

Agreements with the neighbouring TSOs:

- **REE-RTE Agreement:** **Common and Coordinated actions done by TSO in case of collapse.** Also, a new REE-RTE agreement is under preparation (**Common and coordinated actions done by TSO in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems**).

- **PRS-0-015:** **Supporting Procedure for restoration of the Spanish and French Systems after general incidents (Procedimiento de apoyo de los Sistemas español y francés para la reposición del servicio tras incidentes generalizados).**

- **REE-REN Agreement:** Common and coordinated actions to fulfill in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems (**Acuerdo conjunto REE-REN sobre: Acciones conjuntas y coordinadas a...**
realizar en caso de desvío de frecuencia superior a +/- 200 mHz, pérdida de sincronismo o interrupción significativa de suministro en alguno de los sistemas eléctricos).

- **PRS-0-026**: Supporting Procedure for restoration of the Portuguese and Spanish Systems after general incidents (Procedimiento de apoyo de los sistemas portugués y español para la reposición del servicio tras incidentes generalizados).

**Do you have a mitigation plan to the standard?**  
Yes ☐  No ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

**Which emergency issues do you consider in your bilateral/multilateral procedures?** (e.g. changes of network topology, cross-border re-dispatching, counter-trading, transaction curtailment, emergency energy assistance…)

Network diagnosis and reinforcement, internal network constraints treatment, tie lines managements, neighbouring support, voltage control, LFC modes, generation units control, reenergization coordination, generation-load balance, counter-trading (Operational Procedure 4.1. Resolution of congestions in the Spanish-French border and Operational Procedure 4.2. Resolution of congestions in the Spanish-Portuguese border) and emergency energy assistance (REE-REN Agreement: Supporting energy exchange between the Portuguese and Spanish electrical system (Acuerdo conjunto REN-REE para el establecimiento de intercambios de apoyo entre los sistemas eléctricos de Portugal y España).

List of evidences, comments:

**Agreements with the neighbouring TSOs:**

- **REE-RTE Agreement**: Common and Coordinated actions done by TSO in case of collapse. Also, a new REE-RTE agreement is under preparation (Common and coordinated actions done by TSO in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems).


- **REE-REN Agreement**: Common and coordinated actions to fulfill in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems (Acuerdo conjunto REE-REN sobre: Acciones conjuntas y coordinadas a realizar en caso de desvío de frecuencia superior a +/- 200 mHz, pérdida de sincronismo o interrupción significativa de suministro en alguno de los sistemas eléctricos).

- **REE-REN Agreement**: PRS-0-026 Supporting Procedure for restoration of the Portuguese and Spanish Systems after general incidents (Procedimiento de apoyo de los sistemas portugués y español para la reposición del servicio tras incidentes generalizados).

**Do you have written agreements concluded with all adjacent TSOs which take into consideration emergency procedures?**

<table>
<thead>
<tr>
<th>Neighbour</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTE</td>
<td>☒</td>
<td>☐</td>
</tr>
</tbody>
</table>
List of evidences, comments:

Agreements with the neighbouring TSOs:
- **REE-RTE Agreement**: *Common and Coordinated actions done by TSO in case of collapse*. Also, a new REE-RTE agreement is under preparation (*Common and coordinated actions done by TSO in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems*).
- **REE-RTE Agreement**: *PRS-0-015 Supporting Procedure for restoration of the Spanish and French Systems after general incidents* (*Procedimiento de apoyo de los Sistemas español y francés para la reposición del servicio tras incidentes generalizados*).
- **REE-REN Agreement**: *Common and coordinated actions to fulfill in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems* (*Acuerdo conjunto REE-REN sobre: Acciones conjuntas y coordinadas a realizar en caso de desvió de frecuencia superior a +/- 200 mHz, pérdida de sincronismo o interrupción significativa de suministro en alguno de los sistemas eléctricos*).
- **REE-REN Agreement**: *PRS-0-026 Supporting Procedure for restoration of the Portuguese and Spanish Systems after general incidents* (*Procedimiento de apoyo de los sistemas portugués y español para la reposición del servicio tras incidentes generalizados*).

AUDIT PHASE

**COMPLIANCE AUDIT 2012**

**Compliance Level suggestion by the audit team:**
FC

**Explanation for the suggested compliance level:**
The four above mentioned agreements and the procedure “Supporting energy exchange between the Portuguese and Spanish electrical system” cover the requirements of the standard. The Spanish legislation "Operational Procedure 4.1. Resolution of congestions in the Spanish-French border" and "Operational Procedure 4.2. Resolution of congestions in the Spanish-Portuguese border" cover preventive actions to ensure system security.

In case of identified congestion the predefined topology changes must be checked with neighbouring TSO(s) to agree the possible needed modifications due to the current system situation.
4.5 P5-B-S3.1 BACK-UP OF CONTROL ROOM FUNCTIONS

PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2011

P5-B-S3.1
Back-up of control room functions. The control room functions shall be backed up to face any damage to the main installations. This shall be activated within less than three hours and tested for operation at least once a year.

Compliance Level: FC

Explanation for the full compliance declaration:
REE has two symmetric control centers completely redundant and located in different locations. Redundancy is tested regularly. At any moment it is possible to operate from one control center or from the other one.

Additional Questions
Do you have a back-up of control room functions in separate locations? yes

AUDIT QUESTIONNAIRE 2012

P5-B-S3.1 BACK-UP OF CONTROL ROOM FUNCTIONS. The control room functions shall be backed up to face any damage to the main installations. This shall be activated within less than three hours and tested for operation at least once a year.

Compliance level   FC ☒   SC ☐   NC ☐

Concise explanation and list of evidences for declared compliance level:
REE has two symmetric control centers completely redundant and located in different villages (CECOEL and CECORE). At any moment it is possible to operate from one control center or from the other one.

Redundancy is tested regularly: multisite tests performed three times in a year according to IX017: Activation of the symmetric support of the control centers in case of Pre-Alert or Alert caused by the operational capability lost in any of the control rooms (Activación del respaldo simétrico de los centros de control ante situación de pre-alerta o alerta por pérdida de operatividad en alguno de los centros de control).

Do you have a mitigation plan to the standard? Yes ☐   No ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:
Do you have a back-up of control room functions in separate locations?

Yes ☒ No ☐

List of evidences, comments:

REE has two symmetric control centers completely redundant and located in different villages (CECOEL and CECORE). At any moment it is possible to operate from one control centre or from the other one.

How often do you test such ability?

Three times in a year.

List of evidences, comments:

Redundancy is tested regularly: multisite tests performed three times in a year according to IX017: Activation of the symmetric support of the control centers in case of Pre-Alert or Alert caused by the operational capability lost in any of the control rooms (Activación del respaldo simétrico de los centros de control ante situación de pre-alerta o alerta por pérdida de operatividad en alguno de los centros de control).

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
REE has two fully redundant control centres which operate in parallel: CECOEL and CECORE. The two control centres usually are responsible for different areas (e.g. North/West and Centre/South/East of Spain) Both have the possibility to overtake full functionalities of each other's in case of disturbance. The transfer of the control between control centres is instantaneous and it is tested three times per year according to REE procedure "IX017: Activation of the symmetric support of the control centres in case of Pre-Alert or Alert caused by the operational capability lost in any of the control rooms".
4.6 **P5-B-S5.2 Tie lines opening policy**

**Preparatory phase**

### Self-assessment questionnaire 2011

<table>
<thead>
<tr>
<th><strong>P5-B-S5.2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tie lines opening policy. Disconnection from the synchronous system will be considered the ultimate remedial action and will only be undertaken after coordination with the neighbouring TSOs ensuring that this action will not endanger the remaining synchronous area. Keeping the interconnection in operation as long as possible is of utmost importance, but shall be consistent with the operating constraints. Therefore any manual emergency opening of tie lines shall be announced in advance, predefined and duly prepared in a coordinated way with the neighboring TSO. Opening of a tie line has to be assessed and agreed upon in advance in a transparent way.</td>
</tr>
</tbody>
</table>

**Compliance level:** FC

<table>
<thead>
<tr>
<th>RTE</th>
<th>REN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Explanation for the full compliance declaration:**

- In the mutual agreement with RTE 'Characteristics of the tie lines France-Spain' all the protection system and automatic devices of the tie lines with France are defined. 
- With Portugal there are not automatic devices installed near the tie lines. 
- Prior to the opening a tie line, neighbouring TSO is informed.

**Additional questions**

Is your tie line opening policy (automatic or manual) coordinated with all concerned neighbouring TSOs?

<table>
<thead>
<tr>
<th>RTE</th>
<th>REN</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

### Audit questionnaire 2012

**P5-B-S5.2 Tie lines opening policy.** Disconnection from the synchronous system will be considered the ultimate remedial action and will only be undertaken after coordination with the neighbouring TSOs ensuring that this action will not endanger the remaining synchronous area.

- Keeping the interconnection in operation as long as possible is of utmost importance, but shall be consistent with the operating constraints. Therefore any manual emergency opening of tie lines shall be announced in advance, predefined and duly prepared in a coordinated way with the neighbouring TSO.

- Opening of a tie line has to be assessed and agreed upon in advance in a transparent way; automatic opening may be performed when given events occur and if certain thresholds are exceeded (e.g. overload damage of the equipment).
Urgent opening can be carried out in case of physical danger to human beings or installations without prior information to neighbouring TSOs involved.

**Compliance level**

<table>
<thead>
<tr>
<th>FC</th>
<th>SC</th>
<th>NC</th>
</tr>
</thead>
</table>

Concise explanation and list of evidences for declared compliance level:

Both REE-RTE Agreement: *Common and Coordinated actions done by TSO in case of collapse and REE-REN Agreement: Common and coordinated actions to fulfill in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems* establish that information about tie lines state must be priority given and tie lines must be energized as soon as possible.

In the mutual agreement with RTE ‘*Characteristics of the tie lines France-Spain*’ all the protection system and automatic devices of the tie lines with France are defined. • With Portugal there are not automatic devices installed near the tie lines.

REE-RTE Agreement: *Real time operation of the interconnection lines between Spain and France* and REE-REN Agreement: *Real time operation of the interconnection lines between Spain and Portugal* establish the procedure for the urgent opening of the tie lines.

**Do you have a mitigation plan to the standard?**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

--------------------------------------------------------------------------------------------------------------------------

**Is your tie line opening policy (automatic or manual) coordinated with all concerned neighbouring TSOs?**

<table>
<thead>
<tr>
<th>Neighbour</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTE</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>REN</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
List of evidences, comments:

In the mutual agreement with RTE ‘Characteristics of the tie lines France-Spain’ all the protection system and automatic devices of the tie lines with France are defined. • With Portugal there are not automatic devices installed near the tie lines.

REE-RTE Agreement: Real time operation of the interconnection lines between Spain and France and REE-REN Agreement: Real time operation of the interconnection lines between Spain and Portugal establish the procedure for the urgent opening of the tie lines.

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
“Common and Coordinated actions done by TSO in case of collapse” (REE-RTE) and “Common and coordinated actions to fulfil in case of frequency deviation higher than +/- 200 mHz, lost of synchronism or significant blackout in any of the electrical systems” (REE-REN) state that tie lines must be given a priority and tie lines must be energized as soon as possible after tripping.

REE has installed distance and differential protection devices on tie lines with RTE and REN. In addition at the Spanish-French border RTE has installed additional over current protection devices. The bilateral agreement with RTE “Characteristics of the tie lines France-Spain” defines protection systems and all automatic devices of the tie lines. RTE provides regular reports on the settings of these devices.
4.7 P5-B-S6.3 MANAGEMENT OF ENTSO-E RG CE OVER-FREQUENCY

Preparatory Phase

Self-Assessment Questionnaire 2011

P5-B-S6.3

Management of ENTSO-E RG CE over-frequency. In case the system frequency is still higher than a dedicated threshold (50.2 Hz), TSOs shall take additional manual (or automatic if available) actions to decrease the frequency (i) through starting pumped-storage power plants or (ii) decreasing the level of generation of active power by activating extra primary reserve if available (next steps under the leadership of the frequency leader - refer to §C).

Compliance Level: FC

Explanation for the full compliance declaration:

- Pumped-stored power plants are started manually in case of high frequency.
- From the control centre it is possible to monitor the behaviour of generation units.

Additional Questions

- Do you have procedures to limit the output power of power plants? yes
- Do you have procedures to start pumps in case of over-frequency? yes

Audit Questionnaire 2012

P5-B-S6.3 MANAGEMENT OF ENTSO-E RG CE OVER-FREQUENCY. In case the system frequency is still higher than a dedicated threshold (50.2 Hz), TSOs shall take additional manual (or automatic if available) actions to decrease the frequency (i) through starting pumped-storage power plants or (ii) decreasing the level of generation of active power by activating extra primary reserve if available (next steps under the leadership of the frequency leader - refer to §C).

Compliance level FC ☒ SC ☐ NC ☐

Concise explanation and list of evidences for declared compliance level:

- Operational instruction to the generation units and pumped-storage power plants may be given by the system operator in real time according to the Spanish legislation Operational Procedure 3.2 Technical constraints management (Resolución de restricciones técnicas), Operational Procedure 3.7 Programming of the not manageable renewable generation units (Programación de la generación de origen renovable no gestionable) and Operational Procedure 7.3 Tertiary reserves (regulación terciaria).74574
- From the control centre it is possible to monitor the behavior of generation units.

Do you have a mitigation plan to the standard? Yes ☐ No ☒

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:
Do you have procedures to limit the output power of power plants?

Yes ☒ No ☐

List of evidences, comments:

Operational instruction to the generation units may be given by the system operator in real time according to the Spanish legislation Operational Procedure 3.2 Technical constraints management (Resolución de restricciones técnicas), Operational Procedure 3.7 Programming of the not manageable renewable generation units (Programación de la generación de origen removable no gestionable) and Operational Procedure 7.3 Tertiary reserves (regulación terciaria).

Do you have procedures to start pumps in case of over-frequency?

Yes ☒ No ☐

List of evidences, comments:

Operational instruction to the pumped-storage power plants may be given by the system operator in real time according to the Spanish legislation Operational Procedure 7.3 Tertiary reserves (regulación terciaria).

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
The Spanish legislation "Operational Procedure 3.2 Technical constraints management", "Operational Procedure 3.7 Programming of the not manageable renewable generation units" and "Operational Procedure 7.3 Tertiary reserves" cover the actions to manage over frequency situation.

REE is able to send commands to any manageable and "non manageable"1 renewable power unit greater than 10 MW to reduce its production in real time whenever it is necessary including if the frequency goes over 50.2 Hz. REE performs a test for each new unit to define if it's "manageable". The units which pass tests can take part in ancillary service market. Conventional thermal units may disconnect after frequency exceeds 51.5 Hz.

---

1 According to the Spanish legislation (Royal Decree 661/2007), the "non manageable" generation is defined as the one whose primary energy source is neither controllable nor storable and whose associated production plants do not have the possibility of following the system operator instructions without primary energy spills, or the firmness of expected future production is not enough to be considered as a program.
4.8 P5-B-S6.4 MANAGEMENT OF ENTSO-E RG CE UNDER-FREQUENCY

PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2011

P5-B-S6.4
Management of ENTSO-E RG CE under-frequency. In case the system frequency is lower than a dedicated threshold (49.8 Hz), TSOs shall take additional manual (or automatic if available) actions to increase the frequency (i) through stopping pumped-storage power plants or (ii) increasing the level of active power generation by activating extra primary reserve if available (next steps under the leadership of the frequency leader - refer to §C).

Compliance Level: FC

Explanation for the full compliance declaration:
The pumped-storage power plants trip automatically at 49.5 Hz (50 %) and 49.3 Hz (50 %)

Additional Questions
Do you have procedures to increase the output power of power plants? yes
Do you have procedures to stop pumps in case of under-frequency? yes

AUDIT QUESTIONNAIRE 2012

P5-B-S6.4 MANAGEMENT OF ENTSO-E RG CE UNDER-FREQUENCY. In case the system frequency is lower than a dedicated threshold (49.8 Hz), TSOs shall take additional manual (or automatic if available) actions to increase the frequency (i) through stopping pumped-storage power plants or (ii) increasing the level of active power generation by activating extra primary reserve if available (next steps under the leadership of the frequency leader - refer to §C).

Compliance level  FC ☒  SC ☐  NC ☐

Concise explanation and list of evidences for declared compliance level:

Do you have a mitigation plan to the standard? Yes ☑  No ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

Operational instruction to the generation units and pumped-storage power plants may be given by the system operator in real time according to the Spanish legislation. Operational Procedure 3.2 Technical constraints management (Resolución de restricciones técnicas) and Operational Procedure 7.3 Tertiary reserves (regulación terciaria).
Do you have procedures to increase the output power of power plants?

Yes ☑ No ☐

List of evidences, comments:
Operational instruction to the generation units may be given by the system operator in real time according to the Spanish legislation Operational Procedure 3.2 Technical constraints management (Resolución de restricciones técnicas) and Operational Procedure 7.3 Tertiary reserves (regulación terciaria).

Do you have procedures to stop pumps in case of under-frequency?

Yes ☑ No ☐

List of evidences, comments:
Operational instruction to the pumped-storage power plants may be given by the system operator in real time according to the Spanish legislation Operational Procedure 7.3 Tertiary reserves (regulación terciaria).

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
The Spanish legislation "Operational Procedure 3.2 Technical constraints management", "Operational Procedure 3.7 Programming of the not manageable renewable generation units" and "Operational Procedure 7.3 Tertiary reserves" cover the actions to manage under frequency situation.

Spanish legislation "Operational Procedure 1.6 Security plans for the system operation" contains the pumps disconnection (and load shedding) criterion for the Spanish grid:
• 49.5 Hz: 50% of the pumped-storage power plants at each location
• 49.3 Hz: the other 50% of the pumped-storage power plants at each location

All generation units in Spanish grid must stay connected to the grid up to a frequency of 48 Hz. When the system reaches a frequency below 48 Hz for at least three seconds the generation units may be disconnected from the grid.
4.9 **P5-B-S6.4.1.1 Load Shedding Capabilities**

**Preparatory Phase**

**Self-Assessment Questionnaire 2011**

<table>
<thead>
<tr>
<th>P5-B-S6.4.1.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load shedding capabilities. For cases where there is a major frequency drop, automatic function for load shedding in response to a frequency criterion must be installed in order to prevent a further frequency drop and the collapse of the system.</td>
</tr>
<tr>
<td><strong>Compliance Level:</strong> FC</td>
</tr>
<tr>
<td><strong>Explanation for the full compliance declaration:</strong></td>
</tr>
<tr>
<td>The load shedding schema is established in the document: Operation Procedure 1.6 ‘Security plans for the system operation’.</td>
</tr>
<tr>
<td><strong>Additional Questions</strong></td>
</tr>
<tr>
<td>Do you have automatic UFLS installed in your system?</td>
</tr>
</tbody>
</table>

**Audit Questionnaire 2012**

**P5-B-S6.4.1.1 Load Shedding Capabilities.** For cases where there is a major frequency drop, automatic function for load shedding in response to a frequency criterion must be installed in order to prevent a further frequency drop and the collapse of the system.

**Compliance level**

<table>
<thead>
<tr>
<th>FC</th>
<th>SC</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**Concise explanation and list of evidences for declared compliance level:**

The load shedding schema is established in the Spanish legislation Operational Procedure 1.6 Security plans for the system operation (Establecimiento de los planes de Seguridad para la operación del Sistema).

**Do you have a mitigation plan to the standard?** Yes [ ] No [ ]

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

---

**Do you have automatic UFLS installed in your system?**

Yes [ ] No [ ]
List of evidences, comments:
The load shedding schema is established in the Spanish legislation Operational Procedure 1.6 Security plans for the system operation (Establecimiento de los planes de Seguridad para la operación del Sistema).

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
Spanish legislation "Operational Procedure 1.6 Security plans for the system operation" contains the load shedding criterion: frequency steps with amount of remaining load for the Spanish grid.
4.10 P5-B-S6.4.1.2 LOAD SHEDDING CRITERION

PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2011

<table>
<thead>
<tr>
<th>P5-B-S6.4.1.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load shedding criterion. At 49.0 Hz the automatic load shedding of customer consumption shall start and will reach at least 5% as the first step. The total control area consumption has to be considered in the stepwise percentages to shed on the basis of individual evaluations by TSOs.</td>
</tr>
<tr>
<td>Compliance Level: FC</td>
</tr>
<tr>
<td>Explanation for the full compliance declaration: The load shedding schema is established in the document: Operation Procedure 1.6 'Security plans for the system operation'.</td>
</tr>
<tr>
<td>Additional Questions</td>
</tr>
<tr>
<td>Do you respect the first stage of load shedding of at least 5% of the total customer consumption at 49Hz? yes</td>
</tr>
</tbody>
</table>

AUDIT QUESTIONNAIRE 2012

P5-B-S6.4.1.2 LOAD SHEDDING CRITERION. At 49.0 Hz the automatic load shedding of customer consumption shall start and will reach at least 5% as the first step. The total control area consumption has to be considered in the stepwise percentages to shed on the basis of individual evaluations by TSOs.

Compliance level  

Concise explanation and list of evidences for declared compliance level:

The Spanish legislation Operational Procedure 1.6 Security plans for the system operation (Establecimiento de los planes de Seguridad para la operación del Sistema) establish the criterion for the design of the load shedding schema.

The load shedding schema has been designed according to the following steps:

- 49.5 Hz: 50% of the pumped-storage power plants at each location.
- 49.3 Hz: the other 50% of the pumped-storage power plants at each location.
- 49.0 Hz: 15% of the total real load of the system.
- 48.7 Hz: 15% of the total real load of the system.
- 48.4 Hz: 10% of the total real load of the system.
- 48.0 Hz: 10% of the total real load of the system.

This current procedure (Operational Procedure 1.6.) is in a review process.
Do you have a mitigation plan to the standard? Yes ☐ No ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

Do you respect the first stage of load shedding of at least 5% of the total customer consumption at 49Hz?
Yes ☒ No ☐

List of evidences, comments:

According to the Spanish legislation Operational Procedure 1.6 Security plans for the system operation (Establecimiento de los planes de Seguridad para la operación del Sistema), at 49 Hz the 15% of the total consumer consumption will be shed.

This standard has been considered in the review process of Operational Procedure 1.6.

How many stages is your UFLS consisted of and what percentage of load is operated under the load shedding relays in each stage?

The load shedding schema has been designed according to the following steps:

- 49.5 Hz: 50% of the pumped-storage power plants at each location.
- 49.3 Hz: the other 50% of the pumped-storage power plants at each location.
- 49.0 Hz: 15% of the total real load of the system.
- 48.7 Hz: 15% of the total real load of the system.
- 48.4 Hz: 10% of the total real load of the system.
- 48.0 Hz: 10% of the total real load of the system.

List of evidences, comments:

The load shedding schema is established in the Spanish legislation Operational Procedure 1.6 Security plans for the system operation (Establecimiento de los planes de Seguridad para la operación del Sistema).

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:

Spanish legislation "Operational Procedure 1.6 Security plans for the system operation" contains the load shedding criterion for the Spanish grid:

- 49.5 Hz: 50% of the pumped-storage power plants at each location.
<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Percentage of Total Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>49.3</td>
<td>Other 50% of pumped-storage power plants</td>
</tr>
<tr>
<td>49.0</td>
<td>15% of total real load of the system</td>
</tr>
<tr>
<td>48.7</td>
<td>15% of total real load of the system</td>
</tr>
<tr>
<td>48.4</td>
<td>10% of total real load of the system</td>
</tr>
<tr>
<td>48.0</td>
<td>10% of total real load of the system</td>
</tr>
</tbody>
</table>
4.11 P5-B-S6.4.1.3 LOAD SHEDDING PLAN – CHECKS

PREPARATORY PHASE

Self-Assessment Questionnaire 2011

| P5-B-S6.4.1.3 | Load shedding plan - checks. TSOs organise in common with DSOs (or with other involved parties) the regular checking (at least once a year) of the load shedding plan in order to ensure the predicted load shedding when applied. |

Compliance Level: FC

Explanation for the full compliance declaration:

We carry out a check of our load shedding plan once a year in coordination with DSOs.

There are no Questions defined for this company and this policy!

Additional Questions

Audit Questionnaire 2012

P5-B-S6.4.1.3 LOAD SHEDDING PLAN – CHECKS. TSOs organise in common with DSOs (or with other involved parties) the regular checking (at least once a year) of the load shedding plan in order to ensure the predicted load shedding when applied.

Compliance level FC ☐ SC ☒ NC ☐

Concise explanation and list of evidences for declared compliance level:

REE organises regular meetings with DSOs in order to check the load shedding plan and evaluate if modifications are needed.

Evidences: Agendas and minutes of these meetings, DSOs communications with update information about UFLS relays location and evaluation reports performed by REE.

Do you have a mitigation plan to the standard? Yes ☐ No ☒

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

Do you have the load shedding plan?

Yes ☒ No ☐

List of evidences, comments:
PRG-0-012 List of load-shedding devices in case of under-frequency (Relación de relés de deslmathre de carga por minima frecuencia).

Do you check the load shedding plan with DSOs at least once a year?

Yes ☒ No ☐

List of evidences, comments:

REE organises regular meetings with DSOs in order to check the load shedding plan and evaluate if modifications are needed.

Evidences: Agendas and minutes of these meetings, DSOs communications with update information about UFLS relays location and evaluation reports performed by REE.

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
SC

Explanation for the suggested compliance level:
REE has previously updated its load shedding plan annually but, due to the new regulation from 2009 (load reduction service), REE has not issued the official load shedding plan for the last three years. Indeed REE is currently moving to a load reduction scheme which implementation implies the recalibration of load shedding relays and other systems. The main idea behind the new scheme is to integrate small household type of loads as aggregated ones and the load reduction service providers to be fit for load shedding.

Audit Team reviewed annual agenda and minutes of the meetings from the meetings between REE and Spanish DSOs.

Improvement plan with deadline:

REE will organise annually a review of the load shedding scheme. Official load shedding plan will be distributed at least once per year.
Deadline: end 2013
4.12 P5-C-S1.2 TSO RESTORATION PLAN

PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2011

<table>
<thead>
<tr>
<th>P5-C-S1.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSO restoration plan. Each TSO has to prepare in advance and update regularly a restoration plan. This restoration plan includes a bottom-up approach and a top-down approach.</td>
</tr>
<tr>
<td>Compliance Level: FC</td>
</tr>
<tr>
<td>Explanation for the full compliance declaration:</td>
</tr>
<tr>
<td>We have domestic procedures (The restoration plans are included in the Operation Manual). This restoration plan includes a bottom-up approach and a top-down approach. We update our restoration plan at national level in case of any important change in the power system and at least one a year.</td>
</tr>
<tr>
<td>Additional Questions</td>
</tr>
<tr>
<td>Does your restoration plan include a bottom-up approach and a top-down approach?</td>
</tr>
<tr>
<td>Do you update regularly your restoration plan?</td>
</tr>
</tbody>
</table>

AUDIT QUESTIONNAIRE 2012

P5-C-S1.2 TSO RESTORATION PLAN. Each TSO has to prepare in advance and update regularly a restoration plan. This restoration plan includes a bottom-up approach and a top-down approach.

Compliance level

FC ☒ SC ☐ NC ☐

Concise explanation and list of evidences for declared compliance level:

We have domestic procedures (The restoration plans are included in the Operation Manual). These Restoration Plans include a bottom-up approach and a top-down approach. We update our Restoration Plans at national level in case of any important change in the power system and at least one a year.

Do you have a mitigation plan to the standard? Yes ☐ No ☒

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:
Do you have restoration procedures?
Yes ☒ No □
List of evidences, comments:

Restoration Plans included in the Operation Manual.

Does your restoration plan include a bottom-up approach and a top-down approach?
Yes ☒ No □
List of evidences, comments:

Restoration Plans included in the Operation Manual. These restoration plans include a bottom-up approach and a top-down approach.

Do you update your restoration plan regularly?
Yes ☒ No □
List of evidences, comments:

The Restoration Plans are updated in case of any important change in the power system and at least one a year.

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
Audit Team checked "Spanish System Restoration Plans (PRS)" which divide Spain into seven zones which have their own top-down and bottom-up restoration concepts. Spanish legislation "Operational Procedure 1.6 Security plans for the system operation" demands for regular update of the restoration plans and their verification. Audit Team reviewed annual updates from 1997 to 2011. All the necessary and updated documentation is available in the control room in electronic format and hard copy too. Most major transmission substations in Spain are equipped with backup generators for prolonged disruption.
4.13 P5-C-S1.2.1.1 SUCH PROCEDURES HAVE TO BE PROVED AT LEAST BY SIMULATION OR OFF-LINE CALCULATIONS

PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2011

P5-C-S1.2.1.1
Such procedures have to be proved at least by simulation or off-line calculations.

Compliance Level: FC

Explanation for the full compliance declaration:
We performe partial and general periodical restoration simulations.

Additional Questions
Do you test your restoration plan by simulation or by off-line calculations? yes

AUDIT QUESTIONNAIRE 2012

P5-C-S1.2.1.1 SUCH PROCEDURES HAVE TO BE PROVED AT LEAST BY SIMULATION OR OFF-LINE CALCULATIONS

Compliance level FC ☒ SC ☐ NC ☐

Concise explanation and list of evidences for declared compliance level:
During the update of the restoration plan, off-line calculations are performed when applied.
We perform partial and general periodical restoration simulations.
Additionally, according to IP003 Qualification of the personnel (Cualificación del personal), the personnel on shift have to perform at least one session at the Operational Training Simulator (OTS) every 18 months.

Do you have a mitigation plan to the standard? Yes ☒ No ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

How do you test your restoration plan?
By means of the partial or general periodical restoration simulations, off-line calculations, and the OTS sessions.
List of evidences, comments:

Simulations reports and off-line calculations.

AUDIT PHASE

**COMPLIANCE AUDIT 2012**

Compliance Level suggestion by the audit team:

FC

Explanation for the suggested compliance level:

Audit Team reviewed the offline calculations and simulation revisions from 2005 to 2011. Spanish legislation "Operational Procedure 1.6 Security plans for the system operation" requires regular update of the restoration plans and their verification.

REE also participates in onsite tests for re-energisation of nuclear power plant ancillary services from black start capable units.
4.14 **P5-C-S1.2.1.2** EACH TSO HAS TO EVALUATE THE NUMBER OF UNITS CAPABLE OF BLACK START AND ISLANDED OPERATION TO CONTRIBUTE TO THE RESTORATION AND TO GET KNOWLEDGE OF UNITS IN HOUSE LOAD OPERATION

**PREPARATORY PHASE**

### SELF-ASSESSMENT QUESTIONNAIRE 2011

**P5-C-S1.2.1.2**

Each TSO has to evaluate the number of units capable of black start and islanded operation to contribute to the restoration and to get knowledge of units in house load operation.

**Compliance Level:** FC

**Explanation for the full compliance declaration:**

In the Spanish system the number of power plants with black start capability is sufficient.

**Additional Questions**

Have you evaluated your needs for black start units?  

**yes**

### AUDIT QUESTIONNAIRE 2012

**P5-C-S1.2.1.2** EACH TSO HAS TO EVALUATE THE NUMBER OF UNITS CAPABLE OF BLACK START AND ISLANDED OPERATION TO CONTRIBUTE TO THE RESTORATION AND TO GET KNOWLEDGE OF UNITS IN HOUSE LOAD OPERATION

**Compliance level**  

- FC  
- SC  
- NC

Concise explanation and list of evidences for declared compliance level:

The number of black-start units considered in the restoration plan is sufficient in order to perform the restoration process satisfactorily (Furthermore we take into account additional groups to cover outages). As the restoration plan analyzes the worst situation in case of incident, units in house load operation are not considered.

Evidences: Simulations reports and off-line calculations.

**Do you have a mitigation plan to the standard?**  

- Yes  
- No

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:
Have you evaluated your needs for black start units?

Yes ☒ No ☐

List of evidences, comments:

Simulations reports and off-line calculations.

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
The “Spanish System Restoration Plans (PRS)” define the amount of required black start capable power plants per each predefined zone. Each zone has redundant black start capable units.
4.15 **P5-C-S1.2.1.3 Black start capabilities of units shall be tested regularly on-site at least once per three years**

**PREPARATORY PHASE**

**SELF-ASSESSMENT QUESTIONNAIRE 2011**

**P5-C-S1.2.1.3**

Black start capabilities of units shall be tested regularly on-site at least once per three years.

**Compliance Level:** NC

**Actions taken to reach compliance:**

Procedure for contracting and ensuring restoration capabilities was proposed to Spanish Regulatory Authorities. REE has asked for information over black start capability tests of generation units considered in Restoration Plans.

**Deadline:**

Temporary measures to preserve the security of interconnected system

REE has started with a regular process for updating data about black-start capabilities tests.

**Existing addendum for this Policy reference**

Yes

**Additional Questions**

Do you test the black start capabilities of units at least once per three years?

No

**AUDIT QUESTIONNAIRE 2012**

**P5-C-S1.2.1.3 Black start capabilities of units shall be tested regularly on-site at least once per three years**

**Compliance level**

| FC | SC | NC |

Concise explanation and list of evidences for declared compliance level:

REE declared non-compliance with this standard and established a mitigation plan in January 2011.

According to this mitigation plan, REE started a process for collecting data about black-start capabilities tests from generation companies in order to preserve the security of the synchronously interconnected ENTSO-E SOC area.

REE has received the information from all the units with black start capability.

Evidences: Information over black start capability tests of all the generation units (sent by generation companies in September 2012).
COMPLIANCE AUDIT REPORT
REE
2. – 3.10.2012

Do you have a mitigation plan to the standard?  Yes  ☐   No  ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

--------------------------------------------------------------------------------------------------------------------------

Do you test the black start capabilities of units at least once per three years?
Yes  ☐   No  ☐

List of evidences, comments:

Evidences: Information over black start capability tests of all the generation units (sent by generation companies in September 2012).

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
SC

Explanation for the suggested compliance level:
REE provided information from the producers on their black start capable units. Although the units were tested within three years from the audit date as from the standard requirement, REE does not have legal mandate to demand black start tests from the producers. The Spanish government has been informed on the issue and REE is involved in discussion with the government to have a more secure way to ensure functionalities tests and availability of the black start capable units.

Improvement plan with deadline:
REE will report Regulatory Authorities the situation about this standard and will propose the inclusion within its functions to demand black start tests from the producers.
Deadline: end 2013
4.16 P5-C-S2.3 CHOICE OF LOAD FREQUENCY CONTROLLER MODES OR STATES IN CASE OF BLACKOUT

PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2011

<table>
<thead>
<tr>
<th>P5-C-S2.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice of Load Frequency controller modes or states in case of blackout.</td>
</tr>
<tr>
<td>In case of blackout, the load frequency secondary control mode switching</td>
</tr>
<tr>
<td>depends on the reenergisation strategy. For the bottom-up strategy, it is</td>
</tr>
<tr>
<td>up to the TSO to choose the load frequency secondary controller in stopped</td>
</tr>
<tr>
<td>control state (or in frequency control mode) in order to share the</td>
</tr>
<tr>
<td>contribution to frequency regulation with all the units of the control</td>
</tr>
<tr>
<td>area. For the top-down strategy, the frequency secondary controller</td>
</tr>
<tr>
<td>shall be in stopped control state in the area that called for reenergising.</td>
</tr>
</tbody>
</table>

Compliance Level: FC

Explanation for the full compliance declaration:
These criteria are taken into account in our restoration plans

Additional Questions:
Do you have procedure which defines the choice of the load frequency secondary controller depending on the reenergisation strategy?  yes

AUDIT QUESTIONNAIRE 2012

P5-C-S2.3 CHOICE OF LOAD FREQUENCY CONTROLLER MODES OR STATES IN CASE OF BLACKOUT. In case of blackout, the load frequency secondary control mode switching depends on the reenergisation strategy.

For the bottom-up strategy, it is up to the TSO to choose the load frequency secondary controller in stopped control state (or in frequency control mode) in order to share the contribution to frequency regulation with all the units of the control area.

For the top-down strategy, the frequency secondary controller shall be in stopped control state in the area that called for reenergising.

Compliance level  FC ☑  SC ☐  NC ☐

Concise explanation and list of evidences for declared compliance level:
These criteria are taken into account in our Restoration Plans, particularly in PRS-0-009 General Criteria to take into account in the restoration process (Criterios generales a aplicar en los procesos de reposición).

Do you have a mitigation plan to the standard?  Yes ☐  No ☑

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:
Do you have procedure which defines the choice of the load frequency secondary controller depending on the reenergisation strategy?

Yes ☒ No ☐

List of evidences, comments:

These criteria are taken into account in our Restoration Plans, particularly in PRS-0-009 General Criteria to take into account in the restoration process (Criterios generales a aplicar en los procesos de reposición).

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
"PRS-0-009 General Criteria to take into account in the restoration process" defines the LFC modes. Audit Team also checked the relative functionality in REE SCADA system.
4.17 P5-C-S3.6 COORDINATION WITH DSOs FOR RECONNECTION OF SHED LOAD

PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2011

<table>
<thead>
<tr>
<th>P5-C-S3.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination with DSOs for reconnection of shed load. TSOs have to coordinate the reconnection of shed load with DSOs. Local and remote reconnection of customer’s loads has to be agreed in advance in cooperation between the TSO and its DSOs. Automatic reconnection has to be avoided.</td>
</tr>
<tr>
<td>Compliance Level: FC</td>
</tr>
<tr>
<td>Explanation for the full compliance declaration:</td>
</tr>
<tr>
<td>There is a procedure between REE and DSOs where the criteria to reconnect the shed load are established</td>
</tr>
<tr>
<td>Additional Questions</td>
</tr>
<tr>
<td>Do you have procedures for reconnection with DSOs which are connected to TSO’s grid and are involved in load shedding?</td>
</tr>
<tr>
<td>Are you in a position to avoid automatic reconnection of loads after load shedding?</td>
</tr>
</tbody>
</table>

AUDIT QUESTIONNAIRE 2012

P5-C-S3.6 COORDINATION WITH DSOs FOR RECONNECTION OF SHED LOAD. TSOs have to coordinate the reconnection of shed load with DSOs. Local and remote reconnection of customers’ loads has to be agreed in advance in cooperation between the TSO and its DSOs. Automatic reconnection has to be avoided.

Compliance level FC ☒ SC ☐ NC ☐

Concise explanation and list of evidences for declared compliance level:

The criteria to reconnect the shed load are established in the procedure PRS-0-012 List of load-shedding devices in case of under-frequency (Relación de relés de deslastre de carga por mínima frecuencia) and in the document “Shed load restoration after incident” (a procedure among REE and DSOs). In these documents it is mentioned specifically that automatic reconnection function of the load shedding devices must be cancelled.

Do you have a mitigation plan to the standard? Yes ☐ No ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:
Do you have procedures for reconnection with DSOs which are connected to TSO’s grid and are involved in load shedding?

Yes ☒ No ☐

List of evidences, comments:
- PRS-0-012 List of load-shedding devices in case of under-frequency (Relación de relés de deslastre de carga por minima frecuencia).
- “Shed load restoration after incident” (a procedure among REE and DSOs)

Are you in a position to avoid automatic reconnection of loads after load shedding?

Yes ☒ No ☐

List of evidences, comments:
In these documents it is mentioned specifically that automatic reconnection function of the load shedding devices must be cancelled.
DSOs have sent REE the cancellation confirmation of this automatic reconnection function.

AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
FC

Explanation for the suggested compliance level:
The load shedding plan “PRS-0-012 List of load-shedding devices in case of under-frequency” and the Spanish legislation in “Operational Procedure 1.6 Security plans for the system operation” forbid reconnection of shed load.
4.18 P5-C-S3.7 RECONNECTION OF GENERATORS AFTER ABNORMAL FREQUENCY EXCURSION

PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2011

<table>
<thead>
<tr>
<th>P5-C-S3.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reconnection of generators after abnormal frequency excursion. The TSO has to coordinate the reconnection of generators tripped due to abnormal frequency excursion. In this case of loss of generation, the TSO reconnects generators, based on the instructions of frequency leader, keeping adequate margins of the downward balancing reserve sufficient at least to cope with the next generation power to reconnect. The reconnection of generators is managed step by step in order to minimize the impact on the frequency deviation and the reserve margins. The process of reconnecting generators has to be done stepwise in blocks of maximum power defined by the TSO with respect to the operating reserve of the own TSO’s grid. The TSOs define the criteria for reconnection and disconnection with the constraint to avoid over-frequency conditions. For installation connected to DSOs grids the local and remote reconnection has to be agreed in advance in cooperation between the TSO and DSOs for the main units. Automatic reconnection of all generators has to be forbidden when in accordance with legislation.</td>
</tr>
</tbody>
</table>

Compliance Level: FC

| RTE | REN |
|---------------------------------------------|

Explanation for the full compliance declaration:
According criteria in our restoration plans.

Additional Questions

- Are you able to coordinate the reconnection of all generators connected to the TSO’s grid, yes
- Are you able to coordinate the reconnection of all generators connected to the DSOs’ grids except small distributed generation, in coordination with DSOs? yes

AUDIT QUESTIONNAIRE 2012

P5-C-S3.7 RECONNECTION OF GENERATORS AFTER ABNORMAL FREQUENCY EXCURSION. The TSO has to coordinate the reconnection of generators tripped due to abnormal frequency excursion.

In this case of loss of generation, the TSO reconnects generators, based on the instructions of frequency leader, keeping adequate margins of the downward balancing reserve sufficient at least to cope with the next generation power to reconnect. The reconnection of generators is managed step by step in order to minimize the impact on the frequency deviation and the reserve margins. The process of reconnecting generators has to be done stepwise in blocks of maximum power defined by the TSO with respect to the operating reserve of the own TSO’s grid.

The TSOs define the criteria for reconnection and disconnection with the constraint to avoid over-frequency conditions.
For installation connected to DSOs grids the local and remote reconnection has to be agreed in advance in cooperation between the TSO and DSOs for the main units. Automatic reconnection of all generators has to be forbidden when in accordance with legislation.

**Compliance level**

<table>
<thead>
<tr>
<th>FC</th>
<th>SC</th>
<th>NC</th>
</tr>
</thead>
</table>

Concise explanation and list of evidences for declared compliance level:

In Operational Procedure 1.6 *Definition of the Security plans for the System operation (Establecimiento de los planes de seguridad para la operación del sistema)* disconnection plans for the generation power plants in case or over-frequency are established, included the not manageable generation units. Also, it is established that automatic reconnection of the not manageable generation units of more than 10 MW of installed power is forbidden and reconnection must be done under the instructions of the System Operator. On the other hand, it is mentioned than reconnection of the not manageable generation units of less than 10 MW must be done only when the frequency of the system reaches a value equal or inferior to 50 Hz.

The instructions for the reconnection of the special regime units will be managed by CECRE (Special Regime Control Center).

**Do you have a mitigation plan to the standard?**

| Yes | No |

In case of an existing Addendum or a Non Compliance Declaration; list of evidences for a mitigation plan, comments:

**Are you able to coordinate the reconnection of all generators connected to the TSO’s grid?**

| Yes | No |

List of evidences, comments:

Through the system operator EMS, the telemeasurement productions of all the generation units connected to the Transmission Grid are received, so that REE is able to manage the reconnection of the generation facilities connected to the TSO’s grid step by step in a coordinated way.

**Are you able to coordinate the reconnection of all generators connected to the DSOs’ grids except small distributed generation, in coordination with DSOs?**

| Yes | No |

List of evidences, comments:

Through the system operator EMS, the telemeasurement productions of all the special regime units of more than 1 MW are received, no matter if the units are connected to the Transmission or Distribution networks.

Furthermore, all the special regime generation units of more than 10 MW are attached to a RESCC (Renewable Energy Source Control Centres). The management of the production of these facilities is done by CECRE, who emits the production instructions of
AUDIT PHASE

COMPLIANCE AUDIT 2012

Compliance Level suggestion by the audit team:
Although the 2012 Onsite Audit Program includes this standard within those to be audited onsite, the audit team omits finally any statement on the compliance level of this standard.

During the onsite audit the audit team focused on the dispersed generation aspects, the critical issue concerning this standard according to the SG CME criteria. However, in the RG CE Plenary it was later decided (in the meeting on November 28th, 2012) that this standard does not apply to non-conventional dispersed generation but only to conventional large generation units connected to TSO grids.

The audit team considers that re-evaluation of the compliance with this standard is not feasible for the following reasons:
- an assessment about the compliance level based on unfocussed onsite gathered materials would be unfair
- an assessment about the compliance level based on additional information provided ex-post by the TSO, not onsite, would be a biased process
- it is not possible to repeat the onsite audit process for this standard, due to the large effort required both from the audit team and the audited TSO.

Thus, the audit team decided not being in condition to state an audited compliance level for this standard.

The audit team recognises reconnection of generators after abnormal frequency excursions as a critical issue for the security of supply, especially in the light of the increasing penetration of dispersed generation. Therefore the audit team suggests the development of the necessary efficient rules intended to promote the secure operability of the synchronous zone by the RG CE Plenary. From a technical point of view, it is important to remind that the issue is well taken into account by the SG SPD (which is analysing the problem and looking for solutions at the Continental Europe level) and, the Draft Network Code for Requirements for Grid Connection Applicable to all Generators (Article 8(1)(g), 26 June 2012 version\(^2\)).

---

\(^2\) The Relevant TSO shall define while respecting the provisions of Article 4(3) the conditions under which a Power Generating Module shall be capable of connecting automatically to the Network. These conditions shall include:
- frequency ranges, within which an automatic connection is admissible, and a corresponding delay time
- maximum admissible gradient of increase of Active Power output Automatic connection is allowed unless determined otherwise by the Relevant Network Operator in coordination with the Relevant TSO.
5 CONCLUSIONS

The Audit Team found that REE is fully compliant with 16 out of 18 audited standards. REE estimates that its staff needed about 200 man hours for the preparation of the compliance audit. The Audit Team visited the REE control room at the beginning of the second audit day. The evidences presented in the control room helped the auditors to better understand the organisation of the work and the processes.

REE was very well prepared for the audit. All necessary documentation was easily available during the audit. Documentation was also available to the audit team in the preparation phase and the necessary translation of all relevant parts from Spanish to English provided. The REE representatives answered all questions in a competent way and gave detailed explanations.

The Audit Team confirmed REE sufficient compliance level in case of the two standards P5-B-S6.4.1.3 and P5-C-S1.2.1.3 due to following reasons:

- due to new regulation from 2009 (load reduction service) REE is currently implementing a recalibration of load shedding relays and other systems and thus the load shedding plan has not been issued since the last three years
- according to the present regulation, REE does not have legal mandate to demand black start tests from the Producers.

The audit team considers that an evaluation of the compliance with the P5-C-S3.7 standard is not feasible, as explained in the relevant section in the audit work sheet (section 4.18).

In case of the REE Compliance Audit, all preconditions for an excellent and successful audit were fulfilled and the Audit Team wishes to express its gratitude to the REE company management.
6 Signature Page

ENTSO-E Audit Team Members:

Rafal Kuczynski (Audit Team Leader)

Heinz-Dieter Ziesemann (Audit Team Member)

Silvia Moroni (Audit Team Member)

Lasse Konttinen (Compliance Monitoring Advisor)

Date and Place: 06.02.2013, Brussels, Belgium