NET4GAS, s.r.o

HP PIPELINE DN1400, NODE KATEŘINSKÝ POTOK - NODE PŘIMDA

Pressure Tests and Stress Tests – Specification

11.12.2018

ILF CONSULTING ENGINEERS

Werner-Eckert-Strasse 7, 81829 München, DE
Jirsíkova 5, 186 00 Praha 8, CZ

Tel: +49 89 25 55 94-0
+420 255 091 420
E-mail: info.muc@ilf.com
info.prg@ilf.com
Web: www.ilf.com

REVISION HISTORY

000	11.12.2018	Approved	Brodníček	Balatinec	Schorling
B02	30.11.2018	Re-Issue for Review	Brodníček	Balatinec	Schorling
B01	02.11.2018	Issue for Review	Brodníček	Balatinec	Schorling
A01	01.11.2018	Issue for IDC	Brodníček	Balatinec	Schorling
Rev.	Date	Issue, Purpose	Prepared	Checked	Approved

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Scope of the Document

This specification describes the pressure tests and stress tests associated with the construction project of HP Pipeline DN 1400, Distribution node Kateřinský potok – Distribution node Přimda. The project subject is construction of the HP Gas Pipeline DN 1400, PN 85 in the total length of approximately 150 km providing interconnection between Distribution node Kateřinský Potok and Distribution node Přimda. The welded steel pipes DN 1400 of the pipeline section are made of the fine grained fully killed steel with the minimum guaranteed yield point, type L485ME, conforming to ČSN EN ISO 3183 PSL 2. The gas pipeline will be buried.

The purpose of the specification and the pressure test and stress test activities is to ensure the integrity, tightness of the piping / pipeline, reduction of the mechanical stress developed in the piping / pipeline during the construction, long-term inhibition of further development of fatigue and other defects in the pipe walls and increase of the operating reliability and life.

Stress Test — The pipeline sections between LV Stations (excluding short portions of Category B pipes upstream and downstream LV Stations) shall be subject to Stress Test. Longer portions of pipeline in different categories (A and B) shall be stress tested separately.

Pressure Test — The pipeline sections upstream and downstream the LV Stations (Category B pipes) and all piping inside LV Stations shall be subject to Pressure test.

Since the stress test presents a deep intervention to the piping material, this work must be managed by a competent expert within the Contractor Company.

Detailed technical design of the pressure tests and stress tests, including the specific identification of tested sections, shall be subject of the Contractor´s documentation. A qualified person shall develop a technical and organizational design on the basis of the specification and the as-built documentation of the gas pipeline.

The technical - organizational design shall contain a detail list of activities, procedures and resources for the safe and proper completion of the pressure test and stress tests. The technical and organizational design shall consider the statements of the competent bodies (Ministry of Environment - EIA, Water Management Authority etc.).

The pressure tests and stress tests shall be carried out only by a company that possesses trained personnel, expert supervisors, required technology and instrumentation, and that has implemented a recognized quality system. The Contractor shall develop the technical and organizational test design and submit it to the Employer for approval no later than three weeks prior to initiation of the tests. The Employer may

choose to check the procedure and has the right to strengthen or change the conditions of the test specifications, without prejudice to the liability of the inspection technician for the compliance with the specification requirements.

This specification summarizes Employer´s requirements and basic parameters for the pressure tests and stress tests.

The pressure tests shall be performed independently for individual sections. The actual division of the final sections must be done by competent experts based on the construction documentation and detailed information and construction specifications. The test parameters specific for each tested part shall be defined on the basis of the actual construction parameters, such as the manufacturing documentation of the piping, installation of the piping (Pipe Book), elevations and values confirmed through an experiment by an expert company during the assessment.

1.2 Definitions

Term	Explanation
Project	HP Pipeline DN 1400, node Kateřinský potok – node Přimda
Employer	NET4GAS
Consultant	ILF Consulting Engineers
Contractor	Means responsible Contractor regarding engineering and supplying of total scope outlined within this specification

1.3 Abbreviations

For the purposes of this specification, the following abbreviations shall apply:

Term	Explanation
ČSN	Czech Standards Institute
D	Specified outside diameter
DN	Diameter Nominal
DP / PN	Design Pressure / Pressure Nominal
EIA	Environmental Impact Assessment
EN	European standards

Term	Explanation
ISO	International Organization for Standardization
LV	Line Valve
MOP	Maximum Operating Pressure
TU (DN)	Line valve station (Distribution node)
TPG	Technical regulations - Gas
SSV	Safety Shut-off Valve

1.4 References

No.	Number	Title
1	C4G-HPPL-ILF-GENER-STR-SPC-800	Pipes DN 300 - DN 1200 - Specification
2	C4G-HPPL-ILF-GENER-LIN-SPC-804	Cleaning, Calibration and First Run - Specification
3	C4G-HPPL-ILF-GENER-STR-SPC-809	Assembling Material < DN 300 - Specification
4	C4G-HPPL-ILF-GENER-STR-SPC-813	Line Pipes DN 1400 - Specification
5	C4G-HPPL-ILF-GENER-STR-SPC-823	Piping Installation and Fabrication Specification
6	C4G-HPPL-ILF-UP513-LIN-VYK-100 - 127	Alignment Sheets – Part UP 513
7	C4G-HPPL-ILF-UP514-LIN-VYK-100 - 125	Alignment Sheet – Part UP 514
8	C4G-HPPL-ILF-UP515-LIN-VYK-100 - 136	Alignment Sheet – Part UP 515
9	C4G-HPPL-ILF-UP516-LIN-VYK-100 - 136	Alignment Sheet – Part UP 516

10	C4G-HPPL-ILF-UP517-LIN-VYK-100 - 137	Alignment Sheet – Part UP 517
11	C4G-HPPL-ILF-UP518-LIN-VYK-100 - 129	Alignment Sheet – Part UP 518
12	C4G-HPPL-ILF-UP519-LIN-VYK-100 - 135	Alignment Sheet – Part UP 519
13	C4G-HPPL-ILF-UP520-LIN-VYK-100 - 149	Alignment Sheet – Part UP 520
14	C4G-HPPL-ILF-UP530-LIN-VYK-100 - 120	Alignment Sheet – Part UP 530
15	C4G-HPPL-ILF-RU006-STR-VYK-300	RU Katerinsky Potok - Piping Arrangement Drawing
16	C4G-HPPL-ILF-TU33S-STR-VYK-300	TU Jirkov - Piping Arrangement Drawing
17	C4G-HPPL-ILF-TU50S-STR-VYK-300	TU Vrskman - Piping Arrangement Drawing
18	C4G-HPPL-ILF-TU51S-STR-VYK-300	TU Hrusovany - Piping Arrangement Drawing
19	C4G-HPPL-ILF-TU52S-STR-VYK-300	TU Syrovice - Piping Arrangement Drawing
20	C4G-HPPL-ILF-TU53S-STR-VYK-300	TU Malmerice - Piping Arrangement Drawing
21	C4G-HPPL-ILF-TU40S-STR-VYK-300	TU Mladotice - Piping Arrangement Drawing
22	C4G-HPPL-ILF-TU41S-STR-VYK-300	TU Hubenov - Piping Arrangement Drawing
23	C4G-HPPL-ILF-TU42S-STR-VYK-300	TU Svinomazy - Piping Arrangement Drawing
24	C4G-HPPL-ILF-TU48S-STR-VYK-300	TU Bor - Piping Arrangement Drawing
25	C4G-HPPL-ILF-RU005-STR-VYK-300	RU Primda - Piping Arrangement Drawing

1.5 Codes and Standards

1.5.1 International Codes and Standards

No.	Number	Title
1	ČSN EN ISO 3183	Petroleum and natural gas industries -- Steel pipe for pipeline transportation systems
2	ČSN EN 12327	Gas infrastructure - Pressure testing, commissioning and decommissioning procedures - Functional requirements
3	ČSN EN 1594	Gas supply systems - Pipelines for maximum operating pressure over 16 bar - Functional requirements

1.5.2 Technical rules and technical instructions

No.	Number	Title
1	TPG 702 04	Gas mains and service pipelines of steel for maximum operating pressure up to 100 bar included
2	TPG 702 11	Cleaning and drying pipelines of all pressure levels after the construction
3	TPG 935 01	Section valves on steel gas pipelines
4	TPG 923 01	Certification of processes – Testing the professional level and working qualities in the field of gas installations
5	TP-T01-01-01-03	Principles for design, construction and repair of HP gas pipelines and connections up to 100 bar.
6	Public Notice No. 85/1978 Sb. (Vyhláška)	Inspections, inspections and tests of gas equipment

7	Public Notice No. 21/1979 Sb. (Vyhláška)	Which are designated dedicated gas facilities and sets certain conditions to ensure their safety
8	Law No. 360/1992 Sb. (Zákon)	On the pursuit of the profession of authorized architects and on the pursuit of the profession of authorized engineers and engineers in construction
9	Law No. 174/1968Sb. (Zákon)	State professional oversight of work safety
10	Law No. 17/1992Sb. (Zákon)	Act On the environment
11	Law No. 254/2001Sb. (Zákon)	Water Act

And all referenced related standards and technical rules as amended, which are in force at the time of commencement of operations.

1.6 Priority, exceptions

Before starting the work (i.e. the technical-organizational design - see Chapter 1), the Contractor shall notify the Employer / Employer´s supervisor / a third party of any conflicts between this specification, related documents, codes, standards, and technical regulations as outlined above, and any other specification that is part of the tender. In such a case, the Employer / Employer´s supervisor / a third party shall provide a written precedent and/or interpretation before starting the construction / work. Compliance with the requirements contained herein shall not exempt the Contractor from his liability or other contractual obligation to perform its duties.

1.7 Requirements for documentation

1.7.1 General

All documentation shall be delivered

a) in digital format, two copies

- in editable format (Word, Excel, dwg...)
- in fixed format (PDF...)

b) 4 printed copies in legally acceptable form

Employer / Third Party prior to commencing of the works shall audit, review and approve the method statements, testing procedures and related documentation, certifications for equipment, instruments and personnel in writing.

1.7.2 Stress Test

The stress test of gas pipelines shall be carried out according to TPG 702 04.

The stress test Contractor shall develop and provide for the approval of the following documentation. The detail design and its appendices and stress test evaluation shall be developed by an inspector of gas installations.

- The stress test detail design (hereinafter only referred to as the detail design)
- The final report, database list (see Chapter 7 hereof)

The detail design provides an update and detail specification of the relevant part of the project documentation and shall include the following:

- actual division into individual parts (sections), technical description of test sections, description and sequence of operations relevant to the test
- execution of the stress test of piping sections to be used for tie-in connections and for gaps between stress test sections, technical description of test sections, description and sequence of operations relevant to the test
- method of provision and disposal of the necessary water, including the necessary decisions of the administrative authorities and the affected persons, including necessary analysis of the water used
- filling and venting of the pressure sections
- pressurizing
- depressurizing
- list and parameters of used technology and instrumentation
- list of used materials, tools and agents for the stress tests
- stress test acceptance parameters
- safety precautions
- the plot of the tested sections on the map
- the plot of the tested sections in the gas pipeline altitude - stationing chart, indicating the contacts with roads, watercourses, power lines, etc.
- test layout with the indication of the specific water take-off point, the method of its delivery to the test site, the location of the equipment needed for the test
- the procedure of filling the piping with water, including specification of equipment needed (number of filling pigs, method of pig position detection during filling, dimensions of gauging plates etc.)

- the method of detecting and resolving any potential pipe leaks (especially at locations covered with earth)
- the method of water discharge from the pipeline and drying of the pipeline
- the procedure for ensuring compliance with obligations towards the organization of state professional inspection and representatives of the operator

The piping for interconnections and gaps between stress test sections shall be also subjected to the stress test, for example in the form of a stand-alone piping section of total necessary length from that the pieces of required lengths will be cut. This shall be specified in the detail design.

The Employer, Technical Supervisor of the Employer and The Technical Inspection of The Czech Republic (in accordance with the Act No. 174/1968 Sb.) shall be invited to the stress test.

1.7.3 Pressure Tests

Sections or objects without a stress test shall be subjected to the pressure test according to Chapter 4. This shall be specified in the detail design.

A pressure test detail design shall be provided to the Employer by the Contractor prior to beginning of the construction and shall include the following, as a minimum:

- safety aspects
- detailed test section limits
- detailed test calculation
- detailed test pressures and volumes
- detailed filling concept
- approvals for the supply and disposal of water
- information of authorities
- performance of the pressure tests including performance of the flushing and cleaning
- operation prior testing
- performance of gauging
- performance of emptying of water from the piping system
- special conditions

The Employer, Technical Supervisor of the Employer and The Technical Inspection of The Czech Republic (in accordance with the Act No. 174/1968 Sb.) shall be invited to the pressure test.

2 TEST SECTIONS

The project of planned HP Gas Pipeline DN 1400 between Distribution node Kateřinský potok and Distribution node Přimda shall be divided into separate sections. The pressure tests or stress tests shall be performed independently for each part of particular section.

2.1 Stress Tested – Pipeline

Includes sections of the pipeline designed in Category A and Category B (excluding sections described in Chapter 2.2) in accordance with TPG 702 04.

- HP Gas pipeline DN 1400, PN 85 between Distribution node Kateřinský potok and Distribution node Přimda

2.2 Pressure Tested – Pipeline

Includes sections of the pipeline designed in Category B in accordance with TPG 702 04.

- Section of pipeline DN 1400, PN 85 from the KM 0.00 inside the station to the distance 102 m in the downstream direction from the fence of Distribution node Kateřinský potok (RU006).
- Section of pipeline DN 1400, PN 85 from the distance 155 m in the upstream direction from the fence of Line valve station Jirkov (TU33 S) to the distance 192 m in the downstream direction from the fence.
- Section of pipeline DN 1400, PN 85 from the distance 77 m in the upstream direction from the fence of Line valve station Vrskmaň (TU50 S) to the distance 48 m in the downstream direction from the fence.
- Section of pipeline DN 1400, PN 85 from the scraper trap (Receiver) inside the Line valve station Malměřice (TU50 S) to the distance 87 m in the upstream direction from the fence.
- Section of pipeline DN 1400, PN 85 from the scraper trap (Launcher) inside the Line valve station Malměřice (TU50 S) to the distance 84 m in the downstream direction from the fence.
- Section of pipeline DN 1400, PN 85 from the distance 40 m in the upstream direction from the fence of Line valve station Mladotice (TU40 S) to the distance 82 m in the downstream direction from the fence.

- Section of pipeline DN 1400, PN 85 from the distance 68 m in the upstream direction from the fence of Line valve station Hubenov (TU41 S) to the distance 52 m in the downstream direction from the fence.
- Section of pipeline DN 1400, PN 85 from the distance 68 m in the upstream direction from the fence of Line valve station Hubenov (TU41 S) to the distance 52 m in the downstream direction from the fence.
- Section of pipeline DN 1400, PN 85 from the distance 86 m in the upstream direction from the fence of Line valve station Sviňomazy (TU42 S) to the distance 75 m in the downstream direction from the fence.
- Section of pipeline DN 1400, PN 85 from the distance 71 m in the upstream direction from the fence of Line valve station Bor (TU48 S) to the distance 87 m in the downstream direction from the fence.
- Section of pipeline DN 1400, PN 85 from the scraper trap (Receiver) inside the Distribution node Přimda (RU005) to the distance 48 m in the upstream direction from the fence.

2.3 Pressure Tested – Station piping

Includes station piping designed in Category B (designed in PN 100) in accordance with TPG 702 04.

- Station piping inside the Distribution node Kateřinský potok (RU006)
- Station piping inside the Line valve station Jirkov (TU33 S)
- Station piping inside the Line valve station Vrskmaň (TU50 S)
- Station piping inside the Line valve station Hrušovany (TU51 S)
- Station piping inside the Line valve station Sýrovice (TU52 S)
- Station piping inside the Line valve station Malměřice (TU53 S)
- Station piping inside the Line valve station Mladotice (TU40 S)
- Station piping inside the Line valve station Hubenov (TU41 S)
- Station piping inside the Line valve station Jirkov (TU33 S)
- Station piping inside the Line valve station Sviňomazy (TU42 S)
- Station piping inside the Line valve station Bor (TU48 S)
- Station piping inside the Distribution node Přimda (RU005)

3 STRESS TEST

Pipeline designed in Category A in accordance with TPG 702 04 shall undergo the stress test. The longer section of pipeline designed in Category B (excluding sections described in chapter 2.2) shall be stress tested separately. The water used for these tests is the same as the water used for the pressure tests. The water sources are described in the Chapter 5. of this specification.

3.1 Technical Features - Stress Tested Pipelines

General characteristics of HP gas pipeline leading from Distribution node Kateřinský potok (RU006) to Distribution node Přimda (RU005).

- Total gas pipeline length: approximately 149,919 m
- Outside diameter: D = 1422.0 mm
- Wall thickness (Category A): tv = 18.0 mm (18.0 mm +1.00/-0.5 mm)

  Wall thickness (Category B): tv = 21.5 mm (21.5 mm +1.00/-0.5 mm)
- Design pressure (DP): 8.5 MPa
- Max. Operating pressure (MOP): 8.5 MPa
- Steel: L485ME, PSL2 (according to ČSN EN ISO 3183)
- Steel yield point: Ry min. = 485 MPa
- Tensile strength: Rm min. = 570 MPa
- Internal volume of the piping: V~1.494 m^3/1 m of piping
- Expected gas pipeline length for the stress test L=147,812 m (2,107 m is pressure tested)
- The number of sections for stress test shall be defined by Contractor.

3.2 Stress test procedure

3.2.1 General

Since the stress test presents a deep intervention to the piping material, this work must be managed by a competent expert within the Contractor Company. An expert means a person possessing good expertise, at least two years of experience in executing stress tests; this person shall be an inspection technician for safety-classified gas installations possessing an adequate certification. The strength test and leakage test shall be executed by an inspection technician for safety-classified gas installations possessing an

adequate certification. The technical supervisor of the Employer (TDI), the Employer and the Czech Technical Inspection (TIČR) shall be invited to the stress tests. TIČR supervision of HP gas pipeline pressure test is required by the Regulation No. 174/1968 Coll.

The stress test Contractor shall provide for the development and approval of the testing procedure on the basis of the construction design by an expert (see below), the detail design, its amendments and stress test evaluation. The Employer may choose to check the procedure and has the right to strengthen or change the conditions of the test specifications, without prejudice to the liability of the inspection technician for the compliance with the specification requirements. Approval of the state expert supervision organization (TIČR) shall be obtained for the pressure test procedure.

In the case of the ambient temperature under 5 °C special safety measures shall be implemented as described by the Contractor in the testing procedure. The testing process shall be suspended if good quality execution of the tests cannot be guaranteed. The test media (water) shall be protected from freezing at low temperatures (e.g. by thermal insulation or an anti-freeze additive).

It is appropriate to provide the free ends of the piping with thermal insulation or at least protect them from solar radiation in the case of higher air temperature fluctuation.

Before starting the stress tests the Employer shall receive a statement from the Contractor that the non-destructive tests (NDT) were completed for all welds and that the welds conform to the requirements, all piping welds were approved and there are no unresolved repairs or outstanding welds within the tested piping section (other than the final tie-in/golden welds). The NDT statement shall confirm that all cathodic protection welds required for the connection of conductors were completed. Furthermore, it is necessary to obtain confirmation that all paints and coatings on the section to be tested are completed and no repairs will be carried out after pressure tests.

Prior to the start of the stress tests, individual sections of the pipeline must be cleaned and calibrated. The test section is filled with water by means of filling pigs (separating elements). Water shall be pumped into the piping at a controlled rate and under calculated and maintained back-pressure through a balance tank using at least two pigs. The amount of water (flow rate and volume) pumped into the piping shall be monitored continuously. The filling water shall not be aggressive, the water pH value for the test shall range between 5 to 8, and water shall be free of organic and inorganic contamination in the maximum possible extent; filter app. 50 micron. Minimum amount of air shall be allowed within the section filled with water. In case of an excessive air volume in the filled tested section the filling shall be repeated or due execution of the stress test shall be ensured otherwise. The limiting air content in the tested piping section immediately after filling is 6 % of the internal volume of the tested piping section. Any excessive air is not acceptable since it would have a negative impact on the stress test. The pressurizing equipment used for the stress test shall allow constant pressurizing rate

(amount of water added in a unit of time) up to the limiting pressure; the maximum rate deviation shall be ± 5 %. All parts that will form part of the pressurizing or measurement equipment for the stress test (e.g. terminal chambers, valves for filling of the tested section) shall be adequately rated to the highest pressure to which they will be exposed. The calculated coefficient of max. 0.90 to the yield point of the given part shall be respected at this pressure.

According to TPG 702 04, the length of each individual tested section should not be more than 15 km and the internal volume should not be more than 6000 m^3.

Two adjacent tested sections shall be connected by maximum 3 welds after the stress test. When making the tie-in connections of the pipes, no additional stress must be developed by bending of the pipes; tie-in connections shall be made at straight sections using pipe components that were stress tested in advance.

The stress test has the following main phases:

- Preliminary leakage test
- First pressure load
- Second pressure load - strength test
- Leakage test

3.2.2 Preliminary leakage test

When filling of the tested piping section with water will be completed, a preliminary leakage test shall be executed within the section in the form of a pressure cycle or a delay in the start of the first pressure load. Potential leak spots are monitored and the temperature shall be stabilized.

The preliminary leakage test shall start after pressure stabilization and balancing of the temperature within the tested piping section. Stabilization and proof of venting is required after filling. The delay for balancing of the water temperature can be terminated if the change of the mean temperature is max. 0.5°C in one hour; the minimum delay shall be 60 minutes.

When 20 to 30 % of the limiting testing pressure for the preliminary leakage test is achieved, the piping shall be visually checked for leaks at the non-buried parts of the tested section, pressurizing equipment and gauges.

The purpose of the preliminary leakage test is to verify the leak-proof installation of the tested section, pressurizing piping, valves and other installations that will be used for the testing. Furthermore, it will allow verification of the functionality of pressurizing equipment and gauges, testing of the cooperation of persons involved in the testing, and last but not least, it will provide information required for the stress test parameter correction.

The first pressure load can be applied after successful completion of the preliminary leakage test.

3.2.3 First pressure load

The first pressure load shall be applied in order to achieve the limiting pressure for the stress test that will develop piping stress close to the yield point. A time delay shall be applied after achieving the limiting pressure; this is the time of plastic deformation of the steel.

The pressure raise rate per minute shall range between 0.5 % to 4 % of the limiting pressure. The pressurizing shall be done at adequate rate and free of pressure surges. The initial tightness and elastic deformation shall be verified during the pressurizing operation; the plastic deformation shall be monitored continuously. Pressurizing shall not be interrupted when achieving 80 % of the pressure at the yield point level. If this happens and the process will not be able to continue immediately, the pressure shall be reduced under 80 % of the pressure at the yield point level. The testing operator shall decide on the next step based on the applied procedure. The Contractor shall be ready for potential detection and localization of any loss of integrity of the piping; safety risks of quick pressure drop shall be taken into account. The pressure applied at the most exposed pipe within the tested section shall not exceed 100 % of the limiting pressure. The limiting permanent integral piping deformation shall not be exceeded within the tested section; this will guarantee that the acceptable permanent deformation of the most load exposed pipe within the tested section will not be exceeded. The value of the limiting permanent integral piping deformation, respective the value of the maximum permissible permanent deformation for an individual pipe, shall be determined specifically for the used piping material and considering the size and character of the tested section. Pressurizing shall be stopped as soon as the limiting permanent integral piping deformation is achieved. The final value decisive for termination of the pressurizing shall be determined by an expert in control of the stress test. The pressurizing equipment shall be isolated (by a shut-off valve etc.) from the tested section after completion of the pressurizing. A time delay of at least 60 minutes shall be applied after completion of the main piping material relaxation process (app. few minutes). After this time, the pressure in the tested piping section shall be reduced by rapid partial water discharge; the pressure at the highest point of the tested section shall be maintained at the minimum level of 0.2 MPa in order to reduce the risk of under pressure and any potential later air leakage into the tested section. Consequently, a delay of at least 10 minutes shall be applied.

The second pressure load can be applied after successful completion of the first pressure load.

3.2.4 Second pressure load – strength test

The second pressure load shall be applied at the pressure level of the first load reduced by 0.1 MPa to 0.2 MPa. The pressure rising rate shall be constant and equal to the rate applied within the first pressure load as to enable comparison of both pressurizing processes. The pressurizing equipment shall be isolated (by a shut-off valve etc.) from the tested section after completion of the pressurizing for the second pressure load. Furthermore, a time delay shall be applied; it shall be terminated no earlier than 15 minutes after completion of the residual piping material relaxation processes. Such processes are deemed completed at the moment of a light non-linear pressure reduction due to lasting plastic deformation of the piping material or linear pressure reduction. The total time from achieving the prescribed pressure for the second pressure load until completion of the time delay shall not exceed 90 minutes. Strength of the tested piping will be confirmed if no loss of material integrity or undesirable deformation occurs during the strength test. Any potential linear pressure reduction shall not be deemed a strength test failure (it can be caused by a leak that is to be verified during the leakage test).

3.2.5 Leakage test

The leakage test shall follow immediately or consequently after completion of the time delay after the second pressure load without draining the pressure media for pressure reduction. The temperature shall be measured and evaluated during the leakage test. All leaks must be identified and repaired. The ground surface along the entire length of the tested section must be observed in order to identify the leaks. The leakage test shall be evaluated according to TPG 702 04.

If intervention to the piping material is necessary in order to correct an identified leak or if a pipe is replaced with more than three welds, the second pressure load as well as the leakage test shall be repeated. If the connection is made with maximum three welds or if a leak cause is identified within components that will not form part of the gas pipeline to be handed over (i.e. the terminal chambers or components that will be replaced), only the leakage test shall be repeated. The leakage test duration shall be determined based on the character and size of the tested section and accuracy of the instrumentation. Additionally, the development of the measured values in time can be evaluated. The test duration determined shall guarantee safe identification on any potential piping leaks. The basic duration used for the total test duration determination shall be 24 hours. The procedure according to TPG 702 04, par. 22.1 Water Pressure Test, shall be used in the case of failed leakage test. As a rule, any repeated pressure test with different media (e.g. air) is not permissible.

The obligations defined by the state supervision organizations shall be followed in planning, execution and reporting of the leakage test. The strength test and leakage test are the gas installation pressure tests within the sense of the applicable regulations.

After a successful pressure and leakage tests the piping shall be drained and dried. Water shall be drained from the piping by isolation pigs (isolation elements); consequently, the piping shall be dried according to TPG 702 11. Pig runs during water expelling and drying serve also for cleaning and control of cleanness of the pipeline. After the tests, calibration shall be performed again.

3.3 Basic Calculations for the Stress Test

3.3.1 The test pressure at 100 % of the yield point

- $p_k = \frac{2 \cdot t_v \cdot R_y}{D} = \frac{2 \cdot 18.0 \cdot 485}{1422} = 12.28\ MPa$

Where:

p_k – limit pressure [MPa]

t_v – calculated pipe wall thickness [mm]

R_y – yield point in the pipe circumferential direction [MPa]

D – outer nominal pipe diameter [mm]

3.3.2 Minimum pressure for the stress test

The minimum pressure at any point of the tested piping section shall not be less than 85 % of the pressure that is at the 100 % level of the yield point.

- $p_{k\,min} = 0.85 \cdot 12.28 = 10.44\ MPa$

3.3.3 Maximum pressure for the stress test

The maximum pressure at any point of the tested piping section shall not be more than pressure at 100 % of the yield point.

- $p_{k\,max} = 1.00 \cdot 12.28 = 12.28\ MPa$

The final pressure value shall be determined based on the actual line pipes delivery, actual yield point and actual condition of the construction.

The above design values are indicated for the guaranteed yield point. In developing the stress test design and calculating the limit pressure that is to be used for the tested section, the actual material and dimensional values of pipes provided by the manufacturer (actual yield point) or determined by measurement and material tests shall be used for the calculation of p_k.

3.4 Machinery and equipment

The following machinery shall be used for the testing and stress test:

- cranes
- excavators
- trucks, containers
- tanks
- mobile generators
- high-pressure pumps
- water pumps, including hoses and accessories (suctions strainers ...)
- pumps for ditch drainage including accessories
- compressors
- filling and drainage chambers

Pumps, compressors etc. should have an adequate capacity and power for quick filling to the required pressure.

3.5 Tools

The following tools and equipment shall be used for testing and stress tests:

- filling pigs
- high accuracy pressure gauges
- main pressure gauge, accuracy at least 0.1 %
- monitoring pressure gauge, accuracy at least 1 %
- recording pressure gauges
- recording pressure gauge for stress test measurement or automatic recording of electronic pressure measurement
- flow meters, accuracy at least 0.5 %
- recording temperature gauges for water and air temperature measurement, resolution at least 0.1°C
- wireless communication devices
- hardware, software, evaluation devices

The instruments shall have a valid gauging certificate issued by an accredited laboratory. The certificate shall be valid at the start of the works and remain valid for the entire duration of the works.

The main pressure gauge and flow meter (respectively also the other instrumentation) as well as the method of evaluating the dependence of pressure change on the delivered about of water shall provide adequate accuracy and rate of identification of the achieved permanent integral piping deformation.

The Contractor shall provide personnel, the test medium (water), machinery and equipment, temporary supports, ladders, all materials including the test chamber, instrumentation and spare parts that may be required for the pressure tests and stress tests.

3.6 Parameter check method

The amount of water for the tested piping section filling shall be measured with a flow meter so that the air volume within the section does not exceed 6 % of the internal capacity of the tested piping section.

Throughout the stress tests, the temperature, water pressure (pressure gauge with an accuracy of at least 0.1% with recording, temperature gauge with resolution of at least 0.1°C with recording) must be monitored in the tested section according to the test schedule and measurement of the exact amount of water that is pumped into the test section of the pipeline. The piping section strength shall be confirmed if no loss of material integrity occurs during the test; the piping section shall be confirmed tight if no visual leak will be identified and water leak will not be indicated by temperature and pressure measurement.

For the purpose of the stress test, the temperature of piping with buried and exposed sections shall be measured directly on the piping surface, as follows:

- one measurement probe on each exposed end of the piping;
- one measurement probe on the buried piping section in the distance of 50 to 200 m from each end of the piping;
- measurement probe on each intermediate buried piping section, provided that the biggest permissible distance between the probes on one intermediate buried piping section is 2 km;
- at least one probe within each above ground section, provided that the maximum length of the above ground section per one probe is 500 m.

Therefore, the minimum number of probes (for any length of the piping) is three, i.e. two probes on exposed ends and one on the buried section, ideally in the middle of the section. The mean temperature of the medium in the piping shall be calculated as the

weighted average of temperatures at the buried and exposed piping sections. During the period of temperature balancing within the section the temperature values are recorded at least once in one hour; the temperature values shall be recorded at least once in fifteen minutes during the pressure test. The measurement probes shall be installed during the backfilling works.

The purpose of the stress test is to prove the strength and tightness of the installed piping. The leakage test shall follow after the strength test.

A piping section strength shall be proven if no material integrity loss occur during the stress test; a piping section tightness shall be proven if $\Delta p_{sk} \leq \Delta p_{ref}$ applies for the actual pressure change Δp_{sk} for the duration of the leakage test (Δp_{ref} according to TPG 702 04, par. 22.1.4).

Detailed calculation of the parameters of the stress tests, pressure tests, leakage tests, supervision and process procedure must be ensured by a competent specialist of the implementing company.

A technical report is to be drawn up on the development and evaluation of the test; the report shall be kept in full version throughout the service life of the tested section of the pipeline together with other pipeline documentation to be archived by the prospective pipeline operator. The report shall include, in particular, the technical data of the tested pipeline section, the calculation of the main parameters of the stress test (limit pressure, etc.), a description of the pressurization process of the tested section, i.e. the measured values of pressure and the pumped water quantity in the individual pressure loads, the measured temperature, etc. The data must be given in the form of tables and charts. The report shall include, in particular, charts of the dependence of the pressure in the tested section on the volume of water drawn and the time-pressure characteristic. A report shall be drawn from the pipeline test, which shall be an integral part of the as-built documentation of the pipeline.

4 PRESSURE TESTS

Piping in the stations / Distribution node and section of gas pipeline mentioned above shall undergo pressure test and tightness test. The water used for these tests is the same as the water used for the stress tests. The water can be transported by means of trucks or water used from the stress tests can be used.

4.1 Technical Features – Pressure tested pipeline

The following parameters are valid for all sections of the pipeline inside stations designed in Category B in accordance with TPG 702 04.

- Outside diameter: D = 1422.0 mm

- Wall thickness: t_v = 21.5 mm (21.5 mm +1.00/-0.5 mm)
- Design pressure (DP): 8.5 MPa
- Max. operating pressure (MOP): 8.5 MPa
- Steel: L485ME, PSL2 (according to ČSN EN ISO 3183)
- Steel yield point: $R_{y\,min.}$ = 485 MPa
- Tensile strength: $R_{m\,min.}$ = 570 MPa
- Manufacturing tolerances are in compliance with: C4G-HPPL-ILF-GENER-STR-SPC-813 Line Pipes - Specification

4.1.1 HP Pipeline DN 1400 / PN 85 inside the DN Kateřinský potok (RU006)

Pipeline DN 1400, PN 85 from the connection to existing pipeline inside Distribution node Kateřinský potok (RU006) to the distance 102 m from the fence in the direction to Distribution node Přimda (RU005).

- Total length of pressure tested gas pipeline: 143 m (41 m inside the station and 102 m outside the station)
- The number of sections for pressure test: 1

4.1.2 HP Pipeline DN 1400 / PN 85 inside the LVS Jirkov (TU33 S)

Pipeline DN 1400, PN 85 from the distance 155 m in the upstream direction from the fence of Line valve station Jirkov (TU33 S) to the distance 192 m in the downstream direction from the fence.

- Total length of pressure tested gas pipeline: 409 m (62 m inside the station and 347 m outside the station)
- The number of sections for pressure test: 1

4.1.3 HP Pipeline DN 1400 / PN 85 inside the LVS Vrskmaň (TU50 S)

Pipeline DN 1400, PN 85 from the distance 77 m in the upstream direction from the fence of Line valve station Vrskmaň (TU50 S) to the distance 48 m in the downstream direction from the fence.

- Total length of pressure tested gas pipeline: 151 m (26 m inside the station and 125 m outside the station)
- The number of sections for pressure test: 1

4.1.4 HP Pipeline DN 1400 / PN 85 inside the LVS Hrušovany (TU51 S)

Pipeline DN 1400, PN 85 from the distance 105 m in the upstream direction from the fence of Line valve station Hrušovany (TU48 S) to the distance 66 m in the downstream direction from the fence.

- Total length of pressure tested gas pipeline: 198 m (27 m inside the station and 171 m outside the station)
- The number of sections for pressure test: 1

4.1.5 HP Pipeline DN 1400 / PN 85 inside the LVS Sýrovice (TU52 S)

Pipeline DN 1400, PN 85 from the distance 75 m in the upstream direction from the fence of Line valve station Sýrovice (TU48 S) to the distance 43 m in the downstream direction from the fence.

- Total length of pressure tested gas pipeline: 141 m (23 m inside the station and 118 m outside the station)
- The number of sections for pressure test: 1

4.1.6 HP Pipeline DN 1400 / PN 85 inside the LVS Malměřice (TU53 S)

Pipeline DN 1400, PN 85 from the distance 87 m in the upstream direction from the fence of Line valve station Malměřice (TU50 S) to the distance 84 m in the downstream direction from the fence.

- Total length of pressure tested gas pipeline: 257 m (86 m inside the station and 171 m outside the station)
- The number of sections for pressure test: 1

4.1.7 HP Pipeline DN 1400 / PN 85 inside the LVS Mladotice (TU40 S)

Pipeline DN 1400, PN 85 from the distance 40 m in the upstream direction from the fence of Line valve station Mladotice (TU40 S) to the distance 82 m in the downstream direction from the fence.

- Total length of pressure tested gas pipeline: 180 m (58 m inside the station and 122 m outside the station)
- The number of sections for pressure test: 1

4.1.8 HP Pipeline DN 1400 / PN 85 inside the LVS Hubenov (TU41 S)

Pipeline DN 1400, PN 85 from the distance 68 m in the upstream direction from the fence of Line valve station Hubenov (TU41 S) to the distance 52 m in the downstream direction from the fence.

- Total length of pressure tested gas pipeline: 138 m (18 m inside the station and 120 m outside the station)
- The number of sections for pressure test: 1

4.1.9 HP Pipeline DN 1400 / PN 85 inside the LVS Sviňomazy (TU42 S)

Pipeline DN 1400, PN 85 from the distance 86 m in the upstream direction from the fence of Line valve station Sviňomazy (TU42 S) to the distance 75 m in the downstream direction from the fence.

- Total length of pressure tested gas pipeline: 221 m (60 m inside the station and 161 m outside the station)
- The number of sections for pressure test: 1

4.1.10 HP Pipeline DN 1400 / PN 85 inside the LVS Bor (TU48 S)

Pipeline DN 1400, PN 85 from the distance 71 m in the upstream direction from the fence of Line valve station Bor (TU48 S) to the distance 87 m in the downstream direction from the fence.

- Total length of pressure tested gas pipeline: 180 m (22 m inside the station and 158 m outside the station)
- The number of sections for pressure test: 1

4.1.11 HP Pipeline DN 1400 / PN 85 inside the DN Přimda (RU005)

Pipeline DN 1400, PN 85 to the distance 48 m in the upstream direction from the fence of Distribution node Přimda (RU005).

- Total length of pressure tested gas pipeline: 89 m (41 m inside the station and 48 m outside the station)
- The number of sections for pressure test: 1

4.2 Technical Features – Pressure tested Station piping

4.2.1 LVS Jirkov (TU33 S)

General characteristic parameters of station:

Parameters of pipes inside the station:

- For by-pass of line valve
  - Outside diameter and wall thickness: 508.0 x 12.5 mm
  - Design pressure (DP): 10.0 MPa
  - Max. operating pressure (MOP): 8.5 MPa
- For vents
  - Outside diameter and wall thickness: 323.8 x 8.8 mm
  - Design pressure (DP): 10.0 MPa
  - Max. operating pressure (MOP): 8.5 MPa
- For by-passes of valves
  - Outside diameter and wall thickness: 88.9 x 4 mm
  - Design pressure (DP): 10.0 MPa
  - Max. operating pressure (MOP): 8.5 MPa

Manufacturing tolerances are in compliance with:

- Station piping DN 300 – DN 1400:
  - C4G-HPPL-ILF-GENER-STR-SPC-818 Station Pipes DN 300 – DN 1400 - Specification
- Station piping DN 50 – DN 250:
  - C4G-HPPL-ILF-GENER-STR-SPC-809 Assembling Material < DN 300 - Specification

Materials of pipes:

- DN 50 – DN 500: steel L290NE (acc. to ČSN EN ISO 3183, PSL 2)

Overall volume of piping inside the station: V ~ 611 m^3 (including pressure tested pipeline + station piping)

4.2.2 LVS Vrskmaň (TU50 S)

General characteristic parameters of station:

Parameters of pipes inside the station:

- For by-pass of line valve
  - Outside diameter and wall thickness: 508.0 x 12.5 mm

- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For vents

- Outside diameter and wall thickness: 323.8 x 8.8 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For by-passes of valves

- Outside diameter and wall thickness: 88.9 x 4 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

Manufacturing tolerances are in compliance with:

- Station piping DN 300 – DN 1400:
  – C4G-HPPL-ILF-GENER-STR-SPC-818 Station Pipes DN 300 – DN 1400 - Specification
- Station piping DN 50 – DN 250:
  – C4G-HPPL-ILF-GENER-STR-SPC-809 Assembling Material < DN 300 - Specification

Materials of pipes:

- DN 50 – DN 500: steel L290NE (acc. to ČSN EN ISO 3183, PSL 2)

Overall volume of piping inside the station: V ~ 226 m^3 (including pressure tested pipeline + station piping)

4.2.3 LVS Hrušovany (TU51 S)

General characteristic parameters of station:

Parameters of pipes inside the station:

– For by-pass of line valve

- Outside diameter and wall thickness: 508.0 x 12.5 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For vents

- Outside diameter and wall thickness: 323.8 x 8.8 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For by-passes of valves

- Outside diameter and wall thickness: 88.9 x 4 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

Manufacturing tolerances are in compliance with:

- Station piping DN 300 – DN 1400:
  – C4G-HPPL-ILF-GENER-STR-SPC-818 Station Pipes DN 300 – DN 1400 - Specification
- Station piping DN 50 – DN 250:
  – C4G-HPPL-ILF-GENER-STR-SPC-809 Assembling Material < DN 300 - Specification

Materials of pipes:

- DN 50 – DN 500: steel L290NE (acc. to ČSN EN ISO 3183, PSL 2)

Overall volume of piping inside the station: V ~ 296 m^3 (including pressure tested pipeline + station piping)

4.2.4 LVS Sýrovice (TU52 S)

General characteristic parameters of station:

Parameters of pipes inside the station:

– For by-pass of line valve

- Outside diameter and wall thickness: 508.0 x 12.5 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For vents

- Outside diameter and wall thickness: 323.8 x 8.8 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

- For by-passes of valves
  - Outside diameter and wall thickness: 88.9 x 4 mm
  - Design pressure (DP): 10.0 MPa
  - Max. operating pressure (MOP): 8.5 MPa

Manufacturing tolerances are in compliance with:

- Station piping DN 300 – DN 1400:
  - C4G-HPPL-ILF-GENER-STR-SPC-818 Station Pipes DN 300 – DN 1400 - Specification
- Station piping DN 50 – DN 250:
  - C4G-HPPL-ILF-GENER-STR-SPC-809 Assembling Material < DN 300 - Specification

Materials of pipes:

- DN 50 – DN 500: steel L290NE (acc. to ČSN EN ISO 3183, PSL 2)

Overall volume of piping inside the station: V ~ 211 m^3 (including pressure tested pipeline + station piping)

4.2.5 LVS Malměřice (TU53 S)

General characteristic parameters of station:

Parameters of pipes inside the station:

- For by-pass of line scraper traps
  - Outside diameter and wall thickness: 1219.0 x 22.2 mm
  - Design pressure (DP): 10.0 MPa
  - Max. operating pressure (MOP): 8.5 MPa
- For by-pass of line valve
  - Outside diameter and wall thickness: 508.0 x 12.5 mm
  - Design pressure (DP): 10.0 MPa
  - Max. operating pressure (MOP): 8.5 MPa
- For kicker line of scraper trap
  - Outside diameter and wall thickness: 323.8 x 8.8 mm
  - Design pressure (DP): 10.0 MPa

- Max. operating pressure (MOP): 8.5 MPa

– For by-passes of valves

- Outside diameter and wall thickness: 114.3 x 4.5 mm
- Design pressure (DP): 7.35 MPa
- Max. operating pressure (MOP): 7.35 MPa

– For by-passes of valves

- Outside diameter and wall thickness: 88.9 x 4 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

Manufacturing tolerances are in compliance with:

- Station piping DN 300 – DN 1400:
  – C4G-HPPL-ILF-GENER-STR-SPC-818 Station Pipes DN 300 – DN 1400 - Specification
- Station piping DN 50 – DN 250:
  – C4G-HPPL-ILF-GENER-STR-SPC-809 Assembling Material < DN 300 - Specification

Materials of pipes:

- DN 1200: steel L485ME (acc. to ČSN EN ISO 3183, PSL 2)
- DN 50 – DN 500: steel L290NE (acc. to ČSN EN ISO 3183, PSL 2)

Overall volume of piping inside the station: V ~ 384 m^3 (including pressure tested pipeline + station piping)

4.2.6 LVS Mladotice (TU40 S)

General characteristic parameters of station:

Parameters of pipes inside the station:

– For interconnection with phase 1

- Outside diameter and wall thickness: 711.0 x 17.5 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For by-pass of line valve

- Outside diameter and wall thickness: 508.0 x 12.5 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For vents

- Outside diameter and wall thickness: 323.8 x 8.8 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For by-passes of valves

- Outside diameter and wall thickness: 88.9 x 4 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

Manufacturing tolerances are in compliance with:

- Station piping DN 300 – DN 1400:
  – C4G-HPPL-ILF-GENER-STR-SPC-818 Station Pipes DN 300 – DN 1400 - Specification
- Station piping DN 50 – DN 250:
  – C4G-HPPL-ILF-GENER-STR-SPC-809 Assembling Material < DN 300 - Specification

Materials of pipes:

- DN 700: steel L360NE (acc. to ČSN EN ISO 3183, PSL 2)
- DN 50 – DN 500: steel L290NE (acc. to ČSN EN ISO 3183, PSL 2)

Overall volume of piping inside the station: V ~ 269 m^3 (including pressure tested pipeline + station piping)

4.2.7 LVS Hubenov (TU41 S)

General characteristic parameters of station:

Parameters of pipes inside the station:

– For by-pass of line valve

- Outside diameter and wall thickness: 508.0 x 12.5 mm
- Design pressure (DP): 10.0 MPa

- Max. operating pressure (MOP): 8.5 MPa

– For vents

- Outside diameter and wall thickness: 323.8 x 8.8 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For by-passes of valves

- Outside diameter and wall thickness: 88.9 x 4 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

Manufacturing tolerances are in compliance with:

- Station piping DN 300 – DN 1400:
  – C4G-HPPL-ILF-GENER-STR-SPC-818 Station Pipes DN 300 – DN 1400 - Specification
- Station piping DN 50 – DN 250:
  – C4G-HPPL-ILF-GENER-STR-SPC-809 Assembling Material < DN 300 - Specification

Materials of pipes:

- DN 50 – DN 500: steel L290NE (acc. to ČSN EN ISO 3183, PSL 2)

Overall volume of piping inside the station: V ~ 206 m^3 (including pressure tested pipeline + station piping)

4.2.8 LVS Sviňomazy (TU42 S)

General characteristic parameters of station:

Parameters of pipes inside the station:

– For by-pass of line valve

- Outside diameter and wall thickness: 508.0 x 12.5 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For vents

- Outside diameter and wall thickness: 323.8 x 8.8 mm

- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For by-passes of valves

- Outside diameter and wall thickness: 88.9 x 4 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

Manufacturing tolerances are in compliance with:

- Station piping DN 300 – DN 1400:
  – C4G-HPPL-ILF-GENER-STR-SPC-818 Station Pipes DN 300 – DN 1400 - Specification
- Station piping DN 50 – DN 250:
  – C4G-HPPL-ILF-GENER-STR-SPC-809 Assembling Material < DN 300 - Specification

Materials of pipes:

- DN 50 – DN 500: steel L290NE (acc. to ČSN EN ISO 3183, PSL 2)

Overall volume of piping inside the station: V ~ 330 m^3 (including pressure tested pipeline + station piping)

4.2.9 LVS Bor (TU48 S)

General characteristic parameters of station:

Parameters of pipes inside the station:

– For by-pass of line valve

- Outside diameter and wall thickness: 508.0 x 12.5 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For vents

- Outside diameter and wall thickness: 323.8 x 8.8 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

– For by-passes of valves

- Outside diameter and wall thickness: 88.9 x 4 mm
- Design pressure (DP): 10.0 MPa
- Max. operating pressure (MOP): 8.5 MPa

Manufacturing tolerances are in compliance with:

- Station piping DN 300 – DN 1400:
  - C4G-HPPL-ILF-GENER-STR-SPC-818 Station Pipes DN 300 – DN 1400 - Specification
- Station piping DN 50 – DN 250:
  - C4G-HPPL-ILF-GENER-STR-SPC-809 Assembling Material < DN 300 - Specification

Materials of pipes:

- DN 50 – DN 500: steel L290NE (acc. to ČSN EN ISO 3183, PSL 2)

Overall volume of piping inside the station: V ~ 269 m^3 (including pressure tested pipeline + station piping)

4.2.10 DN Přimda (RU005)

General characteristic parameters of station:

Parameters of pipes inside the station:

- For interconnection with phase 1
  - Outside diameter and wall thickness: 1219.0 x 22.2 mm
  - Design pressure (DP): 10.0 MPa
  - Max. operating pressure (MOP): 8.5 MPa
- For kicker line of scraper trap
  - Outside diameter and wall thickness: 323.8 x 8.8 mm
  - Design pressure (DP): 10.0 MPa
  - Max. operating pressure (MOP): 8.5 MPa
- For by-passes of valves
  - Outside diameter and wall thickness: 114.3 x 4.5 mm
  - Design pressure (DP): 7.35 MPa
  - Max. operating pressure (MOP): 7.35 MPa

Manufacturing tolerances are in compliance with:

- Station piping DN 300 – DN 1400:
  - C4G-HPPL-ILF-GENER-STR-SPC-818 Station Pipes DN 300 – DN 1400 - Specification
- Station piping DN 50 – DN 250:
  - C4G-HPPL-ILF-GENER-STR-SPC-809 Assembling Material < DN 300 - Specification

Materials of pipes:

- DN 1200: steel L485ME (acc. to ČSN EN ISO 3183, PSL 2)
- DN 50 – DN 500: steel L290NE (acc. to ČSN EN ISO 3183, PSL 2)

Overall volume of piping inside the station: V ~ 133 m^3 (including pressure tested pipeline + station piping)

4.3 Station / Pipeline layouts

Piping arrangements together with other parameters of stations along HP Pipeline DN 1400 node Kateřinský potok - node Přimda are summarized in the table below:

Station	Section for Pressure Test	Arrangement drawing / Alignment Sheet
DN Kateřinský potok (RU006)	Katerinsky Potok - Piping Arrangement	C4G-HPPL-ILF-RU006-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP513-LIN-VYK-100
TU Jirkov (TU33 S)	TU Jirkov - Piping Arrangement	C4G-HPPL-ILF-TU33S-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP513-LIN-VYK-122, C4G-HPPL-ILF-UP513-LIN-VYK-123
TU Vrskmaň (TU50 S)	TU Vrskman – Piping Arrangement	C4G-HPPL-ILF-TU50S-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP514-LIN-VYK-100
TU Hrušovany (TU51 S)	TU Hrusovany - Piping Arrangement	C4G-HPPL-ILF-TU51S-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP515-LIN-VYK-100
TU Sýrovice (TU52 S)	TU Syrovice - Piping Arrangement	C4G-HPPL-ILF-TU52S-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP516-LIN-VYK-100
TU Malměřice (TU53 S)	TU Malmerice - Piping Arrangement Drawing	C4G-HPPL-ILF-TU53S-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP517-LIN-VYK-100
TU Mladotice (TU40 S)	TU Mladotice - Piping Arrangement	C4G-HPPL-ILF-TU40S-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP518-LIN-VYK-100
TU Hubenov (TU41 S)	TU Hubenov - Piping Arrangement	C4G-HPPL-ILF-TU41S-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP518-LIN-VYK-129
TU Sviňomazy (TU42 S)	TU Svinomazy - Piping Arrangement Drawing	C4G-HPPL-ILF-TU42S-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP520-LIN-VYK-100

Station	Section for Pressure Test	Arrangement drawing / Alignment Sheet
TU Bor (TU48 S)	TU Bor - Piping Arrangement	C4G-HPPL-ILF-TU48S-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP530-LIN-VYK-100
DN Přimda (RU005)	RU Primda - Piping Arrangement	C4G-HPPL-ILF-RU005-STR-VYK-300
	Alignment Sheet	C4G-HPPL-ILF-UP530-LIN-VYK-120

4.4 Pressure test procedure

4.4.1 General

Prior to the commissioning of the gas pipeline, the piping in the Category B shall be subjected to the pressure test, i.e. the strength test and leakage test, which shall be carried out in accordance with ČSN EN 1594, ČSN EN 12327 and TPG 702 04.

Note: The stress test boundary corresponds to the Category A + 1 pipe of Category B or according to the stress test detail design / stress test procedure.

The purpose of the pressure test is to prove the strength and tightness of the installed piping. Pressure tests shall be carried out according to TPG 702 04, par. 22.2 on the basis of the procedure that shall conform to ČSN EN 1594, ČSN EN 12327, TPG 702 04 and Regulation of the Czech Occupational Health and Safety Authority No. 85/1978 Coll. The pressure test procedure shall be developed by the pressure test Contractor and approved by the Czech Technical Inspection (TIČR).

The leakage test can be combined with the strength test. Both tests shall be executed by an inspection technician for safety-classified gas installations possessing an adequate certification. The Employer´s technical supervisor, the Employer and the Czech Technical Inspection (TIČR) shall be invited to witness the pressure tests. TIČR supervision of HP gas pipeline pressure test is required by the Act No. 174/1968 Coll.

Water shall be used as the test medium; water shall not be aggressive; it shall be free of organic and inorganic contamination that may have a negative impact on the test. Water volumes, water sources etc. are specified in the Chapter 5.

The Contractor shall start the pressure test immediately after the construction of a piping system has been completed and the Employer shall declare the section ready for testing.

All foundations and supports shall be installed before commence of the pressure test. All welded and mechanical joints shall remain uninsulated and free from paint until pressure testing has been completed. Testing of lines supported by springs shall be carried out

with the locking pins installed in the springs. The locking pins shall then be removed prior to commissioning.

All control valves and ultrasonic flowmeters installed in tested sections shall be dismantled and replaced by an appropriate spool pieces before pressure testing.

All parts of tested piping which can be damaged by testing or by intrusion of water and dirt, such as instrumentation, tubing of valve actuators etc., shall be suitably isolated or dismantled prior of testing.

Following limitations regarding pressure testing shall be take in consideration:

- Any process equipment, piping system or vessel where the MOP exceeds 0.5 bar without the internal pressure generated by the weight of the contents shall be commissioned only on the basis of successful pressure tests.
- Piping sections and equipment not allowed to be hydrotested for some reason shall be subject to tightness testing. This same requirement applies to the case of repairs and the inter-connection of process systems hydrotested individually. These sections, equipment, etc. shall be defined by Contractor during detail engineering. Employer shall be informed prior to start of construction.

Execution of the pressure test under ambient temperatures below 0 °C is forbidden.

Tightness of all bolted connections and positions of all valves must be checked before the pressure test. All valves installed within the tested section shall be approximately in 1/2 open position during filling of the tested section as well as during the pressure test so that water and pressure gets in the intermediate space in the valve body.

All contamination / impurities shall be cleaned by the Contractor after completion of the piping installation. The tested sections shall be inspected before starting the pressure test and a piping cleanness report shall be issued. This report shall be signed and approved by the Employer.

The number of golden welds at tie-in connections shall be minimized to the necessary number of welds as agreed with the Employer.

Water shall be discharged from the piping after completion of the pressure test; the piping shall be dried according to the procedure approved by the operator and prepared in conformity with TPG 702 11.

Draining and drying of valves included in the pressure tested section shall be provided by the Contractor.

The gas pipeline shall be handed over to the operator only after successful completion of the test confirmed by the state expert supervision organization.

4.4.2 Pressure test with visual evaluation of the tightness

The purpose of the strength test is to prove the strength of the installed piping. The leakage test shall follow after the strength test, its purpose is to prove tightness of the installed piping.

The tested section may include various dimensions, the biggest internal pipe surface, however, shall be no more than 25 000 m^2.

The pressure raise rate per minute shall range between 0.5 % to 6.0 % of the test pressure value.

The tested piping and all its components should be freely accessible for the visual inspection.

The test pressure in the tested piping section for the strength test shall be:

Pressure Rating (ASME)	DP [MPa]	MOP [MPa]	Test Pressure
Class 600	10.0	8.5	1.3 x MOP

The time course of the pressure test shall have the following stages:

- Filling of the tested section with water.- the proper venting of the filled section shall be ensured
- Pressure rising shall be suspended when 30 - 50 % of the test pressure will be achieved; the visual examination of the tested section shall be performed in order to identify any potential leaks and changes that may potentially affect the test.
- Pressurizing of the piping to 90% of the test pressure.
- Decreasing of the pressure inside the piping so that the pressure in the highest point of the piping remains in the range of 1.0 – 1.5 MPa.
- The time delay in the length of 10 minutes.
- Pressurizing of tested piping to the test pressure level.
- The time delay after reaching the test pressure level shall be at least 90 minutes and is divided into two successive parts:
  - 30 minutes of strength test (no access of people)
  - 60 minutes of tightness test (visual control)

The tested section is considered as a strong when the integrity of the material is not disrupted within the duration of the test. The tested section is considered as a tight when the there is no visual proof of leakage from the tested piping.

If there are any buried parts of the tested piping section, the leakage test duration shall be prolonged to 24 hours; the overpressure in the piping and the air temperature shall be measured for the entire duration of the test.

The tested section is considered as a strong when the integrity of the material is not disrupted within the duration of the test. The tested section is considered as a tight when there is no visual proof of leakage and measuring of pressure and temperature does not prove the leakage of water from the piping.

4.5 Pressure Test Scheduling

The location, spacing and method of installation of the measuring equipment shall be agreed with the Employer and notified body. The location of the measuring equipment shall be marked on a drawing and be always available on site.

Test Pressure and Test Method:

- B2 - Pressure/Temperature Measurement Method Using Water (Pressure Applied Twice) applied for the pipeline
- A2 - Visual Method Using Water (Pressure Applied Twice) applied for the station.

4.6 Machinery and equipment

The same machinery and equipment shall be used for the pressure test as for the stress test. The machines are listed in Chapter 3.4.

4.7 Tools

The same tools shall be used for the pressure test as for the stress test. The tools are listed in Chapter 3.5.

4.8 Parameter check method

The tested piping section strength shall be confirmed if no loss of material integrity occurs during the pressure test; the piping section shall be confirmed tight if no visual water leak will be identified.

Strength of a buried piping section shall be confirmed if no loss of material integrity occurs during the pressure test and tight if no visual leak will be identified and water leak will not be indicated by temperature and pressure measurement.

Pressure shall be measured with direct-indicating electronic pressure converter, accuracy class better than 0.5 that shall be used for the data recording. If a current loop will be used for the data recording, the A/D converters shall be min. 12 bit. The permitted instrumentation specified in TPG 702 04 shall be used only exceptionally under appropriate conditions (stabilized weather). The pressure gauges shall have a verification certificate valid before beginning of the work; the certificate shall remain valid for the entire duration of the works. If indirect-indicating converters will be used, the entire measurement chain must have a valid certificate.

5 WATER SOURCES

The stress tests and pressure tests of pipeline shall be executed by means of water. For the execution of stress tests and pressure tests, the water shall be drawn from the selected watercourses at the crossing points with pipeline. The amount of water taken in one drawdown is limited to approximately 15,000 m^3 (for two stress-tested sections of pipeline). The pumped water shall be sampled and analysed for its quality. After execution of stress tests / pressure tests, the quality of water shall be verified again by the analysis. In case of adequate quality, the water shall be discharged back into watercourse. In case that quality limits stated by national / local authority for related watercourse are not matched, water shall be cleaned before discharge. The water pumping shall be executed by means of mobile pump with possible local intake and mobile filtering unit. The watercourse administrator and local water authorities shall approve drowning and disposal of water in advance.

Suggested places for pumping of water are:

- Kyjická water reservoir / Bílina
- Chomutovka river
- Ohře river
- Podhora creek / Kryrský pond - according to river Ohře basin authority recommendations, there is possibility of water drawdown from the water reservoir Vidhostice
- Střela river
- Úterský creek
- Mže river

From the environment point of view, the discharge of water at the end of tested section is not always adequate. In such case, pumping of water back to the source point is suggested. The crossing of Mže river is located in the 2. protective zone of drinking water source for the Stříbro city, located 2 kilometers downstream the river. Therefore, in this case it is proposed to discharge the used water on the side of the Mže river into the river Úhlavka and on the opposite side of the river from the river to the Úterský creek.

Suggested places for drainage of water after pressure / stress tests are:

- Kyjická water reservoir / Bílina
- Chomutovka river
- Ohře river
- Podhora creek / Kryrský pond
- Střela river
- Úterský creek
- Úhlavka river

Detailed technical solution of stress tests including division of test sections is a part of execution documentation. Safety zone (160 m on both sides from the outline of pipeline) shall be marked with warning tables “Pozor napěťové zkoušky – nebezpečí ohrožení života“, these tables shall be placed at each location where roads are crossing the safety zones. In addition, municipal office shall inform civilians about execution of tests. The Contractor is also obliged to inform ČR police department prior execution of any works. The parking and stopping of any vehicle shall be prohibited on the roads crossing the safety zone at the distance of 160 m in both directions from the tested pipeline, and this prohibition shall be adequately marked.

5.1 Water requirements

Prior to the first filling with water, the water (up to 10% of the section volume) shall be pumped into the tested section of piping. The purpose of this pre-pumped water is to simplify the process of filling the piping with the filling water. Prior to filling of the tested section with water, this section shall be flushed out with about 20 m^3, this water is considered to be drained out of the section and not used again. The flushing is used to facilitate piping filling with water for pressure tests. After flushing the test section, filling, pressure tests including stress tests and the transfer of water to the next section (already flushed) are performed.

For piping designed in Category B which shall undergo only pressure test and leakage test, the use of water from the adjacent section proposed for stress test is anticipated.

The Stress test is assumed to be performed in one direction. – i.e. in the main direction of gas flow from DN Kateřinský potok (RU 006) to DN Přimda (RU 005). After the successful stress test, water shall be pumped into the next section gradually to the last section.

The required amount of water for stress tested sections shall be calculated by Contractor.

The required amount of water for pressure tested sections at Stations is approximately:

Station	Volume of section [m^3]
DN Kateřinský potok (RU006)	214
LVS Jirkov (TU33 S)	611
LVS Vrskmaň (TU50 S)	226
LVS Hrušovany (TU51 S)	296
LVS Sýrovice (TU52 S)	211
LVS Malměřice (TU53 S)	384
LVS Mladotice (TU40 S)	269
LVS Hubenov (TU41 S)	206
LVS Sviňomazy (TU42 S)	330
LVS Bor (TU48 S)	269
LVS Přimda (RU 005)	133

The maximum allowed amount of water to be drawn from the water sources stated in chapter 5.1 is V ~ 15,000 m^3. The water from one tested section can be transferred (for example by pumping) to another section in order to sequentially test all sections.

The calculated amount of water is approximate and may differ from the amount of water actually required. The Contractor should take into account the amount of water lost due to leakage due to the loss of water in the drainage and pumping piping, etc.

6 SAFETY AND ENVIRONMENTAL PROTECTION

The requirements for the safety during the construction and testing in conformity with the standards and documents referred to in Chapter 1 hereof and this specification, as well as any future technical and organizational documents developed by the expert work

Contractor and subject to the Employer ´s approval, shall be considered during the entire period of the gas pipeline work execution and testing.

The Contractor shall notify the local authorities in writing on the testing schedule and organization before the gas pipeline pressure tests on the basis of the documentation approved by the Employer and according to the project technical and organizational documentation.

The Contractor shall ensure safety of the operators, the population and their assets as well as protection of the machinery and equipment along the pipeline within the tested section.

Remote controlled valves shall be used for depressurization of the piping.

The testing personnel shall be briefed on the applicable safety rules and provably trained.

Constant wireless communication shall be provided between the control stations, a pressurizing operator and a pressure test manager during the pressure tests.

The line section that is to be tested shall be marked with warning signs visible day and night; access of non-authorized persons shall be prevented. The safety zone (at least 20 m to both sides from the piping contour) shall be marked with warning signs “Attention - pressure tests - high danger!” The warning signs shall be installed on both sides of the roads, along all roads that cross the safety zone, at the safety zone boundary and particularly at locations where the piping crosses railway, roads or where it is nearby populated areas out of the safety zone. The population shall be further informed about the tests via local authorities in a way usual within the given region. The Contractor shall further notify the Police of the Czech Republic in advance of the tests. The Clearway traffic sign shall be installed on roads that cross the tested gas pipeline 160 m ahead of and behind the tested gas pipeline.

Combustion engines must be leak proof in terms of oil and fuel leakage to the soil during fueling. Leakage of oil products and chemical substances shall be eliminated. The process of line filling with water, drainage or excess water discharge shall be monitored at all times. Samples of water shall be taken from the water and its quality determined by analysis. After performance of the pressure tests, quality of water shall be once more verified by analysis and, in case of appropriate quality, the water shall be discharged back into the watercourse. In case of exceeding limit values specified for the watercourse in the statement of the competent river administration, or in the water authority approval, the water shall be treated before its discharge. Water taking and discharge shall be agreed with the administrators of the watercourses and competent water authorities. The waste management shall follow the applicable regulations and directives.

The affected area shall be cleaned, the warning signs shall be removed, the check excavations shall be backfilled, any damaged sections shall be restored and all temporary installations shall be removed.

7 PIPELINE DRAINAGE AND DRAYING

The process of draining the individual pipeline sections can begin after successful pressure test and strength tests, leakage tests and stress tests. The drainage and drying process is described in C4G-HPPL-ILF-GENER-LIN-SPC-804 Cleaning, Calibration and First run – specification.

8 SUMMARY

All information collected on the pressure tests and stress tests shall be recorded in the database. The database shall contain all identifiable data related to the pressure tests; the database shall be sorted in ascending order from the gas pipeline start in the gas flow direction.

A technical report shall to be drawn up on the development and evaluation of each stress test and pressure test; the report shall be kept throughout the service life of the tested section of the pipeline together with other pipeline documentation to be archived by the prospective pipeline operator. The report must include the test date, and technical data of the tested pipeline section, in particular the calculation of the main stress test parameters (limit pressure, etc.), a description of the pressurization process of the tested section, i.e. the measured values of pressure and the pumped water volume in the individual pressure loads, the measured temperatures, etc. The data must be given in the form of tables and charts. The report shall include, in particular, charts of the dependence of the pressure in the tested section on the volume of water drawn and the time-pressure characteristic. A report shall be drawn from the pipeline test, which shall be an integral part of the as-built documentation of the pipeline.

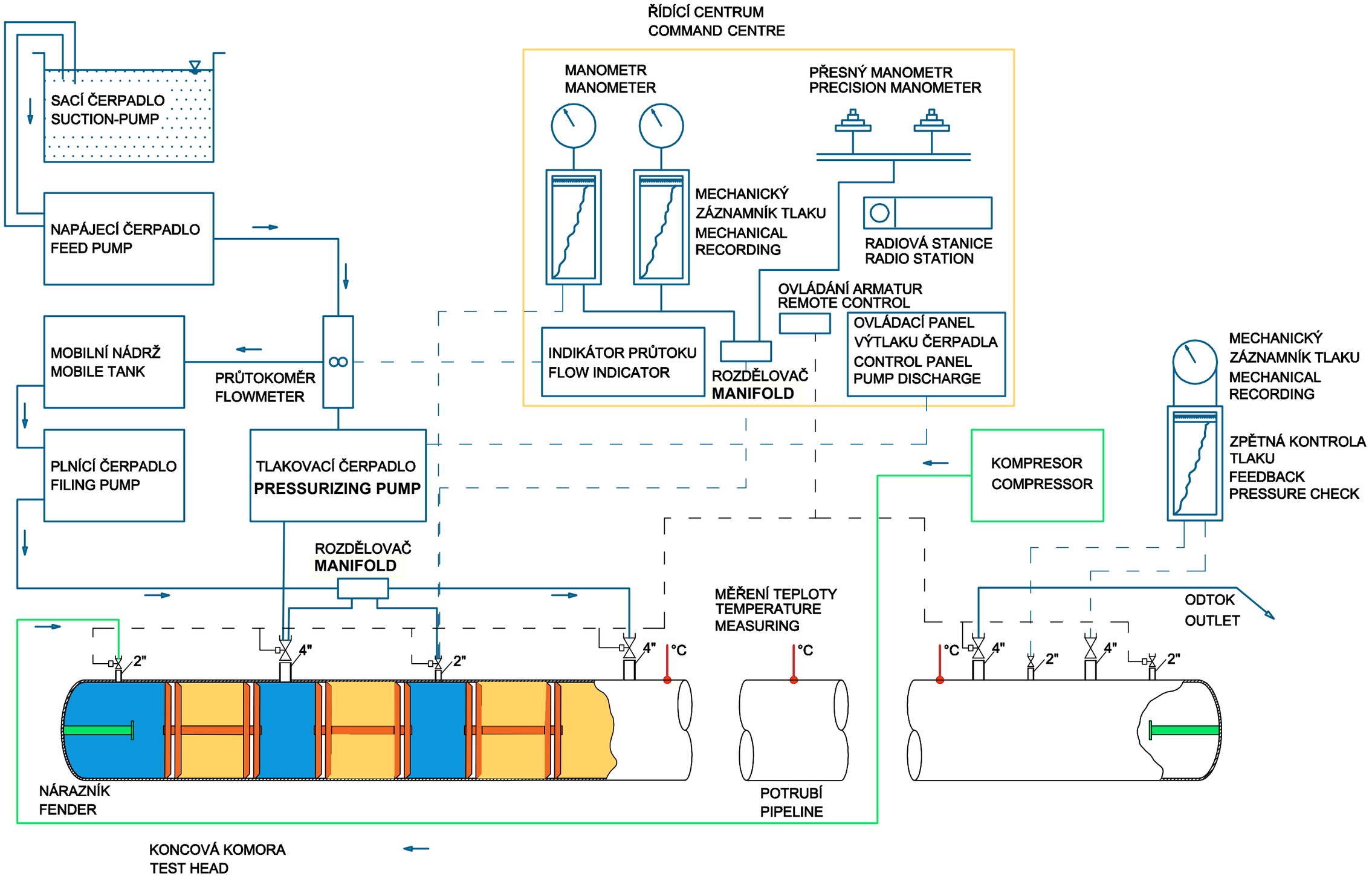
9 APPENDIXES

A01 - Pressure test diagram

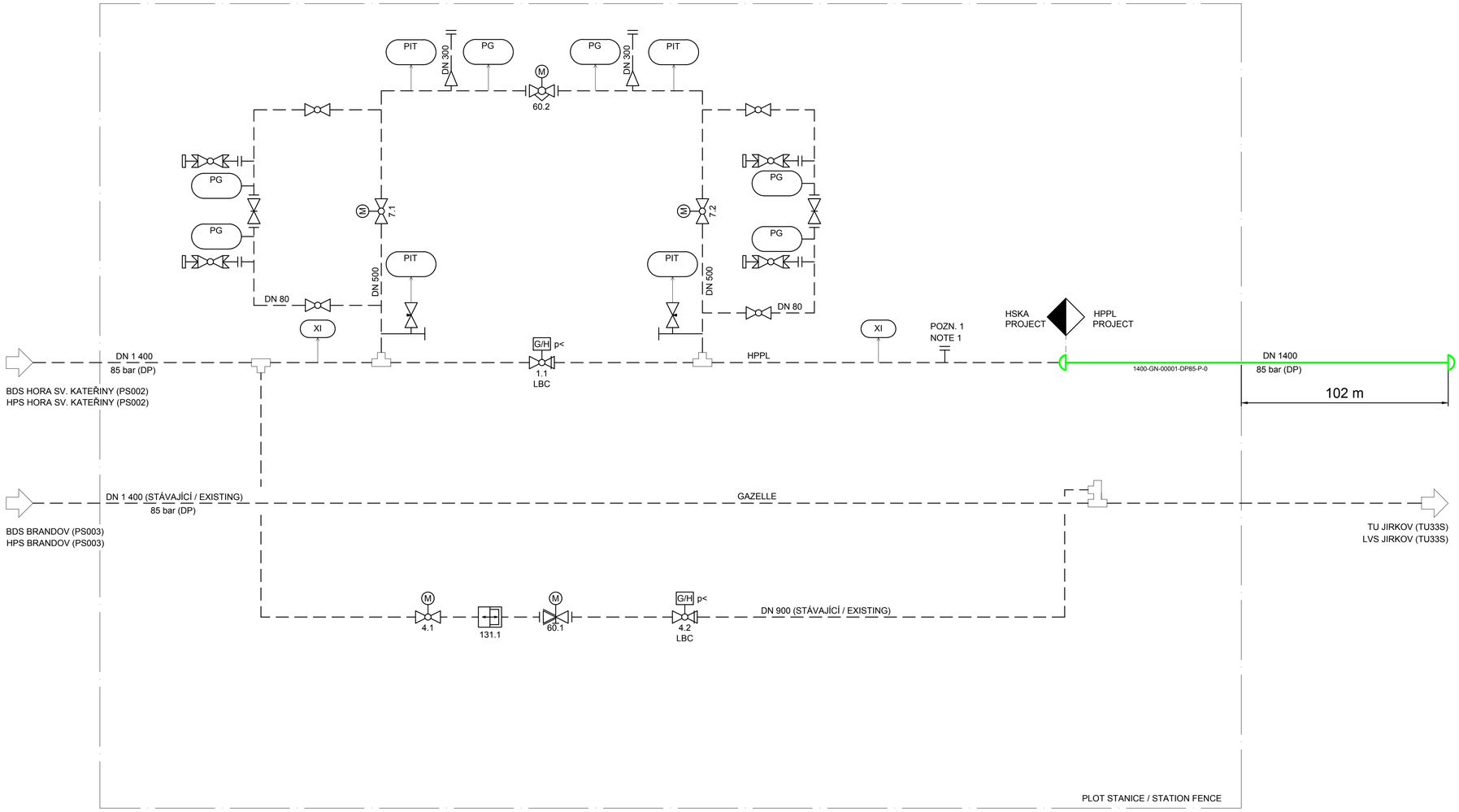
A02 - Detailed pressure tested sections of stations

PRESSURE TEST SCHEME
STRESS TEST / PRESSURE TEST

C4G-HPPL-ILF-GENER-LIN-SPC-803-000 ANNEX A01



PRESSURE TEST SECTIONS - A02.1



POZNÁMKY / NOTES:

1. BALÓNOVACÍ HRDLO PRO UZAVŘENÍ POTRUBÍ./ BALLOON NECK FOR PIPELINE PLUGGING.
2. TRASOVÝ UZÁVĚR PRO VTL PLYNOVOD DN 1 400 BUDE UMÍSTĚN V TU JIRKOV (TU33S). NEBO V KS JIRKOV (TU50S). ROZHODNUTÍ BUDE PROVEDENO V POZDĚJŠÍ FÁZI PROJEKTU ./ THE LINE VALVE FOR HP PIPELINE DN 1 400 SHALL BE INSTALLED AT LVS JIRKOV (TU33S) OR AT CS JIRKOV (TU50S). THE DECISION SHALL BE MADE IN THE LATER STAGES OF DESIGN.

ZKRATKY / ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

RU: ROZDĚLOVACÍ UZEL
DN: DISTRIBUTION NODE

KS: KOMPRESOROVÁ STANICE
CS: COMPRESSOR STATION

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
RU KATEŘINSKÝ POTOK - TECHNOLOGICKÉ SCHÉMA / DN KATEŘINSKÝ POTOK - PFD	C4G-HPPL-ILF-RU006-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
001	30.08.2018	Opětovně schváleno / Re-Approved	Brodníček	Balatinec	Schorling
000	29.11.2017	Schváleno / Approved	Team	Jasenčák	Šomský
B01	25.09.2017	Vydáno k posouzení / Issue for Review	Team	Jasenčák	Miško
A01	15.09.2017	Vydáno pro IDC / Issue for IDC	Team	Jasenčák	Miško

KLIENT / CLIENT:
NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR:
ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

DRAWING TITLE / NÁZEV VÝKRESU:

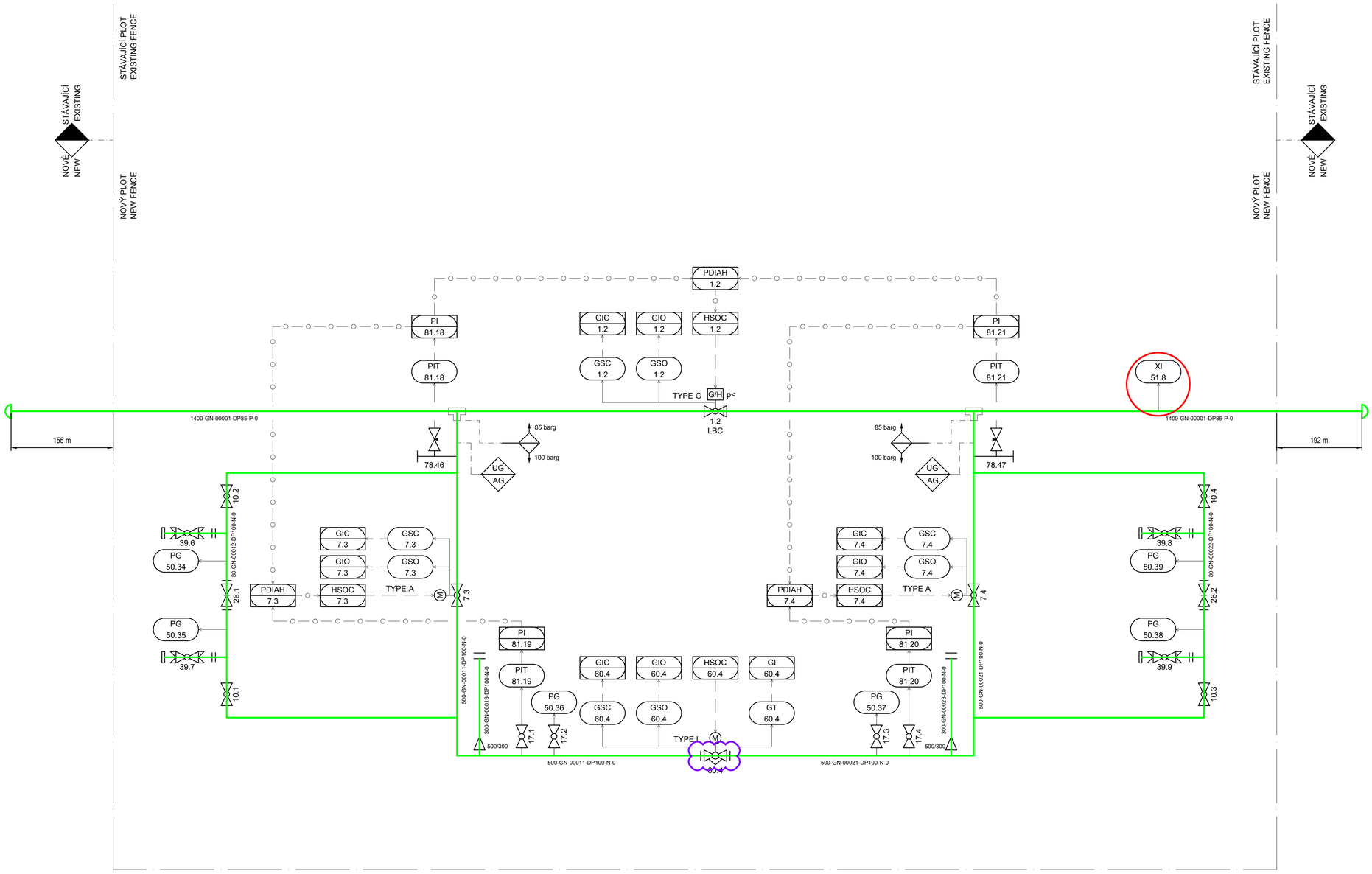
RU KATEŘINSKÝ POTOK - PROCESNÍ SCHÉMATA A INSTRUMENTACE
DISTRIBUTION NODE KATEŘINSKÝ POTOK - P&I DIAGRAM

MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET Z / OF
original size A1 -	N662	C4G-HPPL-ILF-RU006-STR-DIA-110-001	1 1

Tisk / Printing: 04.10.2018
Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Katerinsky potok.dwg

PROJECT No. - N662
ORIGINAL SHEET SIZE - A1

PRESSURE TEST SECTIONS - A02.2



POZNÁMKY / NOTES:

1. TRASOVÝ UZÁVĚR PRO VTL PLYNOVOD DN 1 400 BUDE UMÍSTĚN V TU JIRKOV (TU33S). NEBO V KS JIRKOV (TU50S). ROZHODNUTÍ BUDE PROVEDENO V POZDĚJŠÍ FÁZI PROJEKTU./ THE LINE VALVE FOR HP PIPELINE DN 1 400 SHALL BE INSTALLED AT LVS JIRKOV (TU33S) OR AT CS JIRKOV (TU50S). THE DECISION SHALL BE MADE IN THE LATER STAGES OF DESIGN.

ZKRATKY/ ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

RU: ROZDĚLOVACÍ UZEL
DN: DISTRIBUTION NODE

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
KS JIRKOV - TECHNOLOGICKÉ SCHÉMA / CS JIRKOV - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-KS007-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
001	29.08.2018	Opětovně schváleno / Re-Approved	Brodníček	Balatinec	Schorling
000	8.1.2018	Schváleno / Approved	Štrama	Šomský	Jasenčák
B01	29.11.2017	Vydáno k posouzení / Issue for Review	Štrama	Šomský	Jasenčák
A01	28.11.2017	Vydáno pro IDC / Issue for IDC	Štrama	Šomský	Jasenčák

KLIENT / CLIENT:
NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR:
ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

DRAWING TITLE / NÁZEV VÝKRESU:

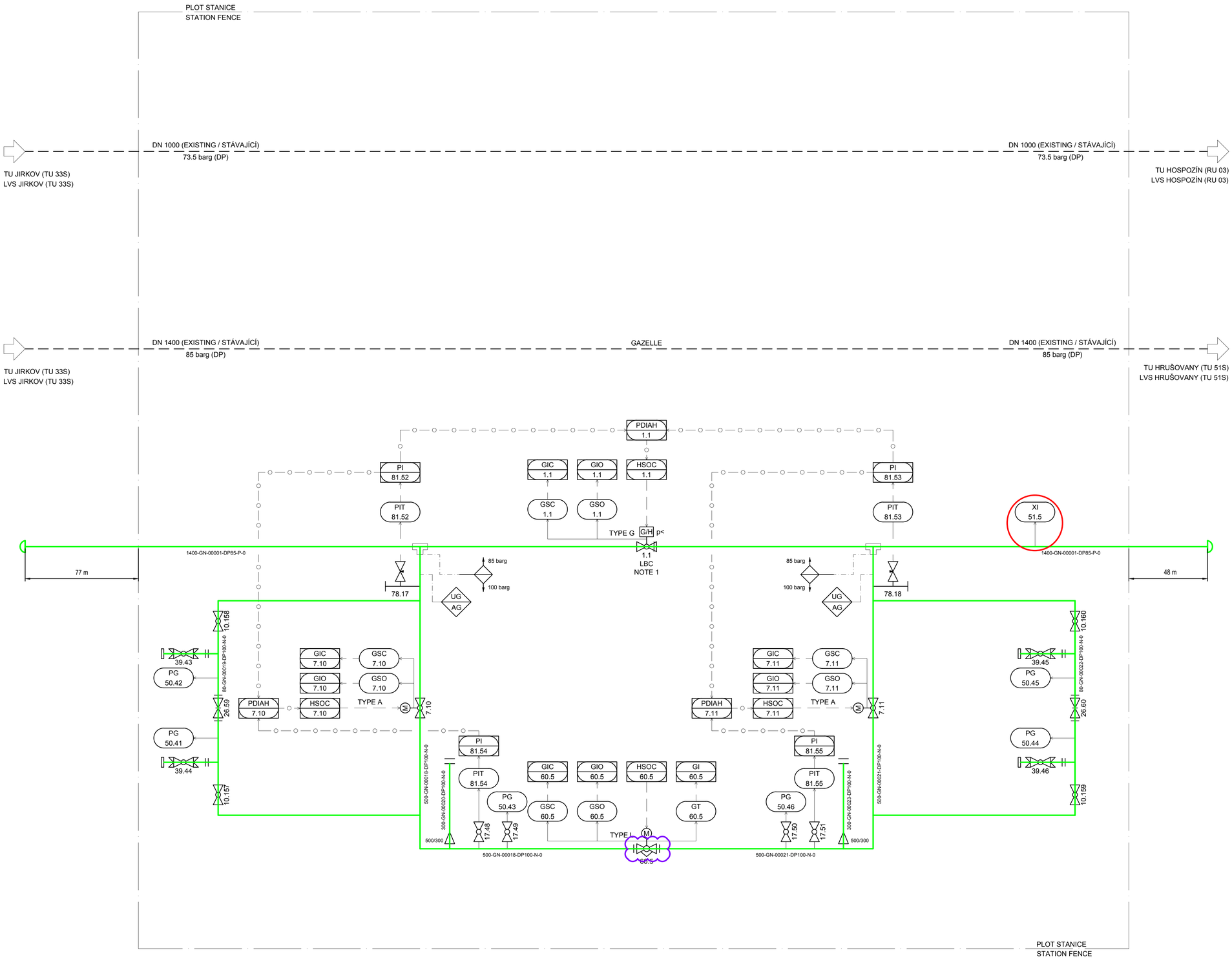
TU JIRKOV - PROCESNÍ SCHÉMATA
A INSTRUMENTACE
LVS JIRKOV - P&I DIAGRAM

MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET Z / OF
original size A1 -	N662	C4G-HPPL-ILF-TU33S-STR-DIA-110-001	1 1

Tisk / Printing: 01.10.2018
Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Jirkov.dwg

PROJECT No.: N662
ORIGINAL SHEET SIZE - A1

PRESSURE TEST SECTIONS - A02.3



POZNÁMKY/ NOTES:

1. TRASOVÝ UZÁVĚR PRO VTL PIYNOVOD DN 1400 BUDE UMÍSTĚN V TU JIRKOV (TU33S). NEBO V TU VRSKMAN (TU50S). ROZHODNUTÍ BUDE PROVEDENO V POZDĚJŠÍ FÁZI PROJEKTU.
   / THE LINE VALVE FOR HP PIPELINE DN 1 400 SHALL BE INSTALLED AT LVS JIRKOV (TU33S) OR AT LVS VRSKMAN (TU50S). THE DECISION SHALL BE MADE IN THE LATER STAGES OF DESIGN.

ZKRATKY/ ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
TU VRSKMAŇ - TECHNOLOGICKÉ SCHÉMA / LVS VRSKMAN - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-TU50S-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
000	01.10.2018	Approved / Schváleno	Brodníček	Balatinec	Schorling
B01	29.08.2018	Vydáno k posouezní / Issue for Review	Brodníček	Balatinec	Schorling
A01	27.08.2018	Vydáno k IDC / Issue for IDC	Brodníček	Balatinec	Schorling

KLIENT / CLIENT: NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR: ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

DRAWING TITLE / NÁZEV VÝKRESU:

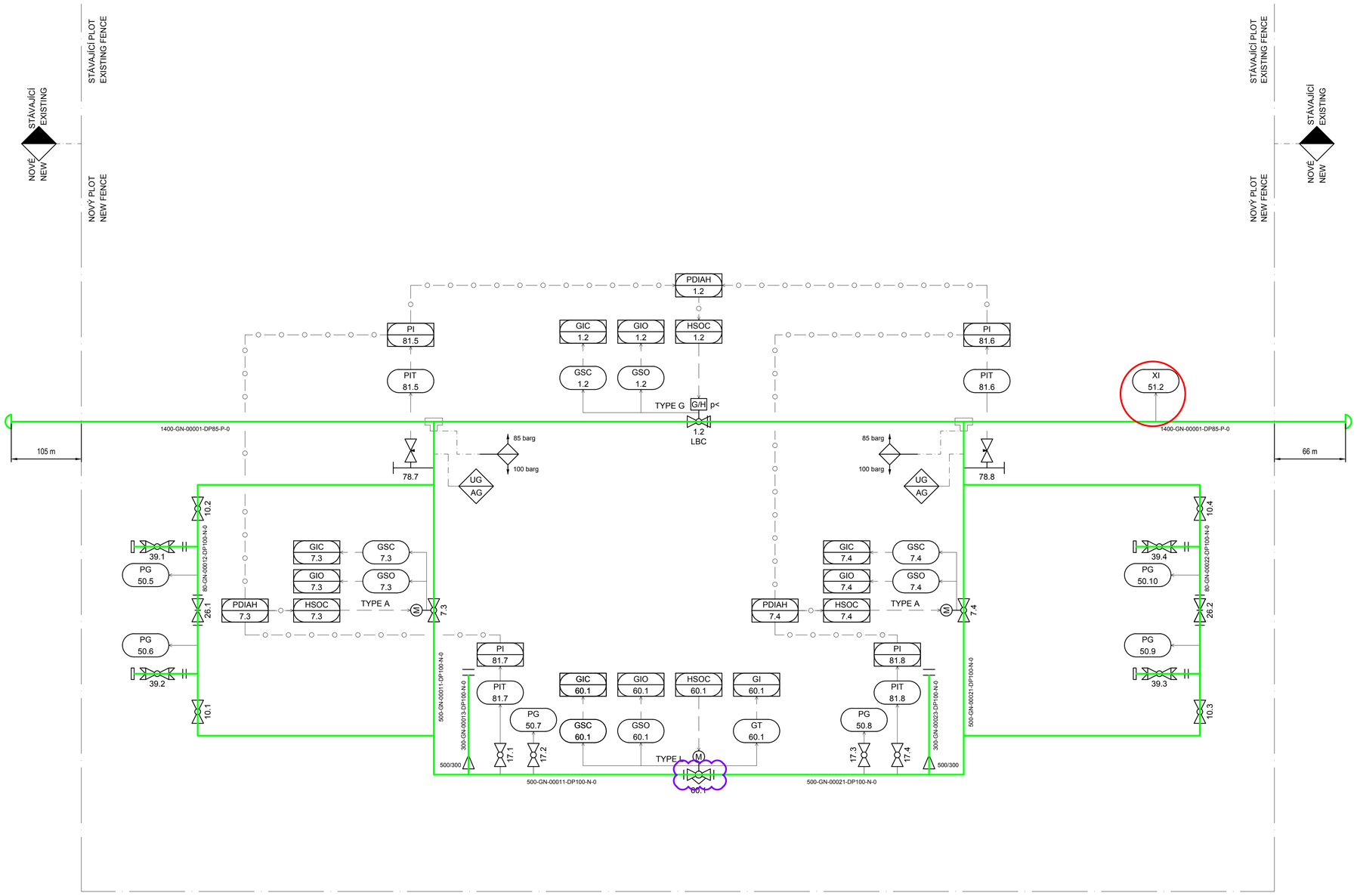
TU VRSKMAŇ - PROCESNÍ SCHÉMATA A INSTRUMENTACE
LVS VRSKMAŇ - P&I DIAGRAM

MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET Z / OF
original size A1 -	N662	C4G-HPPL-ILF-TU50S-STR-DIA-110-000	1 1

Tisk / Printing: 01.10.2018
Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Vrskmaň.dwg

PROJECT No. : N662
ORIGINAL SHEET SIZE - A1

PRESSURE TEST SECTIONS - A02.4



POZNÁMKY / NOTES:

1. TRASOVÝ UZÁVĚR PRO VTL PLYNOVOD DN 1400 BUDE UMÍSTĚN V TU JIRKOV (TU33S). NEBO V KS JIRKOV (TU50S). ROZHODNUTÍ BUDE PROVEDENO V POZDĚJŠÍ FÁZI PROJEKTU./
   THE LINE VALVE FOR HP PIPELINE DN 1 400 SHALL BE INSTALLED AT LVS JIRKOV (TU33S) OR AT CS JIRKOV (TU50S). THE DECISION SHALL BE MADE IN THE LATER STAGES OF DESIGN.

ZKRATKY/ ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

KS: KOMPRESOROVÁ STANICE
CS: COMPRESSOR STATION

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
TU HRUŠOVANY - TECHNOLOGICKÉ SCHÉMA / LVS HRUŠOVANY - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-TU51S-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
001	30.08.2018	Opětovně schváleno / Re-Approved	Brodníček	Balatinec	Šabata
000	5.12.2017	Schváleno / Approved	Štrama	Šomský	Jasenčák
B01	25.09.2017	Vydáno k posouzení / Issue for Review	Team	Jasenčák	Miško
A01	15.09.2017	Vydáno pro interdisciplinární kontrolu / Issue for IDC	Team	Jasenčák	Miško

KLIENT / CLIENT:
NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR:
ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

DRAWING TITLE / NÁZEV VÝKRESU:

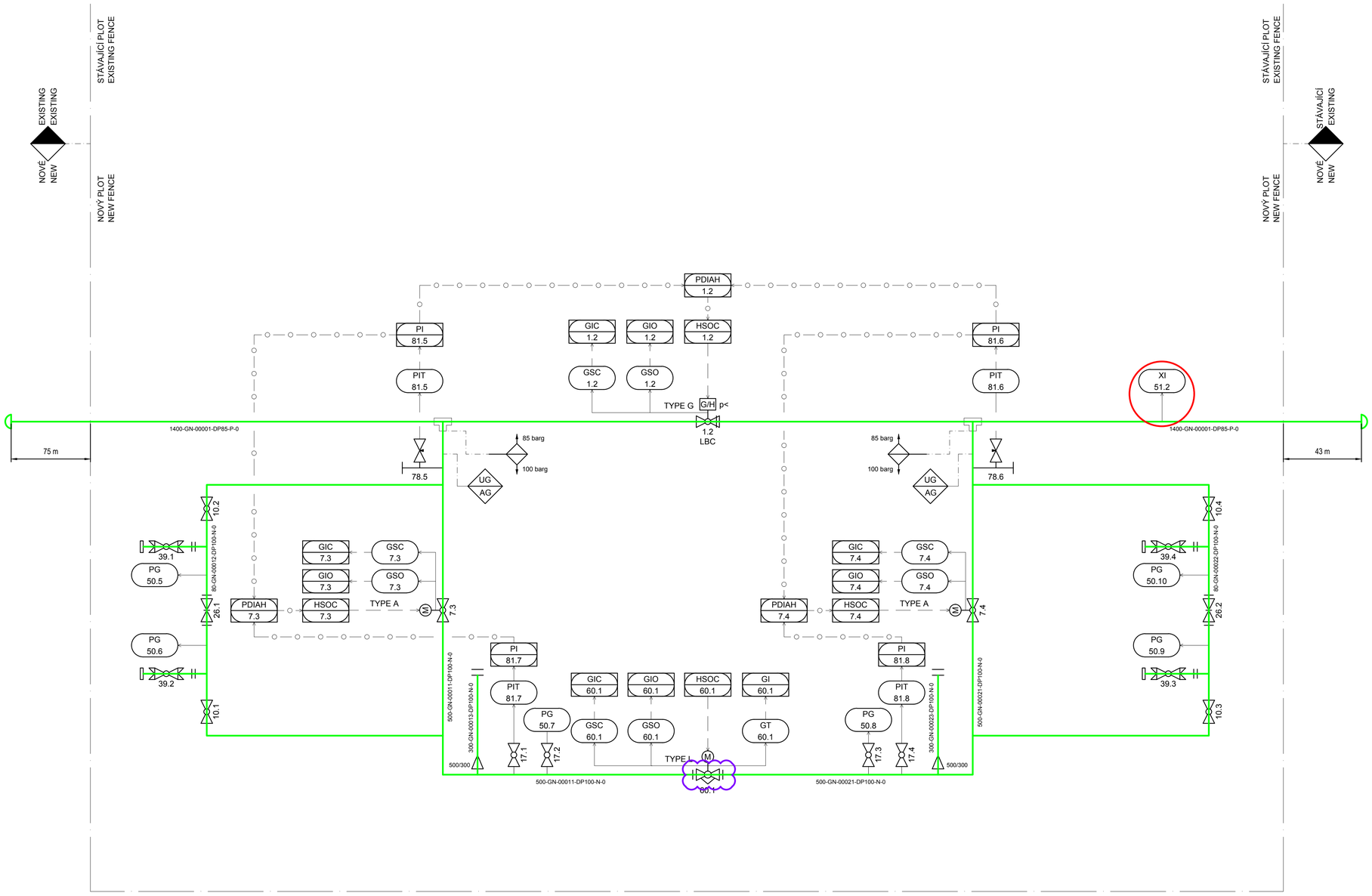
TU HRUŠOVANY - PROCESNÍ SCHÉMATA A INSTRUMENTACE LVS HRUŠOVANY - P&I DIAGRAM

MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET	Z / OF
original size A1 -	N662	C4G-HPPL-ILF-TU51S-STR-DIA-110-001	1	1

Tisk / Printing: 01.10.2018
Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Hrušovany.dwg

PROJECT No.: N662
ORIGINAL SHEET SIZE - A1

PRESSURE TEST SECTIONS - A02.5



POZNÁMKY / NOTES:

ZKRATKY / ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
TU SÝROVICE - TECHNOLOGICKÉ SCHÉMA / LVS SÝROVICE - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-TU52S-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
001	30.08.2018	Opětovně schváleno / Re-Approved	Brodníček	Balatinec	Šabata
000	5.12.2017	Schváleno / Approved	Štrama	Šomský	Jasenčák
B01	28.09.2017	Vydáno k posouzení / Issue for Review	Team	Jasenčák	Miško
A01	15.09.2017	Vydáno pro IDC / Issue for IDC	Team	Jasenčák	Miško

KLIENT / CLIENT:
NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR:
ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

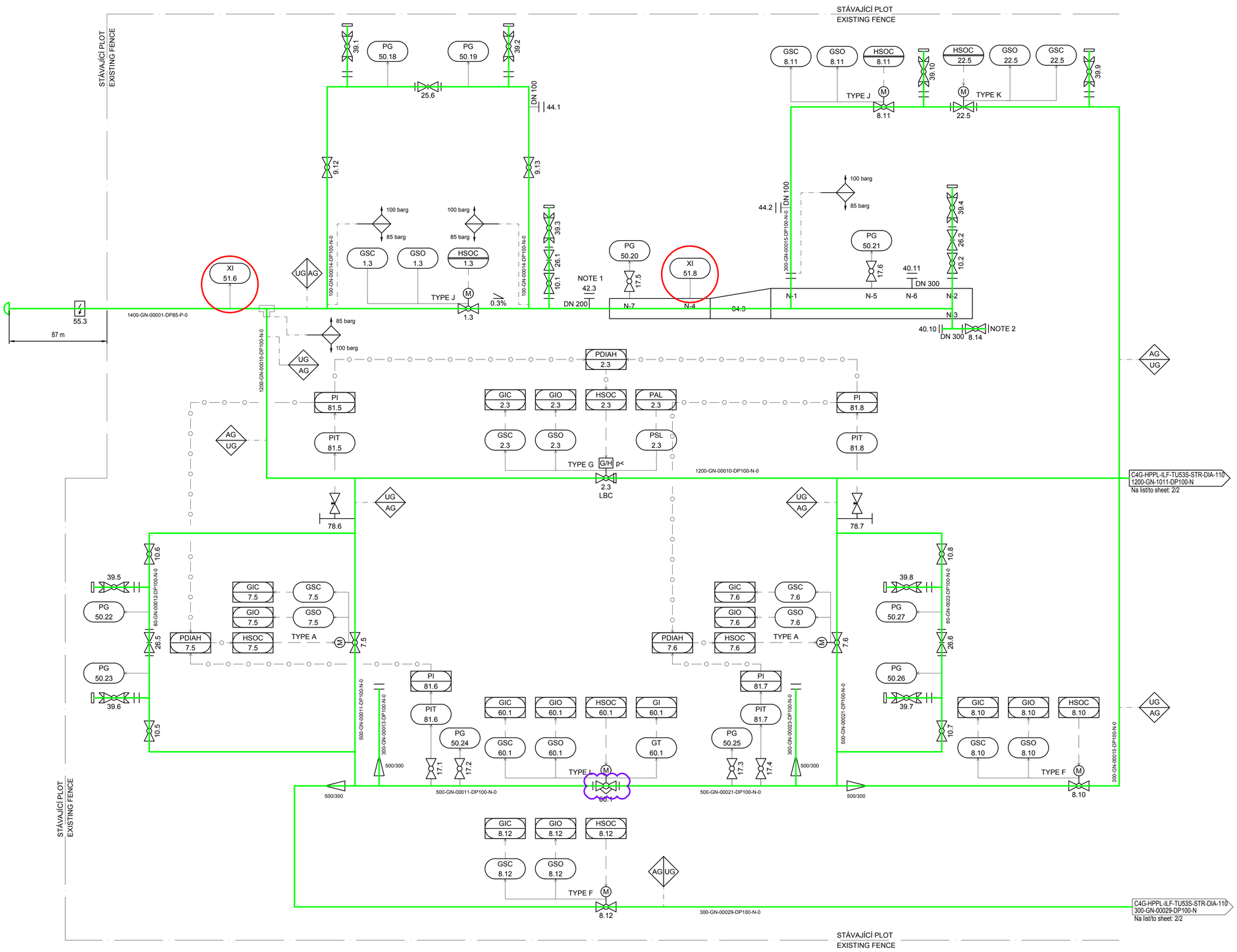
DRAWING TITLE / NÁZEV VÝKRESU:

TU SÝROVICE - PROCESNÍ SCHÉMATA A INSTRUMENTACE
LVS SÝROVICE - P&I DIAGRAM

MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET	Z / OF
original size A1 -	N662	C4G-HPPL-ILF-TU52S-STR-DIA-110-001	1	1

Tisk / Printing: 01.10.2018
Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Syrovice.dwg

PROJECT No.: N661
ORIGINAL SHEET SIZE - A1



POZNÁMKY/ NOTES:

1. BALÓNOVACÍ HRDLO PRO UZAVŘENÍ POTRUBÍ / BALLOON NECK FOR PIPELINE PLUGGING
2. PŘIPOJENÍ MOBILNÍHO SEPARÁTORU / CONNECTION TO MOBILE SEPARATOR

ZKRATKY/ ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
TU MALMĚŘICE - TECHNOLOGICKÉ SCHÉMA / LVS MALMĚŘICE - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-TU53S-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
001	30.08.2018	Opětovně schváleno / Re-Approved	Brodníček	Balatinec	Schorling
000	8.1.2018	Schváleno / Approved	Štrama	Šomský	Jasenčák
B02	29.11.2017	Opětovně vydáno k posouzení / Re-Issue for Review	Štrama	Šomský	Jasenčák
B01	2.10.2017	Vydáno k posouzení / Issue for Review	Team	Jasenčák	Miško
A01	15.09.2017	Vydáno pro IDC / Issue for IDC	Team	Jasenčák	Miško

KLIENT / CLIENT:
NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR:
ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

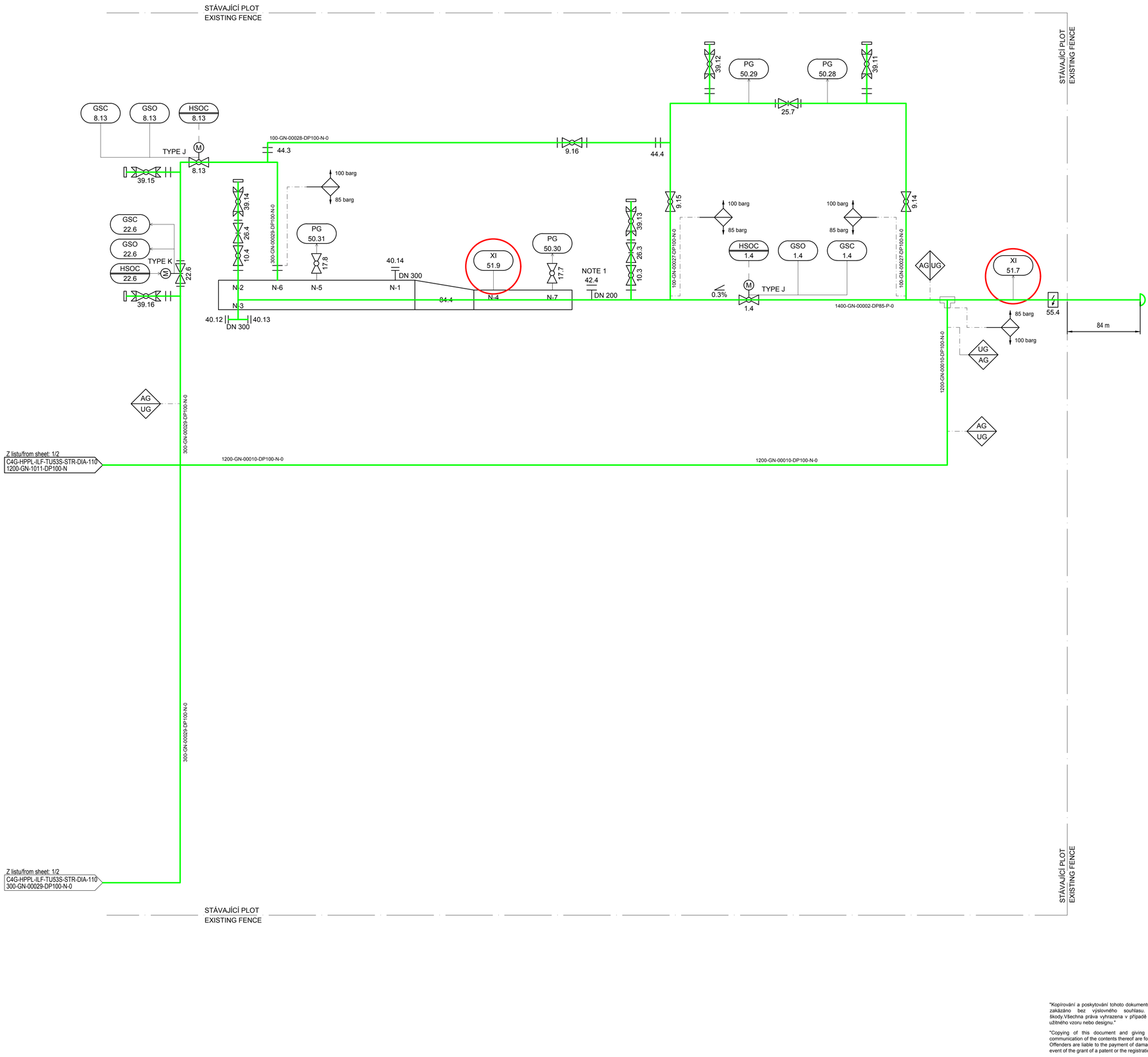
DRAWING TITLE / NÁZEV VÝKRESU:

TU MALMERICE - PROCESNÍ SCHÉMATA A INSTRUMENTACE
LVS MALMERICE - P&I DIAGRAM

MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET Z / OF
original size A1 -	N662	C4G-HPPL-ILF-TU53S-STR-DIA-110-001	1 2

Tisk / Printing: 02.11.2018
Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Malměřice.dwg

PROJECT No. : N662
ORIGINAL SHEET SIZE - A1



POZNÁMKY / NOTES:

1. BALÓNOVACÍ HRDLO PRO UZAVŘENÍ POTRUBÍ / BALLOON NECK FOR PIPELINE PLUGGING

ZKRATKY / ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
TU MALMĚŘICE - TECHNOLOGICKÉ SCHÉMA / LVS MALMĚŘICE - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-TU53S-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
001	30.08.2018	Opětovně schváleno / Re-Approved	Brodníček	Balatinec	Schorling
000	8.1.2018	Schváleno / Approved	Štrama	Šomský	Jasenčák
B02	29.11.2017	Opětovně vydáno k posouzení / Re-Issue for Review	Štrama	Šomský	Jasenčák
B01	2.10.2017	Vydáno k posouzení / Issue for Review	Team	Jasenčák	Miško
A01	15.09.2017	Vydáno pro IDC / Issue for IDC	Team	Jasenčák	Miško

KLIENT / CLIENT: NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR: ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

DRAWING TITLE / NÁZEV VÝKRESU:

TU MALMERICE - PROCESNÍ SCHÉMATA A INSTRUMENTACE
LVS MALMERICE - P&I DIAGRAM

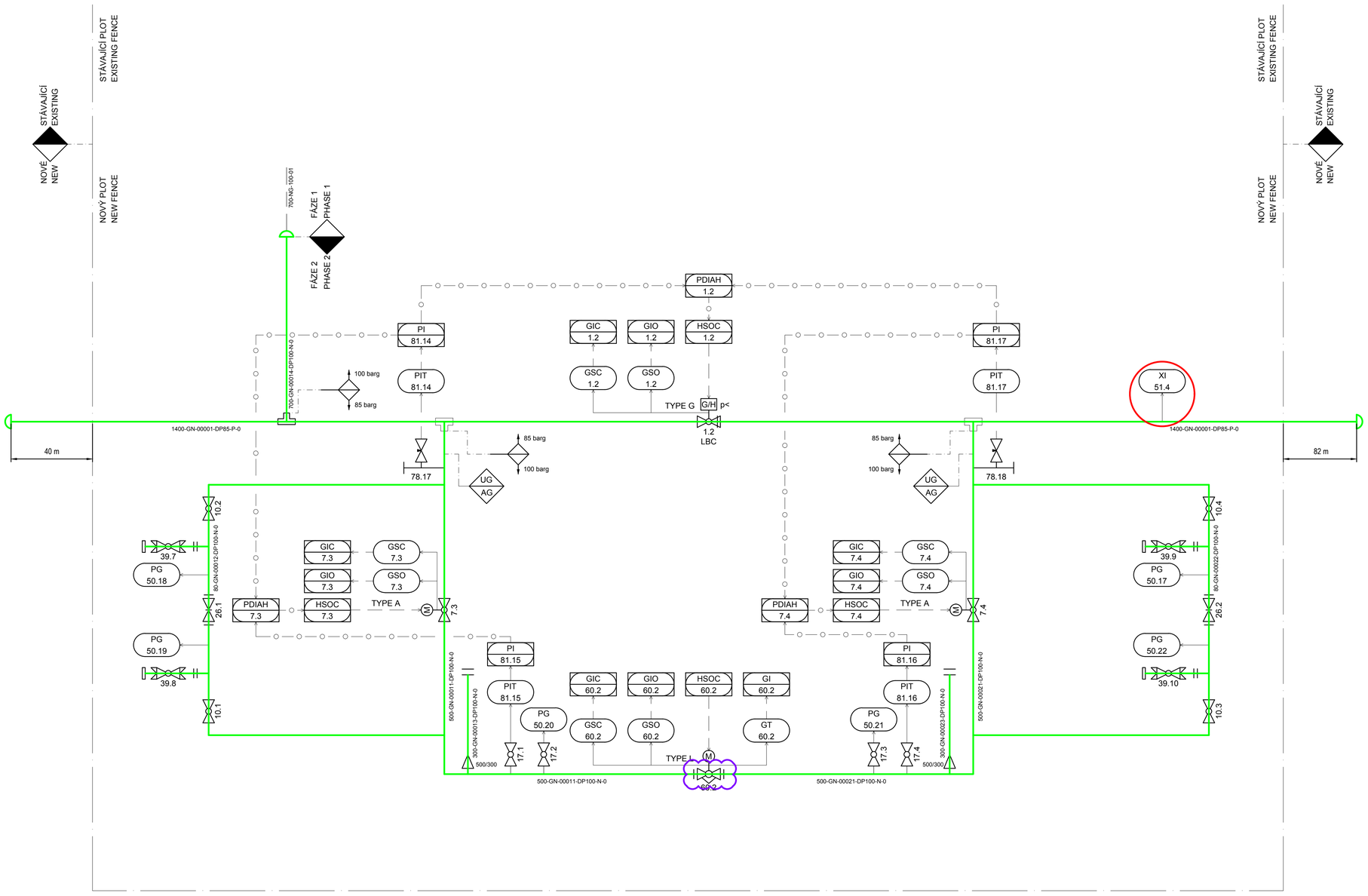
MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET Z / OF
original size A1 -	N662	C4G-HPPL-ILF-TU53S-STR-DIA-110-001	2 2

Tisk / Printing: 02.11.2018

Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Malměřice.dwg

PROJECT No. - N662
ORIGINAL SHEET SIZE - A1

PRESSURE TEST SECTIONS - A02.7



POZNÁMKY / NOTES:

ZKRATKY / ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
TU MLADOTICE - TECHNOLOGICKÉ SCHÉMA / LVS MLADOTICE - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-TU40S-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
001	30.08.2018	Opětovně schváleno / Re-Approved	Brodníček	Balatinec	Schorling
000	5.12.2017	Schváleno / Approved	Štrama	Šomský	Jasenčák
B01	28.09.2017	Vydáno k posouzení / Issue for Review	Team	Jasenčák	Miško
A01	15.09.2017	Vydáno pro IDC / Issue for IDC	Team	Jasenčák	Miško

KLIENT / CLIENT:
NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR:
ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

DRAWING TITLE / NÁZEV VÝKRESU:

TU MLADOTICE - PROCESNÍ SCHÉMATA A INSTRUMENTACE LVS MLADOTICE - P&I DIAGRAM

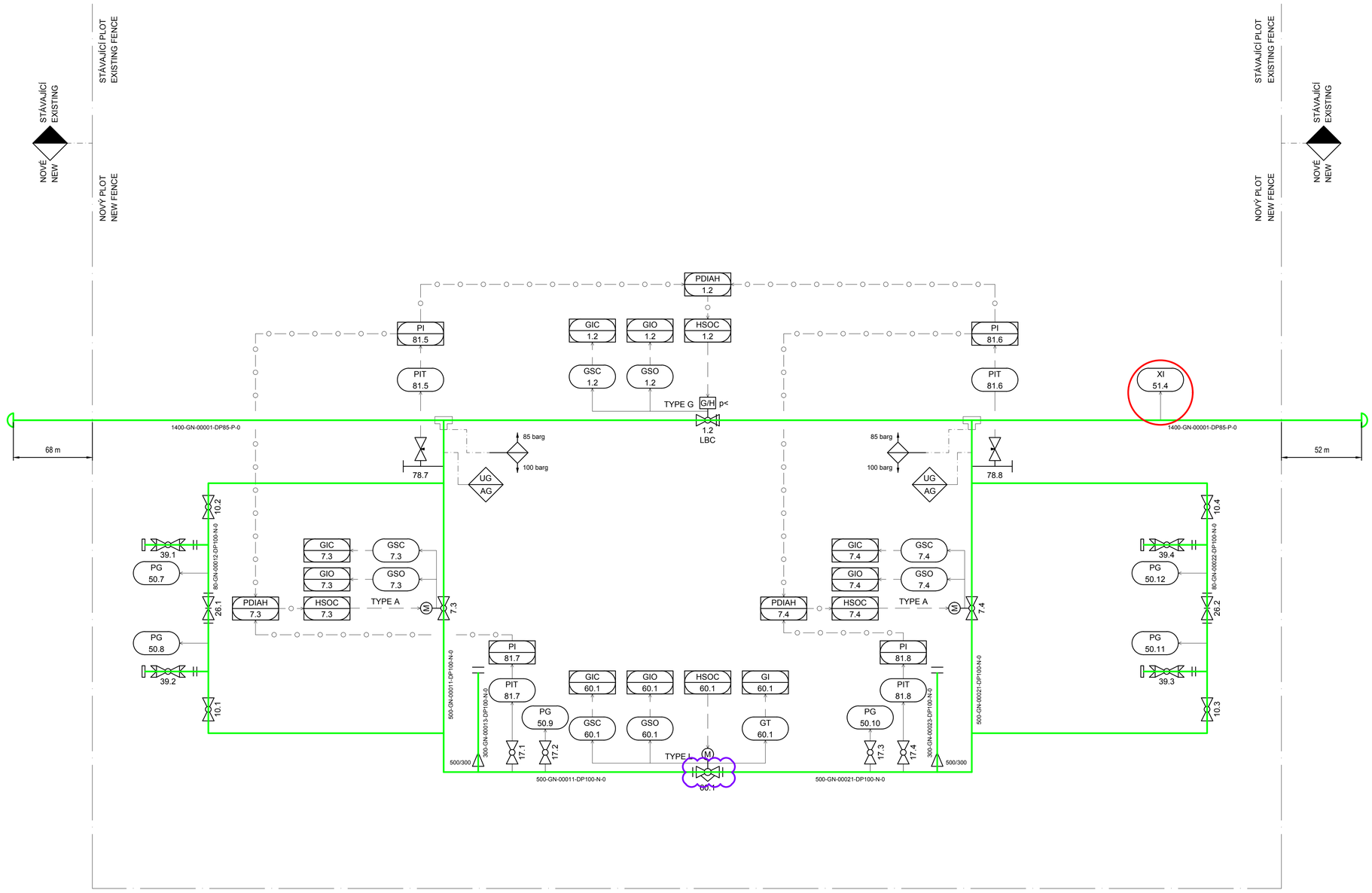
MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET	Z / OF
original size A1 -	N662	C4G-HPPL-ILF-TU40S-STR-DIA-110-001	1	1

Tisk / Printing: 02.10.2018

Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Mladotice.dwg

PROJECT No.: N662
ORIGINAL SHEET SIZE - A1

PRESSURE TEST SECTIONS - A02.8



POZNÁMKY / NOTES:

ZKRATKY / ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
TU HUBENOV - TECHNOLOGICKÉ SCHÉMA / LVS HUBENOV - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-TU41S-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
001	30.08.2018	Opětovně schváleno / Re-Approved	Brodníček	Balatinec	Schorling
000	5.12.2017	Schváleno / Approved	Štrama	Šomský	Jasenčák
B01	25.09.2017	Vydáno k posouzení / Issue for Review	Team	Jasenčák	Miško
A01	15.09.2017	Vydáno pro IDC / Issue for IDC	Team	Jasenčák	Miško

KLIENT / CLIENT: NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR: ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

DRAWING TITLE / NÁZEV VÝKRESU:

TU HUBENOV - PROCESNÍ SCHÉMATA A INSTRUMENTACE LVS HUBENOV - P&I DIAGRAM

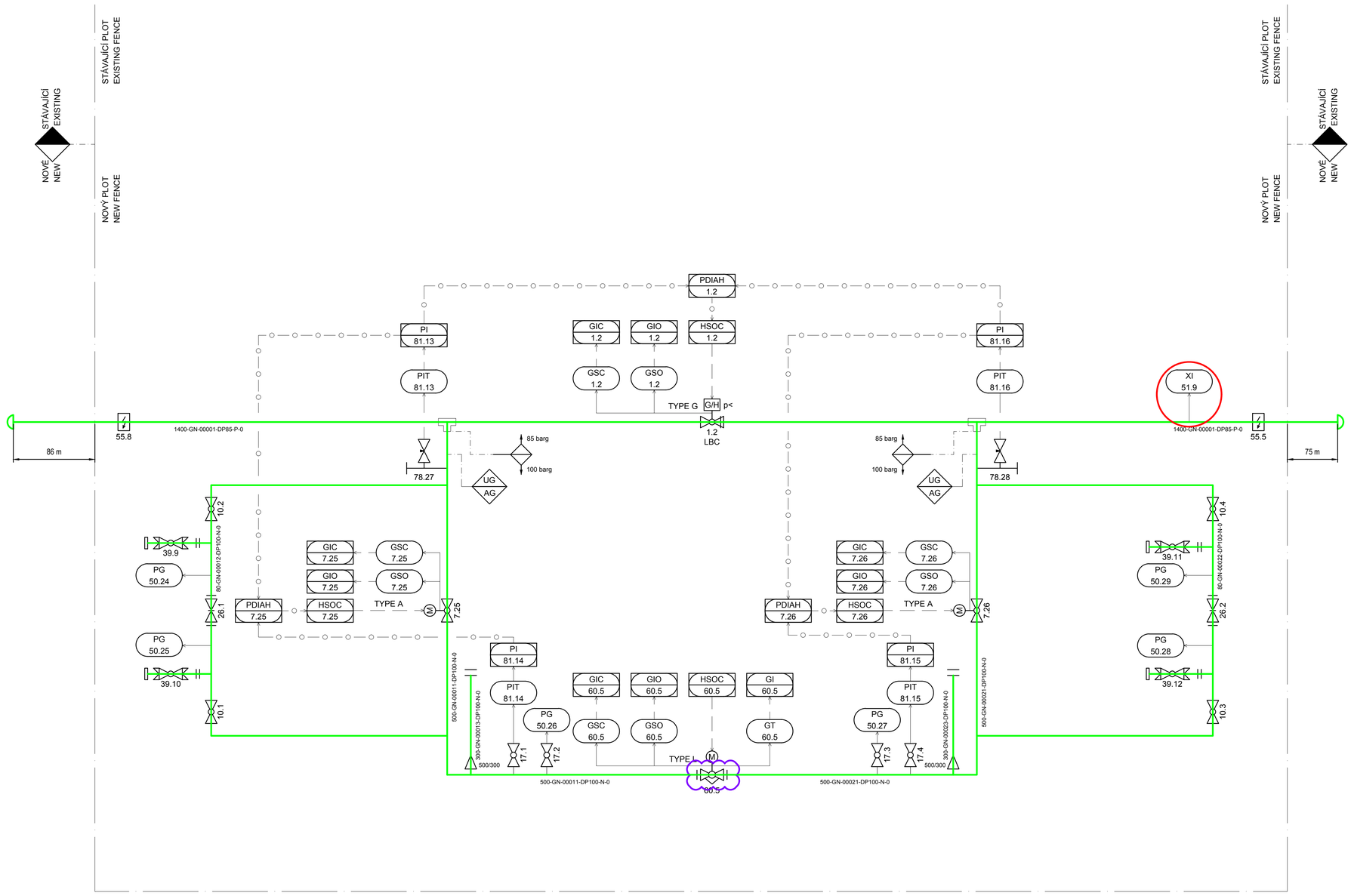
MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET	Z / OF
original size A1 -	N662	C4G-HPPL-ILF-TU41S-STR-DIA-110-001	1	1

Tisk / Printing: 01.10.2018

Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Hubenov.dwg

PROJECT No.: N662
ORIGINAL SHEET SIZE - A1

PRESSURE TEST SECTIONS - A02.9



POZNÁMKY / NOTES:

ZKRATKY / ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
TU SVIŇOMAZY - TECHNOLOGICKÉ SCHÉMA / LVS SVIŇOMAZY - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-TU42S-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
001	30.08.2018	Opětovně schváleno / Re-Approved	Brodníček	Balatinec	Schorling
000	5.12.2017	Schváleno / Approved	Štrama	Šomský	Jasenčák
B01	25.09.2017	Vydáno k posouzení / Issue for Review	Team	Jasenčák	Miško
A01	15.09.2017	Vydáno k IDC / Issue for IDC	Team	Jasenčák	Miško

KLIENT / CLIENT:
NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR:
ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

DRAWING TITLE / NÁZEV VÝKRESU:

TU SVIŇOMAZY - PROCESNÍ SCHÉMATA A INSTRUMENTACE LVS SVIŇOMAZY - P&I DIAGRAM

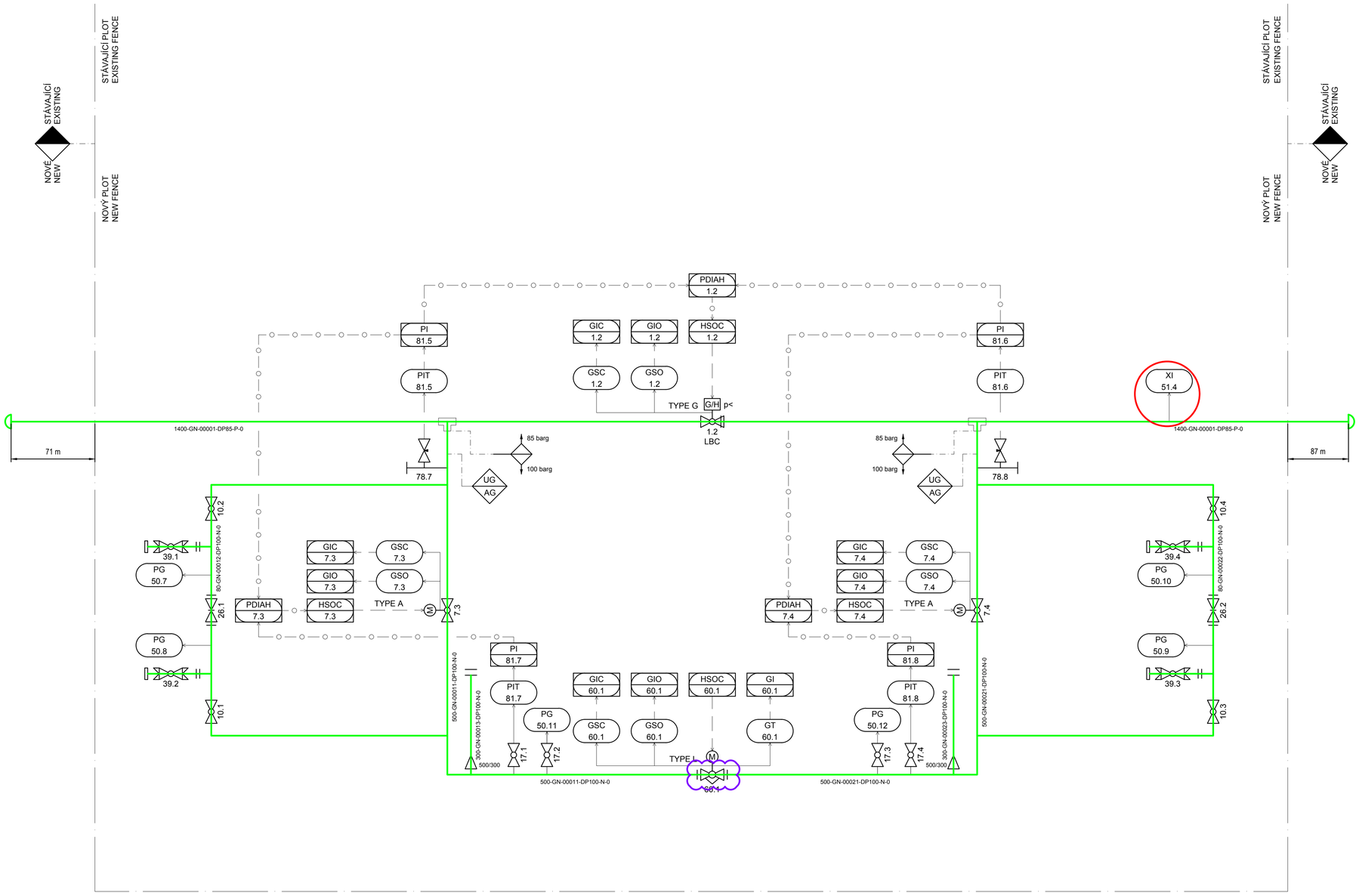
MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET	Z / OF
original size A1 -	N662	C4G-HPPL-ILF-TU42S-STR-DIA-110-001	1	1

Tisk / Printing: 01.10.2018

Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Svińomazy.dwg

PROJECT No.: N662
ORIGINAL SHEET SIZE - A1

PRESSURE TEST SECTIONS - A02.10



POZNÁMKY / NOTES:

ZKRATKY / ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

RU: ROZDĚLOVACÍ UZEL
DN: DISTRIBUTION NODE

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
TU BOR - TECHNOLOGICKÉ SCHÉMA / LVS BOR - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-TU48S-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

REV	DATUM DATE	VYDÁNÍ, DRUH ZMĚNY ISSUE, SCOPE OF REVISION	VYPRACOVAL PREPARED	KONTROLOVAL CHECKED	SCHVÁLIL APPROVED
001	30.08.2018	Opětovně Scváleno / Re-Approved	Brodníček	Balatinec	Schorling
000	5.12.2017	Schváleno / Approved	Štrama	Šomský	Jasenčák
B01	25.09.2017	Vydáno k posouzení / Issue for Review	Team	Jasenčák	Miško
A01	15.09.2017	Vydáno pro IDC / Issue for IDC	Team	Jasenčák	Miško

KLIENT / CLIENT:
NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR:
ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

DRAWING TITLE / NÁZEV VÝKRESU:

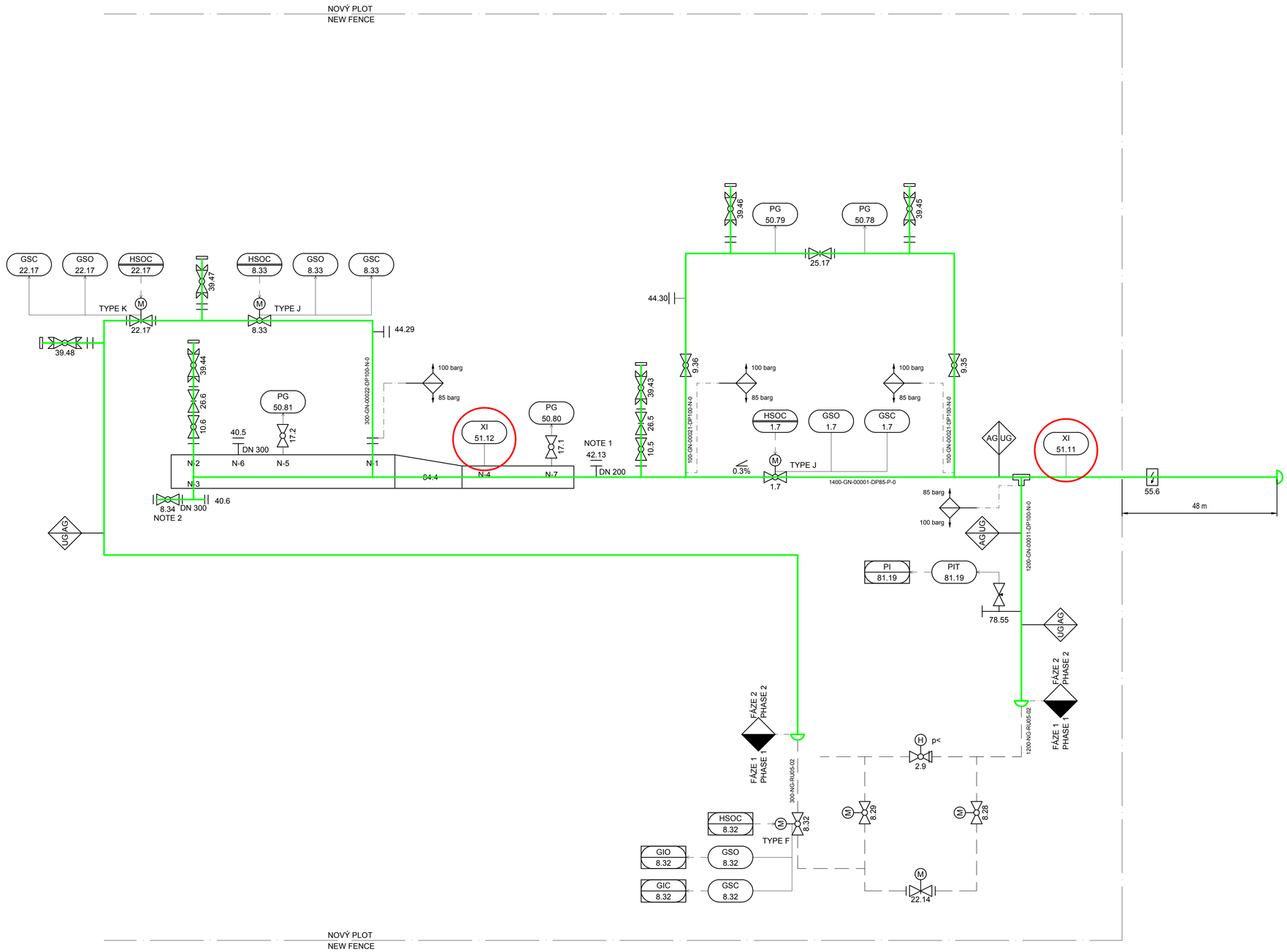
TU BOR - PROCESNÍ SCHÉMATA A INSTRUMENTACE
LVS BOR - P&I DIAGRAM

MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET Z / OF
original size A1 -	N662	C4G-HPPL-ILF-TU48S-STR-DIA-110-001	1 1

Tisk / Printing: 01.10.2018

Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Bor.dwg

PROJECT No.: N662
ORIGINAL SHEET SIZE - A1



POZNÁMKY / NOTES:

1. BALÓNOVACÍ HRDLO PRO UZAVŘENÍ POTRUBÍ / BALLOON NECK FOR PIPELINE PLUGGING
2. PŘIPOJENÍ MOBILNÍHO SEPARÁTORU / CONNECTION TO MOBILE SEPARATOR

ZKRATKY / ABBREVIATIONS:

TU: TRASOVÝ UZÁVĚR
LVS: LINE VALVE STATION

LBC: HAVARIJNÍ PORUCHOVÁ OCHRANA
LBC: LINE BREAK CONTROL

SOUVISEJÍCÍ DOKUMENTY / REFERENCE DOCUMENTS:

NÁZEV VÝKRESU / DOCUMENT TITLE:	Č. VÝKRESU / DOCUMENT NO.:
RU PŘIMDA - TECHNOLOGICKÉ SCHÉMA / LVS PRIMDA - PROCESS FLOW DIAGRAM	C4G-HPPL-ILF-RU005-STR-DIA-101
LEGENDA PROCESNÍHO DIAGRAMU / LEGEND FOR PROCESS DIAGRAMS	C4G-HPPL-ILF-GENER-STR-DIA-101

DISMOUNTED

DISMOUNTED - ADAPTOR

NOT MOUNTED - BLIND ADAPTOR

PRESSURIZED SECTION

REV	DATUM / DATE	VYDÁNÍ, DRUH ZMĚNY / ISSUE, SCOPE OF REVISION	VYPRACOVAL / PREPARED	KONTROLOVAL / CHECKED	SCHVÁLIL / APPROVED
001	30.08.2018	Opětovně schváleno / Re-Approved	Brodníček	Balatinec	Schorling
000	8.1.2018	Schváleno / Approved	Štrama	Šomský	Jasenčák
B02	29.11.2017	Opětovně vydáno k posouzení / Re-Issue for Review	Štrama	Šomský	Jasenčák
B01	2.10.2017	Vydáno k posouzení / Issue for Review	Team	Jasenčák	Miško
A01	15.09.2017	Vydáno pro IDC / Issue for IDC	Team	Jasenčák	Miško

KLIENT / CLIENT: NET4GAS, s. r. o.

PROJEKTANT / ENGINEERING CONTRACTOR: ILF CONSULTING ENGINEERS

PROJEKT / PROJECT: **CAPACITY FOR GAS - C4G**
VTL Plynovod DN1400, RU Kateřinský potok - RU Přimda
HP Pipeline DN1400, Node Kateřinský potok - Node Přimda

STUPEŇ / PHASE: DVZ

DRAWING TITLE / NÁZEV VÝKRESU:

RU PRIMDA - PROCESNÍ SCHÉMATA A INSTRUMENTACE
DN PRIMDA - P&I DIAGRAM

MĚŘÍTKO / SCALE:	PROJ. NO.:	Č. VÝKRESU / DRAWING NO.:	LIST / SHEET	Z / OF
original size A1 -	N662	C4G-HPPL-ILF-RU005-STR-DIA-110-001	1	1

Tisk / Printing: 02.11.2018
Soubor / File: P:\project\N Projects\N662 C4G DN1400\Team\Brodnicek\05 Schémata - Pressure tests\Pressure Test Diagram - Přimda.dwg

PROJECT No. - N662
ORIGINAL SHEET SIZE - A1