COMPLIANCE AUDIT REPORT
NOS BiH - Nezavisni operator sistema u Bosni i Hercegovini

24 – 25 APRIL 2014

COMPLIANCE AUDIT CONDUCTED IN THE NATIONAL CONTROL CENTRE IN SARAJEVO BY ENTSO-E RGCE SG CME
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

NOS BiH - Nezavisni Operator Sistema u Bosni i Hercegovini ................................................................. 1

1         EXECUTIVE SUMMARY ................................................................................................................. 5
  1.1     COMPLIANCE MONITORING IN ENTSO-E RGCE ............................................................... 5
  1.2     AUDITED TSO ............................................................................................................................. 5
  1.3     AUDITED OH STANDARDS ......................................................................................................... 5
  1.4     RESULTS ....................................................................................................................................... 5

2         AUDIT REPRESENTATIVES ............................................................................................................. 7

3         AUDIT PLAN .................................................................................................................................... 8
  3.1     GENERAL PROCEDURES ............................................................................................................. 8
  3.2     SCOPE .......................................................................................................................................... 10
  3.3     METHODOLOGY ......................................................................................................................... 10
  3.4     EVALUATION PRINCIPLES ......................................................................................................... 11
  3.5     CONFIDENTIALITY ....................................................................................................................... 11

4         AUDIT WORKSHEET FOR 2014 ONSITE AUDIT ............................................................................... 12
  4.1     OH STANDARD P3-A1-S3.3. CALCULATIONS IN REAL TIME OPERATION .................................... 12
  4.2     OH STANDARD P3-A1-S3.3.1 FREQUENCY CALCULATION ....................................................... 15
  4.3     OH STANDARD P3-A1-S3.3.2 ADDITIONAL N-1 CALCULATIONS ............................................... 17
  4.4     OH STANDARD P3-A2-S1. DETERMINATION OF THE EXTERNAL CONTINGENCY LIST AND
          OBSERVABILITY AREA ......................................................................................................................... 19
  4.5     OH STANDARD P3-A2-S2 IMPLEMENTATION OF OBSERVABILITY AREA ......................................... 22
  4.6     OH STANDARD P3-A2-S6 DATA PROVISION ............................................................................. 24
  4.7     OH STANDARD P3-A3-S2. OVERLOADS IN N-1 SITUATION (SIMULATION) ................................ 26
  4.8     OH STANDARD P3-A3-S2.2 INSTANTANEOUS TRIPPING IN N-1 SIMULATIONS ........................ 28
  4.9     OH STANDARD P3-A3-S4.1 TIE-LINES OPERATION CONDITIONS .............................................. 30
  4.10    OH STANDARD P3-A3-S4.2.2 SYNCHRONISING EQUIPMENT SETTINGS .................................. 32
  4.11    OH STANDARD P3-A3-S4.2.3 PROTECTION SYSTEM SETTING .................................................. 35
  4.12    OH STANDARD P3-A4-S5 PREPARATION OF REMEDIAL ACTIONS IN THE OPERATIONAL
          PLANNING STAGE ............................................................................................................................... 37
  4.13    OH STANDARD P3-A4-S5.1 ............................................................................................................ 39
  4.14    OH STANDARD P3-A4-S5.2 ............................................................................................................ 40
  4.15    OH STANDARD P3-A4-S5.3 ............................................................................................................ 41
  4.16    OH STANDARD P3-A4-S5.4 ............................................................................................................ 43

5         PROGRESS CHECK ON FINDINGS FROM 2010 ONSITE AUDIT - POLICY 8 ......................... 45
  5.1     OH STANDARD P8-A-R1 – TRAINING PROGRAM ............................................................................ 45
  5.2     OH STANDARD P8-A-R2 – INITIAL PROGRAM ............................................................................ 47
  5.3     OH STANDARD P8-A-R3 – CONTINUOUS PROGRAM .................................................................... 49
  5.4     OH STANDARD P8-A-S1 – TRAINING PROGRAMS ....................................................................... 50
  5.5     OH STANDARD P8-A-S2 – TSO REFERENCE LIST OF ENGLISH TECHNICAL TERMS ............ 52
  5.6     OH STANDARD P8-C-S2 – ORGANIZATION ................................................................................. 53
  5.7     OH STANDARD P8-C-S1 – COMMON TRAINING .......................................................................... 54
  5.8     OH STANDARD P8-C-S6 – TRAINING OF TRainers .................................................................... 55

6         CONCLUSIONS .................................................................................................................................. 56

7         SIGNATURE PAGE ............................................................................................................................. 58
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 randomly.

Sub-Group Compliance Monitoring & Enforcement (SG CME) is in charge of performing above mentioned two processes. The 2014 is the fifth year of conducting mandatory compliance audits. SG CME performed 4 voluntary compliance audits in 2008-2009 and 24 mandatory audits in 2010-2013.

1.2 AUDITED TSO

The RGCE member TSO NOS BiH was chosen for a Compliance Audit in 2014. CME conducted the audit on 24 & 25 April 2014 in Sarajevo, Bosnia and Herzegovina.

1.3 AUDITED OH STANDARDS

The Compliance Audit encompassed 16 standards/sub-standards of Operation Handbook Policy 3 (Operational Security) and made a progress check on findings from previous onsite audit (from Policy 8 – 2010). In 2013, NOS BiH made compliance declarations in the self-assessment process for all standards of OH Policy 3, a subset of which has been checked against their evidence during the audit.

1.4 RESULTS

At the beginning the audit team had an hour and a half long visit in the National Control Centre, which helped the audit team to understand better the organisation and processes in the system of NOS BiH.

The Audit Team audited 16 standards/sub-standards. The Audit Team found that NOS BiH is FCo with 14 standards and SCo with 2 standards. One standard was downgraded to SCo and one standard was upgraded to FCo according to the answers declared in the Compliance Monitoring Self-Assessment campaign 2013. NOS BiH was well prepared for the audit. A lot of the documents considered as evidence were available during the audit. All these documents were a good basis for proving the compliance level of NOS BiH with the audited standards. Requests for additional material were promptly met.

BiH The Audit Team also checked the progress related to Policy 8 done by NOS BiH from Compliance Audit in 2010. NOS BiH was able to prove at least particular progress in each of 8 checked standards.

In the case of this Compliance Audit, all preconditions for a successful audit were fulfilled and the Audit Team wishes to express its gratitude to the NOS BiH staff involved in the Audit and the company management.

Table 1 describes NOS BiH compliance declaration in self-assessment questionnaire 2013 and compliance audit questionnaire 2014 with compliance level suggestion by the CME audit team after reviewing the evidence for the audited standards.
## Table 1: Compliance level changes for the audited OH standards

<table>
<thead>
<tr>
<th>OH Standard</th>
<th>Self-assessment questionnaire 2013</th>
<th>Compliance audit questionnaire 2014</th>
<th>On site compliance audit 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3-A1-S3.3. CALCULATIONS IN REAL TIME OPERATION</td>
<td>SCo</td>
<td>SCo</td>
<td>SCo</td>
</tr>
<tr>
<td>P3-A1-S3.3.1 FREQUENCY CALCULATION</td>
<td>NCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>P3-A1-S3.3.2 ADDITIONAL N-1 CALCULATIONS</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>P3-A2-S1. DETERMINATION OF THE EXTERNAL CONTINGENCY LIST AND OBSERVABILITY AREA</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>P3-A2-S2 IMPLEMENTATION OF OBSERVABILITY AREA</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>P3-A2-S6 DATA PROVISION</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>P3-A3-S2. OVERLOADS IN N-1 SITUATION (SIMULATION)</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>P3-A3-S2.2 INSTANTANEOUS TRIPPING IN N-1 SIMULATIONS</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>P3-A3-S4.1 TIE-LINES OPERATION CONDITIONS</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>P3-A3-S4.2.2 SYNCHRONISING EQUIPMENT SETTINGS</td>
<td>FCo</td>
<td>FCo</td>
<td>SCo</td>
</tr>
<tr>
<td>P3-A3-S4.2.3 PROTECTION SYSTEM SETTING</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>P3-A4-S5 PREPARATION OF REMEDIAL ACTIONS IN THE OPERATIONAL PLANNING STAGE</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>OH STANDARD P3-A4-S5.1</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>OH STANDARD P3-A4-S5.2</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>OH STANDARD P3-A4-S5.3</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
<tr>
<td>OH STANDARD P3-A4-S5.4</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
</tbody>
</table>
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 in 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. No objection was expressed by NOS BiH. NOS BiH personnel involved in the audit is given in 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>CEPS</td>
<td>Martin Rehacek</td>
<td><a href="mailto:rehacekm@ceps.cz">rehacekm@ceps.cz</a></td>
</tr>
<tr>
<td>Audit team member</td>
<td>SEPS</td>
<td>Martin Jedinak</td>
<td><a href="mailto:martin.jedinak@sepsas.sk">martin.jedinak@sepsas.sk</a></td>
</tr>
<tr>
<td>Audit team member</td>
<td>IPTO</td>
<td>Yiannis Tolias</td>
<td><a href="mailto:tolias@admie.gr">tolias@admie.gr</a></td>
</tr>
<tr>
<td>Compliance Monitoring Advisor</td>
<td>ENTSO-E Secretariat</td>
<td>Jaka Žvab</td>
<td><a href="mailto:jaka.zvab@entsoe.eu">jaka.zvab@entsoe.eu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Function in the company</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head of Strategic Planning Department</td>
<td>Bojan Zecevic, president of WG</td>
</tr>
<tr>
<td>Head of Real Time Operation Department</td>
<td>Senad Hadzic</td>
</tr>
<tr>
<td>Operational Planning Department</td>
<td>Adnan Carsimamovic</td>
</tr>
<tr>
<td>Operational Planning Department</td>
<td>Aldin Mesanovic</td>
</tr>
<tr>
<td>Head of IT Department</td>
<td>Dusko Vickovic</td>
</tr>
<tr>
<td>Strategic Planning Department</td>
<td>Edina Aganovic</td>
</tr>
</tbody>
</table>
3 Audit Plan

3.1 General Procedures

The audit covered a chosen set of Operation Handbook (OH) standards which had already been monitored within the Compliance Monitoring Program 2013 self-assessment process.

The completed Audit Worksheet was sent by email to the ENTSO-E Secretariat and carbon copies to all Audit Team members four weeks before the first audit day. The complete schedule of the audit process for NOS BiH is given in Table 4.

In preparation for the audit, NOS BiH organised its supporting compliance documentation which is the evidence of the compliance with audited standards. The ENTSO-E RGCE SG CME acknowledges a good preparation for the audit.

All documentation (evidence) required for the onsite audit of each standard was available as a hard copy or in electronic format at the audit location. The Control Area Manager and/or other responsible expert personnel were 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.

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 4. Schedule for the Compliance Audit

<table>
<thead>
<tr>
<th>Event</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submittal of the audit material on behalf of the Audit Team</td>
<td>8 weeks prior to audit 27.2.2014</td>
</tr>
<tr>
<td>Objection or concern about audit team personnel</td>
<td>5 weeks prior to audit 20.3.2014</td>
</tr>
<tr>
<td>Submittal of the completed Audit Worksheet to the Audit Team by NOS BiH</td>
<td>4 weeks prior to audit 27.3.2014</td>
</tr>
<tr>
<td>Initial feedback based on the submitted Audit Worksheet sent to NOS BiH by the Audit Team</td>
<td>2 working days prior to audit 22.4.2014</td>
</tr>
<tr>
<td>Opening meeting of the Audit Team and CAM of NOS BiH</td>
<td>First audit day, 24.4.2014 09:00 – 09:30</td>
</tr>
<tr>
<td>(1) Introduction of the Audit Team members,</td>
<td></td>
</tr>
<tr>
<td>(2) Description of how the on-site audit will be conducted,</td>
<td></td>
</tr>
<tr>
<td>(3) Discussion on how confidential information will be handled,</td>
<td></td>
</tr>
<tr>
<td>(4) Discussion on data access required by the Audit Team,</td>
<td></td>
</tr>
<tr>
<td>(5) Announcement that NOS BiH will be asked to provide feedback on the audit process and results,</td>
<td></td>
</tr>
<tr>
<td>(6) Presentation of the TSO and TSO’s organization.</td>
<td></td>
</tr>
<tr>
<td>Start of the OH standards’ review* and progress check on findings from previous onsite audit (from Policy 8 – 2010)</td>
<td>First audit day, 24.4.2014 09:30 – 17:30</td>
</tr>
<tr>
<td>Continuation of the OH standards’ review and progress check on</td>
<td>Second audit day, 25.4.2014 09:00 – 12:30</td>
</tr>
<tr>
<td>findings from previous onsite audit (from Policy 8 – 2010)</td>
<td></td>
</tr>
<tr>
<td>Internal Audit Team meeting</td>
<td>Second audit day, 25.4.2014 12:30 – 14:00</td>
</tr>
<tr>
<td>Closing meeting with CAM of NOS BiH</td>
<td>Second audit day, 25.4.2014 14:00 – 15:30</td>
</tr>
<tr>
<td>(1) Presentation of preliminary audit findings and recommendations to be included on the draft audit report, with a strong emphasis on the evidence for each compliance level or non-compliance identified by the Audit Team,</td>
<td>Second audit day, 25.4.2014 14:00 – 15:30</td>
</tr>
<tr>
<td>(2) Discussion and feedback by NOS BiH with a possibility to object the findings,</td>
<td></td>
</tr>
<tr>
<td>(3) In case of any non-compliance or lack of evidence of compliance, first draft proposal of the TSO on an adequate mitigation plan, including deadline. Should such an immediate proposal not be possible, the TSO must submit it afterwards in written copy within seven days.</td>
<td></td>
</tr>
<tr>
<td>Delivery of the draft audit report to NOS BiH for review</td>
<td>2 weeks after the audit 9.5.2014</td>
</tr>
<tr>
<td>Remarks by NOS BiH</td>
<td>4 weeks after the audit 23.5.2014</td>
</tr>
<tr>
<td>Delivery of the final audit report to NOS BiH</td>
<td>6 weeks after the audit 6.6.2014</td>
</tr>
<tr>
<td>Acknowledgement of the final Audit Report by ENTSO-E RGCE Plenary and decision on its possible internal or external publishing.</td>
<td>RGCE Plenary in 2015</td>
</tr>
</tbody>
</table>
3.2 Scope

The objective of Compliance Audits in 2014 is to check chosen set of standards from OH Policy 3. These standards were also monitored in the 2013 regular compliance process via the self-assessment questionnaire.

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 2013 stored at the ENTSO-E Secretariat related to audited TSO concerning the audited OH standards
- Audit Worksheet (AW) 2014
- 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

3.3 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 2013 self-assessment questionnaires. It also processed (assessed) the answers in the 2014 Audit Worksheet filled in by the audited TSO.

The applied 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 identified the potential sources of audit evidence and estimated the amount and type of evidence needed.

The audit team used 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 determined whether the evidence presented by the TSO is sufficient. They did this by assessing the relevance, validity and reliability of the information and documentation presented.

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

3.4 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
- Fill in the audit questionnaire and submit to the audit team before the audit
- Identification of documents and other material 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 2013 cross-border check regarding compliance level declarations)
- Analysis of the explanations and comments which the audited TSO made in the self-assessment 2013 and audit questionnaires 2014 in written form in order to evaluate the quality of explanations and comments
- Identification of the missing explanations in the self-assessment 2013 and audit questionnaire 2014
- Analysis of the improvements achieved during the implementation of mitigation and improvement plans declared in the MLA Addendum/Addenda, in the self-assessment questionnaire 2013 and in the Audit Worksheet 2014 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 2013 and audit questionnaire 2014.
  - The goal was 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 was to improve the quality of the presented evidence.
  - The goal was to present material 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.

3.5 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 Worksheet for 2014 Onsite Audit

4.1 OH Standard P3-A1-S3.3. Calculations in Real Time Operation

Self-Assessment Questionnaire 2013

P3-A1-S3.3

Calculations in real time operation. The N situation has to be determined by state estimation on the basis of measurements and topology. Each TSO must perform an automatic N-1 simulation for all the contingencies of the contingency list in real time.

Compliance Level: SCo

Actions taken to reach compliance:

Available functions are in use

Deadline: 12/2015

Additional Questions

Do you determine the N situation by state estimation on the basis of measurements and topology? yes

Do you have a list of contingencies for the automatic N-1 simulations in real time? yes

Do you perform an automatic N-1 simulation for all the contingencies of the contingency list in real time? yes

Audit Questionnaire 2014

P3-A1-S3.3

Calculations in real time operation. The N situation has to be determined by state estimation on the basis of measurements and topology. Each TSO must perform an automatic N-1 simulation for all the contingencies of the contingency list in real time.

Compliance Level: SCo

Concise explanation and list of evidence for declared compliance level:

Contingency analysis function is running automatically after each execution of state estimator (periodically every 15 minutes and spontaneously after each changing network. Contingency analysis function is not fully operational because we still don't have certain 110 kV measurements. List of evidence: Functional Specification Contingency Evaluation from Siemens.
Do you have a mitigation plan to the standard?    Yes ☒    No ☐

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

We expect missing measurements to be operational till end of 2014.

Additional Questions

Do you determine the N situation by state estimation on the basis of measurements and topology?    Yes ☒    No ☐

Do you have a list of contingencies for the automatic N-1 simulations in real time?    Yes ☒    No ☐

Do you perform an automatic N-1 simulation for all the contingencies of the contingency list in real time?    Yes ☒    No ☐

List of evidence, comments:


AUDIT PHASE

COMPLIANCE AUDIT 2014

Compliance Level suggestion by the audit team: SCo

Explanation for the suggested compliance level:

In SCADA there are all the high voltage substations, including 110 kV level. NOS BiH has model of the first loop of neighbouring system and all the substations from the SHB block. Measurements in the substations are P, Q and voltage, including state of topology. Functionality of real time analysis is limited by datasets. Insufficient quality of data from generators and few measurements at 110kV level cause problems with convergence of the model in real time. NOS BiH dispatchers were able to do some calculation in study mode. Simulation of line tripping of Ernestinovo-Zerjavinec 400kV (line from adjacent system added in contingency list) was shown and the model didn’t converge, therefore the impact on the system after tripping of this line was not clear. NOS BiH has model of internal network in study mode function, where simulations of tripping can be performed. On the grid scheme previous and new values of P and Q were shown on the elements in the system. Internal line Gacko-Mostar simulation of tripping was presented in study mode and it was calculated well.

Deadlines for improvements of Siemens EMS is in progress based on document Functional Specification Contingency Evaluation and corresponding letters that were shown by NOS BiH. NOS BiH is expected to be compliant with training of dispatcher by the end of 2014. They have an agreement with SIEMENS for training of dispatchers, NOS expressed strong need for the training of the trainer, which will be able to train operators on EMS/SCADA functions (letter to SIEMENS 25 March 2014 – SCADA/EMS and telecommunication System Project in BiH, contract number TEPRP-ZEKC PT-01/04)
Audit team recommendations:

- To improve data quality to reach convergency of the model.
- Dispatchers to be more familiar with EMS/SCADA functionalities (contingency analysis...) and should be trained regularly to be more efficient on these kind of studies.
- To implement neighbouring network in their model to be able to use in study mode.

Improvement plan with deadline:
During the meeting NOS BiH and Audit team have set up the Improvement Plan that consists of the all before mentioned recommendations fulfilment.
Deadline: end of 2014
### 4.2 OH STANDARD P3-A1-S3.3.1 FREQUENCY CALCULATION

#### SELF-ASSESSMENT QUESTIONNAIRE 2013

**P3-A1-S3.3.1**

**Frequency of calculation.** The automatic N-1 simulation must run periodically, at least every 15 minutes in real time.

**Compliance Level:** NCo

**Actions taken to reach compliance:**

Not available.

**Deadline:** 12/2015

**Temporary measures to preserve the security of interconnected system**

Working in safe mode.

**Existing addendum for this policy reference** no

**Additional Questions**

How often do you perform an automatic N-1 simulation in real time?

**Actions taken to reach compliance:** Not available.

**Temporary measures to preserve the security of interconnected system:** Working in safe mode.

**Deadline:** 12/2015

---

#### AUDIT QUESTIONNAIRE 2014

**P3-A1-S3.3.1**

**Frequency of calculation.** The automatic N-1 simulation must run periodically, at least every 15 minutes in real time.

**Compliance Level:** FCo
Concise explanation and list of evidence 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 evidence for a mitigation plan, comments:

Additional Questions

How often do you perform an automatic N-1 simulation in real time?

Every 15 min.

List of evidence, comments:


AUDIT PHASE

COMPILANCE AUDIT 2014

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:
System is capable of performing N-1 analysis every 15 minutes, the period is adjustable from 5 minutes.

List of evidence:
- Audit team checked the functionality in the control room.
4.3 OH STANDARD P3-A1-S3.3.2 ADDITIONAL N-1 CALCULATIONS

SELF-ASSESSMENT QUESTIONNAIRE 2013

**P3-A1-S3.3.2**

**Additional N-1 calculations.** The TSOs must perform additional N-1 simulations prior to the application of important topology changes by manoeuvres (opening line, opening bus-bar) or after a relevant unexpected change of topology or a significant shift of the generation pattern (e.g. units tripped or out of operation).

**Compliance Level:** FCo

**Additional Questions**

In which cases or in which situations do you perform additional N-1 simulations?

*Missing answer from TSO.*

AUDIT QUESTIONNAIRE 2014

**P3-A1-S3.3.2**

**Additional N-1 calculations.** The TSOs must perform additional N-1 simulations prior to the application of important topology changes by manoeuvres (opening line, opening bus-bar) or after a relevant unexpected change of topology or a significant shift of the generation pattern (e.g. units tripped or out of operation).

**Compliance Level:** FCo

Concise explanation and list of evidence for declared compliance level:

Acceptance test book for DPF as shown on SCADA system (N-1 simulations prior to the application of important topology changes by manoeuvres). Automatic N-1 simulation is running when any change of network configuration is occurred.

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

Yes ☐ No ☐

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

Additional Questions

In which cases or in which situations do you perform additional N-1 simulations?

When there are critical disconnections.

List of evidence, comments:

AUDIT PHASE

COMPLIANCE AUDIT 2014

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:

System enables additional calculations, dispatchers are obliged to use the calculations before taking relevant actions.
4.4 OH STANDARD P3-A2-S1. DETERMINATION OF THE EXTERNAL CONTINGENCY LIST AND OBSERVABILITY AREA

SELF-ASSESSMENT QUESTIONNAIRE 2013

**P3-A2-S1**

**Determination of the external contingency list and observability area.** Each TSO is required to determine the external contingency list and the external observability list related to its responsibility area. External contingency list items must be treated as normal type of contingencies in all N-1 security calculations in all time frames. Additionally exceptional contingencies (double lines, busbars) as announced by a neighbouring TSO have to be included by the TSO if it considers them very relevant for risks.

**Compliance Level:** FCo

**Additional Questions**

Do you determine the external contingency list related to your responsibility area?  
yes

Do you determine the external observability list related to your responsibility area?  
yes

Which criteria do you implement in determination of the external contingency list and the external observability list related to your responsibility area?

Missing answer from TSO.

Do you include the elements of your external observability list in the model of your security analysis?  
yes

AUDIT QUESTIONNAIRE 2014

**P3-A2-S1**

**Determination of the external contingency list and observability area.** Each TSO is required to determine the external contingency list and the external observability list related to its responsibility area. External contingency list items must be treated as normal type of contingencies in all N-1 security calculations in all time frames. Additionally exceptional contingencies (double lines, busbars) as announced by a neighbouring TSO have to be included by the TSO if it considers them very relevant for risks.

**Compliance Level:** FCo
Concise explanation and list of evidence for declared compliance level:
Bilateral agreements with EMS, CGES and HOPS; Output data from PSS / E

Do you have a mitigation plan to the standard? Yes ☐ No ☐
In case of an existing Addendum or a Non Compliance Declaration; list of evidence for a mitigation plan, comments:

Additional Questions

Do you determine the external contingency list related to your responsibility area? Yes ☒ No ☐

Do you determine the external observability list related to your responsibility area? Yes ☒ No ☐

Which criteria do you implement in determination of the external contingency list and the external observability list related to your responsibility area?
NOS BiH uses the same numerical value limits for “Contingency influence threshold” and for “Observability influence threshold”. This value is determined empirically and it is 20%. OTDF calculation from PSS / E obtained elements neighbouring system, whose outages the power flows at least one internal items changed more than 20%. Thus obtained a collection of elements neighbouring system determines external contingency list (external observability list).

Do you include the elements of your external observability list in the model of your security analysis? Yes ☒ No ☐

List of evidence, comments:
Output data from PSS / E; Model for security analysis is SEE model. Zone observability of NOS BiH is completely located in SEE region.

AUDIT PHASE

COMPLIANCE AUDIT 2014

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:
In SCADA there are all the high voltage substations including 110 kV, they have model of the first loop of neighbouring system and all substations from the SHB block. Measurements in the substations are P, Q and voltage, including state of topology.

List of evidence:
- Bilateral agreement between NOS BiH (+ Transco) and EMS, 14 April 2011 (Sporazum o vodjenju pogona i o medjusobnoj suradnji i razmjeni elektricne energije na prekograničnim dalekovodima koji povezuju elektroenergetske sustave Srbije i Bosne i Hercegovine), document is presenting external contingencies list and observability areas for NOS BiH and EMS systems.
- Bilateral agreement between NOS BiH (+ Transco) and HOPS, 12 November 2007, last update of the document is from March 2013. (Sporazum o vodjenju pogona i o medjusobnoj suradnji i razmjeni elektricne energije na prekograničnim dalekovodima koji povezuju elektroenergetske sustave Hrvatske i Bosne i Hercegovine), documents is presenting external contingencies list and observability areas for NOS BiH and HOPS systems.
- Bilateral agreement between NOS BiH (+ Transco) and CGES, 28 October 2011, (Sporazum o medjusobnoj suradnji i razmjeni elektricne energije na intekonektivnim dalekovodima koji povezuju elektroenergetske sustave Bosne i Hercegovine i Crne Gore), documents is presenting external contingencies list and observability areas for NOS BiH and CGES systems.
**4.5 OH STANDARD P3-A2-S2 IMPLEMENTATION OF OBSERVABILITY AREA**

### SELF-ASSESSMENT QUESTIONNAIRE 2013

**P3-A2-S2**

**Implementation of observability area.** The external network model corresponding to the observability area must be implemented in the SCADA system and its real-time observability by state estimator must be ensured by a proper amount of exchanged online data.

**Compliance Level:** FCo

**Additional Questions**

Are there external elements of your observability area that are not included in your SCADA/EMS model?  

Yes ☑

### AUDIT QUESTIONNAIRE 2014

**P3-A2-S2**

**Implementation of observability area.** The external network model corresponding to the observability area must be implemented in the SCADA system and its real-time observability by state estimator must be ensured by a proper amount of exchanged online data.

**Compliance Level:** FCo

Concise explanation and list of evidence for declared compliance level:

Observability area is implemented in the SCADA system and its real-time observability is ensured by state estimator and it can be seen on SCADA system.

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

Yes ☑  No ☐

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

Additional Questions

Are there external elements of your observability area that are not included in your SCADA/EMS model?  

Yes ☑  No ☐
List of evidence, comments:

Observability area is implemented in the SCADA system.

AUDIT PHASE

COMPLIANCE AUDIT 2014

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:
In SCADA there are all the substation including 110 kV, they have a model of the first loop of neighbouring system and all substations from the SHB block in their EMS. Measurements in the substations are P, Q and voltages, including the topology.

During the visit in the control room we have randomly checked the substations on different voltage levels. There are P, Q and voltage measurement in all the substations.
4.6 OH STANDARD P3-A2-S6 DATA PROVISION

SELF-ASSESSMENT QUESTIONNAIRE 2013

P3-A2-S6

Data provision. The TSO has to provide its neighbours in due time with all needed information for adequate simulations. Each TSO must provide the real-time telemetry and the network characteristics to its neighbours that is necessary for the neighbouring TSOs to have a sufficient external network model of the observability area for the state estimator and for the N-1 security calculations. This implies among others all data related to switching status, active and reactive power flows, voltage, injections and loads, tap changer position of transformers.

Compliance Level: FCo

<table>
<thead>
<tr>
<th></th>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
</tbody>
</table>

Additional Questions

- Do you provide the data requested by the neighbouring TSO in due time?
  - CGES: yes
  - HEP-OPS: yes
  - JP EMS: yes

- Do you receive the data requested from the neighbouring TSO in due time?
  - CGES: yes
  - HEP-OPS: yes
  - JP EMS: yes

AUDIT QUESTIONNAIRE 2014

P3-A2-S6

Data provision. The TSO has to provide its neighbours in due time with all needed information for adequate simulations. Each TSO must provide the real-time telemetry and the network characteristics to its neighbours that is necessary for the neighbouring TSOs to have a sufficient external network model of the observability area for the state estimator and for the N-1 security calculations. This implies among others all data related to switching status, active and reactive power flows, voltage, injections and loads, tap changer position of transformers.

Compliance Level: FCo
<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

Concise explanation and list of evidence for declared compliance level:

Real-time telemetry and the network characteristics to its neighbours can be seen on our SCADA system.

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

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

Additional Questions

Do you provide the data requested by the neighbouring TSO in due time?

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes ☒ No ☐</td>
<td>Yes ☒ No ☐</td>
<td>Yes ☒ No ☐</td>
</tr>
</tbody>
</table>

Do you receive the data requested from the neighbouring TSO in due time?

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes ☒ No ☐</td>
<td>Yes ☒ No ☐</td>
<td>Yes ☒ No ☐</td>
</tr>
</tbody>
</table>

List of evidence, comments:
Requested data is exchanged with neighbouring TSO by e-mail or/and direct contact.

**COMPLIANCE AUDIT 2014**

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:
In SCADA there are all the high voltage substation including 110 kV, they have model of the first loop of neighbouring system and all substations from the SHB block. Measurements in the substations are P, Q and voltage, including state of topology.

During the visit in the control room audit team randomly checked the neighbouring substations on 220 and 400 kV voltage levels. The metering pattern was the same as for the internal substations (P, Q and voltage measurement in all the substations).
4.7 OH STANDARD P3-A3-S2. OVERLOADS IN N-1 SITUATION (SIMULATION)

SELF-ASSESSMENT QUESTIONNAIRE 2013

P3-A3-S2

Overloads in N-1 situation (simulation). Considering the loss of a network element (N-1 situation) overloads on impacted network elements are admitted only if remedial actions are available as to get back any overloaded network element below its respective Permanent Admissible Transmission Loading PATL.

Compliance Level: FCo

Additional Questions

What type of remedial action do you use to get back an overloaded network element below its respective PATL?

Missing answer from TSO.

AUDIT QUESTIONNAIRE 2014

P3-A3-S2

Overloads in N-1 situation (simulation). Considering the loss of a network element (N-1 situation) overloads on impacted network elements are admitted only if remedial actions are available as to get back any overloaded network element below its respective Permanent Admissible Transmission Loading PATL.

Compliance Level: FCo

Concise explanation and list of evidence for declared compliance level:

Remedial actions are prepared in Procedures in real time operations in DC NOS BiH.

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

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

Additional Questions

What type of remedial action do you use to get back an overloaded network element below its respective PATL?

List of evidence, comments:
Redispatching of generations, manipulations with transformers and transmission lines.

### COMPLIANCE AUDIT 2014

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

**Explanation for the suggested compliance level:**

Inside the system of NOS BiH there are procedures provided by dispatchers, the agreement defines how to operate the system in case of emergency.

There are the following curative remedial actions available:

- internal topology change including disconnection of lines in case of overloading or voltage issues
- internal re-dispatching of generators (as allowed by grid code)
- cross border re-dispatching and topology change in order to decrease the angle for synchronisation or relief of the congestions, this is non costly measure.

NOS BiH uses both TATL and PATL, values are exchanged with Transco and are implemented in SCADA, values are changed twice a year (for winter and summer season).

**List of evidence:**

- Procedures in real time operations in DC NOS BiH, *(Tehnicki pravilnik NOS BiH, Sarajevo 6.9.2006)*
- Amendments to the previous mentioned bilateral agreements with HOPS, EMS, CGES. In these amendments there is a statement of good will of TSOs to support each other in emergency situations.
- Excel table with line parameters, including PATL and TATL
4.8 OH STANDARD P3-A3-S2.2 INSTANTANEOUS TRIPPING IN N-1 SIMULATIONS

**SELF-ASSESSMENT QUESTIONNAIRE 2013**

**P3-A3-S2.2**

**Instantaneous tripping in N-1 simulation.** It is admitted to overpass the TC of a network element after a N-1 simulation exclusively if there is no uncontrolled evolution for the overall system (no cascading tripping, no voltage collapse, no loss of synchronism). If the N-1 simulation indicates an uncontrolled evolution or cascading effects with impact outside the boundaries, preventive remedial actions are mandatory to come back to an N-1 secure situation. TSO informs its neighbours as soon as the danger of over-passing is detected and no remedial actions are available to avoid it.

**Compliance Level:** FCo

**Additional Questions**

Do you apply preventive remedial actions in case that probable instantaneous tripping in N-1 simulation leads to a cascading effect?

- Yes

**AUDIT QUESTIONNAIRE 2014**

**P3-A3-S2.2**

**Instantaneous tripping in N-1 simulation.** It is admitted to overpass the TC of a network element after a N-1 simulation exclusively if there is no uncontrolled evolution for the overall system (no cascading tripping, no voltage collapse, no loss of synchronism). If the N-1 simulation indicates an uncontrolled evolution or cascading effects with impact outside the boundaries, preventive remedial actions are mandatory to come back to an N-1 secure situation. TSO informs its neighbours as soon as the danger of over-passing is detected and no remedial actions are available to avoid it.

**Compliance Level:** FCo

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

Remedial actions are prepared in Procedures in real time operations in DC NOSBiH and in Bilateral agreements with neighbouring TSO-s.

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

- Yes ☐
- No ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidence for a mitigation plan, comments:
**Additional Questions**

Do you apply preventive remedial actions in case that probable instantaneous tripping in N-1 simulation leads to a cascading effect?

Yes ☒ No ☐

List of evidence, comments:

Change of network topology, redispaching of generations cancelation of transactions.

List of evidence: Bilateral agreements with EMS, CGES and HOPS.

---

**COMPLIANCE AUDIT 2014**

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:

NOS BiH can use trilateral preventive remedial action as agreed between NOS BiH, HOPS and CGES. There is no potential cascading in the NOS BiH system detected.

Moreover, the Defence plan is being under development and will be finished by end of 2014, it is to be made in coordination with Transco. The document will include new preventive and curative actions. So far NOS BiH has no real defence plan in place.

List of evidence:

- Letters/emails between NOS BiH, HOPS, CGES, proving that the agreement upon concrete preventive topology change was concluded in February-March 2014.
## 4.9 OH STANDARD P3-A3-S4.1 TIE-LINES OPERATION CONDITIONS

### SELF-ASSESSMENT QUESTIONNAIRE 2013

**P3-A3-S4.1**

**Tie-lines operating conditions.** The information on values of PATL, TATL or couples (TATL; Duration), overload conditions (acceptable duration of overload), and TC of tie-lines must be shared with adjacent TSOs. Mutual information must be agreed and implemented. In case of settings changes TSO has to inform the adjacent TSO on the new values.

**Compliance Level:** FCo

**Additional Questions**

Do you have a reference document with the values of PATL, TATL and TC for both sides of tie-lines agreed by both TSOs?

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

Please, describe the procedure of changing settings of PATL, TATL and TC on tie-lines?

Missing answer from TSO.

### AUDIT QUESTIONNAIRE 2014

**P3-A3-S4.1**

**Tie-lines operating conditions.** The information on values of PATL, TATL or couples (TATL; Duration), overload conditions (acceptable duration of overload), and TC of tie-lines must be shared with adjacent TSOs. Mutual information must be agreed and implemented. In case of settings changes TSO has to inform the adjacent TSO on the new values.

**Compliance Level:** FCo

Concise explanation and list of evidence for declared compliance level:

All PATL, TATL and TC values are agreed and included in Bilateral agreements.

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

Yes ☐ No ☐

In case of an existing Addendum or a Non Compliance Declaration; list of evidence for a mitigation plan.
Additional Questions

Do you have a reference document with the values of PATL, TATL and TC for both sides of tie-lines agreed by both TSOs?

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Please, describe the procedure of changing settings of PATL, TATL and TC on tie-lines?

All data in the Bilateral agreements can be changed only by mutual agreement. Initiative for change may be initiated by either side.

List of evidence, comments:

Bilateral agreements with EMS, CGES and HOPS.

COMPLIANCE AUDIT 2014

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:

All three agreements contain the relevant information regarding tie-lines conditions.

List of evidence:

- Excel table with line parameters, including PATL and TATL
- Bilateral agreement between NOS BiH (+ Transco) and EMS, 14 April 2011 (Sporazum o vodjenju pogona i o medjusobnoj suradnji i razmjeni elektricne energije na prekograničnim dalekovodima koji povezuju elektroenergetske sustave Srbije i Bosne i Hercegovine), document is presenting external contingencies list and observability areas for NOS BiH and EMS systems.
- Bilateral agreement between NOS BiH (+ Transco) and HOPS, 12 November 2007, last update of the document is from March 2013. (Sporazum o vodjenju pogona i o medjusobnoj suradnji i razmjeni elektricne energije na prekograničnim dalekovodima koji povezuju elektroenergetske sustave Hrvatske i Bosne i Hercegovine), documents is presenting external contingencies list and observability areas for NOS BiH and HOPS systems.
- Bilateral agreement between NOS BiH (+ Transco) and CGES, 28 October 2011, (Sporazum o medjusobnoj suradnji i razmjeni elektricne energije na intekonktivnim dalekovodima koji povezuju elektroenergetske sustave Bosne i Hercegovine i Crne Gore), documents is presenting external contingencies list and observability areas for NOS BiH and CGES systems.
4.10 OH STANDARD P3-A3-S4.2.2 SYNCHRONISING EQUIPMENT SETTINGS

SELF-ASSESSMENT QUESTIONNAIRE 2013

P3-A3-S4.2.2

Synchronising equipment settings. TSO is obliged to inform the neighbouring TSO about the settings of the synchronising equipment for switching supervision installed on tie-lines (voltage phase angle difference, voltage module difference, frequency difference).

Compliance Level: FCo

Additional Questions

Do you inform your neighbours about the settings of the synchronising equipment for switching supervision installed on your side of tie-lines?

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

Do you have information about the settings of the synchronising equipment for switching supervision installed on the neighbouring side of tie-lines?

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

AUDIT QUESTIONNAIRE 2014

P3-A3-S4.2.2

Synchronising equipment settings. TSO is obliged to inform the neighbouring TSO about the settings of the synchronising equipment for switching supervision installed on tie-lines (voltage phase angle difference, voltage module difference, frequency difference).

Compliance Level: FCo

Concise explanation and list of evidence for declared compliance level:

Bilateral agreements with EMS, CGES and HOPS.

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

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

Do you inform your neighbours about the settings of the synchronising equipment for switching supervision installed on your side of tie-lines?

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes ☒</td>
<td>Yes ☒</td>
<td>Yes ☒</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Do you have information about the settings of the synchronising equipment for switching supervision installed on the neighbouring side of tie-lines?

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes ☒</td>
<td>Yes ☒</td>
<td>Yes ☒</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

List of evidence, comments:

* Bilateral agreements with EMS, CGES and HOPS.

**COMPLIANCE AUDIT 2014**

Compliance Level suggestion by the audit team: SCo

Explanation for the suggested compliance level:
No evidence of direct exchange of settings between neighbouring TSOs, but NOS BiH is participating in SG SPD where they exchange information regarding synchronising equipment settings in common document. The audit team has reviewed the common ENTSO-E document which indicates probable data exchange.

List of evidence:

Audit team recommendations:
- To set up internal procedure to exchange on synchronisation equipment settings information on regular basis.
- To exchange the relevant information on synchronisation equipment settings with neighbouring TSOs as a part of operational agreements with neighbours.

Improvement plan with deadline:
During the meeting NOS BiH and Audit team have set up the Improvement Plan that consists of the first mentioned recommendation fulfilment.
Deadline: 23.5.2014
After the Improvement Plan is completed, to provide evidence back to the Audit team.
4.11 OH STANDARD P3-A3-S4.2.3 PROTECTION SYSTEM SETTING

**SELF-ASSESSMENT QUESTIONNAIRE 2013**

**P3-A3-S4.2.3**

**Protection system settings.** The settings of protection systems for tie-lines have to be co-ordinated between TSOs. Therefore TSO is obliged to inform in advance neighbouring TSOs of the settings of protection systems and of changes in operating conditions of tie lines.

**Compliance Level:** FCo

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
</tbody>
</table>

**Additional Questions**

How do you coordinate the settings of protection systems for tie-lines with neighbouring TSOs?

*Missing answer from TSO.*

**AUDIT QUESTIONNAIRE 2014**

**P3-A3-S4.2.3**

**Protection system settings.** The settings of protection systems for tie-lines have to be co-ordinated between TSOs. Therefore TSO is obliged to inform in advance neighbouring TSOs of the settings of protection systems and of changes in operating conditions of tie lines.

**Compliance Level:** FCo

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Compliance Level:**

Concise explanation and list of evidence for declared compliance level:

Bilateral agreements with EMS, CGES and HOPS.

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

Yes □ No □

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

How do you coordinate the settings of protection systems for tie-lines with neighbouring TSOs?

In part of Bilateral agreement with neighbouring TSO is given complete setting of protection systems and it is checked within TSO-s personnel periodically or when some change in settings is performed by each TSO.

List of evidence, comments:

Bilateral agreements with EMS, CGES and HOPS.

COMPLIANCE AUDIT 2014

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:

The agreements with all three neighbouring TSOs contain the relevant information regarding Protection system settings.

List of evidence:

- Bilateral agreement between NOS BiH (+ Transco) and EMS, 14 April 2011 (Sporazum o vodjenju pogona i o medjusobnoj suradnji i razmjeni elektricne energije na prekogranicnim dalekovodima koji povezuju elektroenergetske sustave Srbije i Bosne i Hercegovine), document is presenting external contingencies list and observability areas for NOS BiH and EMS systems.
- Bilateral agreement between NOS BiH (+ Transco) and HOPS, 12 November 2007, last update of the document is from March 2013. (Sporazum o vodjenju pogona i o medjusobnoj suradnji i razmjeni elektricne energije na prekogranicnim dalekovodima koji povezuju elektroenergetske sustave Hrvatske i Bosne i Hercegovine), documents is presenting external contingencies list and observability areas for NOS BiH and HOPS systems.
- Bilateral agreement between NOS BiH (+ Transco) and CGES, 28 October 2011, (Sporazum o medjusobnoj suradnji i razmjeni elektricne energije na intekonektivnim dalekovodima koji povezuju elektroenergetske sustave Bosne i Hercegovine i Crne Gore), documents is presenting external contingencies list and observability areas for NOS BiH and CGES systems.
4.12 OH STANDARD P3-A4-S5 PREPARATION OF REMEDIAL ACTIONS IN THE OPERATIONAL PLANNING STAGE

SELF-ASSESSMENT QUESTIONNAIRE 2013

P3-A4-S5

Preparation of remedial actions in the operational planning stage. Preventive and curative remedial actions are due to be prepared in the operational planning stage.

Compliance Level: FCo

No Additional Questions

AUDIT QUESTIONNAIRE 2014

P3-A4-S5

Preparation of remedial actions in the operational planning stage. Preventive and curative remedial actions are due to be prepared in the operational planning stage.

Compliance Level: FCo

Concise explanation and list of evidence for declared compliance level:

Compliance Level: FCo from P3-A4-S5.1 to P3-A4-S5.4 ⃝ FCo for P3-A4-S5

List of evidence: Bilateral agreements with EMS, CGES and HOPS; Annual Maintenance program for SEE region, Monthly Maintenance program for NOS BiH, Weekly teleconference-WOPT, DACF forecast files; PSS/E output analysing data of remedial actions between TSO’s.

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

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

COMPLIANCE AUDIT 2014

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:

Inside the system of NOS BiH there are procedures provided by dispatchers, the agreement defines how to operate the system in case of emergency.

There are the following curative remedial actions available:

- internal topology change including disconnection of lines in case of overloading or voltage
issues

- internal re-dispatching of generators (as allowed by grid code)
- cross border re-dispatching and topology change in order to decrease the angle for synchronisation or relief of the congestions, this is non costly measure.

NOS BiH can use trilateral preventive remedial action as agreed between NOS BiH, HOPS and CGES.

There is no potential cascading in the NOS BiH system detected.

Moreover, the Defence plan is being under development and will be finished by end of 2014, it is to be made in coordination with Transco. The document will include new preventive and curative actions. So far NOS BiH has no real defence plan in place.

List of evidence:

- Procedures in real time operations in DC NOSBiH, (Tehnicki pravilnik NOS BiH, Sarajevo 6.9.2006)
- Amendments to the previous mentioned bilateral agreements with HOPS, EMS, CGES. In these amendments there is a statement of good will of TSOs to support each other in emergency situations.
- Letters/emails between NOS BiH, HOPS, CGES, proving that the agreement upon concrete preventive topology change was concluded in February-March 2014.
- Email correspondence between Milan Jovovic and Aldin Mesanovic (NOS BiH) and HE Dubrovnik on 27 February 2014 till 4 March.
4.13 OH STANDARD P3-A4-S5.1

SELF-ASSESSMENT QUESTIONNAIRE 2013

P3-A4-S5.1

Remedies are prepared pursuant to the time horizons they are detected: from year ahead, to week ahead and till day ahead.

Compliance Level: FCo

No Additional Questions

AUDIT QUESTIONNAIRE 2014

P3-A4-S5.1

Remedies are prepared pursuant to the time horizons they are detected: from year ahead, to week ahead and till day ahead.

Compliance Level: FCo

Concise explanation and list of evidence for declared compliance level:

- NOS BiH applies remedial actions through preparing yearly, monthly and weekly maintenance scheduling program (including weekly teleconference-WOPT), and through DACF forecast models.
- List of remedial actions is compliant between TSO’s in bilateral agreements.

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

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

COMPLIANCE AUDIT 2014

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:

Explanation are in the standard P3-A4-S5.
4.14 OH STANDARD P3-A4-S5.2

SELF-ASSESSMENT QUESTIONNAIRE 2013

P3-A4-S5.2

These remedial actions (preventive/curative) have to be previously assessed by numerical simulations in order to evaluate the efficiency of those measures on the constraints.

Compliance Level: FCo

No Additional Questions

AUDIT QUESTIONNAIRE 2014

P3-A4-S5.2

These remedial actions (preventive/curative) have to be previously assessed by numerical simulations in order to evaluate the efficiency of those measures on the constraints.

Compliance Level: FCo

Concise explanation and list of evidence for declared compliance level:

NOS BiH performs numerical calculation for special situation simulations in power system when remedial action is needed.

List of evidence: PSS/E output analysing data of remedial actions between TSO’s.

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

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

COMPLIANCE AUDIT 2014

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:

Explanation are in the standard P3-A4-S5.

List of evidence:

- Concrete example of remedial action calculation was shown, done in PSS/E.
4.15 OH STANDARD P3-A4-S5.3

SEF-ASSESSMENT QUESTIONNAIRE 2013

P3-A4-S5.3

The remedial actions applied by a TSO with possible influence abroad must be checked between all TSOs of the same region in order to prevent counter-effects to neighbouring networks. Additional simulations have to be executed.

Compliance Level: FCo

Additional Questions

How are remedial actions with possible influence abroad checked between all TSOs of your region(s) before applied by the TSO(s), in the different time frames?

Missing answer from TSO.

AUDIT QUESTIONNAIRE 2014

P3-A4-S5.3

The remedial actions applied by a TSO with possible influence abroad must be checked between all TSOs of the same region in order to prevent counter-effects to neighbouring networks. Additional simulations have to be executed.

Compliance Level: FCo

Concise explanation and list of evidence for declared compliance level:

NOS BiH applies remedial actions with neighbour TSO’s in accordance with Bilateral agreements. List of evidence: Bilateral agreements with EMS, CGES and HOPS.

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

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

Additional Questions

How are remedial actions with possible influence abroad checked between all TSOs of your region(s) before applied by the TSO(s), in the different time frames?
Checking of remedial action is performed in accordance with Bilateral agreements and Policy 4.

List of evidence, comments:

- Bilateral agreements with EMS, CGES and HOPS.

---

**COMPLIANCE AUDIT 2014**

Compliance Level suggestion by the audit team: FCo

**Explanation for the suggested compliance level:**
Communication is done by email with all neighbouring TSOs. Possible influence on neighbouring TSOs is checked on DACF files.

List of evidence:
- Bilateral agreements with all neighbouring TSOs.
- An example of email correspondence for remedial actions between EMS, CGES and HOPS.
- Email correspondence between Milan Jovovic and Aldin Mesanovic (NOS BiH) and HE Dubrovnik on 27 February 2014 till 4 March.
4.16 OH STANDARD P3-A4-S5.4

SELF-ASSESSMENT QUESTIONNAIRE 2013

P3-A4-S5.4

The remedial actions with possible influence abroad have to be agreed by the neighbouring TSOs in advance. Therefore information between TSOs is due to be exchanged without any delay as soon as a problem is detected for the real time operation.

Compliance Level: FCo

<table>
<thead>
<tr>
<th>CGES</th>
<th>HEP-OPS</th>
<th>JP EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCo</td>
<td>FCo</td>
<td>FCo</td>
</tr>
</tbody>
</table>

No Additional Questions

AUDIT QUESTIONNAIRE 2014

P3-A4-S5.4

The remedial actions with possible influence abroad have to be agreed by the neighbouring TSOs in advance. Therefore information between TSOs is due to be exchanged without any delay as soon as a problem is detected for the real time operation.

Compliance Level: FCo

<table>
<thead>
<tr>
<th>CGES: FCo</th>
<th>HEP-OPS: FCo</th>
<th>JP EMS: FCo</th>
</tr>
</thead>
</table>

Concise explanation and list of evidence for declared compliance level:

Verification of remedial action is performed in accordance with bilateral agreements and Policy 4.
List of evidence: Bilateral agreements with EMS, CGES and HOPS.

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

In case of an existing Addendum or a Non Compliance Declaration; list of evidence for a mitigation plan, comments:
COMPLIANCE AUDIT 2014

Compliance Level suggestion by the audit team: FCo

Explanation for the suggested compliance level:

Communication is done by email with all neighbouring TSOs. Possible influence on neighbouring TSOs is checked on DACF files.

List of evidence:

- Bilateral agreements with all neighbouring TSOs.
- An example of email correspondence for remedial actions between EMS, CGES and HOPS.
- Email correspondence between Milan Jovovic and Aldin Mesanovic (NOS BiH) and HE Dubrovnik on 27 February 2014 till 4 March.
- Email correspondence regarding high voltage issues on 400 kV grid, communication between NOS BiH, HOPS and EMS between 7 and 11 April 2014.

Audit team recommendation:

- To set up multilateral procedures for the issues that appear on regular basis (like high voltage problems…)
- To start with regional Daily Operational Planning Conferences (DOPT) based on DACF results.
5 PROGRESS CHECK ON FINDINGS FROM 2010 ONSITE AUDIT- POLICY 8

In this chapter all standards that were not fully compliant during the 2010 audit on Policy 8 are listed, a sub chapter per standard. The TSO is requested to fill in the current situation on the standard. This will be discussed during the audit with the audit team and will be part of reporting of the audit team.

5.1 OH STANDARD P8-A-R1 – TRAINING PROGRAM

<table>
<thead>
<tr>
<th>P8-A-R1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Training program.</strong> Each TSO provides its dispatchers with a structured training program that is designed to develop and improve their skills. This program includes initial and continuous parts. The training has to be permanently adapted to the operational evolutions. All the issues of the training have to be regularly checked and updated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compliance Level: SC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actions taken to reach compliance:</strong></td>
</tr>
<tr>
<td>We have Dispatcher Training Simulator-DTS but it is not in function yet. We are planning to put it in function very soon.</td>
</tr>
</tbody>
</table>

| Deadline: 12/2010 |

Findings of Audit team in 2010

Good command of English is a recruitment requirement for all dispatcher candidates. All dispatchers are able to handle all tasks in the control centre. Every shift has a designated leader. Dispatcher has to have two years of dispatching experience before he can act as shift leader in the control room.

ISO BiH provided initial training program for Nenad Čavarkapa, Muris Bakalović, Eldin Rizvanović, “TRAINING PROGRAM OF ENGINEERS FOR SYSTEM MANAGEMENT IN REAL TIME CANDIDATES-EMPLOYED IN ISO B&H DC” which consist of almost all required actions by P8-A-G2. ISO BiH DTS is currently not in operation, but they train their people with load flow / dynamics programs. The program was signed by Senad Hadžić on 15.1.2009. ISO BiH also showed older versions of initial program approval “Program obuke operativnih dispecera – pripravnika uposlenih u DC NOS BiH” by Omer Hadzic (General Manager of ISO BiH) on February in 2006. ISO BiH provided plenty of evidence with signature for occurred initial training for above mentioned dispatcher candidates. Initial training was finished with an exam which is signed by Senad Hadžic on 15.12.2009.

ISO BiH does not have a written procedure for continuous training, They informed the audit team that each dispatcher has to participate to continuous training at least once a year and they also organise training courses on need basis for all dispatchers.

New mark for quality of explanation: a
New mark for list of references: \textit{b (initial program) / e (continuous program)}

Compliance level: \textit{SC}

Remark: Written general procedure for initial and continuous training programs and checks for their validity in regular intervals.

Improvement/mitigation plan with deadline (if needed): Written procedure for continuous program will be prepared till March 2011.

\textbf{NOS BiH current process description and improvements made since 2010:}

DTS is still not in full function. We have ongoing activities with experts from SIEMENS regarding training our stuff for full implementation of DTS in NOS BiH. Procedure for continuous program has been prepared within the time.

List of evidence: Initial and continuous training program for dispatcher Bojan Krajina No:2458/11 date:05.09.2011. Another examples are: continuous program for all dispatchers 22.12.2010, Intraday change of daily schedule, or ENTSO E wide Awareness System 29.10.2013. Corresponding letter from SIEMENS.

\textbf{Audit team comment:}

NOS BiH provides dispatcher with training on new issues that are needed and defined ad-hoc. Besides trainings that are defined ad-hoc, audit team recommends to establish regular schedules of continuous training of dispatchers in order to keep sufficient level of skill, as example EMS/SCADA calculations and study mode analysis.

List of evidence:
- Initial and continuous training program for dispatcher Bojan Krajina No:2458/11 date:05.09.2011, signed by Senad Hadzic, Head of realtime operation department.
- Corresponding letter from SIEMENS. NOS BiH has an agreement with SIEMENS for training of dispatchers, NOS BiH expressed strong need for the training of the trainer, which will be able to train operators on DTS (letter to SIEMENS 25 March 2014 – SCADA/EMS and telecommunication System Project in BiH, contract number TEPRP-ZEKC PT-01/04)
5.2 OH STANDARD P8-A-R2 – INITIAL PROGRAM

**P8-A-R2.**

**Initial program.** The initial program consists of a theoretical part and on-the-job part complemented by simulator sessions.

**Compliance Level:** SC

**Actions taken to reach compliance:**

We have to include simulator sessions in the Initial program.

**Deadline:** 12/2010

**Explanation of the declared compliance level:**

We have theoretical and on-the-job part, but do not have simulator sessions in the Initial program.

**Findings of Audit team in 2010**

Does the TSO have evidences to confirm self-assessment?

Finding: ISO BiH provided initial training program for Nenad Čavarkapa, Muris Bakalović, Eldin Rizvanović, “TRAINING PROGRAM OF ENGINEERS FOR SYSTEM MANAGEMENT IN REAL TIME CANDIDATES-EMPLOYED IN ISO B&H DC” which consist of almost all required actions by P8-A-G2. ISO BiH DTS is currently not in operation, but they train their people with load flow / dynamics programs. The program was signed by Senad Hadžić on 15.1.2009. ISO BiH also showed older versions of initial program approval "PROGRAM OBUKE OPERATIVNIH DISPECERA – PRIPRAVNIKA UPOLENIH U DC NOS BiH" by Omer Hadzic on February in 2006. ISO BiH provided plenty of evidence with signature for occurred initial training for above mentioned dispatcher candidates. Initial training was finished with an exam which is signed by Senad Hadzic on 15.12.2009.

New mark for quality of explanation: a

New mark for list of references: b

**Compliance level:** SC

**Remark:** Initial program up to date and implementation of DTS training.

**Improve**ment/mitigation plan with deadline (if needed): DTS will be put in operation till the end of 2011.

**NOS BiH current process description and improvements made since 2010:**

DTS is not put in operation by deadline, but we have ongoing activities with experts from SIEMENS regarding training our stuff for full implementation of DTS in NOS BiH.
Audit team comment:

Despite having implemented Initial program, NOS BiH has no DTS in place at the moment. SIEMENS provided new offer for DTS, which is valid by 15.5.214 and is planned to be implemented by end of 2014.

List of evidence:
- Official written offer from SIEMENS regarding new DTS system, 405-SG-EA-101/143, date 17.4.2014.
## 5.3 OH STANDARD P8-A-R3 – CONTINUOUS PROGRAM

<table>
<thead>
<tr>
<th>P8-A-R3.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Continuous program.</strong> The continuous program is applied to all dispatchers as soon as they are certified and nominated to a dispatcher position. The main aim of the continuous program is to keep and extend the dispatchers’ knowledge and competences. The continuous program is established to complement the initial program with advanced theoretical parts; learning of new rules and procedures; additional simulator sessions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compliance Level: SC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actions taken to reach compliance:</strong></td>
</tr>
<tr>
<td>We need to put in function DTS to reach Full compliance.</td>
</tr>
<tr>
<td><strong>Deadline:</strong> 12/2010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explanation of the declared compliance level:</th>
</tr>
</thead>
<tbody>
<tr>
<td>We do not provide additional simulator sessions. To reach the full compliance we need to put in function Dispatcher Training Simulator - DTS.</td>
</tr>
</tbody>
</table>

**NOS BiH current process description and improvements made since 2010:**

**Does the TSO have evidences to confirm self-assessment?**

Finding: ISO BiH does not have a written procedure for continuous training. They informed the audit team that each dispatcher has to participate to continuous training at least once a year and they also organise training courses on need basis for all dispatchers.

New mark for quality of explanation: a

New mark for list of references: e

**Compliance level: SC**

**Remark:** Written procedure for continuous program and implementation of DTS training.

**Improvement/mitigation plan with deadline (if needed):** Written procedure for continuous program will be prepared till March 2011 and DTS implementation is expected till the end 2011.

**NOS BiH current process description and improvements made since 2010:**

Written procedure for continuous program are prepared, but DTS is still not in full function. Examples for continuous program for all dispatchers: 29.10.2013. ENTSO E wide Awareness System.

**COMPLIANCE AUDIT 2014**

**Audit team comment:**

Despite having implemented continuous program, NOS BiH has no DTS in place at the moment.
SIEMENS provided new offer for DTS, which is valid by 15.5.214 and is planned to be implemented by end of 2014.

List of evidence:
- Official written offer from SIEMENS regarding new DTS system, 405-SG-EA-101/143, date 17.4.2014.

Audit team recommendation:
- To establish regular schedules of continuous training of dispatchers in order to keep sufficient level of skill, as example Study mode analysis.

### 5.4 OH STANDARD P8-A-S1 – TRAINING PROGRAMS

#### P8-A-S1.

**Training programs.** The initial and continuous program has to consider the relevant parts of the UCTE Operation Handbook and mutual agreements between TSOs. Each TSO defines its specific requirements for the initial program and the continuous program and their duration.

**Compliance Level:** SC

**Actions taken to reach compliance:**

**Deadline:** 12/2010

**NOS BiH current process description and improvements made since 2010:**

Finding: Does the TSO have evidences to confirm self-assessment?

Finding: ISO BiH provided initial training program for Nenad Čavarkapa, Muris Bakalović, Eldin Rizvanović, “TRAINING PROGRAM OF ENGINEERS FOR SYSTEM MANAGEMENT IN REAL TIME CANDIDATES-EMPLOYED IN ISO B&H DC” which consist of almost all required actions by P8-A-G2. ISO BiH DTS is currently not in operation, but they train their people with load flow / dynamics programs. The program was signed by Senad Hadžić on 15.1.2009. ISO BiH also showed older versions of initial program approval “PROGRAM OBUKE OPERATIVNIH DISPECERA – PRIPRAVNIKA UPOLENIH U DC NOS BiH” by Omer Hadzic (General Manager of ISO BiH) on February in 2006. ISO BiH provided plenty of evidence with signature for occurred initial training for above mentioned dispatcher candidates. Initial training was finished with an exam which is signed by Senad Hadzic on 15.12.2009.

ISO BiH does not have a written procedure for continuous training, they informed the audit team that each dispatcher has to participate to continuous training at least once a year and they also organise training courses on need basis for all dispatchers.

New mark for quality of explanation: a

New mark for list of references: b (initial program) / e (continuous program)

**Compliance level:** SC

**Remark:** Written general procedure for initial and continuous training programs and checks for their validity in regular intervals. Also DTS training should be implemented for initial and continuous training.
Improvement/mitigation plan with deadline (if needed): Written procedure for continuous program will be prepared till March 2011 and DTS implementation is expected till the end 2011.

**NOS BiH current process description and improvements made since 2010:**

- Written procedure for continuous program are prepared, but DTS is still not in full function.

---

**COMPLIANCE AUDIT 2014**

**Audit team comment:**

NOS BiH showed Initial program including knowledge of OH and agreements. Subjects of OH and agreements are not part of continuous training.

**List of evidence:**

- Initial and continuous training program for dispatcher Bojan Krajina No:2458/11 date:05.09.2011, signed by Senad Hadzic, Head of realtime operation department.

**Audit team recommendation:**

- To establish regular schedules of continuous training of dispatchers in order to keep sufficient level of skills, in this case regarding OH and bilateral agreements with neighbouring TSOs. Can be managed with Workshops attended by dispatchers.
## 5.5 OH STANDARD P8-A-S2 – TSO REFERENCE LIST OF ENGLISH TECHNICAL TERMS

### P8-A-S2.

**TSO reference list of English technical terms.** Each TSO makes available a reference list of technical terms in English with translation to the mother language of dispatchers for operation and for training based on the existing UCTE reference list (see Appendix 8).

**Compliance Level:** SC

### NOS BiH current process description and improvements made since 2010:

**Does the TSO have evidences to confirm self-assessment?**

Finding: ISO BiH provided document “Medjunarodni elektrotehnicki recnik” (1988) which contained translations of technical terms to French, English, Russian and German with detailed explanations per term. The document can be found in the control room of ISO BiH.

New mark for quality of explanation: a

New mark for list of references: b

**Compliance level:** SC

**Remark:** Remake the current document to match with meaning of this standard. Reference list has to be done in a way, that technical term in English is translated to mother language (opposite way is using at this time). Reference list of English technical terms has to be based on the Appendix 8 of RGCE OH. Check that document is available for dispatchers.

**Improvement/mitigation plan with deadline (if needed):** Appendix 8 is to be translated till the end of October 2010.

### NOS BiH current process description and improvements made since 2010:

Appendix 8 has been translated till the end of October 2010. List of reference: Appendix 8, No:04-3177/10, date:01.11.2010.

### COMPLIANCE AUDIT 2014

**Audit team comment:**

ISO BiH provided document “Appendix 8 - Terminology, October 2010” which contained translations of technical terms from English. The document can be found in the control room of ISO BiH.
### 5.6 OH STANDARD P8-C-S2 – ORGANIZATION

**P8-C-S2.**  
**Organization.** The training coordination manager determines appropriate procedures for the training organization. These procedures shall cover: a description of the dispatchers required qualifications (knowledge and skills); a reference list of topics for training programs linked to the dispatchers required qualification; the processes for the initial and continuous programs including scripts/documents; of the theoretical sessions, time-schedules, supervision, tools, support for trainees, evaluation/validation and continuous improvement of the programs, the process of dispatchers accreditation; trainers selection and training of trainers.

**Compliance Level:** SC  
**Actions taken to reach compliance:**

**Deadline:** 12/2010

**NOS BiH current process description and improvements made since 2010:**

Does the TSO have evidences to confirm self-assessment?

FInding: ISO BiH has not nominated training coordination manager, but the list of tasks is partially covered by various bodies and people of ISO BiH.

New mark for quality of explanation: a  
New mark for list of references: e  
Compliance level: SC  
Remark: Nominated training coordination manager should fulfil all requirements of the standard.

Improvement/mitigation plan with deadline (if needed): Training coordination manager will be nominated till March 2011.

**NOS BiH current process description and improvements made since 2010:**

Training coordination manager is main dispatcher and he makes procedures for the training organization.

---

**Audit team comment:**

Training coordination manager is head of operation department (Senad Hadzic) in the same time and he makes procedures for the training organization.
5.7 OH STANDARD P8-C-S1 – COMMON TRAINING

P8-B-S1.

Common training. Each TSO implements at least one of the four actions defined in guidelines P8-B-G3 to improve communication and coordinated measures between neighbouring TSO dispatchers. The actions taken have to be chosen depending on the mutual level of risks for secure system operation with the first (or further) neighbouring TSO.

Compliance Level: SC

Actions taken to reach compliance:

Deadline: 12/2010

NOS BiH current process description and improvements made since 2010:

Does the TSO have evidences to confirm self-assessment?

Finding: ISO BiH provided email exchange on arranged common training and workshops. They also presented agendas, presentations and actual expense reports for past workshops. Inter-TSO workshops are arranged once per year with each neighbouring TSO according to ISO BiH.

New mark for quality of explanation: a

New mark for list of references: b

Compliance level: FC

Remark: Written basic plan for Inter-TSO experience exchange for dispatchers. Workshops and conferences should have “minutes”.

Improvement/mitigation plan with deadline (if needed):

NOS BiH current process description and improvements made since 2010:

Training coordination manager is main dispatcher and he makes procedures for the training organization. Evidence: Common training NOS BiH and CGES dispatchers No:42/2014, date: 14.01.2014 and Isolated operation of HPP Mostarsko Blato, No: 151/13, date: 13.02.2013.

COMPLIANCE AUDIT 2014

Audit team comment:

List of evidence:

- Invitation to NCC dispatchers workshop 7-10.2013, in Serbia (email correspondence from 10 September 2013)
- Invitation to training of dispatchers of CGES and NOS BiH (email correspondence from 14.1.2014)
- Invitation to training of dispatchers for EAS system in Prague (email correspondence from
5.8 OH STANDARD P8-C-S6 – Training of Trainers

Training of trainers. Depending on education and previous experience, an individual training program is defined for each trainer; it can be provided by internal sessions or by outsourced training sessions.

Compliance Level: SC

Actions taken to reach compliance:

Deadline: 12/2010

NOS BiH current process description and improvements made since 2010:

Does the TSO have evidences to confirm self-assessment?

Finding: ISO BiH does not have a procedure for training of trainers. ISO BiH cleared out that trainers participate to CIGRE meetings and also some of the trainers are university professors.

New mark for quality of explanation: b

New mark for list of references: missing

Compliance level: NC

Remark: Create a written procedure for training of trainer’s

Improvement/mitigation plan with deadline (if needed): Procedure will be created till the July 2011.

NOS BiH current process description and improvements made since 2010:

We still don’t have a written procedure for training of trainer’s. We still don’t have a professional position trainers but employees who have been selected for training of dispatchers. They are trained mainly in workshops ENTSO-E. List of evidence: ENTSO E wide Awareness System 29.10.2013.

COMPLIANCE AUDIT 2014

Audit team comment:

NOS BiH started to attend regularly ENTOS-E academy (members are Adnan Carsimamovic and Bojan Zecevic).
6 CONCLUSIONS

At the beginning the audit team had an hour and a half long visit in the National Control Centre, which helped the audit team to understand better the organisation and processes in the system of NOS BiH. Presentation of installed SCADA/EMS with demonstration of online and offline calculations was the significant part of this visit.

The Audit Team audited 16 standards/sub-standards. The Audit Team found that NOS BiH is FCo with 14 standards and SCo with 2 standards. One standard was downgraded to SCo and one standard was upgraded to FCo according to the answers declared in the Compliance Monitoring Self-Assessment campaign 2013.

NOS BiH estimates that their staff needed about 100 man hours per each person in the team (6 of them) for the preparation of the compliance audit.

NOS BiH was well prepared for the audit. A lot of the documents considered as evidence were available during the audit. All these documents were a good basis for proving the compliance level of NOS BiH with the audited standards. NOS BiH has quite well updated operation agreements, what is evidence of sufficient cooperation with all neighbours. Requests for additional material were promptly met by NOS BiH.

In the case of this Compliance Audit, all preconditions for a successful audit were fulfilled and the Audit Team wishes to express its gratitude to the NOS BiH staff involved in the Audit and the company management.

The recommendations by Audit team to NOS BiH for Policy 3:

P3-A1-S3.3
- To improve data quality to reach convergency of the grid model.
- Dispatchers to be more familiar with EMS/SCADA functionalities (contingency analysis…) and should be trained regularly to be more efficient on these kind of studies.
- To implement neighbouring network in their model to be able to use in study mode.

P3-A3-S4.2.2
- To set up internal procedure to exchange on synchronisation equipment settings information on regular basis.
- To exchange the relevant information on synchronisation equipment settings with neighbouring TSOs as a part of operational agreements with neighbours.

P3-A4-S5.4
- To start with regional Daily Operational Planning Conferences (DOPT) based on DACF results.
- Set up internal procedure to exchange on operational information on regular basis.
- To set up multilateral procedures for the issues which appear on regular basis (like high voltage problems…)
- To do more calculations also in operational planning stage and to be more familiar with simulation results with aim to be aware of risks. .

The Audit Team also checked the progress related to Policy 8 done by NOS BiH from Compliance Audit in 2010. NOS BiH was able to prove at least particular progress in each of 8 checked standards. Based on results of Compliance Audit in 2010 NOS BiH worked out the training programs for its dispatchers and they appointed Training Coordination Manager. The dispatchers of NOS BiH started to take part in common training as well – they participated in the international workshops. The trainers of NOS BiH dispatchers participate in ENTSO-E Academy in order to deepen their knowledge.
Although NOS BiH made the obvious progress in last 4 years, one important lack of compliance remains: training of dispatchers in NOS BiH is not complemented by DTS sessions. This situation is bound to be changed after NOS BiH implements their own DTS, till the end of 2014 is expected.

The recommendations by Audit team to NOS BiH for Policy 8:

P8-A-R3
- To establish regular schedules of continuous training of dispatchers in order to keep sufficient level of skill, as example Study mode analysis.

P8-A-S1
- To establish regular schedules of continuous training of dispatchers in order to keep sufficient level of skills, in this case regarding OH and bilateral agreements with neighbouring TSOs. Can be managed with Workshops attended by dispatchers.
7 SIGNATURE PAGE

ENTSO-E Audit Team Members:

Martin Rehacek (Audit Team Leader)

Martin Jedinak (Audit Team Member)

Yiannis Tolias (Audit Team Member)

Jaka Zvab (Compliance monitoring Advisor)

Date and Place: 09.05.2014, Brussels, Belgium