

AMENDMENT No. 2

to the

Contract Agreement No BIDSF-020-02-01-00

Substation Bystričany – transformation 400/110 kV, Substation Horná Ždaňa – enlargement, Substation Križovany – enlargement

**Financed by Bohunice International Decommissioning Support Fund (BIDSF),
administered by the European Bank for Reconstruction and Development (EBRD)**

This Amendment No. 2 to the Contract made between:

Slovenská elektrizačná prenosová sústava, a.s.

*Mlynské nivy 59/A,
824 84 Bratislava,
Slovak Republic*

IČO: 35 829 141
Tax-No.: 2020261342
VAT reg. No.: SK2020261342
Bank: Tatra banka, a.s., IBAN: SK30 1100 0000 0026 2019 1900
SWIFT: TATRSKBX
Statutory body: Board of Directors, represented by:
Ing. Miroslav Obert, Chairman of Board of Directors
Ing. Miroslav Stejskal, Vice-chairman of Board of Directors
Registered: in the Commercial Register of Bratislava I District Court, Section: Sa, Insert No.:
2906/B

Person responsible to negotiate the technical issues: Mr. Ľubomír Maco

Person responsible to negotiate the contractual issues: Mrs. Anna Szer the successor of Mr Robert Vehner and Mr Juraj Došek

(hereinafter called "the Employer") of the one part
and

Association SPIE Elektrovod, a.s. – Alter Energo, a.s.

Head of the Association:

*SPIE Elektrovod, a.s.
Prievozska 4C,
824 66 Bratislava 26,
Slovak Republic*

IČO: 36 863 513
Tax-No.: 2022840127
VAT reg. No.: SK2022840127
Bank: Tatra banka, a.s., IBAN: SK26 1100 0000 0026 2004 0555
SWIFT: TATRSKBX
Statutory body: Board of Directors, represented by:
Ing. Karol Slaninka, Member of Board of Directors
Ing. Milan Ferenc, PhD., Member of Board of Directors
Registered: in the Commercial Register of Bratislava I District Court, Section: Sa, Insert No.:
5058/B

(hereinafter called "the Contractor") of the other part.

Whereas:

- (A) The omission of Contract Number and title needs to be rectified by incorporation of the omitted information into the Contract;
- (B) The Employer has appointed Mrs. Anna Szer as a successor of Mr Robert Vehner introduced through the Amendment No 1 which was a successor of Mr Juraj Došek;
- (C) The Engineer made determinations regarding Variations to the Contract, namely:
 - i. Variation Order No. 2 resulting from inadequate DDT: by email dated 13 April 2017, the Contractor informed the Employer regarding irregularities occurred during construction of SO681 Temporary Access road found after Static and Dynamic geotechnical measurements;
 - ii. Variation Order No. 4.2 resulting from Changes to the Employer's Requirements: by letter dated 10 July 2017, the Employer informed the Contractor regarding the update of its operating procedures and requested the Contractor to adapt the distance protection equipment contracted;
 - iii. Variation Order No. 5 resulting from inadequate DDT: by email dated 26 September 2017, the Contractor informed the Employer about unforeseen soil condition (occurrence of wandering streams);
 - iv. Variation Order No. 8 resulting from inadequate DDT: following Progress Meeting conducted on 8 August 2017, the Employer has changed significant parameters in part of the DDI – PS07 400kV Switchyard Gantry in order to ensure safety aspects;
 - v. Variation Order No. 12 resulting from inadequate DDT: by email dated 13 December 2017, the Contractor informed the Employer about unforeseen inadequate underlying soil condition (rock foundation) during construction of SO522 400kV switchyard foundations and after repeating the geological survey in the designated area;
 - vi. Variation Order No. 13 resulting from the need to unify the Busbar Differential Protection: during the Progress Meeting conducted on 13 March 2018, the Contractor informed the Employer that ABB has terminated the manufacture of the Busbar Differential Protection (BDP) type REB500 v5.02.
- (D) The necessary changes resulting from the above issues need to be incorporated into the Contract provisions.

The Employer and the Contractor agree to amend the Contract through the Amendment No. 2 as follows:

- 1. In this Amendment No. 2 words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
- 2. This Amendment No. 2 shall supersede the Amendment No. 1 and the Contract Agreement.
- 3. The Contract Agreement shall be amended as follows:
 - 3.1 The following text "*Contract Agreement*" shall be deleted and replaced by "*Contract Agreement: No BIDSF-020-02-01-00 Substation Bystričany – transformation 400/110 kV, Substation Horná Ždaňa – enlargement, Substation Križovany – enlargement*" in the title of the contract Agreement.
 - 3.2 The following text "*the successor of Mr Robert Vehner and Mr Juraj Došek*" shall be included after "*Person responsible to negotiate the contractual issues: Mrs. Anna Szer*" in the first paragraph that provides details of the Employer.
 - 3.3 In article 2 delete the words:
 - “(a) *Amendment No. 1,*
 - “(b) *The Contract Agreement,*
 - “(c) *The Letter of Acceptance, dated 20 December 2016,*

- (d) *The Letter of Tender, dated 23 September 2016,*
- (e) *The Particular Conditions of Contract,*
- (f) *The General Conditions of Contract,*
- (g) *The Employer's Requirements,*
- (h) *The completed Price Schedules, Data Sheets and Schedules of Requirements,*
- (i) *The Contractors Tender with Appendices."*

and replace them with words:

- "(a) *Amendment No. 2 including Annex 1, Annex 2 and Annex 3 to Amendment No. 2,*
- (b) *Amendment No. 1,*
- (c) *The Contract Agreement,*
- (d) *The Letter of Acceptance, dated 20 December 2016,*
- (e) *The Letter of Tender, dated 23 September 2016,*
- (f) *The Particular Conditions of Contract,*
- (g) *The General Conditions of Contract,*
- (h) *The Employer's Requirements,*
- (i) *The completed Price Schedules, Data Sheets and Schedules of Requirements,*
- (j) *The Contractors Tender with Appendices."*

3.4. Delete text of article 4 and replace with the following text:

"The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein the amount of:

14 290 647,13 EUR

(fourteen million two hundred and ninety thousand six hundred and forty seven Euros and thirteen Cents)

or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract. VAT and other taxes shall not be paid on the funds originating from BIDSF funds."

4. Particular Conditions of Contract shall be amended as follows:

4.1. in Sub-clause 14.4 add the following before the last paragraph:

"The Contractor is entitled to raise an itemised invoice and request payment of the completed variations after formal contract amendment incorporating those variations and pertinent details is signed by both parties"

5. Employer's Requirements shall be supplemented with the following:

"The Approved Variations to the Contract, as provided in Annex 1 to Amendment No. 2 "Engineer's Determinations"; in Annex 2 to Amendment No. 2 "List of Approved Variations to the Contract, series I" and Annex 3 to Amendment No. 2 "The approved Variations to the Contract, series I" shall be duly be incorporated into the Employers Requirements and shall supersede respective provisions provided therein."

6. The completed Price Schedules, Data Sheets and Schedules of Requirements shall be supplemented with the following:

"The Approved Variations to the Contract, as provided in Annex 1 to Amendment No. 2 "Engineer's Determinations"; in Annex 2 to Amendment No. 2 "List of Approved Variations to the Contract, series I" and Annex 3 to Amendment No. 2 "The approved Variations to the Contract, series I" shall be duly be incorporated into the completed Price Schedules, Data Sheets and Schedules of Requirements and shall supersede respective provisions provided therein."

7. Since Slovenská elektrizačná prenosová sústava, a.s. is the obliged person pursuant to the Slovak Act No. 211/2000 Coll. on free access to information (hereafter as "Act on free access to information") and since this legal obligation is to be fulfilled regardless of the governing law of the

agreement, the Parties to this Contract are informed, that this Amendment No. 2 and related tax documents will be published as foreseen in the Act on free access to information in § 5a and § 5b for agreements, orders and invoices.

8. All other terms and conditions unaffected by this Amendment No. 2 shall remain unchanged.
9. This Amendment No. 2 is made in four counterpart originals, two of them for each part of the Contract Agreement.

In Witness whereof the parties hereto have caused the Amendment No. 2. This Amendment No. 2 becomes valid and legally binding from the day of the last party has signed it and effective from the day following the day of the publication of the Contract pursuant to § 47a section 1 of the Act No. 40/1964 Coll. (Civil Code).

SIGNED by: _____
Ing. Miroslav Obert
Chairman of the Board
Slovenská elektrizačná prenosová sústava, a.s.

Date: _____
for and on behalf of the Employer

SIGNED by: _____
Ing. Karol Slaninka
Member of the Board
SPIE Elektrovod, a.s.

Date: _____
for and on behalf of the Contractor

SIGNED by: _____
Ing. Miroslav Stejskal
Vice-chairman of the Board
Slovenská elektrizačná prenosová sústava, a.s.

Date: _____
for and on behalf of the Employer

SIGNED by: _____
Ing. Milan Ferenc, PhD.
Member of the Board
SPIE Elektrovod, a.s.

Date: _____
for and on behalf of the Contractor

Annex 1 to Amendment No. 2

Engineer's Determinations

Date: 25 February 2019

ENGINEER'S DETERMINATION

Project: Bystričany Substation - Transformation 400/110kV; Horná Žďaňa Substation – Enlargement; Križovany Substation - Enlargement

**Engineer's Comment to Contractor's Request for the Variation Order no. 2
Subject: SO681 Temporary Access Road for Construction Site Traffic**

Individual project 1: Horná Žďaňa Substation - Enlargement

Contract Reference: GCC Clause13 as amended by PCC Clauses 13.1 and 13.3.

Variation classification: Inadequate DDT

Reason:

Unexpected inadequate underlying soil condition (bearing capacity).

Procedure:

By email dated 13 April 2017 (Annex 2), the Contractor informed the Engineer / Employer regarding irregularities occurred during construction of SO681 Temporary Access road found after Static and Dynamic geotechnical measurements (see Annex 1 - VO attachment no.3 Static test – 01-17-091 and Dynamic Test 01-17-093).

After reviewing the reasons, the Engineer, by letter dated 18 April 2017 (Annex 2), instructed the Contractor to prepare the Variation Order according to GCC chapter 13, Variation Orders. The Contractor presented his Variation Order No. 2, first draft version, on 11 May 2017. Further scrutiny, review and comments were made. Price determinations, negotiations were taken and, as an outcome, a clean copy of the Variation order no.02 SO 681 "Temporary Access Road for Construction Site Traffic" was presented on 30 June 2018 (Annex 1).

Short description:

Before construction of the temporary access road, the prescribed geotechnical measurements were performed (see VO attachment no.3 Static test – 01-17-091, Dynamic Test 01-17-093) by the Contractor, and these indicated that required compaction values could not be attained using the quantities of road composition layers indicated in the DDT. Additionally, at the 1st Monthly progress meeting dated 16 March 2017 the Employer acknowledged that some underground lines were recently placed and thus were not specified in the Employer's requirements. The Employer requested the Contractor adequately address those underground lines in the Contractor's DDI.

Due to the foregoing, it was necessary to re-design the road composition as stated in the attached supporting documents "Variation order no.02 SO 681 "Temporary Access Road for Construction Site Traffic"

The original price estimation submitted by the Contractor for the total for the Temporary Access Road for Site Construction was €104.300,21 and the revised estimation is €133.092,37, plus processing fee of €1 854,00 (6,43% of cost difference); amounting to an increase of the total contract value by **€30.646,16**.

Eligibility:

Due to fact that not all information necessary for successful completion and safe operation was available to the Contractor, the Employer/Engineer found the variation eligible for application under GCC clause 13.1 and instructed the Contractor to prepare Variation order.

Conclusion / Recommendation:

The technical documentation of the new solution submitted by the Contractor with the Request for Variation Order no.2 has been checked, approved and found eligible under GCC clause 13.1. by the Employer/Engineer.

Following the acceptance of the final technical solution, the Engineer checked the submitted Contractor's cost proposal with the help of a budget estimate set up using prices from the contractual price schedules and, where necessary, from other reliable sources.

The Engineer considers the price adjustment agreed between the Contractor and Employer suitable and, as the additional works detailed are considered necessary for the satisfactory completion of the project, the Engineer therefore recommends acceptance of the Request for Variation Order no.2 as eligible.

Bernard Bolton
Project Manager Bratislava

Annexes:

1. Variation order no.02 SO 681 "Temporary Access Road for Construction Site Traffic"

Date: 25 February 2019

ENGINEER'S DETERMINATION

Project: Substation Bystričany - Transformation 400/110kV; Horná Ždaňa Substation – Enlargement; Křižovany Substation - Enlargement

Engineer's Comment to Contractor's Request for Variation Order no. 04 Part 2

Subject: ČPS 30.3 Electrical protections

Individual project 1: Horná Ždaňa Substation – Enlargement

Contract Reference: GCC Clause13 as amended by PCC Clauses 13.1 and 13.3.

Variation classification: Changes to the Employer's Requirements

Reason:

SEPS amended Employer's Requirements; Operation Procedures: in order to ensure safe operation, the adoption of the distance of protection equipment was requested.

Procedure:

SEPS informed the Contractor by mail dated 10 July 2017 regarding the update of its operating procedures and requested the Contractor to adapt the distance protection equipment contracted.

As result, by letter dated 12 July 2018, the Engineer instructed the Contractor to prepare a Variation Order according to GCC chapter 13, Variation Orders. The Contractor presented his Variation Order No. 4 Part 2, first draft version, on 8 August 2017. Further scrutiny, review and comments were made. Price determinations, negotiations were taken and, as a result, a clean copy of the Variation Order no.04 Part 2 ČPS 30.3 Electrical Protection, was presented on 30 June 2018.

Short description:

To ensure safe and continuous operation of Horná Ždaňa Substation, after the enlargement, busbar W3 will be added, requiring an update of the Operation Procedures and modification of the distant protection equipment (please refer to Variation order no 4.2).

The original price estimate submitted by the Contractor for the total of this work was €260.880,694 and the revised estimate is €273.486,694 with no processing fee applied; amounting to an increase of total contract value by **€12.606,00**.

Eligibility:

The Employer/Engineer found the variation eligible for application under GCC clause 13.2 Value Engineering: namely item (ii), this solution reduces cost of maintenance; and item (iii), this solution provides improvement to the efficiency and value to the Employer,

Conclusion / Recommendation:

The technical documentation of the new solution being submitted by the Contractor with the Request for Variation Order no 04 Part 2 has been checked, approved and found eligible under GCC clause 13.2: Value Engineering (ii,iii) by the Employer/Engineer.

Following the acceptance of the final technical solution, the Engineer checked the submitted Contractor's cost proposal with the help of a budget estimate set up using prices from the contractual price schedules and, where necessary, from other reliable sources.

The Engineer considers the price adjustment agreed between the Contractor and Employer is suitable and, as the additional works detailed are considered necessary for the satisfactory completion of the project, the Engineer, therefore recommends acceptance of the Request for Variation Order no 13 as eligible.

Bernard Bolton
Project Manager Bratislava

Date: 25 February 2019

ENGINEER'S DETERMINATION

Project: Bystričany Substation - Transformation 400/110kV; Horná Žďaňa Substation – Enlargement; Křižovany Substation - Enlargement

Engineer's Comment to Contractor's Request for the Variation Order no. 5

Subject: SO313 Supporting Wall

Individual project 1: Horná Žďaňa Substation – Enlargement

Contract Reference: GCC Clause13 as amended by PCC Clauses 13.1 and 13.3.

Variation classification: Inadequate DDT

Reason:

Unforeseen soil condition (occurrence of wandering streams).

Procedure:

By email dated 26 September 2017 (Annex 2), the Contractor informed the Engineer / Employer regarding irregularities found after:

1. Excavation for SO681 Temporary Access Road,
2. Static and Dynamic geotechnical measurements (see VO attachment no.3 Static test – 01-17-091, Dynamic Test 01-17-093),
3. Excavation SO311 ground works
4. Excavation SO313 Supporting wall
5. Further designer investigations.

As result, the Contractor requested the Engineer to institute variation proceedings.

After review the reasons the Engineer, by letter dated 19 October 2017, instructed the Contractor to prepare a Variation Order according to GCC chapter 13, Variation Orders, The Contractor presented his Variation Order No. 5, first draft version, on 7 November 2017. Further scrutiny, review and comments were made. Price determinations, negotiations were taken and, as an outcome, a clean copy of the Variation Order no.05 SO313, "Supporting Wall", was presented on 30 June 2018.

Short description:

During construction of the temporary access road and earth works, lower load bearing capacities and underground streams were found. (Measurements are attached in the Variation Order). The change consists of an increase in wall reinforcement and support of the drainage layer which is needed due to the variability of the geological conditions at different locations of the wall.

Redesign of the supporting wall followed. This redesign indicated increase of 13,1 tonnes in the amount of steel that reinforces the supporting wall itself, in order to achieve greater overall stiffness. Also, small modifications were made to the shape of the wall where the sloping parts have been converted into rectangular structures. From the point of view of safety and better drainage of possible water, the drainage layer was strengthened and filler and antifreeze wedges were made behind the supports.

By modifying the shape of the wall, the lengths of the core boreholes were increased for drainage of the part of the slope itself behind the wall.

The original price estimate submitted by the Contractor for the total of this work was €200.637,04 and the revised estimate is €220.659,97 plus processing fee of €630,00 (3,55% of cost difference); amounting to an increase of total contract value by €20.652,93.

Eligibility:

The solution presented in the Variation order provides better and safer operation of 400kV Substation Horná Ždaňa.

Due to the fact that not full information necessary for successful completion and safe operation was available to the Contractor, the Employer/Engineer found the variation eligible for application under GCC clause 13.1 and GCC clause 13.2

Conclusion / Recommendation:

The technical documentation of the new solution being submitted by the Contractor with the Request for Variation Order no.5 has been checked, approved and found eligible GCC under clause 13.1. by the Employer/Engineer.

Following the acceptance of the final technical solution, the Engineer checked the submitted Contractor's cost proposal with the help of a budget estimate set up using prices from the contractual price schedules and, where necessary, from other reliable sources.

The Engineer considers the price adjustment agreed between the Contractor and Employer is suitable and, as the additional works detailed are considered necessary for the satisfactory completion of the project, the Engineer therefore recommends acceptance of the Request for Variation Order no.5 as eligible.

Bernard Bolton
Project Manager Bratislava

Date: 25 February 2019

ENGINEER'S DETERMINATION

Project: Bystričany Substation - Transformation 400/110kV; Horná Ždaňa Substation – Enlargement; Křižovany Substation - Enlargement

Engineer's Comment to Contractor's Request for the Variation Order no 8

Subject: PS 07 – Amendment to the Design of the Main Steel Construction

Individual project 1: Horná Ždaňa 400kV Substation - Extension

Contract Reference: GCC Clause13 as amended by PCC Clauses 13.1 and 13.3.

Variation classification: Inadequate DDT

Reason:

Significant parameters have been changed by the Employer in order to ensure safety aspects.

Procedure:

On 6th Progress Meeting dated 8 August 2017 (see Annex 2), the Contractor requested the Employer to confirm values of the tension loads of phase conductors and earthing wires stated in the DDT in order to continue with design works. The Employer was not able to confirm those values and instead has revised the original values stated in DDT of Individual Project 1.

The introduction of the new (revised) values into the design (part of the DDI – PS07 400kV Switchyard Gantry), resulted in a change of the design and identification of the subsequently needed additional work.

After reviewing the reasons, the Engineer instructed the Contractor to prepare a variation order according to GCC chapter 13 Variation orders by letter dated 26 October 2017.

The Contractor presented their Variation Order No. 8, first draft version, on 7 November 2017. Further scrutiny, review and comments were made. Price determinations, negotiations were taken and, as an outcome, a clean copy of the Variation order no.08 PS07 400kV Switchyard Gantry was presented on 30 June 2018.

Short description and reason:

The exact tension loads of phase conductors and earthing wires were not known to the Employer and thus the standard loads (15kN for earth wire and 20kN for phase conductor) were included into the DDT based on which the Civil Permit was issued.

The higher tension loads from phase conductors and earthing wires as revised by the Employer for the planned transmission lines V483 Křižovany and V485 Bystričany resulted into the need to redesign and strengthen the gantry steel structure.

Subsequently, the tension loads were re-calculated as 20kN per earth wire and 60kN per phase conductor.

After detailed calculation and design, an increase in the amount of steel by 15,334 tonnes was indicated.

OFFICIAL USE

The gantry foundations were also reconsidered, however, the recalculation indicated that the gantry foundation structures meet the required load, even after being subjected to the increased forces, and are suitable for further use.

The original price estimate submitted by the Contractor for the total of this work was €1.404.574,57 and the revised estimate is €1,461.224,05, plus processing fee of €2 011,05 (3,55% of cost difference); amounting to an increase of total contract value by **€58.660,53**.

Eligibility:

Due to the fact that not all information necessary for successful completion and safe operation was available to the Contractor, the Employer/Engineer found the variation eligible for application under GCC clause 13.1 and instructed the Contractor to prepare the Variation Order.

Conclusion / Recommendation:

The technical documentation of the new solution being submitted by the Contractor with the Request for Variation Order no 8 has been checked, approved and found eligible under GCC clause 13.1. by the Employer/Engineer.

Following the acceptance of the final technical solution, the Engineer checked the submitted Contractor's cost proposal with the help of a budget estimate set up using prices from the contractual price schedules and, where necessary, from other reliable sources.

The price adjustment agreed between the Contractor and Employer is considered suitable and, as the additional works detailed are considered necessary for the satisfactory completion of the project, the Engineer therefore recommends acceptance of the Request for Variation Order no 8 as eligible.

Bernard Bolton
Project Manager Bratislava

Date: 25 February 2019

ENGINEER'S DETERMINATION

Project: Substation Bystričany - Transformation 400/110kV; Horná Ždaňa Substation – Enlargement; Křižovany Substation - Enlargement

Engineer's Comment to Contractor's Request for Variation Order no. 12

Subject: SO522 400kV Switchyard

Individual project 1: Horná Ždaňa Substation – Enlargement

Contract Reference: GCC Clause13 as amended by PCC Clauses 13.1 and 13.3.

Variation classification: Inadequate DDT

Reason:

Unforeseen inadequate underlying soil condition (rock foundation).

Procedure:

By email dated 13 December 2017, the Contractor informed the Engineer / Employer regarding irregularities occurred during construction of SO522 400kV switchyard foundations and after repeating the geological survey in the designated area (see VO attachment no.9 Geological survey DDI dated 1 December 2017).

After reviewing the reasons, the Engineer, by letter dated 10 January 2018, instructed the Contractor to prepare the Variation Order according to GCC chapter 13, Variation Orders. The Contractor presented his Variation Order No. 2, first draft version, on 11 March 2018. Further scrutiny, review and comments were made. Price determinations, negotiations were taken and, as an outcome, a clean copy of the Variation order no.12 SO522 400kV Switchyard was presented on 30 October 2018.

Short description:

The Variation order covers the change of soil excavation classes in comparison to the DDT according to the Geological survey in the designated area. (see VO attachment no.9 Geological Survey DDI dated 1 December 2017). The additional work covers:

1. Enlargement of equipment foundations due to the change in soil excavation class as excavation is more difficult and inaccurate,
2. Increase of concrete amount to be used to cast enlarged foundations
3. Increase of concrete class due to larger foundations

The original price estimate submitted by the Contractor for the total of this work was €305.801,60 and the revised estimate is €428.470,25 plus processing fee of €8.832,14 (7,2% of cost difference); amounting to an increase of total contract value by **€131.500,79**.

Eligibility:

Due to the fact that not all information necessary for successful completion and safe operation was available to the Contractor, the Employer/Engineer found the variation eligible for application under GCC clause 13.1 and instructed the Contractor to prepare Variation order.

Conclusion / Recommendation:

The technical documentation of the new solution being submitted by the Contractor with the Request for Variation Order no.2 has been checked, approved and found eligible under GCC clause 13.1. by the Employer/Engineer.

Following the acceptance of the final technical solution, the Engineer checked the submitted Contractor's cost proposal with the help of a budget estimate set up using prices from the contractual price schedules and, where necessary, from other reliable sources.

The Engineer considers the price adjustment agreed between the Contractor and Employer suitable and, as the additional works detailed are considered necessary for the satisfactory completion of the project, the Engineer therefore recommends acceptance of the Request for Variation Order no.12 as eligible.

Bernard Bolton
Project Manager Bratislava

ENGINEER'S DETERMINATION

Project: Substation Bystričany - Transformation 400/110kV; Horná Žďaňa Substation – Enlargement; Křižovany Substation - Enlargement

Engineer's Comment to Contractor's Request for Variation Order no. 13

Subject: ČPS 30.3 Electrical protections

Individual project 1: Horná Žďaňa Substation – Enlargement

Contract Reference: GCC Clause13 as amended by PCC Clauses 13.1 and 13.3.

Variation classification: Unification of the Busbar Differential Protection

Reason:

Due to the termination by ABB of the manufacture of Busbar Differential Protection REB500 v5.02 and due to necessity to unify Busbar Differential Protection between the existing and new bays to ensure safe and reliable operation of the sub-station.

Procedure:

The Employers requirements required installation of Busbar Differential Protection (BDP) type REB500 v5.02 (ABB manufacture).

During the 13th Progress Meeting held on 13 March 2018, the Contractor informed that ABB has terminated the manufacture of the Busbar Differential Protection (BDP) type REB500 v5.02. The Employer requested the Contractor to prepare solutions to resolve BDP issue.

It was proposed and accepted by the Employer to completely replace the BDP version 5.02 by an up to date REB500 version 7.6.

As result, by letter dated 25 May 2018, the Engineer instructed the Contractor to prepare a Variation Order according to GCC chapter 13, Variation Orders. The Contractor presented his Variation Order No. 13, first draft version, on 5 June 2018. Further scrutiny, review and comments were made. Price determinations and negotiations were taken and, as a result, a clean copy of the Variation Order no.13 ČPS 30.3 Electrical protections was presented on 30 June 2018.

Short description:

The Employer's Requirements requested an extension of the existing BDP by providing additional 2 units REB500 v5.02. Serial production and support of these, however, has been terminated by ABB. Therefore, the Contractor has proposed and the Employer agreed to replace existing BDP central units, 6 bay units and 2 new units with a new version 7.6. This approach will ensure the unification of BDP and at the same time will ensure the safe and reliable operation.

This solution includes design, supply, installation of new complete BDP device REB500 (1 central unit + 8 bay units) in version 7.6 and modification of existing cubicles. The Employer will receive new complete "Up-To-Date" solution of BDP type REB500.

The original price estimate submitted by the Contractor for the total of this work was €260 880,69 and the revised estimate is €392 678,05 plus processing fee of €4 678,80 (3,55% of cost difference); amounting to an increase of total contract value by **€136 476,16**.

Eligibility:

The Employer/Engineer found the variation eligible for application under GCC clause 13.2 Value Engineering: namely item (ii), this solution reduces cost of maintenance; and item (iii), this solution provides improvement to the efficiency and value to the Employer.

Conclusion / Recommendation:

The technical documentation of the new solution being submitted by the Contractor with the Request for Variation Order no 13 has been checked, approved and found eligible under GCC clause 13.2: Value Engineering (ii,iii) by the Employer/Engineer.

Following the acceptance of the final technical solution, the Engineer checked the submitted Contractor's cost proposal with the help of a budget estimate set up using prices from the contractual price schedules and, where necessary, from other reliable sources.

The Engineer considers the price adjustment agreed between the Contractor and Employer is suitable and, as the additional works detailed are considered necessary for the satisfactory completion of the project, the Engineer, therefore recommends acceptance of the Request for Variation Order no 13 as eligible.

Bernard Bolton
Project Manager Bratislava

Annex 2 to Amendment No. 2

Substation Bystričany - transformation 400/110 kV / Rozvodňa 400 kV Bystričany
Substation Horná Ždaňa - enlargement / Rozvodňa 400 kV H. Ždaňa - rozšírenie
Substation Križovany - enlargement / Rozvodňa 400 kV Križovany - rozšírenie

List of Approved Variations to the Contract, series I/ Zoznam schválených Zmenových návrhov, séria I

No. / č.	Title / Názov	Price / Cena
		EUR
Variation Order No. 2	SO 681 Temporary access road of site transport, Horná Ždaňa / SO681 Dočasná prístupová komunikácia staveniskovej dopravy, Horná Ždaňa	30 646,16
Variation Order No. 4.2	ČPS 30.3 Electric protections, Horná Ždaňa / ČPS 30.3 Zmena špecifikácie elektrických ochrán, Horná Ždaňa	12 606,00
Variation Order No. 5	SO 313 Retaining wall, Horná Ždaňa / SO 313 Oporný múr, Horná Ždaňa	20 652,93
Variation Order No. 8	PS 07 400 kV Switchyard - Increase in weight of gantry steel, Horná Ždaňa / PS 07 Rozvodňa 400 kV - Nárast hmotnosti ocelevej konštrukcie, Horná Ždaňa	58 660,53
Variation Order No. 12	SO 522 400 kV Switchyard - Foundations, Horná Ždaňa / SO 522 Rozvodňa 400 kV - Základy, Horná Ždaňa	131 500,79
Variation Order No. 13	ČPS 30.3 Digital Protections - Busbar differential protection replacement, Horná Ždaňa / ČPS 30.3 Elektrické ochrany - Výmena rozdielovej ochrany pripojníc, Horná Ždaňa	136 476,16
Total – Approved Variations to the Contract, series I / Spolu – Schválené Zmenové návrhy, séria I		390 542,57 €

Annex 3 to Amendment No. 2

**The approved
Variations to the Contract, series I**



Complex ES Bystričany – Transformation 400/110kV

Rozvodňa Horná Ždaňa – enlargement

Variation Order no. 2 – SO681 Temporary Access road of site transport

Created by Ing. Bálint

Checked by Ing. Pastelák

Approved by Ing. Szombath

Contract	Document No.	Date
22 16 112		12-2017

Release	Status	Copy
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1. Identification data

Construction:	Substation Horná Ždaňa – Enlargement
Site location:	400kV Substation Horná Ždaňa region: Banskobystrický district: Žiar nad Hronom municipality: Horná Ždaňa territory: Horná Ždaňa
Employer:	Slovenská elektrizačná a prenosová sústava Mlynské Nivy 59/A 824 84 Bratislava Slovak republic
Operator:	Slovenská elektrizačná a prenosová sústava Prevádzková sprava Stred Priemyselná ulica 3 038 52 Sučany Slovak republic

2. Reasons for the Variation

During works performance on construction „Substation Horná Ždaňa – enlargement. “, of civil part SO681 Temporary Access Road of site transport, additional circumstances were found that caused variation of technical solution of design documentation for implementation (DDI).

During soil bearing capacity measurements for SO681 Temporary access road, as requested by Tender documents (TD) (*measurement report – attachment no.3*), were more severe conditions found than stated in TD. Variation of geological conditions along the planned access road and retaining wall were found. Original geological survey (OGS) by RNDr. Mikuš Pavol as of 17.09.2014 states higher soil bearing capacity than measured before construction. OGS states on page 6 following: *„Designated area may contain descending underground water streams flowing across the area. It is necessary to point out that location and amounts of flowing water varies according to season and actual weather conditions. Streams may occur on spots, where probes were made and no stream was found, also they may disappear from spots where they have been found. “*. That means that occurrence of water negatively affects soil bearing capacity.

3. Reasoning

According to DDT of substation Horná Ždaňa SO 361 Temporary access road – Technical report article 7: *„Before earthmoving works of ground plane, the topsoil will be removed from the ground to the depth of 200mm. After completion of the construction works and dismantling of the road,*

humus topsoil will be spread back. After execution of earthmoving works on the plane in required extent and excavation for designed road, it will be necessary to compact the road surface to the compact degree $E_{def2} = 60 \text{ MPa}$. It is necessary to prove the compact degree of the road plane and other compacted layers by performing static and dynamic load control tests, which number for each compacted layer must be more than 3. The tests must be performed also at places of filling of utility networks. Contractor of ground works is obliged to document to the project investor the test results, which he will consult with site supervisor and responsible designer. Even after that it will be possible to build up single structural parts of the road. In case that required compact degree of the subsoil is not reached, it will be necessary, after confirming by geotechnical expert, to perform suitable technical measures. “, The Contractor performed such measurements. He was unable to reach required compaction values, due weather and soil conditions. Geotechnical measurement protocols are attached. (attachment no.3). These measurements were repeated twice. Also, underground lines not indicated by the DDT were found in the place of the road.

Remedial measures were taken according to Geo-technician’s recommendation, new road layers composition is designed. Below described solution will provide requested road bearing capacity and sufficient protection of the underground lines.

4. Variation description

This is a single-lane two-way road of width 3.0 m and length 518m with four shunts. Stable roadsides will be made on the road edge in the width of 2x 50 cm, thickness 10 cm.

DDT shows road layer composition as follows:

Road composition – Temporary access road (layers):

1.	Recycled crushed asphalt		50 mm
2.	Crushed gravel	31,5 CG	200 mm
3.	<u>Crushed gravel</u>	<u>45 CG</u>	<u>200 mm</u>
	Total		450 mm

Construction of the temporary road on heavy exposed places will be made of road panels, especially on uphill section.

Road composition – Temporary access road (layers):

1.	Road panel	IZD3/828 3/2/0,22	220 mm
2.	<u>Crushed gravel</u>	<u>8-63 ŠD</u>	<u>250 mm</u>
	Total		700mm

DDI requires (after consideration of all measurements and recommendations) following solution:

Road composition – Temporary access road (layers):

1.	Recycled crushed asphalt		50 mm
----	--------------------------	--	-------

2.	Crushed gravel	31,5 CG	200 mm
3.	<u>Crushed gravel</u>	<u>45 CG</u>	<u>200 mm</u>
	Total		450 mm

Road composition – Temporary access road - (improved layers):

1.	Recycled crushed asphalt		50mm
2.	Crushed gravel	31,5 CG	200 mm
3.	Crushed gravel	45 CG	200 mm
4.	Crushed gravel	8-63 CG	200 mm
5.	Geogrid	TENSAR TriAx TX170	
6.	<u>Geotextile</u>	<u>CHS-TeXBS12</u>	
	Total		650mm

Road composition – Temporary access road – underground lines crossings (layers):

1.	Recycled crushed asphalt		50mm
2.	Crushed gravel	31,5 CG	180 mm
3.	Road panel	IZD3/828 3/2/0,22	220 mm
4.	Crushed gravel	8-63 CG	250 mm
5.	Geogrid	TENSAR TriAx TX170	
6.	<u>Geotextile</u>	<u>CHS-TeXBS12</u>	
	Total		700mm

Construction of the temporary road on heavy exposed places will be made of road panels, especially on uphill section, underground lines crossings (optic fibre cables for OHL V492 and OHL V493, water duct, and control cable between well, water reservoir and Control building).

5. Financial summary

Detailed budget and bill of quantity (BoQ) is attached to this document.

- Original budget BoQ from Tender – attachment no.4
- DDI Budget and BoQ – attachment no.5
- Comparative Budget and BoQ DDI-TD – attachment no.6

Financial summary for SO681 – Temporary Access Road:

Variation order budget costs:	133 092,37 EUR
<u>Original budget BoQ from Tender:</u>	<u>-104 300,21 EUR</u>
Costs difference:	28 792,16 EUR
<u>Processing fee (6,43% of costs difference):</u>	<u>1 854,00 EUR</u>
Variation order no.2 – total costs	30 646,16 EUR

6. Completion Date Impact

This variation does not influence overall completion date.

7. Attachments

Attachment no.1 – Preliminary approval by Managing Director of Division of Development and Investment, SEPS a.s.

Attachment no.2 - Construction General designer statement

Attachment no.3 – Soil bearing capacity report

Attachment no.4 - Original budget BoQ from Tender

Attachment no.5 - DDI Budget and BoQ

Attachment no.6 - Comparative Budget and BoQ DDI-TD

Attachment no.7 – Design Documentation for Implementation (DDI) – SO681

Attachment no.8 – Photographs

Attachment no.9 – Consultants statement

Attachment no.1

Preliminary approval by Managing Director of Division of Development and Investment, SEPS a.s.

Issuance of the preliminary approval to change of the solution of the temporary access road – Horná Ždaňa substation

On the basis of the submitted implementation dossier and the necessary consents and statements of its deliberation, I issue, pursuant to SM 09/2009, Annex D, Part B, point 3, I issue the

preliminary approval

to realize the change of the solution of the temporary access road **with a total increase of the construction price by 33 321,44 €** excluding VAT.

At the same time, I impose, in the sense of the Contract for Works 2016-0295-1177501, signed on February 6, 2017, to prepare Amendment No.1 to this Contract to change the implementation of the Earthworks.

In Bratislava, 11.5. 2017

Ing. Miroslav Stejskal
Managing director for the Investment section



Attachment no.2

Construction GOPA Intec statement

intec

c/o SEPS a.s. Mlynské Nivy 59/A, 824 84 Bratislava 26, Slovak Republic

Slovenská elektrizačná prenosová sústava, a.s
Mlynské Nivy 59/A
824 84 Bratislava
Slovak Republic

Bratislava Project Office

Bernard Bolton
Tel: +421 907 331 469
Fax: +421 (2) 5069 2319
e-mail: bernard.bolton@gopa-intec.de

For the attention of Mr Juraj Došek, Mr Ľubomír Maco

Your reference: Your letter dated: Our reference: Date:
2016-0095-1177501/BB/SEPS/001 18 April 2017

Ref.: Substation Horná Ždaňa – Enlargement. SO681 Temporary access road

Dear Sirs

Further to your email request dated 13 April 2017, (including the request letter from the Contractor for preliminary approval), we comment as follows:

The contractor has performed access road Static and Dynamic load tests as requested by the Contract 2016-0095-1177501 documents, section "Employers Requirements chapter 2.18 SO681" Temporary access road". These tests failed as shown in test reports presented with the Contractor's letter.

A suggested solution by the Contractor to provide the requested load capacity is detailed below:

- New road under layer shall be created of geotextile, geogrid and embankment of crushed stones fraction 8-64 mm of thickness of 200mm.
- New static and dynamic load tests will be performed at places where the temporary access road is crossing underground optic cables of OHL V492, V493

The contractor has presented the adjusted Bill of Quantity and design documentation for the temporary access road.

After review of attached documents, we agree with the described process and changes detailed

The Engineer recommends that the Contractor should proceed according to FIDIC Cl. 13.3 Variations Procedure and Cl.20.1 Contractor's Claims. **The Contractor shall not delay any work whilst awaiting a response** (approval, disapproval or comments). The Contractor can proceed with above mentioned works after official approval of the design documents of SO681 Temporary access road according to FIDIC Cl. 5.2 Contractors Document.

The Contractor shall present budgeted Bill of Quantity for review and comments by 11 May 2017 at the latest, according to FIDIC Cl. 13.3 Variations Procedure and Cl.20.1 Contractor's Claims. The contractor shall also follow Special conditions of the Contract 13.3 Variation procedure, whilst preparing his proposal for adjustment of the price (Budgeted Bill of Quantity).

Due to the fact that the permit for the temporary access road is valid until 28 February 2018 we recommend issuance of the preliminary approval as soon as possible.

Yours faithfully

intec

GOPA-International Energy Consultants GmbH

Bernard Bolton
Project Manager Bratislava

Copy: J Došek – Project Director, SEPS
L Maco – Investments Executive Director - Substations, SEPS
K Langschied, Project Director, intec, Bad Homburg

Attachment no.3

Soil bearing capacity measurement report

STATICKÁ ZAŤAŽOVACIA SKÚŠKA

(protokol o skúške)

Evid. č. protokolu:

ÚČEL: Kontrola miery zhutnenia, únosnosti a tuhosti zemných konštrukcií

01-17-091

Zákazník-objednávateľ skúšky: PROFAN, s.r.o. Lubotín	Kontrakt - stavba : Rozvodňa 400 kV Horná Ždaňa Rozšírenie	Objekt: SO 681 Dočasná prístupová komunikácia
Konštrukcia: nespevnená vozovky zo ŠD	Miesto merania: km 0,225 stred	Klimatické podmienky pri meraní: teplota vzduchu: +19 °C teplota konštrukcie: +15 °C
Skúšaný materiál - zloženie konštrukcie: štrkdrvina fr. 0/63 ... hrúbka 600 mm geotextília a geomreža		Použité meradlá a skúšobné zariadenia: <ul style="list-style-type: none"> ▣ zaťažovacia doska priemer 357 mm/0,1 m² ▣ elektronický snímač sily Lukas S 35-200 kN ▣ elektronický odčýlkomer Schut-UPM04500 ▣ bezkontaktný teplomer IR 880A

Technické špecifikácie pre skúšanie: STN 73 6190, STN 73 6133	Technické špecifikácie pre vyhodnotenie a interpretáciu výsledku : projekt stavby
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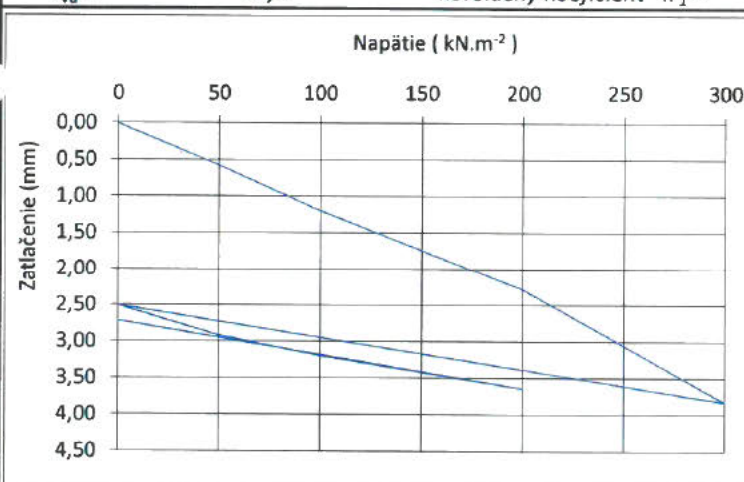
Požadované hodnoty: $E_{def,2} \geq 90 \text{ MN.m}^{-2}$ $E_{def,2}/E_{def,1} \leq 2,50$	Vstupné koeficienty: $k = 26,9$ $r (m) = 0,18$ $f_{tot} (m) = 0,00382$ $\Delta p (MN.m^{-2}) = 0,30$ $f_e (m) = 0,00132$ $v = 0,20$
--	--

Namerané hodnoty: (napätie v $kN.m^{-2}$ /zatláčenie v mm)	Zaťažovací cyklus <i>(zaťaženie - odľahčenie - zaťaženie - odľahčenie)</i>
I.	II.
0 50 100 200 300	0 50 100 200 0
0,00 0,57 1,19 2,28 3,82	2,50 2,91 3,19 3,64 2,71

Vypočítané hodnoty: $\Delta h_1 = 1,09 \text{ mm}$ $\Delta h_2 = 0,45 \text{ mm}$	Zaťaženie pri deformácii - 1,27 mm v $MN.m^{-2}$: 0,106
$E_{def,1} = 24,7 \text{ MN.m}^{-2}$ $E_{def,2} = 59,8 \text{ MN.m}^{-2}$ $E_{def,2}/E_{def,1} = 2,42$	$k = 37,3 \text{ MN.m}^{-3}$ $E_{def} = 21,1 \text{ MN.m}^{-2}$ $E_p = 61,1 \text{ MN.m}^{-2}$

Vysvetlivky: $f_{tot} (m)$...celkové zatláčenie dosky $f_e (m)$...pružné zatláčenie dosky Δp ...rozsah napätia
 $E_{def,1}$, $E_{def,2}$... modul deformácie pre rozsah napätia 100-200 $kN.m^{-2}$ E_{def} ... modul deform. pre rozsah 0-300 $kN.m^{-2}$
 k ... modul reakcie podložia E_p ... modul pružnosti pre rozsah 0-300 $kN.m^{-2}$

Dynamická zaťažovacia skúška - porovnanie pre koreláciu skúšok :
 $E_{vd} = 26,4$ korelačný koeficient $k_1 = 0,93$ $k_2 = 2,26$



stav konštrukcie v čase merania

Vyhodnotenie:

Únosnosť konštrukcie zodpovedá zloženiu konštrukcie a fyzikálno-mechanickým vlastnostiam pôvodného podložia ovplyvneného klimatickými pomermi.

Interpretácia - poznámky:
Dátum vykonania skúšky: 5.5.2017 | **Meral a vyhodnotil:** M. Starší | **Kontroloval a schválil:** RNDr. B. Starší

Prehlásenie: Výsledky skúšky sa týkajú len predmetu skúšania a nenahradzujú iné dokumenty požadované podľa osobitných predpisov. Bez písomného súhlasu laboratória protokol nesmie byť reprodukován inak ako celý.



MOBILNÉ SKÚŠOBNÉ LABORATÓRIUM

Kontakty:

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web: www.kvalitest.sk



Autorizovaný stavebný inžinier č. 2927*A*3-1

STATICKÁ ZAŤAŽOVACIA SKÚŠKA

(protokol o skúške)

Evid. č. protokolu:

ÚČEL: Kontrola miery zžutnenia, únosnosti a tuhosti zemných konštrukcií

01-17-092

Zákazník-objednávateľ skúšky:

PROFAN, s.r.o.

Ľubotín

Kontrakt - stavba :

Rozvodňa 400 kV Horná Žďaňa

Rozšírenie

Objekt:

SO 681

Dočasná prístupová komunikácia

Konštrukcia:

nespevnená vozovky zo ŠD

Miesto merania:

km 0,125 stred

Klimatické podmienky pri meraní:

teplota vzduchu: +19 °C

teplota konštrukcie: +15 °C

Skúšaný materiál - zloženie konštrukcie:

štrkodrvina fr. 0/32 ... hrúbka 200 mm

pôvodná komunikácia - lomový kameň, fr. 0/200 ... hrúbka 300 mm

Použité meradlá a skúšobné zariadenia:

▣ zaťažovacia doska priemer 357 mm/0,1 m²

▣ elektronický snímač sily Lukas S 35-200 kN

▣ elektronický odčýtkomer Schut-UPM04500

▣ bezkontaktný teplomer IR 880A

Technické špecifikácie pre skúšanie:

STN 73 6190, STN 73 6133

Technické špecifikácie pre vyhodnotenie a interpretáciu výsledku :

projekt stavby

Požadované hodnoty:

$$E_{def,2} \geq 90 \text{ MN.m}^{-2}$$

$$E_{def,2}/E_{def,1} \leq 2,50$$

Vstupné koeficienty: $k = 26,9$

$r (m) = 0,18$

$$f_{tot} (m) = 0,00183$$

$$\Delta p (MN.m^{-2}) = 0,30$$

$$f_e (m) = 0,00077$$

$$v = 0,20$$

Namerané hodnoty:

Zaťažovací cyklus

(zaťaženie - odľahčenie - zaťaženie - odľahčenie)

(napätie v kN.m⁻²/zatlačenie v mm)

I.

(napätie v kN.m⁻²/zatlačenie v mm)

II.

I.					II.				
0	50	100	200	300	0	50	100	200	0
0,00	0,32	0,73	1,30	1,83	1,06	1,27	1,42	1,65	1,10

Vypočítané hodnoty:

Zaťaženie pri deformácii - 1,27 mm v MN.m⁻² : 0,19

$$\Delta h_1 = 0,57 \text{ mm}$$

$$\Delta h_2 = 0,23 \text{ mm}$$

$$E_{def,1} = 47,2 \text{ MN.m}^{-2}$$

$$k = 66,9 \text{ MN.m}^{-3}$$

$$E_{def,2} = 117,0 \text{ MN.m}^{-2}$$

$$E_{def} = 44,1 \text{ MN.m}^{-2}$$

$$E_{def,2}/E_{def,1} = 2,48$$

$$E_p = 104,8 \text{ MN.m}^{-2}$$

Vysvetlivky: $f_{tot} (m)$... celkové zatlačenie dosky

$f_e (m)$... pružné zatlačenie dosky

Δp ... rozsah napätia

$E_{def,1}$, $E_{def,2}$... modul deformácie pre rozsah napätia 100-200 kN.m⁻²

E_{def} ... modul deform. pre rozsah 0-300 kN.m⁻²

k ... modul reakcie podložia

E_p ... modul pružnosti pre rozsah 0-300 kN.m⁻²

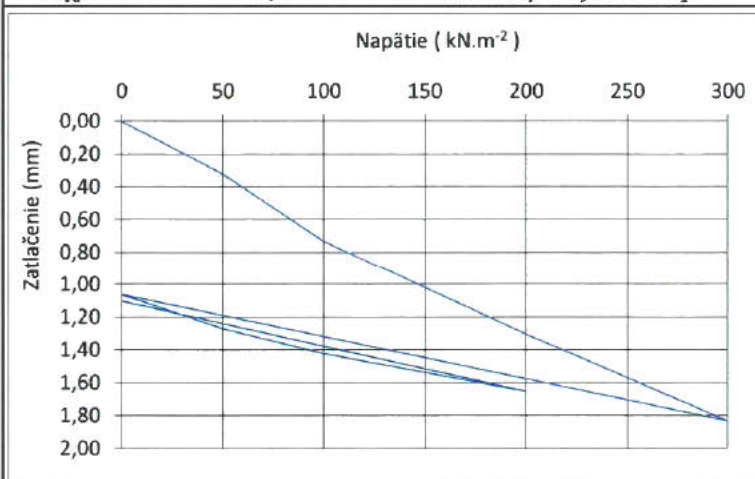
Dynamická zaťažovacia skúška - porovnanie pre koreláciu skúšok :

$$E_{vd} = 50,3$$

$$\text{korelačný koeficient } k_1 =$$

$$0,94$$

$$k_2 = 2,33$$



stav konštrukcie v čase merania

Vyhodnotenie:

Únosnosť konštrukcie vyhovuje požiadavkam.

Interpretácia - poznámky:

Dátum vykonania skúšky:

5.5.2017

Meral a vyhodnotil:

M. Starší

Kontroloval a schválil:

RNDr. B. Starší

Prehlásenie: Výsledky skúšky sa týkajú len predmetu skúšania a nenahradzujú iné dokumenty požadované podľa osobitných predpisov. Bez písomného súhlasu laboratória protokol nesmie byť reprodukován inak ako celý.



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Autorizovaný stavebný inžinier č. 2927*A*3-1

ZAŤAŽOVACIA SKÚŠKA ĽAHKOU DYNAMICKOU DOSKOU

ÚČEL: Kontrola miery zhutnenia, únosnosti a tuhosti zemných konštrukcií (protokol o skúške) **Skúška homogenity konštrukcie**

Evid. číslo protokolu:
01-16-093

Zákazník-objednávateľ skúšky: PROFAN, s.r.o. Ľubotín	Kontrakt - stavba : Rozvodňa 400 kV Horná Ždaňa Rozšírenie	Objekt: SO 681 Dočasná prístupová komunikácia
---	---	---

Konštrukcia: podložie - zemná pláň a konštrukcia vozovky	Miesto merania: celá plocha konštrukcie vo vybraných kontrolných bodoch	Klimatické podmienky pri meraní: teplota vzduchu: + 19 °C teplota konštrukcie: + 15 °C
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Skúšaný materiál - zloženie konštrukcie: štrkodrvina fr. 0/63 ... hrúbka 300 mm geotextília separačná + geomreža íl so strednou plasticitou, mäkká až tuhá konzistencia	Použité meradlá a skúšobné zariadenia: ▣ zaťažovacia doska priemer 300 mm ▣ meracie zariadenie LDD 100 v.č. 194 ▣ bezkontaktný teplomer IR 880A
---	---

Technické špecifikácie pre skúšanie: STN 73 6192, STN 73 6133	Technické špecifikácie pre vyhodnotenie a interpretáciu výsledku : projekt stavby
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Požadované hodnoty: $E_{vd} > 27 \text{ MN.m}^{-2}$ $E_{def,z} > 60 \text{ MN.m}^{-2}$	Metóda merania a vyhodnotenia: prepočítavací vzťah*:	1) $E_{def2} = E_{vd} \cdot 1,5 \text{ (MN.m}^{-2}\text{)} \dots \text{il}$ 2) $E_{def2} = E_{vd} \cdot 2,26 \text{ (MN.m}^{-2}\text{)} \dots \text{štrky}$
---	---	--

Namerané hodnoty :			
Číslo skúšky	Miesto merania	Dynamický modul deformácie $E_{vd} \text{ (MN.m}^{-2}\text{)}$	Statický modul deformácie $E_{def2} \text{ (MN.m}^{-2}\text{)}$
1 Dátum merania 5.5.2017	km 0,400	17,8	40,2 nevyhovuje
2 5.5.2017	km 0,475 (kamenité podložie)	50,8	114,8 vyhovuje
3 5.5.2017	km 0,275 ŠD hr. 600 mm	41,5	93,8 vyhovuje



stav konštrukcie v čase merania

Vyhodnotenie:

Únosnosť a miera zhutnenia vrstvy vyhovuje požiadavkam v úsekoch s hrubšou vrstvou ŠD a na podloží s obsahom andezitových balvanov.

*vzťah medzi výsledkami skúšok dynamickej a statickej zaťažovacej skúšky

Dátum vydania protokolu: 5.5.2017	Meral a vyhodnotil: B. Starší	Kontroloval a schválil: RNDr. B. Starší
--	--------------------------------------	--

Prehlásenie: Výsledky skúšky sa týkajú len predmetu skúšania a nenahradzujú iné dokumenty požadované podľa osobitných predpisov. Bez písomného súhlasu laboratória protokol nesmie byť reprodukován inak ako celý.

Attachment no.4

Original budget BoQ from Tender

Attachment no.5

DDI budget and BoQ

Attachment no.6

Comparative Budget and BoQ DDI-TD

Attachment no.7

placed in separate package

Design Documentation for Implementation (DDI) – SO681 – Temporary access
road of site transport

Attachment no.8

Photographs



Complex ES Bystričany – Transformation 400/110kV

Rozvodňa Horná Ždaňa – enlargement

Variation Order no. 4.2 – ČPS 30.3 Electric protections Horná Ždaňa

Created by Ing. Bálint

Checked by Ing. Pastefák

Approved by Ing. Szombath

Contract	Document No.	Date
22 16 112		07 / 2017

Release	Status	Copy
01		

Obsah

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6. Completion Date Impact	5
7. Attachments	5

1. Identification data

Construction:	Substation Horná Ždaňa – Enlargement
Site location:	400kV Substation Horná Ždaňa region: Banskobystrický district: Žiar nad Hronom village: Horná Ždaňa cadastral area: Horná Ždaňa
Employer:	Slovenská elektrizačná prenosová sústava, a. s. Mlynské Nivy 59/A 824 84 Bratislava Slovenská republika
Operator:	Slovenská elektrizačná prenosová sústava, a. s. Mlynské Nivy 59/A 824 84 Bratislava Slovenská republika

2. Reasons for the Variation

During preparation of detail design for implementation of substation Horná Ždaňa – enlargement electrical part ČPS30.3 Electric protection, some we found insufficiencies in secondary distance protection requirements.

We found that required parameters of the secondary distance protection in the Table of Technical Specifications (hereinafter referred to as TTS) states insufficient number of protection functions, analogue inputs, binary inputs and outputs to adapt Employers additional requirement of future operations of the substation with 3 main busbar systems in comparison with Tender Documents where operation of substation was required with 2 busbar systems only.

Requested parameters of distance protection according to TTS:

- Analogue inputs: 4xI,5xU,
- Binary inputs and outputs: 30BI, 35BO
- Protection functions in the scope of 225FB,
- Signal LED – 15 pieces
- Communication IEC 61850 optic.

Parameters of distance protection offered in the tender:

- Analogue inputs: 8xI,8xU,
- Binary inputs and outputs: 31BI, 37BO

- Protection functions in the scope of 225FB,
- Signal LED – 16 pieces
- Communication IEC 61850 optic.

3. Reasoning

With regard to the found out facts related to adding of bus bar W3, we as the responsible designer, proposed the solution reflecting the aforementioned adverse findings. We propose such parameters of the protection that will fully comply also after adding the bus bar W3 and related instrumentation. If change of protection is required, it will be possible to change settings of the protection without any additional costs for hardware and software.

Since digital protections fulfil an important function at protection of equipment, reliability of operation, minimise duration of adverse impacts on the equipment, switch off only a failed section, and ensure continuous supply of energy in undamaged parts of the grid, we propose to increase the considered parameters.

We propose the change of parameters in compliance with FIDIC – *Conditions of Contract for Plant And Design-Build Contract*, Clause 13.2.

Proposed parameters of distance protection:

- Analogue inputs: 8xI 8xU
- Binary inputs and outputs: 63BI, 44BO
- Protection functions in the scope of 350FB,
- Signal LED – 80 pieces
- Communication IEC 61850 optic

4. Variation description

Differences between DDI and DDT are as follows:

- Replace the module 1xIO214 with module IO208,
- Replace the module 2xIO205 without LED with 2 modules IO207 with LED,
- Replace the module 2xIO206 without LED with 2 modules IO207 with LED,
- Add the module 2xIO207 with LED,
- Add 125FB.

The variation of specification relates to 2 pieces OF distance protections.

5. Financial summary

Detail budget and bill of quantity (BoQ) is attached to this document.

- a) Original budget BoQ from Tender – Annex No. 1.
- b) DDI Budget and BoQ – Annex No. 2.

c) Comparative Budget and BoQ DDI-TD – Annex No. 3.

Financial summary for the electric system – ČPS 30.3 Electric Protection Horná Žďaňa:

Variation order budget costs:	273.486,694 EUR
<u>Original budget BoQ from Tender:</u>	<u>-260.880,694 EUR</u>
Costs difference:	12,606.00 EUR
<u>Processing fee:</u>	<u>0.00 EUR</u>
Variation order no. 4.2 – total costs	12,606.00 EUR

6. Completion Date Impact

This Variation does not influence overall completion date.

7. Attachments

Attachment no. 1 – Preliminary approval by Managing Director of Division of Development and Investment, SEPS

Attachment no. 2 – Original budget BoQ from Tender ES Horná Žďaňa CPS30.3

Attachment no. 3 – DDI Budget and BoQ for proposed solution ES Horná Žďaňa CPS30.3

Attachment no. 4 – Comparative Budget and BoQ DDI-TD ES Horná Žďaňa CPS30.3

Attachment no. 5 – Specification 7SA87_P1A146719_BystHZda

Attachment no. 6 – Approval of general designer

Attachment no. 7 – Approval of SEPS operator, e-mail dated 10/07/2017

Attachment no. 8 – TTS of the second distance protection of line

Attachment no. 9 – Placing of binary inputs and outputs of the second distance protection

Attachment No.1

Preliminary approval by Managing Director of Division of Development and Investment,
SEPS

Vec : Vydanie predbežného súhlasu na zmenu špecifikácie druhého ochranného terminálu – dištančná ochrana

Vážený pán vrchný riaditeľ,

dovoľujeme si Vás požiadať o vydanie predbežného súhlasu na zmenu špecifikácie druhého ochranného terminálu – dištančná ochrana, ktorá sa realizuje v Rozvodni 400 kV Bystričany, Rozvodni 400 kV H. Ždaňa – rozšírenie a v Rozvodni 400 kV Križovany – rozšírenie, ako súčasť stavby „Súbor stavieb Bystričany – transformácia 400/110 kV“. Nakoľko je v požiadavkách objednávateľa chybný počet binárnych vstupov a výstupov druhého ochranného terminálu – dištančnej ochrany, Objednávateľ požiadaval navýšiť počet vstupov a výstupov z pôvodných 24 vstupov a 35 výstupov na vyhovujúci počet 48 vstupov a 48 výstupov. Nová realizačná dokumentácia pre dištančnú ochranu bola prerokovaná a odsúhlasená prevádzkovateľom (SEPS) a s generálnym projektantom VUJE, a.s. Zhotoviteľ vypracoval nový rozpočet a vyčísлил jednotlivé položky navyše prác, viď Prílohu 1 Rozpočtové náklady a 2 Výkaz výmer. Celková cena diela je vyššia o 38 268,00 € bez DPH. Touto zmenou nevzniká žiadny dopad na termíny, či stavebné a územné konania.

Týmto Vás v zmysle SM 09/2009 Prílohy D časť B, bod 3 žiadame vydať predbežný súhlas so zmenovým konaním – viď Prílohu č. 9.

Za kladné vybavenie tejto žiadosti Vám vopred ďakujeme.

S pozdravom,

RNDr. Juraj ~~W~~osek
vedúci samostatného odboru investícií

- Prílohy: 1, Rozpočtové náklady,
2-3, Výkaz výmer,
4, Špecifikácia zariadenia,
5, Špecifikácia zariadenia,
6, Súhlas generálneho projektanta,
7, Súhlas prevádzkovateľa SEPS,
8, Žiadosť zhotoviteľa na realizáciu zmeny,
9, Návrh textu predbežného súhlasu so zmenovým konaním.

**Vydanie predbežného súhlasu na zmenu špecifikácie druhého ochranného terminálu –
dištančná ochrana v Rozvodni 400 kV Bystričany, Rozvodni 400 kV H. Ždaňa –
rozšírenie a v Rozvodni 400 kV Križovany – rozšírenie.**

Na základe predloženej realizačnej dokumentácie a potrebných súhlasov a vyjadrení o jej prerokovaní vydávam v zmysle SM 09/2009 Prílohy D časť B, bod 3

predbežný súhlas

na zrealizovanie **zmeny špecifikácie druhého ochranného terminálu s celkovým navýšením ceny stavby o 38 268,00 € bez DPH.**

Súčasne ukladám v zmysle ZoD 2016-0295-1177501, podpísanej dňa 6. február 2017, vypracovať Dodatok č.1 k tejto ZoD pre zmenu špecifikácie druhého ochranného terminálu – dištančná ochrana.

V Bratislave dňa 9.8.2017

Ing. Miroslav Stejskal
vrchný riaditeľ úseku rozvoja a investícií

Issuance of the preliminary approval to change of the specification of the second protective terminal - distance protection – all substations

On the basis of the submitted implementation dossier and the necessary consents and statements of its deliberation, I issue, pursuant to SM 09/2009, Annex D, Part B, point 3, I issue the

preliminary approval

to realize the change of the specification of the second protective terminal - distance protection

with a total increase of the construction price by 38 268,00 € excluding VAT.

At the same time, I impose, in the sense of the Contract for Works 2016-0295-1177501, signed on February 6, 2017, to prepare Amendment No.1 to this Contract to change the implementation of the Earthworks.

In Bratislava, 9.8. 2017

Ing. Miroslav Stejskal
Managing director for the Investment section

Attachment No.2

Original budget BoQ from Tender ES Horná Ždaňa CPS30.3

Attachment No.3

DDI Budget and BoQ for proposed solution ES Horná Ždaňa CPS30.3

Attachment no. 4

Comparative Budget and BoQ DDI-TD ES Horná Ždaňa CPS30.3

Attachment No.5

Specification 7SA87_P1A146719_BystHZda

Attachment No.6

Approval of general designer

Príloha č.6-stanovisko GP ku ZK-04 PS30: 2.ochranný terminál Siemens

From: Michal.Dekys@vuje.sk [mailto:Michal.Dekys@vuje.sk]

Sent: Tuesday, July 11, 2017 9:01 AM

To: lubor.melovic@alterenergo.sk

Subject: RE: 170616 Complex Bystricany - Substation 400 kV Bystričany - zmena špecifikácie ochrán Siemens

Ahoj,

S požadovanou zmenou špecifikácie druhého ochranného terminálu súhlasíme, nakoľko parametre po zmene sa zhodujú z požiadavkami ktoré sme uvádzali v TTS nášho projektu. Len pripomínam že požadovanú zmenu musí schváliť aj investor.

Michal Dekys

Odoslané z môjho smartphonu Sony Xperia™

---- Lubor Melovič píše ----

Ahoj Michal

Na základe nášho telefonického dohovoru, ťa prosím o **vyjadrenie zmene** špecifikácií druhého ochranného terminálu - dištančnej ochrany a zmene rozdielovej ochrany prípojnic samostatne. S pozdravom

Lubor Melovič

projektový manažér stavieb

Alter Energo, a.s.

Hlavná 561, 951 78 Koliňany

Mob.: +421 915 793 520

@: lubor.melovic@alterenergo.sk

 Myslite na prírodu ... Skutočne potrebujete vytlačiť tento e-mail?

Attachment No.7

Approval of SEPS operator, e-mail dated 10/07/2017

e-mail 10.7.2017:

Pekný deň prajem,

ako doplnenie e-mailu z 14.6.2017, preposielam schválenie špecifikácie ochrán (Ing. Podmanický).

S pozdravom

Peter Merschitz

Od: Podmanický Marián <Marian.Podmanicky@sepsas.sk>

Odoslané: 6. júla 2017 16:42

Komu: Merschitz, Peter; Došek Juraj

Predmet: FW: Complex Bystricany - Substation 400 kV Bystričany - zmena špecifikácie ochrán Siemens

Dobrý deň,

znovu posielam vyjadrenie k technickej špecifikácii ochrán Siemens. Priložené špecifikácie sú vyhovujúce.

Zo zmenou typu ROP z Siemens na ABB súhlasíme.

S pozdravom

Marián Podmanický

From: Podmanický Marián

Sent: Tuesday, June 20, 2017 2:37 PM

To: Došek Juraj (Juraj.Dosek@sepsas.sk) <Juraj.Dosek@sepsas.sk>

Subject: FW: Complex Bystricany - Substation 400 kV Bystričany - zmena špecifikácie ochrán Siemens

Dobrý deň,

špecifikácie navrhnuté projektantom sú vyhovujúce.

S pozdravom

Marián Podmanický

From: Matej Bjalončík [<mailto:matej.bjaloncik@alterenergo.sk>]

Sent: Monday, June 19, 2017 1:19 PM

To: Podmanický Marián <Marian.Podmanicky@sepsas.sk>

Cc: lubor <lubor.melovic@alterenergo.sk>

Subject: Complex Bystricany - Substation 400 kV Bystričany - zmena špecifikácie ochrán Siemens

Dobrý deň,

Chcel by som Vás poprosiť o odsúhlasenie zmeny špecifikácie ochrán Siemens pre akciu Complex Bystričany:

V TTŠ je v požiadavkách objednávateľa chybné uvedení počet binárnych vstupov a výstupov druhého ochranného terminálu - dištančnej ochrany. Objednávateľ požaduje počet vstupov a výstupov navýšiť - požaduje min. 48 vstupov a 48 výstupov (oproti TD 24 vstupov a 35 výstupov)

Z tohto dôvodu je potrebné zmeniť finálnu špecifikáciu ochrán Siemens 7SA87 s vyhovujúcim počtom vstupov a výstupov – presná špecifikácia ochrany odsúhlasená SEPSom je v prílohe. Zmena špecifikácie ochrán sa jedná pre stavby *Bystričany – 3ks, Horná Ždaňa – 2ks a Križovany – 1ks ochrán.*

Presná špecifikácia ochrán je v prílohe.

Dané riešenie má vplyv na cenu, nemá vplyv na termín realizácie.

Ďakujem

Ing. Matej Bjaloncík
Projektant

tel.:+421 918 743513

email: matej.bjaloncik@alterenergo.sk



Upozornenie:

Tento e-mail je určený iba pre osoby, ktorým je adresovaný. Ak ste neprijímateľom, prosíme, aby ste informovali príslušného zamestnanca, ktorý Vám tento e-mail doručil, a odstránili ho z Vášho systému. Odosielateľ neodpovedá za obsah e-mailu, ktorý Vám bol doručovaný. Úplne presná je informácia o správe e-mailu. Skopovanie alebo iné použitie e-mailu nie je povolené. Prosíme o jeho ochranu.

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If you receive this e-mail in error, please notify the sender immediately by e-mail.

Attachment No.8

TTS of the second distance protection of line

Attachment No.9

Placing of binary inputs and outputs of the second distance protection



Complex ES Bystričany – Transformation 400/110kV

Rozvodňa Horná Ždaňa – enlargement

Variation Order no. 5 – SO313 Retaining wall

Created by Ing. Bálint

Checked by Ing. Pastefák

Approved by Ing. Szombath

Contract
22 16 112

Document No.

Date
12-2017

Release
01

Status

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1. Identification data

Construction:	Substation Horná Ždaňa – Enlargement
Site location:	400kV Substation Horná Ždaňa region: Banskobystrický district: Žiar nad Hronom municipality: Horná Ždaňa territory: Horná Ždaňa
Employer:	Slovenská elektrizačná a prenosová sústava Mlynské Nivy 59/A 824 84 Bratislava Slovak republic
Operator:	Slovenská elektrizačná a prenosová sústava Prevádzková sprava Stred Priemyselná 3 038 52 Sučany Slovak republic

2. Reasons for the Variation

During works performance on construction „Substation Horná Ždaňa – enlargement. “, of civil part SO 313 – retaining wall, additional circumstances were found that caused variation of technical solution of design documentation for implementation (DDI).

During soil bearing capacity measurements for SO681 Temporary access road, as requested by Tender documents (TD) (*measurement report – attachment no.3*), were more severe conditions found than stated in TD. Variation of geological conditions along the planned access road and retaining wall were found. Original geological survey (OGS) by RNDr. Mikuš Pavol as of 17.09.2014 states higher soil bearing capacity than measured before construction. OGS states on page 6 following: „Designated area may contain descending underground water streams flowing across the area. It is necessary to point out that location and amounts of flowing water varies according to season and actual weather conditions. Streams may occur on spots, where probes were made and no stream was found, also they may disappear from spots where they have been found.“ That means that occurrence of water negatively affects soil bearing capacity.

3. Reasoning

TD, part SO 313.02 – Technical report, page 3 states: „*Tender documents – part Structural Analysis solves the design of the form and **approximate** reinforcement of the sustained wall for supporting the slope within enlargement of the Switchyard R400 –Horná Ždaňa*“, and following chapter

4.2 Structural Analysis states: „*Structural analysis of foundation structures is made in accordance with valid standards. Responsibility is related to the structure made according to DDI. Submitted project documentation serves only for tendering. In case of any additional changes of bearing parts of the structure or additional loading which was not considered in this project, it is necessary to consult this with structural engineer or responsible designer and prove by sufficient expertise that the structure meets requirements under changed conditions as well.*“. The Contractor's responsible designer suggested the following measures reflecting severe conditions observed and measured during construction and differences to OGS to enhance the design of SO313 – retaining wall and make it reliable and safe. SO313 retaining wall provides support of whole slope above the substation, it was necessary to take observed conditions in consideration, when the DDI for SO313 retaining wall was prepared.

4. Variation description

TD and DDI comparison – measures implemented:

- a) Reinforcement steel amount increase by 13,1 tons to provide higher total firmness of retaining wall.
- b) Modification of retaining wall shape, angled structures were replaced by rectangular structures.
- c) Drainage layer was strengthened to provide improved occurring water drainage. New anti-frost wedges were created including enhancing of clay soil compaction.
- d) Shape modification also caused increase of length of drainage holes to provide drainage of water from the hill held by the retaining wall.

5. Financial summary

Detailed budget and bill of quantity (BoQ) is attached to this document.

- a) Original budget BoQ from Tender – attachment no.4
- b) DDI Budget and BoQ – attachment no.5
- c) Comparative Budget and BoQ DDI-TD – attachment no.6

Financial summary for SO313 – Retaining wall:

Variation order budget costs:	220 659,97 EUR
<u>Original budget BoQ from Tender:</u>	<u>-200 637,04 EUR</u>
Costs difference:	20 022,93 EUR
<u>Processing fee (3,55% of costs difference):</u>	<u>630,00 EUR</u>
Variation order no.5 – total costs	20 652,93 EUR

6. Completion Date Impact

This variation does not influence overall completion date.

7. Attachments

Attachment no.1 – Preliminary approval by Managing Director of Division of Development and Investment, SEPS a.s.

Attachment no.2 - Construction General designer statement

Attachment no.3 – Soil bearing capacity report

Attachment no.4 - Original budget BoQ from Tender

Attachment no.5 - DDI Budget and BoQ

Attachment no.6 - Comparative Budget and BoQ DDI-TD

Attachment no.7 – Design Documentation for Implementation (DDI) – SO313 Retaining wall

Attachment no.8 – Photographs

Attachment no.1

Preliminary approval by Managing Director of Division of Development and Investment, SEPS a.s.

**Issuance of the preliminary approval to change of the SO 313 Retaining wall -
Horná Ždaňa substation**

On the basis of the submitted implementation dossier and the necessary consents and statements of its deliberation, I issue, pursuant to SM 09/2009, Annex D, Part B, point 3, I issue the

preliminary approval

to realize the change of the SO 313 Retaining wall **with a total increase of the construction price by 20 652,93 €** excluding VAT.

At the same time, I impose, in the sense of the Contract for Works 2016-0295-1177501, signed on February 6, 2017, to prepare Amendment No.1 to this Contract to change the implementation of the Earthworks.

In Bratislava, 11.9. 2017

Ing. Miroslav Stejskal
Managing director for the Investment section

Attachment no.2

Construction General designer statement

From: Vaclav Zeman
Sent: Friday, August 25, 2017 1:12 PM
To: Martin Pernis
Cc: Michal Halas; Martin Jasik
Subject: RE: SO 313 oporný múr Horná Ždaňa.

Dobrý deň

Ako spracovateľ predchádzajúcich stupňov PD pre danú stavbu súhlasíme so zdôvodnením potrebných úprav a so zmenou realizácie „SO 313 Oporný múr“ oproti stupňu DVZ v rozsahu navrhovaných zmien.

S pozdravom

Ing. Václav Zeman
technický riaditeľ

LIV - EPI, s.r.o. | Trenčianska 56/F | 821 09 | Bratislava
M: +421 907 714 815 | T: +421 2 5728 6354 | F: +421 2 5728 6352
www.liv-epi.sk | e-mail: zeman@liv-epi.sk

Attachment no.3

Soil bearing capacity measurement report

STATICKÁ ZAŤAŽOVACIA SKÚŠKA

(protokol o skúške)

Evid. č. protokolu:

ÚČEL: Kontrola miery zhutnenia, únosnosti a tuhosti zemných konštrukcií

01-17-091

Zákazník-objednávateľ skúšky: PROFAN, s.r.o. Ľubotín	Kontrakt - stavba : Rozvodňa 400 kV Horná Ždaňa Rozšírenie	Objekt: SO 681 Dočasná prístupová komunikácia
Konštrukcia: nespevnená vozovky zo ŠD	Miesto merania: km 0,225 stred	Klimatické podmienky pri meraní: teplota vzduchu: +19 °C teplota konštrukcie: +15 °C
Skúšaný materiál - zloženie konštrukcie: štrkodrvina fr. 0/63 ... hrúbka 600 mm geotextília a geomreža		Použité meradlá a skúšobné zariadenia: x zaťažovacia doska priemer 357 mm/0,1 m ² x elektronický snímač sily Lukas S 35-200 kN x elektronický odčýlkomer Schut-UPM04500 x bezkontaktný teplomer IR 880A

Technické špecifikácie pre skúšanie: STN 73 6190, STN 73 6133	Technické špecifikácie pre vyhodnotenie a interpretáciu výsledku : projekt stavby
---	---

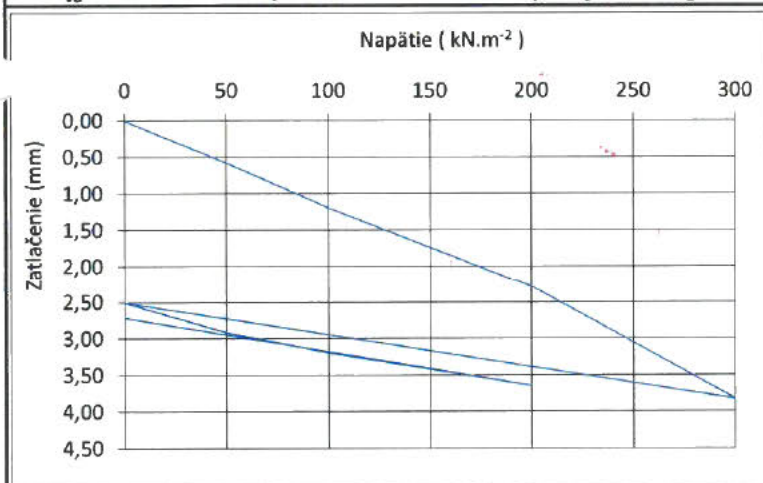
Požadované hodnoty: $E_{def,2} \geq 90 \text{ MN.m}^{-2}$ $E_{def,2}/E_{def,1} \leq 2,50$	Vstupné koeficienty: $k = 26,9$ $r (m) = 0,18$ $f_{tot} (m) = 0,00382$ $\Delta p (\text{MN.m}^{-2}) = 0,30$ $f_e (m) = 0,00132$ $v = 0,20$
--	---

Namerané hodnoty: Zaťažovací cyklus (zaťaženie - odľahčenie - zaťaženie - odľahčenie)			
(napätie v kN.m⁻² /zatláčenie v mm)	I.	(napätie v kN.m⁻² /zatláčenie v mm)	II.
	0 50 100 200 300	0 50 100 200 0	
	0,00 0,57 1,19 2,28 3,82	2,50 2,91 3,19 3,64 2,71	

Vypočítané hodnoty:	Zaťaženie pri deformácii - 1,27 mm v MN.m⁻² : 0,106
$\Delta h_1 = 1,09 \text{ mm}$	$E_{def,1} = 24,7 \text{ MN.m}^{-2}$ $k = 37,3 \text{ MN.m}^{-3}$
$\Delta h_2 = 0,45 \text{ mm}$	$E_{def,2} = 59,8 \text{ MN.m}^{-2}$ $E_{def} = 21,1 \text{ MN.m}^{-2}$
	$E_{def,2}/E_{def,1} = 2,42$ $E_p = 61,1 \text{ MN.m}^{-2}$

Vysvetlivky: $f_{tot} (m)$...celkové zatláčenie dosky $f_e (m)$...pružné zatláčenie dosky Δp ...rozsah napätia
 $E_{def,1}, E_{def,2}$... modul deformácie pre rozsah napätia 100-200 kN.m⁻² E_{def} ... modul deform. pre rozsah 0-300 kN.m⁻²
 k ... modul reakcie podložia E_p ... modul pružnosti pre rozsah 0-300 kN.m⁻²

Dynamická zaťažovacia skúška - porovnanie pre koreláciu skúšok :
 $E_{vd} = 26,4$ **korelačný koeficient** $k_1 = 0,93$ $k_2 = 2,26$



stav konštrukcie v čase merania

Vyhodnotenie:
 Únosnosť konštrukcie zodpovedá zloženiu konštrukcie a fyzikálno-mechanickým vlastnostiam pôvodného podložia ovplyvneného klimatickými pomermi.

Interpretácia - poznámky:

Dátum vykonania skúšky: 5.5.2017 | **Meral a vyhodnotil:** M. Starší | **Kontroloval a schválil:** RNDr. B. Starší

Prehlásenie: Výsledky skúšky sa týkajú len predmetu skúšania a nenahradzujú iné dokumenty požadované podľa osobitných predpisov. Bez písomného súhlasu laboratória protokol nesmie byť reprodukován inak ako celý.

STATICKÁ ZAŤAŽOVACIA SKÚŠKA

(protokol o skúške)

Evid. č. protokolu:

ÚČEL: Kontrola miery zžutnenia, únosnosti a tuhosti zemných konštrukcií

01-17-092

Zákazník-objednávateľ skúšky: PROFAN, s.r.o. Ľubotín	Kontrakt - stavba : Rozvodňa 400 kV Horná Žďaňa Rozšírenie	Objekt: SO 681 Dočasná prístupová komunikácia
Konštrukcia: nespevnená vozovky zo ŠD	Miesto merania: km 0,125 stred	Klimatické podmienky pri meraní: teplota vzduchu: +19 °C teplota konštrukcie: +15 °C
Skúšaný materiál - zloženie konštrukcie: štrkodrvina fr. 0/32 ... hrúbka 200 mm pôvodná komunikácia - lomový kameň, fr. 0/200 ... hrúbka 300 mm		Použité meradlá a skúšobné zariadenia: ▣ zaťažovacia doska priemer 357 mm/0,1 m ² ▣ elektronický snímač sily Lukas S 35-200 kN ▣ elektronický odčítateľ Schut-UPM04500 ▣ bezkontaktný teplomer IR 880A

Technické špecifikácie pre skúšanie: STN 73 6190, STN 73 6133	Technické špecifikácie pre vyhodnotenie a interpretáciu výsledku : projekt stavby
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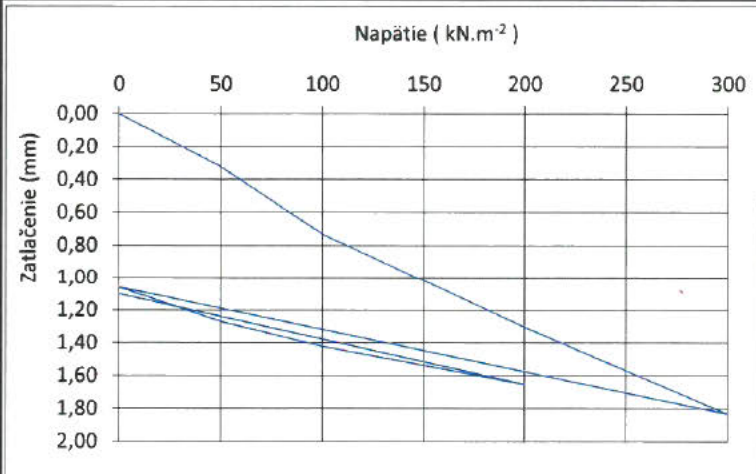
Požadované hodnoty: $E_{def,2} \geq 90 \text{ MN.m}^{-2}$ $E_{def,2}/E_{def,1} \leq 2,50$	Vstupné koeficienty: $k = 26,9$ $f_{tot} (m) = 0,00183$ $f_e (m) = 0,00077$	$r (m) = 0,18$ $\Delta p (\text{MN.m}^{-2}) = 0,30$ $v = 0,20$
--	---	--

Namerané hodnoty: (napätie v kN.m ⁻² /zatláčenie v mm)	Zaťažovací cyklus I.	(zaťaženie - odľahčenie - zaťaženie - odľahčenie) II.
	0 50 100 200 300	0 50 100 200 0
	0,00 0,32 0,73 1,30 1,83	1,06 1,27 1,42 1,65 1,10

Vypočítané hodnoty: $\Delta h_1 = 0,57 \text{ mm}$ $\Delta h_2 = 0,23 \text{ mm}$	Zaťaženie pri deformácii - 1,27 mm v MN.m⁻² : $E_{def,1} = 47,2 \text{ MN.m}^{-2}$ $E_{def,2} = 117,0 \text{ MN.m}^{-2}$ $E_{def,2}/E_{def,1} = 2,48$	$k = 66,9 \text{ MN.m}^{-3}$ $E_{def} = 44,1 \text{ MN.m}^{-2}$ $E_p = 104,8 \text{ MN.m}^{-2}$
--	--	---

Vysvetlivky: $f_{tot} (m)$...celkové zatláčenie dosky $f_e (m)$...pružné zatláčenie dosky Δp ...rozsah napätia
 $E_{def,1}, E_{def,2}$... modul deformácie pre rozsah napätia 100-200 kN.m⁻² E_{def} ... modul deform. pre rozsah 0-300 kN.m⁻²
 k ... modul reakcie podložia E_p ... modul pružnosti pre rozsah 0-300 kN.m⁻²

Dynamická zaťažovacia skúška - porovnanie pre koreláciu skúšok :
 $E_{vd} = 50,3$ korelačný koeficient $k_1 = 0,94$ $k_2 = 2,33$



stav konštrukcie v čase merania

Vyhodnotenie:
 Únosnosť konštrukcie vyhovuje požiadavkam.

Interpretácia - poznámky:

Dátum vykonania skúšky: 5.5.2017 | **Meral a vyhodnotil:** M. Starší | **Kontroloval a schválil:** RNDr. B. Starší

Prehlásenie: Výsledky skúšky sa týkajú len predmetu skúšania a nenahradzujú iné dokumenty požadované podľa osobitných predpisov. Bez písomného súhlasu laboratória protokol nesmie byť reprodukován inak ako celý.

**MOBILNÉ SKÚŠOBNÉ LABORATÓRIUM**

Kontakty:

tel: 048 4161 308 , mobil: 0905401711

e-mail: kvalitest@kvalitest.sk

web: www.kvalitest.sk



Autorizovaný stavebný inžinier č. 2927*A*3-1

ZAŤAŽOVACIA SKÚŠKA ĽAHKOU DYNAMICKOU DOSKOU

ÚČEL: Kontrola miery zhutnenia, únosnosti a tuhosti zemných konštrukcií (protokol o skúške) **Skúška homogenity konštrukcie**

Evid. číslo protokolu:
01-16-093

Zákazník-objednávateľ skúšky: PROFAN, s.r.o. Ľubotín	Kontrakt - stavba : Rozvodňa 400 kV Horná Ždaňa Rozšírenie	Objekt: SO 681 Dočasná prístupová komunikácia
Konštrukcia: podložie - zemná pláň a konštrukcia vozovky	Miesto merania: celá plocha konštrukcie vo vybraných kontrolných bodoch	Klimatické podmienky pri meraní: teplota vzduchu: + 19 °C teplota konštrukcie: + 15 °C
Skúšaný materiál - zloženie konštrukcie: štrkodrvina fr. 0/63 ... hrúbka 300 mm geotextília separačná + geomreža íl so strednou plasticitou, mäkká až tuhá konzistencia		Použitie meradiel a skúšobné zariadenia: ⊗ zaťažovacia doska priemer 300 mm ⊗ meracie zariadenie LDD 100 v.č. 194 ⊗ bezkontaktný teplomer IR 880A
Technické špecifikácie pre skúšanie: STN 73 6192, STN 73 6133	Technické špecifikácie pre vyhodnotenie a interpretáciu výsledku : projekt stavby	

požadované hodnoty:	$E_{vd} > 27 \text{ MN.m}^{-2}$ $E_{def,z} > 60 \text{ MN.m}^{-2}$	Metóda merania a vyhodnotenia:	1) $E_{defz} = E_{vd} \cdot 1,5 \text{ (MN.m}^{-2}\text{)} \dots \text{íl}$ 2) $E_{defz} = E_{vd} \cdot 2,26 \text{ (MN.m}^{-2}\text{)} \dots \text{štrky}$
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Namerané hodnoty :			
Číslo skúšky	Miesto merania	Dynamický modul deformácie $E_{vd} \text{ (MN.m}^{-2}\text{)}$	Statický modul deformácie $E_{defz} \text{ (MN.m}^{-2}\text{)}$
1 Dátum merania 5.5.2017	km 0,400	17,8	40,2 nevyhovuje
2 5.5.2017	km 0,475 (kamenité podložie)	50,8	114,8 vyhovuje
3 5.5.2017	km 0,275 ŠD hr. 600 mm	41,5	93,8 vyhovuje



stav konštrukcie v čase merania

Vyhodnotenie:

Únosnosť a miera zhutnenia vrstvy vyhovuje požiadavkám v úsekoch s hrubšou vrstvou ŠD a na podloží s obsahom andezitových balvanov.

*vzťah medzi výsledkami skúšok dynamickej a statickej zaťažovacej skúšky

Dátum vydania protokolu: 5.5.2017 **Meral a vyhodnotil:** B. Starší **Kontroloval a schválil:** RNDr. B. Starší

Prehlásenie: Výsledky skúšky sa týkajú len predmetu skúšania a nenahradzujú iné dokumenty požadované podľa osobitných predpisov. Bez písomného súhlasu laboratória protokol nesmie byť reprodukován inak ako celý.

Attachment no.4

Original budget BoQ from Tender

Attachment no.5

DDI budget and BoQ

Attachment no.6

Comparative Budget and BoQ DDI-TD

Attachment no.7

placed in separate package

Design Documentation for Implementation (DDI) – SO313 Retaining wall

Attachment no.8

Photographs

Design Documentation for Implementation (DDI) – SO313 Retaining wall



Complex ES Bystričany – Transformation 400/110kV

Rozvodňa Horná Ždaňa – enlargement

Variation Order no. 8 – PS 07 400 kV Switchyard

Created by Ing. Bálint

Checked by Ing. Pastelák

Approved by Ing. Szombath

Contract 22 16 112	Document No.	Date 12-2017
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Release 01	Status	Copy
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1. Identification data

Construction:	Substation Horná Ždaňa – Enlargement
Site location:	400kV Substation Horná Ždaňa region: Banskobystrický district: Žiar nad Hronom municipality: Horná Ždaňa territory: Horná Ždaňa
Employer:	Slovenska elektrizačná a prenosová sústava Mlynské Nivy 59/A 824 84 Bratislava Slovak republic
Operator:	Slovenská elektrizačná a prenosová sústava Prevádzková správa Stred Priemyselná 3 038 52 Sučany Slovak republic

2. Reasons for the Variation

During works performance on construction „Substation Horná Ždaňa – enlargement. “, of civil part PS07 – Gantry, additional circumstances were found that caused variation of technical solution of design documentation for implementation (DDI). This variation includes steel amount increase of Gantry structure, caused by definition of determining values for design of steel structures by the Employer, and also by the circumstances found on site by geological survey made by the Contractor.

3. Reasoning

This steel amount increase of Gantry structure by 15,334 tonnes, was found during design works on Design documentation for Implementation (DDI) .This increase is caused by definition of determining values for design of steel structures by the Employer, and also by the circumstances found on site by geological survey made by the Contractor.

Design of Gantry steel structure in DDI, is determined determining values for design of steel structures during DDI elaboration. These values has not been known during Tender period, and had come out of Design Documentation for Tendering (DDT) of OHL V483 a V485 (Horná Ždaňa – Oslany), which defined tensile force of ACSR conductor 476-AL1/62-STA1 to 60 kN and tensile force of OPGW and GW on every peak of the gantry to 20 kN, large span between the gantry and the last tower (125m), larger values of short circuit currents in the 400kV switchyard. Also, bearing capacity of the slope over 400kV switchyard and geological survey in the place of construction was made. Based

on acquired data DDI and workshop drawings for gantry in Horná Žďaňa 400kV substation were designed.

Steel mass increase is caused by:

- a) Tensile force definition (increase) to 20kN on every peak. DDT stated value of 15kN in accordance with standard STN 33 3230.
- b) Geological conditions found by the survey made during implementation phase

Designed gantry foundation was also evaluated according to static and dynamic stress caused by the changed conditions. This was foundation meet the conditions required on static and dynamic stress. Static calculation and assessment (Attachment 5).

4. Variation description

DDT and DDI comparison – measures implemented:

DDT - Technical report of PS07 states regarding Gantries (MSC) states:

The main steel structure for the new ACA07 and ACA08 bays of the 400kV substation will be of lattice frame type, dip galvanized. It will be assembled of 23m high towers with crossbars of the axial width of 18m and rods for 6m high suspended air termination. The towers of the main steel structure will be anchored to cups in the foundation footings. Once the tower is installed the cups will get filled.

DDI - Technical report of PS07 states regarding Gantries (MSC) states:

The project of the Main Steel Construction (MSC) in the stage of implementation documentation has been processed on the basis of a project for selection of a contractor, processor of the technological part and in accordance with the following documents:

- MSS cross projection with added loads and portals in fields 06, 07, 08, 09 – drawing number 03_PS07.1_DVZ_00, provided as a source document for processing by the client, which indicates theoretical dimension of individual elements of the main steel structure and numbering of fields and footings of poles.
- Geological survey made by GEO spol. s r.o. Nitra, Tehelná 48, 949 01 NITRA (attachment 11)

MSC loading is compliant with standard TN EN 50341-1: 2006 – Electrotechnical regulations of three-phase substation for voltage over 45 kV – determined to 60 kN per phase for outlets, as well as 60 kN for connection in the substation and 20 kN for tension of the earth cable for outlets. This loading corresponds to vertical load components and lateral wind forces and short-circuit.

5. Financial summary

Detailed budget and bill of quantity (BoQ) is attached to this document.

- a) Original budget BoQ from Tender – attachment no.4
- b) DDI Budget and BoQ – attachment no.5
- c) Comparative Budget and BoQ DDI-TD – attachment no.6

Financial summary for PS07 – Gantry:

Variation order budget costs:	1 461 224,054 EUR
<u>Original budget BoQ from Tender:</u>	<u>-1 404 574,574 EUR</u>
Costs difference:	56 649,48 EUR
<u>Processing fee (3,55% of costs difference):</u>	<u>2 011,05 EUR</u>
Variation order no.8 – total costs	58 660,53 EUR

6. Completion Date Impact

This variation does not influence overall completion date.

7. Attachments

Attachment no.1 – Preliminary approval by Managing Director of Division of Development and Investment, SEPS a.s

Attachment no.2 – Construction General designer statement

Attachment no.3 – Certified Civil engineer – Static - statement on gantry foundations

Attachment no.4 - Original budget BoQ from Tender

Attachment no.5 - DDI Budget and BoQ

Attachment no.6 - Comparative Budget and BoQ DDI-TD

Attachment no.7 – Static calculation and assessment HZDA SO 522_S&CDE_AC02

Attachment no.8 – DDI – PS 07 Rozvodňa 400 kV

Attachment no.9 – Photographs

Attachment no.10 – DDT Geological survey

Attachment no.11 - DDI Geological survey

Attachment no.1

Preliminary approval by Managing Director of Division of Development and Investment, SEPS a.s.

Issuance of the preliminary approval for the change of the desing for the main steel structure (HOK) – Horná Ždaňa substation

On the basis of the submitted implementation dossier and the necessary consents and statements of its deliberation, I issue, pursuant to SM 09/2009, Annex D, Part B, point 3, I issue the

preliminary approval

to realize the change of the main steel structure **with a total increase of the construction price by 56 660,53 €** excluding VAT.

At the same time, I impose, in the sense of the Contract for Works 2016-0295-1177501, signed on February 6, 2017, to prepare Amendment No.1 to this Contract to change the implementation of the Earthworks.

In Bratislava 21.5.2018

Ing. Miroslav Stejskal
Managing director for the Investment section



Attachment no.2

Construction SPIE statement

Bratislava, 11.9.2017

4020/50/Bá

Vec: Stanovisko k návrhu hlavnej ocelevej konštrukcie v stupni realizačný projekt
Stavba: Rozvodňa 400kV Horná Ždaňa - rozšírenie

Vážený obchodný partner,

na základe výzvy Vám zasielame stanovisko k nárastu hmotnosti hlavnej ocelevej konštrukcie medzi stupňom dokumentácia pre výber zhotoviteľa (DVZ) a realizačného projektu (DRS), ktorý predstavuje nárast o 15 ton ocele uvádzame nasledovné stanovisko.

Návrh hlavnej ocelevej konštrukcie v stupni DRS vychádzal zo vstupných parametrov odkomunikovaných s projektantom vedení liniek V483 a V485 po spracovaní realizačného projektu, ktorý definoval ťahy od trojväzku vodičov 476-AL1/62-ST1A v hodnote 60 kN a hodnotu ťahu od zemného lana na každú špicu na hodnotu 20 kN vzhľadom na veľké rozpätie od koncového stožiaru po portál (až 125 m) a vyššie skratové prúdy v rozvodni.

Nárast hmotnosti je spôsobený:

- a. Zvýšenou hodnotou ťahu od zemného lana na každú špicu na hodnotu 20 kN. V stupni DVZ boli uvažovaných štandardných 15kN v zmysle normy STN 33 3230.
- b. Hmotnosť definovaná v DRS je uvedená vrátane hmotnosti po úprave pozinkovaním a výrobnými toleranciami, ktoré tvoria 8% z uvedenej hmotnosti .

Zároveň konštatujeme, že všetky základové konštrukcie pod HOK vyhovujú na požadované zaťaženie, aj po prirážení od ocelevej konštrukcie.

S pozdravom

Ing. Tomáš Bálint
manažér pre projekciu DEM
útvár 4020

Attachment no.3

Certified Civil engineer – Static - statement on gantry foundations

Vec: Vyjadrenie k únosnosti základov pod HOK vzhľadom k nárastu hmotnosti HOK

Na základe požiadavky o posúdenie základových konštrukcií pod HOK vzhľadom k nárastu hmotnosti HOK, boli základové konštrukcie opätovne posúdené na dodané uvažované zaťaženie.

Všetky základové konštrukcie pod HOK **vyhovujú** na požadované zaťaženie, aj po prirážení od ocelevej konštrukcie.

Pri návrhu základových konštrukcií sú kritické kombinácie rôznych skratových síl, kde priráženie od vlastnej tiaže ocelevej konštrukcie má zanedbateľný vplyv na základové konštrukcie.

Ing./Martin Kyseľ /

Attachment no.4

Original budget BoQ from Tender

Attachment no.5

DDI Budget and BoQ

Attachment no.6

Comparative Budget and BoQ DDI-TD

Attachment no.7

Static calculation and assessment HZDA SO 522_S&CDE_AC02

Statický výpočet / Static calculation

Arch. č. / No. HZDA=CCA+SO522_S&CDE_AC02
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1 Identifikačné údaje

Názov stavby:	Rozvodňa R400kV Horná Ždaňa – rozšírenie
Miesto stavby:	Elektrická stanica Horná Ždaňa kraj: Banskobystrický okres: Žiar nad Hronom obec: Horná Ždaňa kat. územie: Horná Ždaňa
Investor:	Slovenská elektrizačná a prenosová sústava Mlynské Nivy 59/A 824 84 Bratislava Slovenská republika
Budúci prevádzkovateľ:	Slovenská elektrizačná a prenosová sústava Prevádzková správa Stred Priemyselná ulica 3 038 52 Sučany Slovenská republika

2 Všeobecné údaje

2.1 Predmet a rozsah statického posudku

- Predmetom statického posudku je posúdenie navrhnutých základových konštrukcií pod HOK pri rozšírení objektu rozvodne R400 –Horná Ždaňa
- Výpočet je urobený na základe zmeny požiadaviek technologickej časti, technickej špecifikácie zariadení, výškopisom a polohopisom zariadení.
- Zmena vstupného zaťaženia na HOK

2.2 Podklady

Podkladom pre spracovanie dokumentácie je:

- ZoD medzi SEPS, a.s 2014-0061-1179530 a LiV-EPI, s.r.o. 1423.1
- Konzultácie so zástupcami objednávateľa a prevádzkovateľa,
- Dokumentácia pre územné rozhodnutie (11/2014),
- Obhliadka miesta stavby vykonaná zhotoviteľom dokumentácie

Attachment no.8

placed in separate package

Design Documentation for Implementation (DDI) – PS 07 – Switchyard

Attachment no. 9

Photographs

Attachment no. 10
DDT Geological survey

ZÁVEREČNÁ SPRÁVA

Zákazkové číslo	:	1440
Miesto úlohy	:	Horná Ždaňa
Názov úlohy	:	TR Horná Ždaňa
Objednávateľ	:	LiV-EPI, s.r.o., Bratislava
Riešiteľská org.	:	IGP – Dr. Mikuš, s.r.o., Bratislava
Zodp. riešiteľ	:	RNDr. Mikuš Pavol, Bratislava
Druh geol. prác	:	Inžinierskogeologický prieskum
Etapa prieskumu	:	Orientačný prieskum

Bratislava 17.09.2014

OBSAH

Úvod
Technické práce
Inžinierskogeologické pomery
Hydrogeologické pomery
Pôdomechanické charakteristiky zemín
Rozpojitelnosť a ťažiteľnosť zemín
Seizmicita územia
Záver

PRÍLOHY

- 1 - Geologická lokalizácia 1:100 000
- 2 - Situácia sond 1:800
- 3 - Vysvetlivky ku geol. profilom
- 4 - Geologické zloženie v sondách 1:100
- 5 - Geologické zloženie v sondách 1:100
- 6 - Chemický rozbor podzemnej vody
- 7 - Laboratórne rozbory a skúšky zemín
- 8 - Inžinierskogeologické posúdenie stability



Complex ES Bystričany – Transformation 400/110kV

Rozvodňa Horná Ždaňa – enlargement

Variation Order no. 12 – SO522 Switchyard 400kV – field 7 and 8

Created by Ing. Bálint

Checked by Ing. Pastelák

Approved by Ing. Szombath

Contract	Document No.	Date
22 16 112		12-2017

Release	Status	Copy
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1. Identification data

Construction:	Substation Horná Ždaňa – Enlargement
Site location:	400kV Substation Horná Ždaňa region: Banskobystrický district: Žiar nad Hronom municipality: Horná Ždaňa territory: Horná Ždaňa
Employer:	Slovenska elektrizačná a prenosová sústava Mlynské Nivy 59/A 824 84 Bratislava Slovenska republika
Operator:	Slovenská elektrizačná a prenosová sústava Prevádzková sprava Stred Priemyselná ulica 3 038 52 Sučany Slovenská republika

2. Reasons for the Variation

During works performance on construction „Substation Horná Ždaňa – enlargement“, of civil part SO 522 – field 7 and 8, complicated foundation conditions were found. Geological survey for change of soil class classification was taken. Exact excavations were not possible due to soil class, which caused overconsumption of concrete.

3. Reasoning

Problems that have arisen during the excavation of foundations are caused by the complicated geology in the environment (the photo documentation and independent geological report are attached). So the geologist was called to excavation works to determine the individual soil classes. The excavation works of soil classes 3 – 6 were complicated to be done by great mechanism and in accordance with DDI. Big rocks and boulders mixed with clay soil caused oversized excavations and together with underground water the stability of excavation slope was disrupted. There was a landslide and dropping of rocks from the excavations. The groundwater passed into the foundations base in some places, so the water had to be drained and base cleaned out. All of these facts had an impact on the increase of the amount of the concrete mixture. The rocks of soil class No. 6, that had to be broken right in the excavation, were found during the excavation works. During the earthworks on the substructure under the main retaining structure the trench had to be enlarged by working space for

workers. The whole erection has been complicated by the adverse weather and heavy rainfall (ground and underground water streams). The construction had to be continually drained and rainfall water pumped away.

4. Variation description

The original geological survey:

Engineering geological survey was processed as an indicative survey. The original survey determined the soil workability 3, 4, 5 and emphasising the actual and individual classification has to be done only during the excavation works. Based on this fact the geologist was called to excavation works to determine the individual soil classes.

The individual workability classes of soil and rocks were determined in the geological survey prepared by the company Geo spol. s r.o. as follows:

- workability class 3 – 57%
- workability class 4 – 30%
- workability class 5 – 10%
- workability class 6 – 3%

The original geological survey determined foundation of planned objects and buildings as difficult and undemanding also and foundation conditions as complicated. This can already be seen by realization of gantry foundation together with groundwater and subsurface water.

DDI and DDT comparison is as follows:

- a) Increase of the amount of the concrete mixture and change of soil classes 3, 4, 5, 6 + pumping of rainfall.
- b) Enlargement of trench because of more convenient working space for workers and mainly because of their security.
- c) Increase of excavation works and subsequent removal of soil, draining of the water from trenches

5. Financial summary

Detailed budget and bill of quantity (BoQ) is attached to this document.

- a) Original budget BoQ from Tender – attachment no.4
- b) DDI Budget and BoQ – attachment no.5
- c) Comparative Budget and BoQ DDI-TD – attachment no.6

Financial summary for SO522.1 – Switchyard 400kV – field 7:

Variation order budget costs:	226 851,76 EUR
<u>Original budget BoQ from Tender:</u>	<u>-145 673,82 EUR</u>
Costs difference:	81 177,94 EUR
<u>Processing fee (7,2% of costs difference):</u>	<u>5 844,81 EUR</u>
Variation order no. 12 – field 7	87 022,75 EUR

Financial summary for SO522.2 – Switchyard 400kV – field 8:

Variation order budget costs:	201 618,49 EUR
<u>Original budget BoQ from Tender:</u>	<u>-160 127,78 EUR</u>
Costs difference:	41 490,71 EUR
<u>Processing fee (7,2% of costs difference):</u>	<u>2 987,33 EUR</u>
Variation order no. 12 – field 8	44 478,04 EUR

Financial summary for variation order no. 12 – (i) SO522.1 – Switchyard 400kV – field 7, and (ii) SO522.2 – Switchyard 400kV – field 8:

Variation order budget costs:	428 470,25 EUR
<u>Original budget BoQ from Tender:</u>	<u>-305 801,60 EUR</u>
Costs difference:	122 668,65 EUR
<u>Processing fee (7,2% of costs difference):</u>	<u>8 832,14 EUR</u>
Variation order no.12 – total costs	131 500,79 EUR

6. Completion Date Impact

This variation does not influence overall completion date.

7. Attachments

Attachment no.1 – Preliminary approval by Managing Director of Division of Development and Investment, SEPS a.s.

Attachment no.2 - Construction General designer statement

Attachment no.3 – Technical report HZDA=CCA+SO522_S&CDB_AC01

Attachment no.4 - Original budget BoQ from Tender

Attachment no.5 - DDI Budget and BoQ

Attachment no.6 - Comparative Budget and BoQ DDI-TD

Attachment no.7 – Design Documentation for Implementation (DDI) – SO522 Switchyard 400kV

Attachment no.8 – Photographs

Attachment no. 9 – Geological report – DDT

Attachment no. 10 – Geological report - realization

Attachment no. 11 – Geodetical measurement of foundations

Attachment no. 12 – Ground plan of the substation and sections

Attachment no.1

Preliminary approval by Managing Director of Division of Development and Investment, SEPS a.s.

Vec : Vydanie predbežného súhlasu na SO522.2 Rozvodňa 400 kV – pole č.7 a č.8 – Horná Ždaňa - rozšírenie.

Vážený pán vrchný riaditeľ,

dovoľujeme si Vás požiadať o vydanie predbežného súhlasu na doplnenie rozsahu dokumentácie pre výber zhotoviteľa o náklady spojené so zmenou v SO 522.2 Rozvodňa 400 kV – pole č.7 a č.8, a o udelenie súhlasu na realizáciu zmeny v rozsahu plnenia diela, ktorý sa realizuje v ESt Horná Ždaňa - rozšírenie ako súčasť stavby „Rozvodňa 400 kV Bystričany – transformácia 400/110 kV“. Počas realizácie stavby Horná Ždaňa – rozšírenie, v rámci stavebného objektu SO 522 Rozvodňa 400 kV pre polia č. 7 a č.8 sa pri výkopových prácach zistili zložité základové pomery, ktoré komplikovali zakladanie základových pätičiek, čo malo za následok zmenu zatriedenia triedy zeminy a nadspotrebu betónovej zmesi. Celková cena diela je vyššia o 131 500,79 € bez DPH. Dotknuté zmeny nemajú vplyv na ukončenie SO 522 – Rozvodňa 400 kV ani na konečný termín ukončenia realizácie stavby.

Týmto Vás v zmysle SM 09/2009 Prílohy D časť B, bod 3 žiadame vydať predbežný súhlas so zmenovým konaním – viď Prílohu č. 11.

Za kladné vybavenie tejto žiadosti Vám vopred ďakujeme.

S pozdravom,

Mgr. Anna Kamila Szer
Poverená zastupovaním pracovnej
pozície vedúci odboru investícií z EÚ

Príloha

- 1, Žiadosť zhotoviteľa na realizáciu zmeny;
- 2, Technická správa;
- 3, Výkaz výmer DVZ;
- 4, Výkaz výmer DRS;
- 5, Výkaz výmer – rozdiel;
- 6, Fotodokumentácia;
- 7, Geologický posudok – realizácia;
- 8, Geologický prieskum DVZ;
- 9, Zameranie základov;
- 10, Dokumentácia skutkového prevedenia;
- 11, Návrh textu predbežného súhlasu so zmenovým konaním.

**Issuance of the preliminary approval for SO 522.2 Switchyard 400 kV –
bay No. 7 a No. 8 - Horná Ždaňa substation**

On the basis of the submitted implementation design and the necessary consents and statements of its deliberation, I issue, pursuant to SM 09/2009, Annex D, Part B, point 3, I issue the

preliminary approval

to realize **SO 522.2 Switchyard 400 kV – bay No. 7 a No. 8 - Horná Ždaňa substation with a total increase of the construction price by 131 500,79 €** excluding VAT.

At the same time, I impose, in the sense of the Contract for Works 2016-0295-1177501, signed on February 6, 2017, to prepare Amendment No.1 to this Contract to change the implementation of the Earthworks.

In Bratislava, 7.12.2018

Ing. Miroslav Stejskal
Managing director for the Investment section

Vydanie predbežného súhlasu na SO522.2 Rozvodňa 400 kV – pole č.7 a č.8 – Horná Ždaňa - rozšírenie.

Na základe predloženej realizačnej dokumentácie a potrebných súhlasov a vyjadrení o jej prerokovaní vydávam v zmysle SM 09/2009 Prílohy D časť B, bod 3

predbežný súhlas

na zrealizovanie **SO522.2 Rozvodňa 400 kV – pole č.7 a č.8 v rozvodni Horná Ždaňa s celkovým navýšením ceny stavby o 131 500,79 € bez DPH.**

Súčasne ukladám v zmysle ZoD 2016-0295-1177501, podpísanej dňa 6. február 2017, vypracovať Dodatok č.1 k tejto ZoD pre zmenu realizácie Zemných úprav.

V Bratislave dňa 7.12.2018

Ing. Miroslav Stejskal
vrchný riaditeľ úseku rozvoja a investícií

Attachment no.2

Construction General designer statement

Subject: Designer general statement to the Variation order no. 12 for „The substation Horná Ždaňa – enlargement “

After considering the proposal for the change of the design documentation for implementation and others received documents to the variation order no. 12, I can hereby conclude that by performing the relevant changes there is no significant interference with our work.

We consider the relevant variation order as an adaption of our design to actual conditions which were not or could not be found during preparation of our design.

On the basis of the fact established, I therefore approve the solution mentioned in the variation order. Suggested solutions ensure the safe realization and operation of the work, together with increasing of its quality and value. These solutions also comply fully the idea suggested in design documentation for tendering.

Attachment no.3

Technical report HZDA=CCA+SO522_S&CDB_AC01



Attachment no.4

Original budget BoQ from Tender



Attachment no.5

DDI budget and BoQ



Attachment no.6

Comparative Budget and BoQ DDI-TD

Attachment no.7

placed in separate package

Design Documentation for Implementation (DDI) – SO522 Substation 400 kV



Attachment no.8

Photographs

Rozvodňa R400 kV Horná Ždaňa – rozšírenie

Substation Horná Ždaňa - enlargement

SO 522 Rozvodňa 400 kV / E 522.02 Statika

SO 522 Switchyard 400 kV/E 522.02 Structural design

Fotodokumentácia

k zameranie skutkového stavu rozmerov základov



Attachment no.9

Geological report - DDT

ZÁVEREČNÁ SPRÁVA

Zákazkové číslo	:	1440
Miesto úlohy	:	Horná Ždaňa
Názov úlohy	:	TR Horná Ždaňa
Objednávateľ	:	LiV-EPI, s.r.o., Bratislava
Riešiteľská org.	:	IGP – Dr. Mikuš, s.r.o., Bratislava
Zodp. riešiteľ	:	RNDr. Mikuš Pavol, Bratislava
Druh geol. prác	:	Inžinierskogeologický prieskum
Etapa prieskumu	:	Orientačný prieskum

Bratislava 17.09.2014

OBSAH

Úvod
Technické práce
Inžinierskogeologické pomery
Hydrogeologické pomery
Pôdomechanické charakteristiky zemín
Rozpojiteľnosť a ťažiteľnosť zemín
Seizmicita územia
Záver

PRÍLOHY

- 1 - Geologická lokalizácia 1:100 000
- 2 - Situácia sond 1:800
- 3 - Vysvetlivky ku geol. profilom
- 4 - Geologické zloženie v sondách 1:100
- 5 - Geologické zloženie v sondách 1:100
- 6 - Chemický rozbor podzemnej vody
- 7 - Laboratórne rozbory a skúšky zemín
- 8 - Inžinierskogeologické posúdenie stability

Attachment no.10

Geological report - realization

Attachment no.11

Geodetical measurement of foundations

Rozvodňa R400 kV Horná Ždaňa – rozšírenie

Substation Horná Ždaňa - enlargement

SO 522 Rozvodňa 400 kV / E 522.02 Statika

SO 522 Switchyard 400 kV/E 522.02 Structural design

Zameranie skutkového stavu rozmerov základov

Zameral: Ing. Lukáš Nižňanský, stavbyvedúci

Kontroloval: Ing. Ján Kuzmiak, technický dozor

Overil: Ing. Karol Ferenczy, autorský dozor



Complex ES Bystričany – Transformation 400/110kV

Rozvodňa Horná Ždaňa – enlargement

Variation Order no. 13 – PS 30.3 Digital Protections

Created by Ing. Bálint

Checked by Ing. Pastefák

Approved by Ing. Szombath

Contract
22 16 112

Document No.

Date
03-2018

Release
01

Status

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1. Identification data

Construction:	Substation Horná Ždaňa – Enlargement
Site location:	400kV Substation Horná Ždaňa region: Banskobystrický district: Žiar nad Hronom municipality: Horná Ždaňa territory: Horná Ždaňa
Employer:	Slovenska elektrizačná a prenosová sústava Mlynské Nivy 59/A 824 84 Bratislava Slovak republic
Operator:	Slovenská elektrizačná a prenosová sústava Prevádzková sprava Stred Priemyselná 3 038 52 Sučany Slovak republic

2. Reasons for the Variation

During works performance on construction „Substation Horná Ždaňa – enlargement. “, of electrical part PS30.3 – electrical protections, following circumstances were found that caused variation of technical solution of design documentation for implementation (DDI).

This variation concerns the replacement of Busbar differential protection (BDP) devices (central unit + 8 bay units). Reason for this replacement is manufacture termination of BDP central and bay units REB version 5.02 by the ABB. Manufacturer offers solution as replacement of the complete BDP consisting of 1 central unit and 8 bay units in version 7.6. ABB also announce termination of maintenance support of BDP units version v5.02. Due to partial incompatibility between existing BDP units version 5.02 and new BDP units version 7.6, complete BDP shall be replaced.

This solution includes design, supply, installation of new complete BDP device REB500 (1 central unit + 8 bay units) in version 7.6 and modification of existing cubicles. The Employer will receive new complete UpToDate solution of BDP type REB500.

3. Reasoning

Following circumstances and time relations led to the variation no.13 and replacement of existing BDP REB500 v5.02. included in electrical part PS30.3 – Electrical protections.

September 2016 – Offer from the ABB to the Contractor was placed. BDP device REB500 version 5.02 was included in production programme of the ABB factory.

December 2017 – The Contractor placed order for BDP REB500 v5.02 - 2 bay units. Abb announced that BDP REB500 v5.02 is no longer included in production programme. ABB offered, instead of delivery of 2 outdated REB500 v5.02 bay units, complete replacement of existing BDP device REB500 (1 central unit, 6 bay units) v5.02, for new BDP device REB500 (1 central unit, 8 bay units) in up-to-date version 7.6. Due to partial incompatibility between existing BDP units version 5.02 and new BDP units version 7.6, combination is not recommended i.e. complete BDP shall be replaced.

ABB also announced termination of maintenance support of BDP units version v5.02. That will cause problems with maintenance. Following the fact that existing device will reach its lifetime period in few years it will be subject for replacement anyway.

Operation of 2 two partial incompatible versions of BDP devices is hazardous to safe network operation.

Variation is caused by:

- a) BDP device REB500 v5.02 production termination. This type and manufacture was chosen due to extension of existing BDP device in ES 400kV Horná Ždaňa. DDT solution stated addition of 2 new BDP REB500 v5.02 bay units. These 2 units can be made to measure, but this manufacture is very expensive and equals to 250% price increase. ABB also announced termination of maintenance support of BDP units version v5.02. Therefore, is advantageous to replace complete BDP device REB500 v5.02 for up—to-date BDP device REB500 v7.6.
- b) BDP device replacement requires also change to the approved DDI elaborated for BDP REB500 version 5.02 and modification of existing cubicles accordingly. Scope of testing is also increased.

Therefor we call for Sub-clause 13.2 „Value engineering“ of General Conditions of Contract, and we prepared this Variation order in compliance with Sub-clause 13.3 „Variation procedure“ of General Conditions of Contract.

4. Variation description

The differences between DDT and DDI are as follows::

TD and DDT requirements

- Design, Delivery, Installation, Configuration and Testing of 2 BDP device REB500 v5.02 bay units
- Design, Delivery, Installation and Testing of 2 protection cubicles
- Design, Modification and Testing in existing protection cubicles RC5 and RC6.

DDI and works performed

- Design of 2 BDP device REB500 v5.02 bay units
- Design of 2 protection cubicles
- Design of Modification in existing protection cubicles RC5 and RC6.

Variation order requirements

- Re-Design, Delivery, Installation, Configuration and Testing of 8 BDP device REB500 v7.6 bay units + 1 BDP device REB500 v7.6 central unit
- Re-Design, Delivery, Installation and Testing of 2 protection cubicles
- Re-Design, Modification and Testing in existing protection cubicles RC5 and RC6.
- Design, Modification and Testing in existing protection cubicles of bays 01-06.
- Disassembly of old BDP device REB500 v5.02 (6 bay units +1 central unit)
- Complete BDP device system testing incl. SCMS database update.

5. Financial summary

Detailed budget and bill of quantity (BoQ) is attached to this document.

- a) Original budget BoQ from Tender – attachment no.4
- b) DDI Budget and BoQ – attachment no.5
- c) Comparative Budget and BoQ DDI-TD – attachment no.6

Financial summary for PS30.3 – Electrical Protections:

Variation order budget costs:	392 678,045 EUR
<u>Original budget BoQ from Tender:</u>	<u>-260 880,694 EUR</u>
Costs difference:	131 797,351 EUR
<u>Processing fee (3,55% of costs difference):</u>	<u>4 678,806 EUR</u>
Variation order no.5 – total costs	136 476,157 EUR

6. Completion date

This Variation order influences the completion date and shifts it from 30.6.2018 to 3.9.2018.

7. Attachments

Attachment no.1 – Preliminary approval by Managing Director of Division of Development and Investment, SEPS a.s.

Attachment no.2 - Construction General designer statement

Attachment no.4 - Original budget BoQ from Tender

Attachment no.5 - DDI Budget and BoQ

Attachment no.6 - Comparative Budget and BoQ DDI-TD

Attachment no.1

Preliminary approval by Managing Director of Division of Development and Investment, SEPS a.s.

**Issuance of the preliminary approval for electrical protection within PS 30.3 -
Horná Ždaňa substation**

On the basis of the submitted implementation dossier and the necessary consents and statements of its deliberation, I issue, pursuant to SM 09/2009, Annex D, Part B, point 3,

preliminary approval

to realize electrical protection within PS 30.3 **with a total increase of the construction price by 136 476,157 €** excluding VAT.

At the same time, I impose, in the sense of the Contract for Works 2016-0295-1177501, signed on February 6, 2017, to prepare Amendment No.1 to this Contract to change the implementation of the Earthworks.

In Bratislava, 22.05. 2018

Ing. Miroslav Stejskal
Managing director for the Investment section

Attachment no.2

Construction General designer statement

Subject: Designer general statement to the Variation order no. 13 for „The substation Horná Ždaňa – enlargement“

After considering the proposal for the change of the design documentation for implementation and others received documents to the variation order no. 13 I can hereby conclude that by performing the relevant changes there is no significant interference with our work.

We consider the relevant variation order as an additional request from the Customer.

On the basis of the fact established, I therefore approve the solution mentioned in the variation order. Suggested solutions ensure the safe realization and operation of the work, together with increasing of its quality and value. These solutions also comply fully the idea suggested in design documentation for tendering.

Attachment no.3

Original budget BoQ from Tender

Attachment no.4

DDI Budget and BoQ

Attachment no.5

Comparative Budget and BoQ DDI-TD