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TECHNICAL SPECIFICATION

Doc No: DSF-SPC-QAC-008

Rev. 0

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HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

MEASURING-UP AND AS BUILT DOCUMENTATION

OCTOBER 2023

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REVISION HISTORICAL SHEET

[illegible]



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REFERENCE DOCUMENTS

DESFA Technical Specification DSF-SPC-PIP-004
[Welding Inspection]

DESFA Technical Specification DSF-SPC-PIP-006
[Pressure Testing]

DESFA Technical Specification DSF-SPC-PIP-012
[Welding]

DIN 824
[Technical drawings; Foldings to Filling Size]

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1. SCOPE

This specification covers the requirements for the Measuring-up and As-built documentation for the installed Main Pipeline, the H.P. Branch Lines, as well the various types of the Gas Stations (Metering, Regulating, Compressor).

2. EXTENT

Contractor shall make all measurements and records that are necessary in order to comply with the requirements of the Contract.

After the successful execution of hydraulic test of a pipe section, the Contractor shall immediately deliver to Supervision, the required number of “red marked” copies which will consist the Final As-Built documents/drawings in order to be checked/commented and approved by the Supervision, and all the project information and data to be incorporated on the final documents.

After the approval of the Supervision the Contractor's “red marked” copies will be returned to Contractor in order to issue the final As-built document/drawings.

The pipe log shall be available to Supervision at any time as requested.

The Owner reserves the right to receive part of the As-built documentation prepared by Supervision or Surveyors.

In this case Owner will notify the Contractor in advance the above-mentioned receipt and shall redefine the Contractor's scope of work.

The final documentation of the project is described on the attached list on **APPENDIX a, Fig 9**. The list also indicates the responsibility of Supervision, Third Party or the OWNER, to submit the parts of the documentation to the Contractor for implementation to the Final Documentation Packages (FDP's).

Final Documentation Packages is divided in categories as below:

- SHE: Safety Health and Environment
Safety Manual Plan, Plan, Procedures, Studies, Environmental Plan (EMMP)
- DFOM: Documents for Operation and Maintenance
Project O&M Manual, Materials O&M Manuals, Project Various Lists, EFDs
- FAB: Final As Built
Final As Built Drawings, Standard Drawings, Material Requisition
- QR: Quality Records
Quality Manual Plan, Plan, Procedures, Quality Forms, Material Certificates, Audits

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- RD: Retained Documents

Contractual documents, studies, Permit, Licenses, photo and video documentation.

All FDP files should be numbered as below:

HPPL - ALIV/ FDP/PLS/GEN/DFOM/001

A B C D E F

A) ELEMENT CODE

B) FDP

C) TYPE OF PROJECT

D) UNIT CODE, AREA

E) DOCUMENTATION CATEGORY

F) SEQUENTIAL NUMBER

A) ELEMENT CODE

The code of the Project for which the document is issued, as defined by Owner Document Control Center:

Ex: HPPL = High Pressure PipeLine

The next abbreviation is the name of the project:

Ex: ALIV = Aliveri High Pressure Pipeline

B) FDP (FINAL DOCUMENTATION PACKAGE)

C) TYPE OF PROJECT

PLS: Steel Network

MR: Metering and Regulating Stations

CP: Cathodic Protection

OM: Operation & Maintenance Buildings

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FT: Telecommunications

SC: Scada

GEN: General

D) UNIT CODE, AREA

The unique code for the Network or Station for which the document is issued, as defined by Owner Document Control Center

When referring to the whole project the GEN abbreviation is printed on each volume

E) DOCUMENTATION CATEGORIES

SHE

DFOM

FAB

QR

RD

F) SEQUENTIAL NUMBER

During the preparation phase of the Final Documentation Packages (FDP's) by Contractor, the Supervision (Supervision Contractor or DESFA Representative) ensures the compliance of the FDP's with the relative documentation (DESFA Specification, relative Work Instructions) under the responsibility of the Project Manager.

DESFA DCC Representative performs periodic FDP Audits as DESFA Representative to ensure the compliance of the Project Final Documentation Packages to the current DESFA Specification.

The Supervision Representative signs and approves all the FDP Indices. The following FDP Indices and documentation at least must be reviewed and signed also by Third Part Representative:

1. WELD LOG BOOK
2. PIPE AND WELD LOG BOOK



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3. COATING AND "HOLIDAY" REPORT
4. HYDRAULIC TESTS
5. PIPE AND VALVE CERTIFICATE
6. NDT REPORTS
7. QUARANTEE WELD LIST
8. CALIBRATION CERTIFICATES
9. SURFACE PENETRATION TEST REPORTS
10. RADIOGRAPHY PACKAGES
11. WELDING QUALITY RECORDS

With the Documentation completion, the contractor submit the Final Documentation Packages to Project Manager and carbon copy to DESFA DCC. An Acceptance protocol is signed between all the relevant parties, Contractor, Supervision and Owner.

3. MEASURING-UP

For each welding (e.g. W42) shall be given the Km position, level (H), and coordinates X, Y. Coordinates X,Y and level (H) shall be given in each K point.

After backfilling top soil level should be checked as follows:

- a. Flat areas : Top soil level should be 0,30 m. more than the level shown on longitudinal sections IFC drawings (latest revision).
- b. Mountainous areas : Top soil level should be as the IFC level (latest revision).

Top soil level measurements shall be shown on the as-built longitudinal sections drawings.

The as-built survey shall be carried out using electronic survey equipment and data processing. The system used shall be in accordance with the Owner's requirements.

The survey data shall be handed over to the Supervision. Regarding longitudinal section, drawings shall be given in the form of CD ROMS. Contractor shall define: a. TEXT EDITOR, b. FILE FORMAT

Two lists of coordinates shall be prepared:

- a. 1st (based on the list of tangential intersection points as per basic engineering that will provided by the Owner) to include the intersections (K-points).
- b. 2nd to include the applied triangulation points, bench marks, repers during construction.

4. FORMAT OF DOCUMENTATION

The format of documentation shall be based on the sections of the pipeline as it is described on **APPENDIX A**.

All envelopes of the documentation shall be identified in accordance with the lists identification figures.

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All documentation (pages and drawings) shall be perforated and inserted into binders of heavy-duty quality, two (2) ring level mechanism with clear plastic pockets on both the front and the spine of the binder identification.

The standard width of the binder spine shall be 5 cm or 8 cm.

The binders shall be of such quality so that they can stand unsupported.

Drawings will be drawn to random length size for the convenience in binding. When larger drawings e.t.c. are included in the binder these shall be folded to fit into a plastic pocket page/or folded in accordance with **DIN 824** and fitted with wear resistance tabs to fit the binder.

A list of the titles for the as built documentation shall be provided on the front cover and the back one of the binder, giving project title, Owner logo, unit No. (see **APPENDIX a, Fig. 1, 2 & 3**).

All forms produced by the Contractor shall have on the top of the page the title of the subject and the following description (e.g.):

OWNER	HELLENIC GAS TRANSMISSION	SPREAD
	SYSTEM OPERATOR (DESFA S.A.)	SECTION
PROJECT	GREEK GAS PIPELINE	REF K. POINT
CONTRACT NO	xxxx/year	REF DWG's
SUPERVISION	xxxxxxxxxxxxx	DATE
CONTRACTOR	xxxxxxxxxxxxxxxxxxxxxx	PAGE

All Final Documents should be submitted to the Owner in hard copies and in electronic format. The number of copies will be exactly as the contract defines and all the copied documents must be in color. All electronic documents must be in native format and in colored searchable PDF files).

5. PIPE –LOG AND WELD LOG BOOK

The CONTRACTOR shall maintain a complete, detailed and up-to-date record of all pipeline construction details in the form of a pipelog.

The pipe-log shall, as stated in the specification, comprise two sections.

The first section shall contain all details necessary for the pressure test of the pipeline section in subject. This shall be available at least 1 week prior to commencement of pressure testing.

The second section shall be a more detailed record of all construction details, including isometric sketches of all line installations, etc. (see **APPENDIX D fig 1 & 2**).

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The Contractor shall submit be pipe log book prior to the submission of the red marked up drawings.

6. AS-BUILT DOCUMENTATION

The Contractor shall submit the documents splitted in sections according to the ones mentioned in basic engineering documents. Contractor shall get in contact with Supervision in order to finalize the sequence of the as-built documentation. Contractor shall submit to Supervision the following As-Built documentation for checking/comments and/or approval:

6.1. PIPE LOG AND WELD LOG BOOK

As described in **para 5.0**.

6.2. PRESSURE TEST DOCUMENTATION

The pressure test documentation shall be in accordance with **Job Spec. No. 181/2** and shall contain test, test results, forms and graphs, e.t.c. The following reports are required which will be referred to the pipe section of pressure testing

PRESSURE TEST REPORT,	HYDROSTATIC TEST SUMMARY
	PERMIT FOR PIPELINE WATER FILLING AND HYDROTESTING
PRESSURE TEST REPORT	DATA SHEET FOR PIPELINE SECTION TO BE FILLED WITH WATER (2 PAGES) WITH WATER (2 PAGES) CLEANING ACCEPTANCE CERTIFICATE PIGGING AND GAUGING PLATE LOG
PRESSURE TEST REPORT	WATER FILLING RECORDS TEST REPORT, STABILIZATION
PRESSURE TEST REPORT	EVALUATION OF TIGHTNESS TEST (4 PAGES)
PRESSURE TEST REPORT	PRESSURE VS TEMP
PRESSURE TEST REPORT	TIGHTNESS CALCULATION
PRESSURE TEST REPORT	STRENGTH TEST
PRESSURE TEST REPORT	HYDROSTATIC STRENGTH TEST
PRESSURE TEST REPORT	TIGHTNESS TEST
PRESSURE TEST REPORT	HYDROSTATIC TIGHTNESS TEST DIAGRAMS



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PRESSURE TEST REPORT

FAULT REPORT (2 PAGES)

PRESSURE TEST REPORT

SUMMARY (3 PAGES)

PRESSURE TEST REPORT

REPORT ON HYDROTESTING SECTION
CROSSING, E.T.C.

PRESSURE TEST REPORT

INSTRUMENT CALIBRATION REPORT

PRESSURE TEST REPORT

PIPE LOG SUMMARY HYDROSTATIC TEST
HISTORY DATA SHEET RECORDING MAP
(SC. 1:50.000) LOCATION OF
HYDROTESTING PIPELINE
(SEE **APPENDIX C, FIG. 1 UP TO 29**).

Contractor shall produce an index of all test sections.

6.3. DRYING REPORT

See **Appendix C, Fig. 30**.

6.4. WELDING DOCUMENTATION

The welding documentation shall consist of two sections. The first section include the welding documents and the second one the NDE documentation as per **Job Spec. No. 180/1** and **Job Spec. No. 199/4** and the approved Contractor's welding procedures.

6.4.1. WELDING DOCUMENTS

- WELDING LOG.
- WELDING LOG BOOK.
- TIE-IN's REPORTS.
- WELDING PROCEDURES.
- WELDING PROCEDURE SPECIFICATIONS (WPS).
- PROCEDURE QUALIFICATION RECORDS (PQR)
- WELDERS' & WELDING OPERATORS' CERTIFICATES

6.4.2. AUTHORIZED NDT DOCUMENTATION

- RADIOGRAPHS
- RADIOGRAPHIC INSPECTION REPORTS
- ULTRASONIC EXAMINATION REPORTS.
- MAGNETIC PARTICLE EXAMINATION REPORTS.



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- LIQUID PENETRANT EXAMINATION REPORTS.

(See APPENDIX D, Fig. 1 up to 9).

- NON CONFORMANCE REPORTS.

6.4.3. CERTIFICATES FOR CONSUMABLES

6.5. CATHODIC PROTECTION

The cathodic protection documentation shall consist of:

- PIN BRAZING AND CABLE CONNECTION FOR MEASURING POST REPORTS
- MEASURING POST INSTALLATION REPORTS
- INSTALLATION OF MEASURING POST AND CABLE CONNECTIONS RECORD SHEETS
- CHECK AND CALIBRATION OF POLARIZATION PROBES REPORT (POST TYPE K9).
- SOIL RESISTIVITY MEASUREMENTS.
- TEST REPORTS FOR RIVER CROSSING (TEMPORARY IMPRESSED CURRENT)
- TEST REPORTS FOR RIVER CROSSING.
- TEST REPORTS FOR ROAD/RAILWAY CROSSING WITH CASING.
- NATURAL POTENTIAL RECORD SHEETS (PRECOMMISSION WORKS ONLY).
- GROUND BED RECORD SHEETS.
- INSULATION JOINT TEST RESULTS.

(See **APPENDIX E, Fig. 1 up to 11**).

- 1:50.000 maps (key-plans) including all cathodic protection installed items (measuring posts, C.P. Station insulating couplings, e.t.c.).
- Test reports for grounding installation.
- Sketches for all electrical cables routing including the as built position of the measuring posts and splicing hits.
- Any other installed Cathodic Protection material such as bonding cables, e.t.c.

6.6. COATING DOCUMENTATION

The coating documentation shall consist of a summary of documents for coating of pipes, field joint, weld joints, valves and fittings as follows:



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- PIPE COATING REPORTS (FIELD)
 - VALVES AND FITTINGS COATING REPORTS
- (See **APPENDIX F, Fig. 1 and 2**).
- COATERS' APPROVAL CERTIFICATES

6.7. HDPE PIPE (CONDUIT) DOCUMENTATION

The HDPE pipe (conduit) documentation shall consist of a summary of documents from the installation and test reports as follows:

- INSTALLATION OF HDPE PIPE (CONDUIT) FOR FIBER OPTIC CABLE.
- HDPE PIPE TEST REPORTS. (See APPENDIX F, Fig. 3 and 4).

6.8. MATERIAL CERTIFICATES AND VENDORS DRAWINGS

For materials supplied by Owner, Contractor shall receive all the required documents from Owner in order to incorporate them in the final As-built documentation package. Contractor shall incorporate the above documents in a separate section of the as-built documentation package which should be indexed into types of material.

6.9. PROTOCOLS AND OTHER DOCUMENTATION REQUIRED

The documentation shall consist of a summary of documents as follows:

- MARKER POST INSTALLATION REPORTS
- PROTOCOLS FOR RIVER CROSSINGS
- PROTOCOLS FOR AUGER BORED CROSSINGS
- BORING REPORTS - SURVEY DATA
- HANDING OVER PROTOCOLS OF THE LAND AFTER THE REINSTATEMENT FROM THE CONTRACTOR

(See **APPENDIX F, Fig. 5 up to 9**).

6.10. AS-BUILT DRAWING

6.10.1. GENERAL

The as-built drawings shall be prepared by Contractor based on the Review (R) Drawings on the latest revision and the Contractor's detailed field engineering drawings.

The as-built drawings shall contain all the as-built installations with information and details for the constructed Natural Gas Pipeline.



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Final As Built drawings which are been revised during the current project, must keep their original drawing number.

Revised As Built drawings during the detailed design phase will keep the Final As Built revision number, adding letters to any new revision(ex 3a,3b etc). The Final version will continue the number sequence (ex 4).

Before the issue of the as-built drawings the Contractor shall submit to Supervision for comments/approval two (2) copies of all the red marked as built documents/drawings referred to the pipeline section that have passed successfully all the tests. Supervision then stamp and sign the As built drawings as Final As Built. The Final As built drawings shall be returned to Contractor with or without Supervision's comments in order to be included in the Final Documentation Packages.

Contractor shall also issue to Supervision all final as built drawings in digital format (cad and PDF) in external hard drives.

6.10.2. DRAWINGS CLASSIFICATION

The Contractor shall submit to Supervision the following classification of drawings and lists.

RECORDING MAPS

Dwg Classification

- Recording Maps (1:50.000)	94
- Recording Maps (1:5.000)	93
- Recording Maps (1:1.000)	55
- Special Points, Recording Plans	58
- Geological Drawings	40

LONGITUDINAL SECTIONS

Dwg Classification

- Longitudinal Sections drawings (1:1.000)	55
- Special points, Long, section drawings	58

ENGINEERING FLOW DIAGRAMS

50

PLANS FOR STATION AREA

- Plot Plan	41
- Foundation concrete structure (civil dwg)	43
- Piping Arrangement	51
- Isometrics	52
- Piping Layout	56
- Area classification drawings	



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CATHODIC PROTECTION SYSTEM

- Electrical Power	73
- Cathodic Protection Dwg	78

SPECIAL CABLES INSTALLATION

- Instrument	65
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VARIOUS LIST

- List of tangential intersection points (k)
- List of class location classification
- List of hot and field bends
- List of crossings
- List of measuring posts
- List of saddles
- List of levels of the pipe and ground top between symbols of detailed dwg's (**See Appendix A, Fig. 6**)
- List of drawings
- List of documents
- Equipment List
- Procurement and Material List
- Valve List
- Material Balance Report
- Guarantee Weld List
- List of Insulation Joint
- HDPE connection Llist

VENDORS' DRAWINGS (See Section 6.8)

6.10.3. OPERATING AND MAINTENANCE MANUALS FOR VENDOR EQUIPMENT

For equipment purchased by Owner he provide to Contractor a package of operating and maintenance manuals of the equipment, so that Contractor shall incorporate them in the as built Final Documentation Package.

6.10.4. LONGITUDINAL SECTIONS AND RECORDING PLAN

In the longitudinal sections and Recording Plan drawings shall be shown:



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- The length of the pipeline.
- The starting and finishing pipeline kilometer Chainage shall be shown at the beginning and the end of each drawing.
- K-points, with all required data e.g. Grades / Degrees, kilometer chainage, kind of fittings, e.t.c.
- Match lines must be shown with dwg. nos., and kilometer chainage for the Special Points as Line Valve stations Scraper Stations, National Roads, New National Roads Railroads and River Crossings.
- The position (chainage) of main-valve shall be shown for all line valve station and scraper station.
- The Ownership and the detail description (material, dimensions, elevation, kilometer chainage, e.t.c.) of all existing underground installations (public or private) which are crossing the pipeline (e.g. water pipes, drainage pipes, fuel pipes, power cables, communication cables, e.t.c.).
- The as-built drawings shall have title blocks as shown on **APPENDIX A, Fig. 5a and 5b**. The revised as-built drawings shall have title blocks as shown on **APPENDIX 4**.

6.10.5. LONGITUDINAL SECTIONS

Regarding the longitudinal sections drawing (drawings class 55) it is up to the Contractor's judgment to decide for redrawing them if new elevations have been revealed after R.O.W. preparation, trenching and R.O.W. reinstatement activities.

If the Contractor decide to redraw the above mentioned drawings, then the redrawing shall be done with system compatible with the Owner's one.

In this case the contractor shall deliver also the drawings in the form of CD ROMS.

The following shall be shown on the drawings.

- The final ground levels after the reinstatement with chainage measured from the previous K-points.
- Top of pipe elevations with the chainage measured from the previous K-point.
- The pipeline shall be shown with double line without centerline. (**see APPENDIX A Fig.5**)
- The detail description and the exact location of each fitting (field bends, hot bends) at each K-point.
- The special protection shall be shown with abbreviations in the respective horizontal ROW due to the limited space



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- The exact location and number (Quantity) for the installed saddles.
- The detail description dimensions, elevations of bottom of ditches and other dimensions for all crossings (e.g. roads, ravines, irrigation channels, e.t.c.).
- The Cathodic Protection Measuring Post type and location (chainage).
- All new K-points shall be numbered by using the respective lower K-point No. plus the next English alphabet letter.

6.10.6. RECORDING PLAN

The Contractor shall use the basic engineering Recording Plans (transparencies) for the preparation of the as-built drawings.

The recording plans shall contain all information which are described in **para 6.10.6** as well as the requirements mentioned here below:

- The pipeline shall be shown with one line only, (see **APPENDIX A Fig.7**)
- The R.O.W. limits shall be shown with dotted lines.
- All R.O.W. limit changes (e.g. from 16m/10m to 8m/4m or 6m/6m e.t.c.) shall be shown.
- The weld joint Nos and locations shall be shown every third weld (approximately every 25 m.) For Details see **APPENDIX A, Fig. 7.**
- Measuring post numbering and exact location (kilometer chainage) shall be shown.
- Marker post numbering and exact location (kilometer chainage) shall be shown.
- All information within a zone of 40m/40m from the pipeline centerline shall be shown.

HDPE pipe (conduit) overlapping shall be shown.

All manholes and handholes shall be shown with their special symbols.

6.11. PHOTO DOCUMENTATION AND VIDEO

The Contractor shall submit photographs and video documentation, plus the electronic files, of all the stations during the Construction period.

The photographs will be taken after the coating has been completed, but before backfilling.

The photographs of the stations shall be top view (i.e. layout) and detail (side view), photographs of all equipment, fittings, e.t.c.



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APPENDIX A

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APPENDIX A - Fig. 1 (example)

 HELLENIC GAS TRANSMISSION SYSTEM OPERATOR S.A. NATURAL GAS PROJECT OF GREECE		
W.B.S.	CONTRACT NO.	ELEMENT CODE
CONTRACT TITLE		
OWNER : DESFA S.A PROJECT MANAGER : SUPERVISION COMPANY : CONTRACTOR :		
FINAL DOCUMENTATION PACKAGE PROJECT TITLE UNIT		
FDP NUMBER	FDP DESCRIPTION	
PACKAGE VOLUME No :	: COPY No	



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APPENDIX A - Fig. 2 (example)

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HELLENIC GAS TRANSMISSION SYSTEM OPERATOR S.A.
FINAL DOCUMENTATION PACKAGE
PROJECT UNIT
Contr. No : W.B.S.
FDP DESCRIPTION
ELEMENT CODE
FDP NUMBER
VOLUME No :
COPY No :

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APPENDIX A - Fig. 3 (example)



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APPENDIX A - Fig. 4 (example)

PAGE No	REFERENCE DRAWINGS	REVISIONS					
		0	1	2	3	4	
		0	1	2	3		
		0	1	2	2		
		0	1	2	2		
3	15.06.98	AS BUILT					
2	31.10.96	REVISED AS INDICATED					
1	4.12.95	ISSUE FOR CONSTRUCTION					
0	15.06.95	FIRST ISSUE					
REV.	DATE	DESCRIPTION		DRAWN	CHK'D	ENGR	DEPT. HEAD
OWNER :		 HELLENIC GAS TRANSMISSION SYSTEM OPERATOR , (DESFA S.A.)					
FIRST AS BUILT REVISION		CURRENT AS BUILT REVISION					
PROJECT MANAGEMENT :							
 PLE GmbH							
ENGINEER :							
 ASPROFOS ENGINEERING S.A.							
CONTRACTOR :							
 STROYTRANS GAZ CONSORTIUM CONTRACT : V.P.O. ZARUBEZHNEFTEGAZSTROI No. 224/95 GENERAL DIRECTORATE W.B.S. No.3.3.3.							
PROJECT :							
NATURAL GAS PROJECT (NGTS) HIGH PRESSURE TRANSMISSION SYSTEM KAVALA BRANCH							
DRAWING TITLE :		Section-1100 KARPERI - HALKERO INSTRUMENT SCHEDULE					
SCALE :		DWG No. 5112-110-4-65-01		3		1 OF 1	
ACAD CODE : INSTR.DWG		AS BUILT:		REVISION		SHEET	



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APPENDIX A - Fig. 5a (example)

REFERENCE DRAWINGS							
5112-340-00-55-07 sh 2 of 2	SECTION 3400 - RECORDING PLAN						
5112-190/340-4-96-01	LIST OF TANGENTIAL INTERSECTION POINTS (Ki)						
5112-190/340-4-58-01/11	LIST OF CROSSINGS						
5291-STD-00-11-06	FIELD BENDS OF PIPELINES SECTIONS						
5291-STD-1-43-13	CONCRETE SADDLE FOR PIPELINES						
5291-STD-00-58-04	PIPELINE WITHOUT CASING CROSSING WITH FUTURE ROAD						
5291-STD-00-58-05	PIPELINE WITH STEEL CASING CROSSING WITH FUTURE ROAD						
5291-STD-00-58-06	PIPELINE WITHOUT CROSSING WITH RAILWAY						
NOTE: LOCATION OF ELECTRIC COUPLING K241A2 + 158.81 m. COORDINATES : E: 488428.321 : N: 4203258.213 : Z: 163.375							
2	01.09.97	AS BUILT					
1	05.08.97	ISSUE FOR CONSTRUCTION					
0	04.06.97	FIRST ISSUE					
REV.	DATE	DESCRIPTION		DRAWN	CHK'D	ENGR	DEPT. HEAD
OWNER :  HELLENIC GAS TRANSMISSION SYSTEM OPERATOR, (DESFA) S.A.				APPROVED FOR CONSTRUCTION: REV __1__ DATE 05.08.97			
SUPERVISION :				"AS BUILT" CONTRACTOR : _____ SIGNATURE DATE _____			
CONTRACTOR :							
PROJECT : NATURAL GAS PROJECT (NGTS) HIGH PRESSURE TRANSMISSION SYSTEM XXXXXX PIPELINE				CONTRACT : No. XXX/XX W.B.S. No.			
DRAWING TITLE : Section XXXX XXXXXX - YYYYYY LONGITUDINAL SECTION FROM KXXX + XXX.XXm TO KXXX + XXX.XXm							
SCALE : 1 : 100 1 : 1000		DWG No. XXXX-YYY-00-55-XX		2		1 OF 2	
ACAD CODE : ..		AS BUILT:		REVISION		SHEET	



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APPENDIX A - Fig. 5b (example)

REFERENCE DRAWINGS							
5112-340-00-55-07 sh 1 of 2		SECTION 3400 - LONGITUDINAL SECTION					
5112-340-00-55-07 sh 2 of 2		SECTION 3400 - RECORDING PLAN					
5112-340-00-58-29 sh 1 of 2		SECTION 3400 - DETAIL LONGITUDINAL SECTION					
2	21.06.00	AS BUILT					
1	31.01.00	ISSUE FOR CONSTRUCTION					
0	23.12.99	FIRST ISSUE					
REV.	DATE	DESCRIPTION		DRAWN	CHK'D	ENGR	DEPT. HEAD
OWNER :  HELLENIC GAS TRANSMISSION SYSTEM OPERATOR, (DESFA) S.A.				APPROVED FOR CONSTRUCTION: REV <u> 1 </u> DATE <u>31.01.00</u>			
SUPERVISION :				"AS BUILT" CONTRACTOR : _____ SIGNATURE DATE _____			
CONTRACTOR :							
PROJECT : NATURAL GAS PROJECT (NGTS) HIGH PRESSURE TRANSMISSION SYSTEM XXXXXX PIPELINE				CONTRACT : No. XXX/XX W.B.S. No.			
DRAWING TITLE : Section XXXX XXXXXX - YYYYYY RECORDING PLAN FROM KXXX + XXX.XXm TO KXXX + XXX.XXm							
SCALE : 1 : 100 1 : 200		DWG No. XXXX-YYY-00-58-XX			2		2 OF 2
ACAD CODE : --		AS BUILT:			REVISION		SHEET



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LEVELS OF PIPE AND GROUND TOP BETWEEN

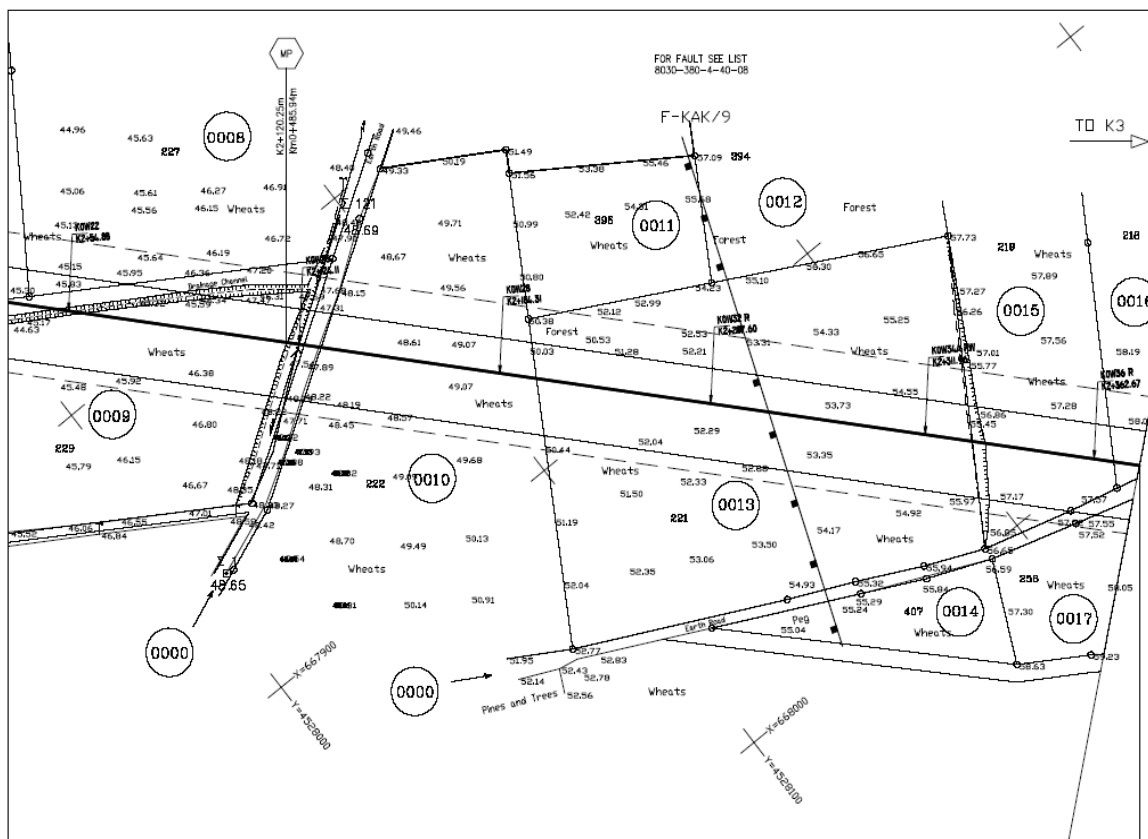
OWNER
PROJECT
CONTRACT No.
SUPERVISION
CONTRACTOR

SPREAD
SECTION
REF.K POINT
REF. DRAWINGS
REPORT NO.
DATE

[illegible]**CONTRACTOR**

SUPERVISION

APPENDIX A - Fig. 7 (example)





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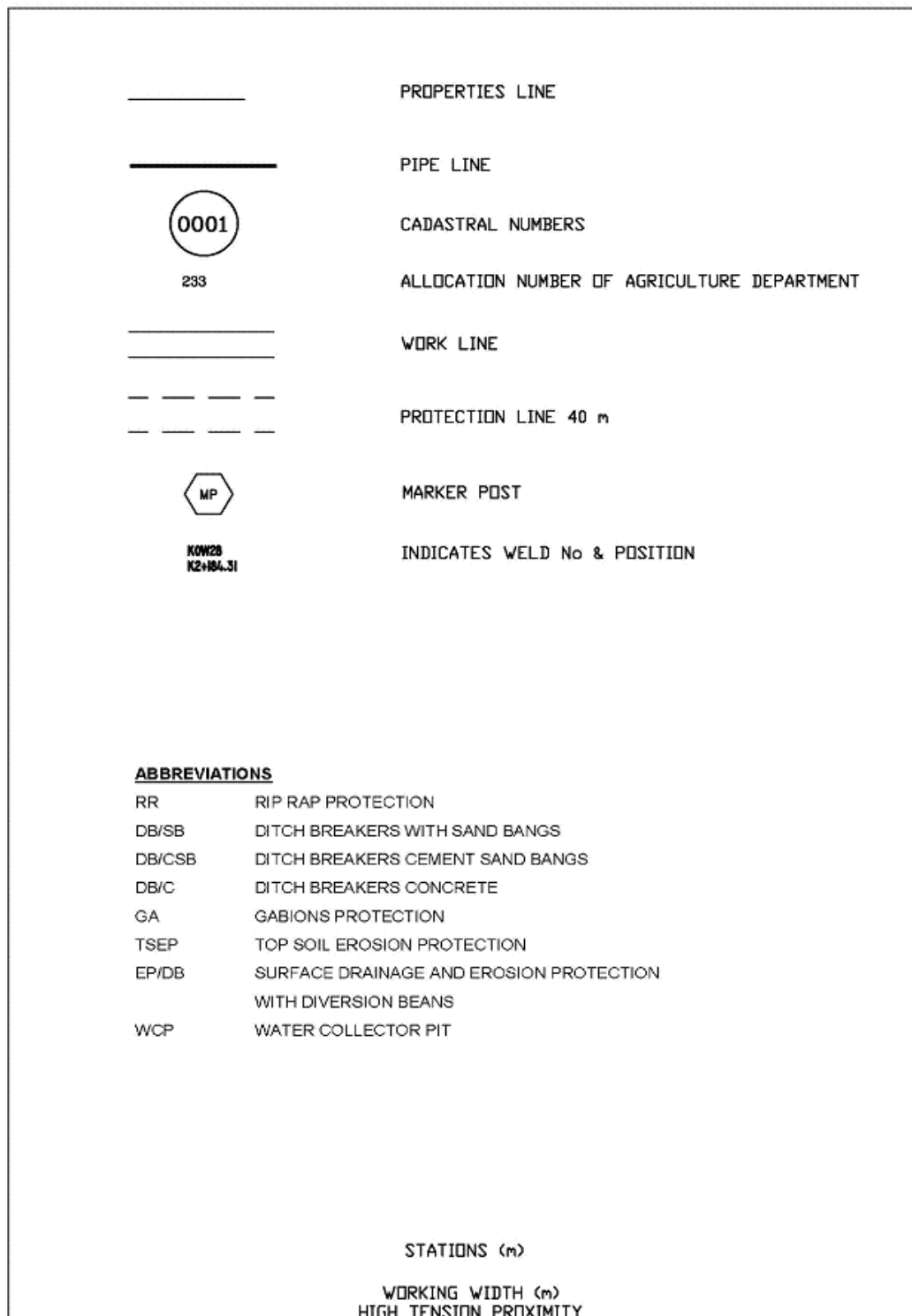
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APPENDIX A - Fig. 8 (example)



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APPENDIX A - Fig. 9 (example)



HELLENIC GAS TRANSMISSION SYSTEM OPERATOR S.A. DOCUMENT CONTROL CENTER

CONTRACTOR

LIST OF FINAL DOCUMENTATION PACKAGES							
CONTRACT TITLE:							
CONTRACT NUMBER:							
ELEM.CODE: W.B.S.: PROJECT ID:							
PROJECT DOCUMENT NUMBER :							
REVISION NUMBER :							
DATE :	FDP No.	Description	Protocol No.	Date to PMN	Date To DEPA	VOL No	Comments
GENERAL DOCUMENTS							
	GEN	S,H,E					
		PROJECT SAFETY DOCUMENTS					
	GEN	DFOM					
		BASIC PIPELINE OPERATION & MAINTENANCE MANUAL					
		SYSTEM OPERATION & MAINTENANCE MANUAL					
		VENDORS MANUALS					
		VARIOUS LISTS					
	GEN	FAB					
		MATERIAL REQUISITIONS					
		JOB SPECIFICATIONS					
		STANDARD DRAWINGS					
		AS BUILT DRAWINGS , PIPE & WELD LOG BOOK ,VARIOUS LIST ,OVERALL & DETAIL FDP REGISTER IN COMPUTERIZED FORMAT					
	GEN	QR					
		PROJECT QUALITY DOCUMENTS					
	GEN	RD					
		PROJECT RETAINED DOCUMENTS					
SECTION							
	SECTION	FAB					
		AS-BUILT DRAWINGS					
		X-RAY FILM HAND OVER PROTOCOLS FOR PIPELINE AND STATIONS					
	SECTION	QR					
		QUALITY FORMS					
	SECTION	RD					
		RETAINED DOCUMENTS					



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APPENDIX B

[illegible]

PIPE LOG BOOK

OWNER	:	HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)	SPREAD	:
PROJECT	:	GREEK GAS PIPELINE	SECTION	:
CONTRACT NO.	:	.....	REF. K POINT	:
SUPERVISION	:	.....	REF. DWG' s	:
CONTRACTOR	:	.....	REPORT No.	:
			DATE	:
			PAGE	:



APPENDIX B - FIG. 2 (example)

[illegible]

NOTES:

CONTRACTOR

NAME

SIGNATURE

SUPERVISION

NAME _____

SIGNATURE

SIGNATURE



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APPENDIX B – FIG. 4 (example)

N/N	ABBREVIATIONS	DESCRIPTION
1	ST	SCRAPER TRAP
2	VBL	BALL VALVE
3	VGA (SHO)	GATE VALVE (SHUT OFF)
4	VGA (TH)	GATE VALVE (THROTTLING)
5	VPL	PLUG VALVE
6	GV	GLOBE VALVE
7	TEE/EQ	EQUAL TEE
8	TEE/EQ/B	EQUAL BARRED TEE
9	TEE/RED	REDUCING TEE
10	TEE/R/B	REDUCING BARRED TEE
11	ELB	ELBOW
12	FLG	FLANGE
13	FL/W/N	WELD NOZZLE FLANGE
14	FL/INS	INSULATING FLANGE
15	FL/BLD	BLIND FLANGE
16	GASK	GASKETS
17	INS CO	INSULATING COUPLE
18	INST	INSTRUMENT
19	PG	PRESSURE GAUGE
20	CP	CAP
21	RE/CON	REDUCER CONCENTRIC
22	NIP	NIPPLE
23	NW	NOZZLE WELD
24	VC	VENT CLOSURES



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25	CC	CONDENSATE COLLECTOR
26	FB	FIELD BEND
27	HB	HOT BEND
28	SBL	SIDE BEND LEFT
29	SBR	SIDE BEND RIGHT
30	SAG	SAG BEND
31	OB	OVER BEND
32	e.g. ILVA ITALY	ILVA ITALY
33	e.g. IFB ITALY	ITALIAN BUTTWELDING FITTINGS
34	e.g. PR DAN/MARK	BRDR. CHRISTENSENS HANER A/S
35	e.g. ATH. KOR	COMMERCIAL AND INDUSTRIAL
		ATHENS KORINTH



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APPENDIX C



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APPENDIX C - FIG. 1 (example)

OWNER : HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
SUPERVISION :
CONTRACTOR :

HYDROSTATIC TEST SUMMARY

LOCATION	:	
SECTION	:	
TEST SECTION No	:	
K POINT REF START	:	K POINT REF END:
KM POINT START	:	KM POINT END :
TOTAL LENGTH MTRS	:	
DATE OF INTERNAL CLEANING	:	
DATE OF INTERNAL GAUGING	:	
DATE OF WATER FILLING	:	
DATE OF STABILIZATION	:	
DATE OF AIR INC TEST	:	
RESULT	:	
DATE OF PS 1 (STRENGTH)	:	
RESULT	:	
DATE OF PS 2 (STRENGTH)	:	
RESULT	:	
DATE OF TIGHTNESS TEST	:	
FITNESS TEST PRESSURE	:	
RESULT	:	
COMMENTS	:	

The above test was conducted in accordance with the latest revised
Hydrotest Specifications and procedures as follows :

SPECIFICATION	:
PROCEDURE	:



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APPENDIX C - FIG. 2 (example)

PERMIT FOR PIPELINE WATERFILLING & HYDROTESTING

OWNER	: : HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)	SPREAD	:
PROJECT	: GREEK GAS PIPELINE	SECTION	:
CONTRACT NO.	:	REF. K POINT	:
SUPERVISION	:	REF. DWG's	:
CONTRACTOR	:	REPORT No	:
		DATE	:
		PAGE	:

PIPELINE SECTION From Km

To Km

Before water filling and testing the following points shall be checked :

	SIGN	SIGN	DATE
1. CONSTRUCTION OF THE PIPELINE SECTION COMPLETED	☐	☐	
2. MATERIAL CERTIFICATES COMPLETED	☐	☐	
3. FIELD INSPECTION REPORTS (form 1-26) CHECKED	☐	☐	
4. SECTION LENGTH CHECKED	☐	☐	
5. SECTION PIPE SUDDLES CHECKED	☐	☐	
6. NUMBER OF GIRTH WELD CHECKED	☐	☐	
7. BENDS CHECKED	☐	☐	
8. INSULATION FLANGES CHECKED	☐	☐	
9. CASING CROSSING CHECKED	☐	☐	
10. L.V.S / S.S INSTALLED	☐	☐	
11. SUMMARY PIPE LOG COMPLETED AND CHECKED	☐	☐	

WATER FILLING IS PERMITTED

CONTRACTOR

OWNER

SUPERVISION

NAME :

NAME :

NAME :

SIGNATURE

SIGNATURE

SIGNATURE

DATE

DATE

DATE



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APPENDIX C - FIG. 3 (example)

OWNER : HELLENIC GAS TRANSMISSION
SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
SUPERVISION :
CONTRACTOR :

SPREAD :
SECTION :
REF. K POINT :
REF. DWG'S :
REPORT No. :
DATE :
PAGE :

PIPELINE SECTION From KM

To KM

1. TOTAL LENGTH :
(including pipes)

2. INSULATING FLANGES :

3. VALVE STATION :

4. SCRAPER STATION :

5. TOTAL NUMBER OF JOINTS
JOINTS :

1st joint of the section :

Last joint of the section :

6. CATHODIC PROTECTION

MEASURING POINTS :

QUALITY LOCATION :

CONTRACTOR

NAME: _____

SIGNATURE _____

DATE _____

SUPERVISION

NAME : _____

SIGNATURE _____

DATE _____



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APPENDIX C - FIG. 4 (example)

1. TOTAL NUMBER OF BENDS :

including HOT BENDS :

FIELD BENDS : _____

2. TOTAL QUANTITY OF
CASING INSTALLED : _____

Location of casing (K-points and their lengths):

Location K point		Length
Start	End	

CONTRACTOR
NAME: _____

SIGNATURE _____

DATE _____

SUPERVISION :
NAME : _____

SIGNATURE _____

DATE _____



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APPENDIX C - FIG. 5 (example)

CLEANING ACCEPTANCE CERTIFICATE

OWNER : HELLENIC GAS TRANSMISSION SYSTEM
OPERATOR (DESFA S.A.)

PROJECT : GREEK GAS PIPELINE

CONTRACT NO. :

SUPERVISION :

CONTRACTOR :

SPREAD :

SECTION :

REF. K POINT :

REF. DWG's :

REPORT No :

DATE :

PAGE :

SUBSECTION No. :

LOG SHEET No. :

DATE OF CLEANING :

SUBSECTION LENGTH :

DATE OF ACCEPTANCE :

CONTRACTOR

NAME:

SIGNATURE

SUPERVISION :

NAME:

SIGNATURE



APPENDIX C - FIG. 6 (example)

PIGGING AND GAUGING PLATE LOG

OWNER	: HELLENIC GAS TRANSMISSION SYSTEM	SPREAD	:
PROJECT	OPERATOR (DESFA S.A.)	SECTION	:
CONTRACT NO.	: GREEK GAS PIPELINE	REF. K	:
SUPERVISION	:	REF. DWG'	:
CONTRACTOR	:	REPORT	:
		DATE	:
		PAGE	:

[illegible]

NOTES:

CONTRACTOR

NAME _____

SIGNATURE _____

SUPERVISION

NAME _____

SIGNATURE _____



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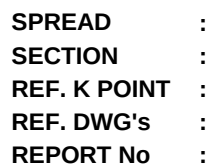


SPREAD :
SECTION :
REF. K POINT :
REF. DWG's :
REPORT No. :

SIGNATURE



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[illegible]

SIGNATURE



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APPENDIX C - FIG. 9 (example)

PRESSURE TEST REPORT EVALUATION OF TIGHTNESS TEST

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K POINT	:
CONTRACT NO.	:	REF. DWG's	:
SUPERVISION	:	REPORT No	:
CONTRACTOR	:		

PIPELINE SECTION No

START FROM : Km END TO : Km
K point K point

TECHNICAL DATA :

Subsection	1	2	3	4	5	6	
Material							
L (m)							
De (mm)							
S (mm)							
r _i (mm)							
0.89*r _i / s * l / L							
Vr _i (m ³)							

AIR TESTS :

P_m = bar t_m = C ==> A = mm³ / kg bar

(A is plotted on the Compressibility Factor Chart on page 3)

$\Delta V (A) / \text{bar} = [(0.89 * r_i / s * L / \Sigma L) + A] * \Sigma V r_i / 1000$

= l / bar

TEST RESULTS :

	1	2	3
P ₁ - P ₂			
$\Delta V (A_b)$			
$\Delta V (A_b) / \Delta V (A)$			

FOR CONTRACTOR

NAME

SIGNATURE

FOR SUPERVISION

NAME

SIGNATURE

FOR OWNER

NAME

SIGNATURE



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APPENDIX C - FIG. 10 (example)

PRESSURE TEST REPORT EVALUATION OF TIGHTNESS TEST

OWNER : HELLENIC GAS TRANSMISSION
SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
SUPERVISION :
CONTRACTOR :

SPREAD :
SECTION :
REF. K POINT :
REF. DWG's :
REPORT No :

PIPELINE SECTION No

START FROM : Km END TO : Km
K point K point

P_1 = pressure immediately before air test
 P_2 = pressure immediately after air test
 $\Delta V (A_b)$ = measured relieved water volume in kg

$\frac{\Delta V (A_b)}{\Delta V (A_b)}$ = air factor

REMARKS :

TIGHTNESS TEST

Maximum allowed deviation $\Delta V (R) = +$ l / h

TEST RESULTS :

	Time	Date	Press. (bar)	Average temperature		C
				Ground C	pipewall C	
Began tightness test			p_1	$t_1 :$	$t_1 :$	$t_1 :$
Compl. tightness test			p_2	$t_2 :$	$t_2 :$	$t_2 :$

p Δt

	V_{r_i} (m ³)
Earth covered segments	
Exposed segments	

$$\frac{t_1 + t_2}{2} = \frac{(t_1 \cdot \text{ground} * V_{r_i} \text{ covered} / \Sigma V_{r_i} + t_1 \cdot \text{pipewall} * V_{r_i} \text{ exposed} / \Sigma V_{r_i})}{2}$$
$$+ \frac{(t_2 \cdot \text{ground} * V_{r_i} \text{ covered} / \Sigma V_{r_i} + t_2 \cdot \text{pipewall} * V_{r_i} \text{ exposed} / \Sigma V_{r_i})}{2}$$
$$= \text{..... } ^\circ\text{C}$$
$$\frac{P_1 + P_2}{2} = \text{..... bar} \Rightarrow B \text{ mm}^3 / \text{kg } ^\circ\text{C}$$

FOR CONTRACTOR

NAME

SIGNATURE

FOR SUPERVISION

NAME

SIGNATURE

FOR OWNER

NAME

SIGNATURE



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APPENDIX C - FIG. 11 (example)

PRESSURE TEST REPORT EVALUATION OF TIGHTNESS TEST

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K POINT	:
CONTRACT NO.	:	REF. DWG's	:
SUPERVISION	:	REPORT No	:
CONTRACTOR	:		

PIPELINE SECTION No

START FROM : Km	.....	END TO : Km	.....
K point	.....	K point	.....

$$\Delta V = \{ (\Sigma * (0.89 * r_i / s * L / \Sigma L - A) * V (A_b) / V (A) * (p_1 - p_2) - 8 * t (lm) - t (2m)) \} + \\ + V r_i / 1000 = \text{.....} l$$

Test time h = hours $\Delta V (R) = \Delta V / h = \text{.....} l / h$

(B is plotted on the Expansion Factor Chart on page 4 of 4)

REMARKS :

FOR CONTRACTOR

NAME

SIGNATURE

FOR SUPERVISION

NAME

SIGNATURE

FOR OWNER

NAME

SIGNATURE



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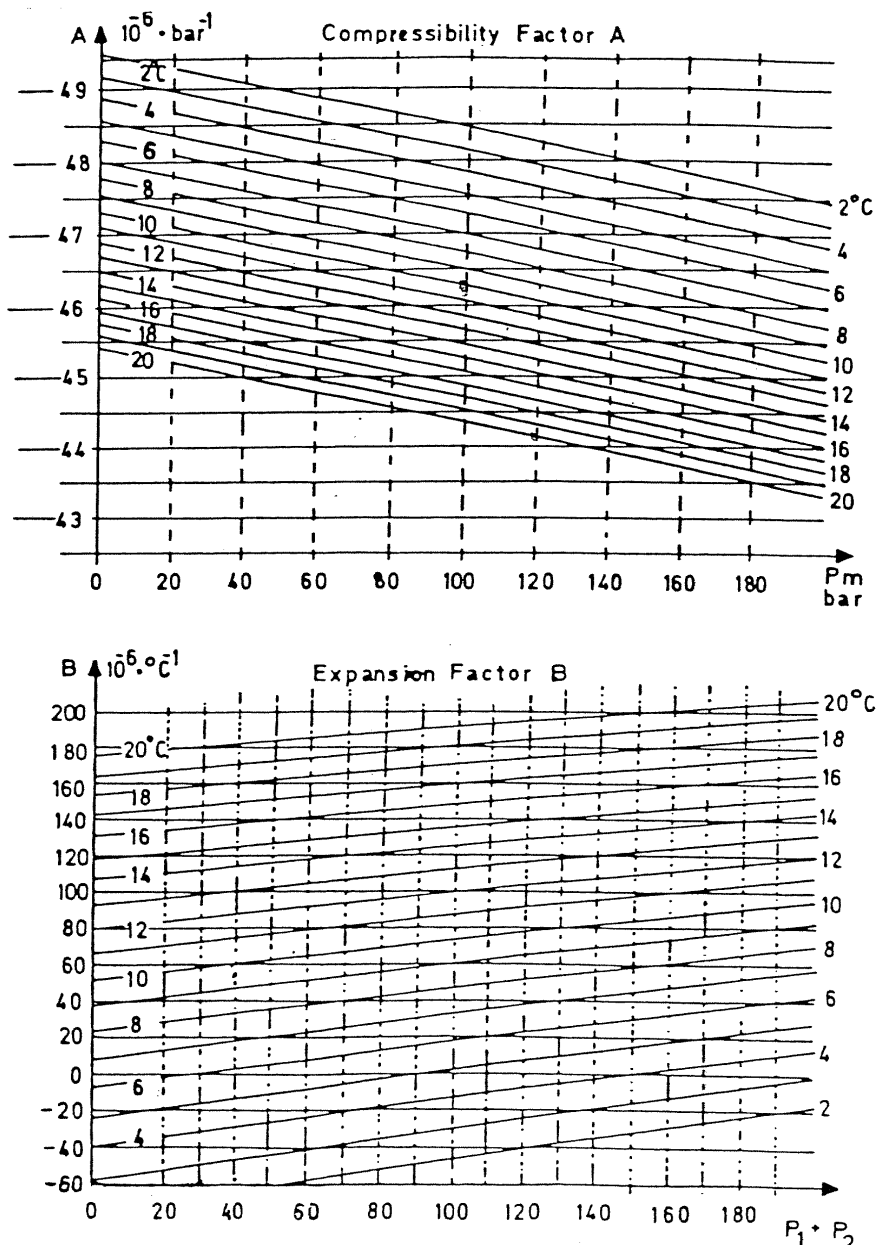
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APPENDIX C – FIG. 12





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APPENDIX C - FIG. 13 (example)

PRESSURE TEST REPORT PRESSURE V^S VOLUME

OWNER : HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
SUPERVISION :
CONTRACTOR :
SPREAD :
SECTION :
REF. K. POINT :
REF DWG's :
REPORT No. :
DATE :
PAGE :

DATE : 22.09.1993

PROJECT : Greece Gas
Diameter mm..... : 914.40
Total Length m..... : 7104.00
Volume cbm..... : 4420.09
RI / S..... : 36.92

Pipe Yield Strength.....(N / mm²) : 448
100% K min. Wallthickness..... : 108.77
Constant Factor (.89)..... : 0.89
Water Temperature Deg. C : 20.00

Pressure barg	Total Vol. Litre	Delta Vol. Litre/bar	A Value
5.00	1730.24	346.05	45.44
10.00	3459.33	345.82	45.38
15.00	5187.29	345.59	45.33
20.00	6914.08	345.36	45.28
25.00	8639.74	345.13	45.23
30.00	10364.26	344.90	45.18
35.00	12087.64	344.68	45.12
40.00	13809.87	344.45	45.07
45.00	15530.96	344.22	45.02
50.00	17250.90	343.99	44.97
55.00	18969.71	343.76	44.92
60.00	20687.37	343.53	44.87
65.00	22403.88	343.30	44.81
70.00	24119.25	343.07	44.76
75.00	25823.48	342.85	44.71
80.00	27546.57	342.62	44.66
85.00	29258.51	342.39	44.61
90.00	30969.31	342.16	44.56
95.00	32678.97	341.93	44.50
100.00	34387.48	341.70	44.45
105.00	36094.85	341.47	44.40
110.00	37801.08	341.25	44.35
115.00	39506.16	341.02	44.30
120.00	41210.10	340.79	44.25
125.00	42912.90	340.56	44.19
130.00	44614.55	340.33	44.14
135.00	46315.06	340.10	44.09



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APPENDIX C - FIG. 14 (example)

TIGHTNESS CALCULATION

OWNER	: HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A)	SPREAD	:
PROJECT	: GREEK GAS PIPELINE	SECTION	:
CONTRACT NO.	:	REF. K. POINT	:
SUPERVISION	:	REF DWG's	:
CONTRACTOR	:	REPORT No.	:
		DATE	:
		PAGE	:

DATE : 22.09.1993

PROJECT : Greece Gas
OWNER : DESFA
LINE SECTION : 36 - 1
FILE NAME : 36 - 2
FILE DIRECTORY : C : \ DESFA \ TEST \

PIPELINE DATA :
LENGTH(meter) : 7104.00
DIAMETER(inch NPS) : 36
PIPE YIELD STRENGTH....(N / mm²) : 448

TIGHTNESS CALCULATION :

First Block Number : 22
Last Block Number : 70
Calculation Period (H) : 24

Pressure Start : 111.166
Pressure End : 111.313
Delta Pressure : + 0.147

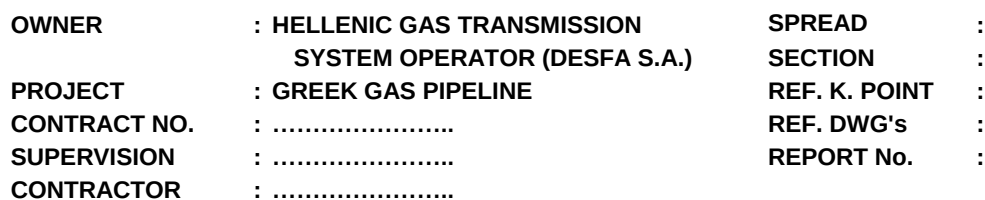
Temperature Start (°C) : 19.73
Temperature End (°C) : 19.86
Delta Temperature (°C) : + 0.13

Actual Volume Change : - 2.15 Litres / Hour
Permissible Volume Change : 4.00 Litres / Hour

The Test is Acceptable !!!!!



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(example)



APPENDIX C - FIG. 16

PRESSURE TEST REPORT HYDROSTATIC STRENGTH TEST

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K. POINT	:
CONTRACT NO.	:	REF DWG's	:
SUPERVISION	:	REPORT No.	:
CONTRACTOR	:	DATE	:
		PAGE	:

DATE : 22.09.1993

PROJECT : Greece Gas
OWNER : DESFA
LINE SECTION : 36 - 1
FILE NAME : 36 - 2
FILE DIRECTORY : C : \ DESFA \ TEST \

PIPELINE DATA :
LENGTH (meter) : 7104.00
DIAMETER : DN 900
PIPE YIELD STRENGTH....(N / mm²) : 448

HYDROSTATIC STRENGTH TEST

NO.	PRESS bar	FLOW l/min	VOLUME litre	DP/DT bar/m	DV/DP l/bar	Σ DDV litre	TIME HH:MM:SS
1	19.69	478.2	3140	1.37	349.80	7.9	15:30:00
2	21.01	467.8	3612	1.26	370.35	-0.3	15:31:00
3	22.37	480.2	4102	1.32	363.12	-0.3	15:32:00
4	23.71	488.5	4588	1.32	369.35	2.0	15:33:00
5	25.07	481.0	5072	1.25	385.32	1.6	15:34:00
6	26.41	487.9	5557	1.40	349.31	2.7	15:35:00
7	27.72	395.7	6024	1.65	239.89	-1.1	15:36:00
8	28.88	391.3	6421	0.94	417.97	19.0	15:37:00
9	29.98	398.4	6817	0.83	478.79	19.4	15:38:00
10	31.08	394.2	7212	1.26	312.43	-18.0	15:39:00
11	32.18	396.1	7607	1.25	317.62	-17.5	15:40:00
12	33.27	395.7	8003	1.07	370.21	-11.2	15:41:00
13	34.36	399.0	8399	0.98	407.23	-5.3	15:42:00
14	35.45	395.5	8796	1.08	364.97	2.7	15:43:00
15	36.53	401.2	9195	1.20	333.64	11.0	15:44:00
16	37.64	397.0	9592	1.11	356.55	13.8	15:45:00
17	38.68	362.4	9974	1.05	343.82	22.2	15:46:00
18	39.68	366.4	10334	1.04	352.61	25.0	15:47:00
19	40.70	371.7	10709	1.07	347.78	34.9	15:48:00
20	41.75	411.1	11106	1.04	395.58	56.1	15:49:00
21	42.85	415.3	11515	1.04	358.65	73.6	15:50:00
22	43.93	418.4	11927	1.16	366.03	97.2	15:51:00
23	45.02	422.6	12344	1.14	395.38	127.4	15:52:00
24	46.10	422.6	12765	1.07	389.97	161.3	15:53:00
25	47.16	422.6	13183	1.08	374.57	198.9	15:54:00
26	48.37	424.6	13658	1.13	294.88	241.5	15:55:00
27	49.48	426.4	14086	0.99	341.98	274.7	15:56:00
28	51.65	436.7	14519	0.92	311.6	311.16	15:57:00
29	50.59	449.3	14953	1.14	367.5	367.5	15:58:00
30	52.76	455.4	15409	1.22	429.1	429.1	15:59:00



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APPENDIX C - FIG. 18 (example)

OWNER : HELLENIC GAS TRANSMISSION
SYSTEM OPERATOR (DESFA S.A)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
SUPERVISION :
CONTRACTOR :
SPREAD :
SECTION :
REF. K. POINT :
REF DWG's :
REPORT No. :
DATE :
PAGE :

PROJECT : Greece Gas
OWNER : DESFA
LINE SECTION : 36 - 1
FILE NAME : 36 - 2
FILE DIRECTORY : C : \ DESFA \ TEST \

PIPELINE DATA :
LENGTH(meter) : 7104.00
DIAMETER : DN 900
PIPE YIELD STRENGTH....(N / mm²) : 448

HYDROSTATIC STRENGTH TEST

NO.	PRESSURE bar	D - PRESS bar	TEMP 1 °C	TEMP 2 °C	TIME HH:MM:SS	DATE DD.MM.YYYY
1	111.399	111.399	22.81		21:30:00	20:09:1993
2	111.417	0.018	24.07		22:00:00	20:09:1993
3	111.387	-0.031	24.14		22:30:00	20:09:1993
4	111.350	-0.037	24.08		23:00:00	20:09:1993
5	111.294	-0.056	23.99		23:30:00	20:09:1993
6	111.310	0.016	23.93		0:00:00	21:09:1993
7	111.259	-0.050	23.86		0:30:00	21:09:1993
8	111.248	-0.011	23.78		1:00:00	21:09:1993
9	111.231	-0.017	23.70		1:30:00	21:09:1993
10	111.224	-0.007	23.63		2:00:00	21:09:1993
11	111.207	-0.017	23.54		2:30:00	21:09:1993
12	111.190	-0.017	23.45		3:00:00	21:09:1993
13	111.186	-0.004	23.33		3:30:00	21:09:1993
14	111.190	0.004	23.12		4:00:00	21:09:1993
15	111.177	-0.012	23.23		4:30:00	21:09:1993
16	111.177	0.000	23.01		5:00:00	21:09:1993
17	111.177	0.000	22.92		5:30:00	21:09:1993
18	111.175	-0.002	22.75		6:00:00	21:09:1993
19	111.174	-0.002	22.67		6:30:00	21:09:1993
20	111.173	-0.001	22.59		7:00:00	21:09:1993
21	111.181	-0.001	22.47		7:30:00	21:09:1993
22	111.166	0.009	22.36		8:00:00	21:09:1993
23	111.162	-0.015	22.31		8:30:00	21:09:1993
24	111.163	-0.005	22.28		9:00:00	21:09:1993
25	111.159	0.001	22.30		9:30:00	21:09:1993
26	111.158	-0.004	22.50		10:00:00	21:09:1993
27	111.136	-0.001	23.95		10:30:00	21:09:1993
28	111.170	-0.022	24.90		11:00:00	21:09:1993
29	111.133	0.034	26.52		11:30:00	21:09:1993
30	111.130	-0.037	28.75		12:00:00	21:09:1993



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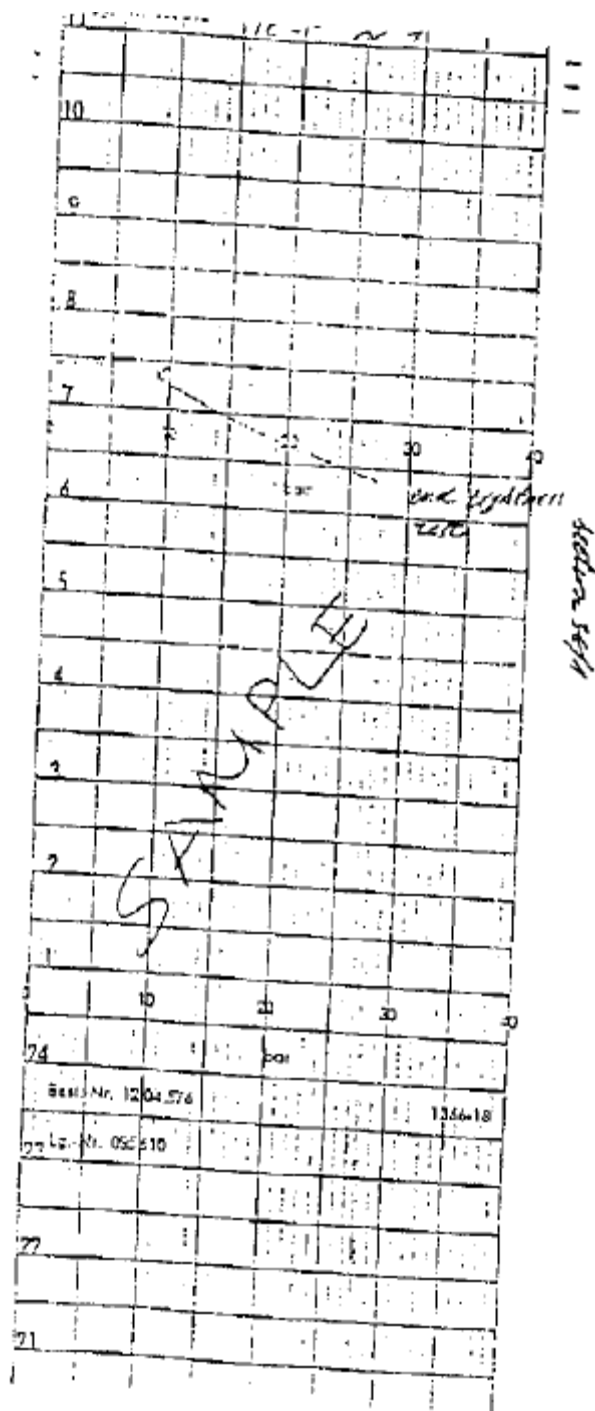
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APPENDIX C – FIG. 19





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APPENDIX C - FIG. 20 (example)

PRESSURE TEST REPORT FAULT REPORT

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K POINT	:
CONTRACT NO.	:	REF. DWG's	:
SUPERVISION	:	REPORT No	:
CONTRACTOR	:		

PIPELINE SECTION No			
START FROM : Km		END TO : Km	
K point		K point	
Fault Log			
Discovered, during :		Waterfalling	
		Strength test	
		Tightness test	
Pressure at leak/break:		bar	pipe temp.: °C
Fault detected time:		Date:	
Fault located time:		Date:	
Fault repaired time:		Date:	
Comments: (damages/repair arrangements etc.)			

FOR CONTRACTOR

FOR SUPERVISION

FOR OWNER

NAME

NAME

NAME

SIGNATURE

SIGNATURE

SIGNATURE



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APPENDIX C - FIG. 21

PRESSURE TEST REPORT FAULT REPORT

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K POINT	:
CONTRACT NO.	:	REF. DWG's	:
SUPERVISION	:	REPORT No	:
CONTRACTOR	:		

PIPELINE SECTION No	
START FROM : Km	END TO : Km
K point	K point
Length of section: m	
Volume of section: m ³	
Fault Data:	
Location: chain. no.	
Type: Leak --	Rate of leak m ³ /h
Break --	
Position: Field weld	--
Pipe seam	--
Body of pipe	--
Valve	--
Temporary installations	--
Others	--
Comments:	

FOR CONTRACTOR

FOR SUPERVISION

FOR OWNER

NAME

NAME

NAME

SIGNATURE

SIGNATURE

SIGNATURE

 Hellenic Gas Transmission System Operator S.A. 357-359 Messogion Av., GR 152 31 Halandri Tel.: 213 088 4000 Fax: 210 674 9504 Email: desfa@desfa.gr	TECHNICAL SPECIFICATION	
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APPENDIX C - FIG. 22

PRESSURE TEST REPORT REPORT ON HYDROTESTING SECTION, CROSSING ETC

OWNER : HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
SUPERVISION :
CONTRACTOR :
SPREAD :
SECTION :
REF. K. POINT :
REF. DRWG's :
REPORT No. :

UNIT..... km.....
K point.....

MATERIAL COMPONENTS

S1	Dxt	Unit	Amount	S1	Dxt	Unit	Amount

Volume of section (unit).....m³

Process of testing

Date/ time	Ambient air temperature °C	Temperature in the unit °C	Pressure			Remarks
			P1 bar	P2 bar	P3 bar	

FOR CONTRACTOR

FOR SUPERVISION

FOR EMPLOYER

NAME

NAME

NAME

SIGNATURE

SIGNATURE

SIGNATURE



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(example)



APPENDIX C - FIG. 24

sheet 1/3

PRESSURE TEST REPORT SUMMARY

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K POINT	:
CONTRACT NO.	:	REF. DWG's	:
SUPERVISION	:	REPORT No	:
CONTRACTOR	:		

PIPELINE SECTION No				
START FROM : Km		END TO : Km		
K point		K point		
Length of section: m				
Volume of section: m ³				
PART LIST				
Type	Manufacture	Material	Dimension	Length
Equipment and Instruments:				
Type	Manufacture	Chainage		
TEST PRESSURE	Level (m)	Pressure (bar)	Maximum stress level in min wall (%SMYS)	
Down-stream point				

FOR CONTRACTOR

NAME

SIGNATURE

FOR SUPERVISION

NAME

SIGNATURE

FOR OWNER

NAME

SIGNATURE



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(example)



APPENDIX C - FIG. 25

sheet 2/3

PRESSURE TEST REPORT SUMMARY

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K POINT	:
CONTRACT NO.	:	REF. DWG's	:
SUPERVISION	:	REPORT No	:
CONTRACTOR	:		

PIPELINE SECTION No			
START FROM : Km		END TO : Km	
K point		K point	
Highest point:			
Lowest point:			
Upstream point:			
FILLING WATER:		pH:	
		Temp.:	
Aircontent:			
TEST LOG:			
	Time	Date	Related test reports
Began filling			
Completed filling			
Began pressuring			
Completed pressuring			
Began depressuring			
Completed depressuring			
Began pressuring			
Completed pressuring			
Completed tightness test			
Began dewatering			
Completed dewatering			

FOR CONTRACTOR

NAME

SIGNATURE

FOR SUPERVISION

NAME

SIGNATURE

FOR OWNER

NAME

SIGNATURE



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(example)



APPENDIX C - FIG. 26

sheet 3/3

PRESSURE TEST REPORT SUMMARY

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K POINT	:
CONTRACT NO.	:	REF. DWG's	:
SUPERVISION	:	REPORT No	:
CONTRACTOR	:		

PIPELINE SECTION No	
START FROM : Km	END TO : Km
K point	K point
TIGHTNESS TEST:	Max allowed volume deviation: lt/h
	Calculated volume deviation: lt/h
	Duration of tightness test: lt/h
REMARKS:	

FOR CONTRACTOR

NAME

SIGNATURE

FOR SUPERVISION

NAME

SIGNATURE

FOR OWNER

NAME

SIGNATURE



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APPENDIX C - FIG. 27

PRESSURE TEST REPORT PIPE - LOG SUMMARY

OWNER	:	HELLENIC GAS TRANSMISSION	SPREAD	:
	:	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	:	GREEK GAS PIPELINE	REF. K POINT	:
CONTRACT NO.	:	.....	REF. DWG's	:
SUPERVISION	:	.....	REPORT No.	:
CONTRACTOR	:	.....		

PIPELINE SECTION No

START FROM : Km END TO : Km

K point K point

VOLUME OF PRESSURE TEST SECTION :

NOMINAL DIAMETER OF PIPING :

LAY - OUT OF THE SECTION :

LEGEND :

LEVEL



HIGH POINT



LOW POINT



LOCATION OF PRESSURING EQUIPMENT

FOR CONTRACTOR

NAME

SIGNATURE

FOR SUPERVISION

NAME

SIGNATURE

FOR OWNER

NAME

SIGNATURE



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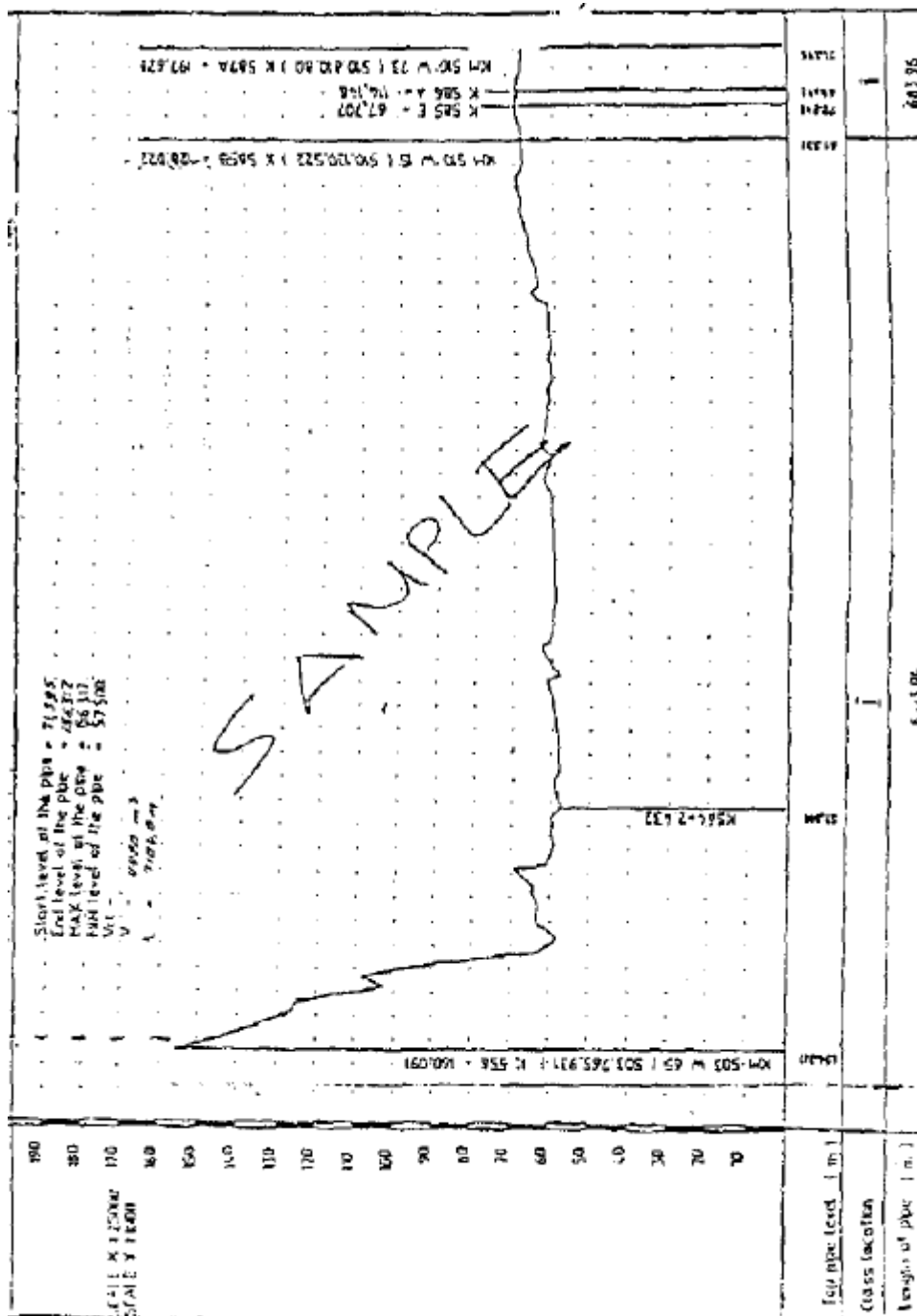
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APPENDIX C – FIG. 28





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APPENDIX C – FIG. 29





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(example)



APPENDIX C - FIG. 30

PIPELINE DRYING REPORT

OWNER : HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
SUPERVISION :
CONTRACTOR :
SPREAD :
SECTION :
REF. K POINT :
REF. DWG's :
REPORT No. :

Section No _____ Length L= _____
from K.p. _____ to K.p. _____

Equipment and measuring devices used for drying :

Date	Time	Pigs launched (No)	Pigs received (No)	Condition of pigs received	Receiver		Dew point at the inlet location (°C)	Remarks
					P (bar)	dew point (°C)		

FOR CONTRACTOR

FOR SUPERVISION

FOR OWNER

NAME

NAME

NAME

SIGNATURE

SIGNATURE

SIGNATURE



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APPENDIX D

(example)

[illegible]



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(example)



APPENDIX D - FIG. 2

WELDING LOG BOOK

OWNER : HELLENIC GAS TRANSMISSION
SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO.:
SUPERVISION :
CONTRACTOR :

SPREAD :
SECTION :
REF K. POINT :
REF DWG'S :
REPORT No. :
DATE :
PAGE :

WELDING PROCEDURES : _____

	pass and direction	filler metal	dia.
• assembly welds	root pass _____ filler pass _____ cap pass _____	_____	_____
• Tie - ins	root pass _____ filler pass _____ cap pass _____	_____	_____

NON - DESTRUCTIVE TEST OF CIRCUMFERENTIAL WELDS

TOTAL NUMBER OF CIRCUMFERENTIAL WELDS IN THE COMPLETED PIPING :

	radiographic tests		results
numbers of welds tested/dia	_____ = 100 % _____ = % _____ = % _____ = %	additional ultrasonic tests conducted on _____ welds = _____ % of certificates for results	total number of welds _____ = 100 % numbers of welds tested by non-destructive methods _____ = 100 %

WELDERS :

No.	Full Name	Ref. No.	Welder Qualification to	Welding Procedure	Welded		Pass(es) on which employed
					From	To	

REMARKS :

CONTRACTOR

NAME

SIGNATURE

SUPERVISION

NAME

SIGNATURE



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(example)

APPENDIX D - FIG. 3																																																																																																																	
NON - CONFORMANCE REPORT																																																																																																																	
																																																																																																																	
OWNER	:	HELLENIC GAS TRANSMISSION	SPREAD	:																																																																																																													
PROJECT	:	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:																																																																																																													
CONTRACT NO.	:		REF. K POINT	:																																																																																																													
SUPERVISION	:		REF. DWG' s	:																																																																																																													
CONTRACTOR	:		REPORT No.	:																																																																																																													
	:		DATE	:																																																																																																													
	:		PAGE	:																																																																																																													
<table border="1"><thead><tr><th rowspan="2">NDE REJECTION REPORT NO./DATE</th><th rowspan="2">DESCRIPTION N OF DEFECTS</th><th rowspan="2">PIPE NO.</th><th rowspan="2">WELD NO.</th><th rowspan="2">WELDER'S NO.</th><th colspan="2">REPAIR</th><th colspan="2">N.D.E.</th><th colspan="2">DESTRUCTIVE EXAMINATION</th></tr><tr><th>YES</th><th>NO</th><th>ACC.</th><th>REJ.</th><th>ACC.</th><th>REJ.</th></tr></thead><tbody><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="10">REMARKS :</td></tr></tbody></table>										NDE REJECTION REPORT NO./DATE	DESCRIPTION N OF DEFECTS	PIPE NO.	WELD NO.	WELDER'S NO.	REPAIR		N.D.E.		DESTRUCTIVE EXAMINATION		YES	NO	ACC.	REJ.	ACC.	REJ.																																																																														REMARKS :									
NDE REJECTION REPORT NO./DATE	DESCRIPTION N OF DEFECTS	PIPE NO.	WELD NO.	WELDER'S NO.	REPAIR		N.D.E.		DESTRUCTIVE EXAMINATION																																																																																																								
					YES	NO	ACC.	REJ.	ACC.	REJ.																																																																																																							
REMARKS :																																																																																																																	
CONTRACTOR					SUPERVISION																																																																																																												
NAME					NAME																																																																																																												
SIGNATURE					SIGNATURE																																																																																																												



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APPENDIX D - FIG. 4

VOLUMES FOR :

- WELDING PROCEDURES
- WELDING PROCEDURES SPECIFICATIONS (W.P.S)



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APPENDIX D - FIG. 5

TIE - IN REPORT

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K. POINT	:
CONTRACT NO.	:	REF. DWG's	:
SUPERVISION	:	REPORT No.	:
CONTRACTOR	:	DATE	:
		PAGE	:

WELD NO.				
DATE OF WELDING				
CHAINAGE				
WELDER'S NO.				
PROCEDURE				
PIPE NO.				
PIPE LENGTH (a)				
PIPE DIA x WALL TH.				
COATING				
INFORMATION ABOUT CUT OFF PIPE PIECES				

SKETCH

WELD NO.	INSPECTION			REMARKS : (Excavation, Dewatering, Tie-in Operation, Welding)
	VISUAL	R.I.	U.I	

CONTRACTOR

NAME :

SIGNATURE

SUPERVISION

NAME :

SIGNATURE



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RADIOGRAPHIC INSPECTION REPORT									
OWNER : HELLENIC GAS TRANSMISSION SYSTEM		SPREAD :							
PROJECT : GREEK GAS PIPELINE		SECTION :							
CONTRACT :		REF. K POINT :							
SUPERVISION :		REF. DWG' s :							
CONTRACTOR :		REPORT No. :							
		DATE :							
		PAGE :							
DIAMETER :		THICKNESS :		STEEL GRADE :					
INSPECTION TECHNIQUE :		SOURCE :		EQUIPMENT :					
WELDING LOG. NO.	PIPE NO.	WELD JOINT NO.	WELDE R NO.	FILM NO.	FILM LOCATION	SENSITIVITY	DENSITY	DEFECTS	Final Conclusion : Acceptable - OK Repair - R To be cut out - CO
REMARKS :									
CONTRACTOR NAME		SUPERVISION NAME							
SIGNATURE		SIGNATURE							

(example)


DESFA
 Hellenic Gas Transmission System Operator

APPENDIX D - FIG. 7

ULTRASONIC EXAMINATION REPORT

OWNER	: HELLENIC GAS TRANSMISSION SYSTEM	SPREAD	:
	OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K POINT	:
CONTRACT NO.	:	REF. DWG' s	:
SUPERVISION	:	REPORT No.	:
CONTRACTOR	:	DATE	:
		PAGE	:

DIAMETER :		THICKNESS :		STEEL GRADE :	
TYPE OF FLAW DETECTOR :		TYPE OF REFERENCE		ANGLE OF RAY ONPUT :	
OPERATING FREQUENCY :		TYPE OF CONTACT LIQUID :		LEVEL OF INSPECTION SENSITIVITY	
WELDING LOG. NO.	PIPE NO.	WELD JOINT NO.	WELDE R NO.	Coordinates and description of defects :	Final Conclusion : Acceptable - OK Repair - R To be cut out - CO
REMARKS :					

CONTRACTOR NAME	SUPERVISION NAME	SIGNATURE



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MAGNETIC PARTICLES INSPECTION REPORT									
OWNER :	HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)				SPREAD :				
PROJECT :	GREEK GAS PIPELINE				SECTION :				
CONTRACT NO. :	.....				REF. K POINT :				
SUPERVISION :	.....				REF. DWG' s :				
CONTRACTOR :	.....				REPORT No. :				
					DATE :				
					PAGE :				
DIAMETER :		THICKNESS :			STEEL GRADE :				
TYPE OF FLAW DETECTOR :					CONTRAST COATING :				
MAGNETIZING FORK :					MAGNETIC INDICATOR :				
WELDING LOG. NO.	PIPE NO.	WELD JOINT NO.	WELDE R NO.	Coordinates and description of defects :	Final Conclusion : Acceptable - OK Repair - R To be cut out - CO				
REMARKS :									
CONTRACTOR NAME					SUPERVISION NAME				
SIGNATURE					SIGNATURE				



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LIQUID PENETRANT INSPECTION REPORT									
OWNER : HELLENIC GAS TRANSMISSION SYSTEM		SPREAD :							
PROJECT : OPERATOR (DESFA S.A.)		SECTION :							
CONTRACT NO. :		REF. K POINT :							
SUPERVISION :		REF. DWG' s :							
CONTRACTOR :		REPORT No. :							
		DATE :							
		PAGE :							
DIAMETER :		THICKNESS :		STEEL GRADE :					
MEANS OF INSPECTION Removed Fluid Penetrant Developer									
WELDING LOG. NO.	PIPE NO.	WELD JOINT NO.	WELDE R NO.	Coordinates and description of defects :	Final Conclusion :				
					Acceptable - OK				
					Repair - R				
					To be cut out - CO				
REMARKS :									
CONTRACTOR NAME						SUPERVISION NAME			
SIGNATURE						SIGNATURE			



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APPENDIX E

(example)

CATHODIC PROTECTION

MEASURING POSTS INSTALLATION REPORT

OWNER :	HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)	: SPREAD :
PROJECT :	GREEK GAS PIPELINE	: SECTION :
CONTRACT NO. :	.....	REF. K POINT :
SUPERVISION :	.....	REF. DWG' s :
CONTRACTOR :	.....	REPORT No. :
		DATE :
		PAGE :

MEASURING POST LOCATION (K POINT km)	CHAINAG E (km)	MEASURING POST TYPE	MEASURING POST IN GROUND	CABLE CONNECTION TO MEASURING POST	SEMICONTACTOR OVERVOLTAGE PROTECTION (TYPE KG ONLY)	SACR.TYPE ANODE (K 33 ONLY) CABLE SLEEVE S FOR ANODE SACRIFICIAL ANODES (QUANTITY)	POLARIZATIO N BROBE TYPE (K9 ONLY)	IDENTIFICATION PLATE	DATE INSTALLE D

CONTRACTOR NAME _____	SUPERVISION NAME _____
SIGNATURE _____	SIGNATURE _____



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CONTRACTOR' S NAME	SUPERVISION' S NAME	PAGE OF.....
DATE / SIGNATURE	DATE / SIGNATURE	



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APPENDIX E - FIG. 4

CATHODIC PROTECTION

CHECK AND CALIBRATION OF POLARIZATION PROBES REPORT (POST TYPE K9)

OWNER : HELLENIC GAS TRANSMISSION
SYSTEM OPERATOR (DESFA S.A.)

PROJECT : GREEK GAS PIPELINE

CONTRACT NO. :

SUPERVISION :

CONTRACTOR :

SPREAD :

SECTION :

REF. K POINT :

REF. DWG' s :

REPORT No. :

DATE :

PAGE :

CHAINAGE						
DATE						
CABLE TEST	TO CALOMEL ELECTRODE (Ω)					
	TO STEEL PLATE (Ω)					
CABLE CONNECTION WITH STEEL PLATE (Ω)						
INSULATION TEST	INSULATING CIRCLE (mV)					
	COUNTER TEST (mV)					
REFERENCE						
ELECTRODE TEST (mV)						
DIAPHRAGM TEST (mV)						
DEVIATION %						
REFERENCE ELECTRODE						
CALIBRATION (mV)						
APPROVAL YES / NO						

REMARKS :

CONTRACTOR

NAME :

SUPERVISION

NAME :



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APPENDIX E - FIG. 5

CATHODIC PROTECTION SOIL RESISTIVITY MEASUREMENTS

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K. POINT	:
CONTRACT NO.	:	LOCATION (km)	:
SUPERVISION	:	REF. DWG's	:
CONTRACTOR	:	REPORT No.	:
		DATE	:
		PAGE	:

MAIN FORMULA FOR SOIL RESISTIVITY

$$p = 2 \pi \cdot a \cdot R \quad (\text{only if } a = 6)$$

REF. K POINT	KM	DISTANCE BETWEEN ELECTRODES a (a)	FORMULA FACTOR f f = 2π.a	READING OF INSTRUMENT (Ωha)	INSTRUMENT FACTOR	RESISTANCE R (Ωha)	SOIL RESISTIVITY p.f.R ρ (Ω h/s)
AVERAGE VALUE							
AVERAGE VALUE							
AVERAGE VALUE							
INSTRUMENT :							
SERIAL No :							
CERT. No. :							
REMARKS :							

CONTRACTOR

OWNER

SUPERVISION

NAME

NAME

NAME

SIGNATURE

SIGNATURE

SIGNATURE



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APPENDIX E - FIG. 6

CATHODIC PROTECTION

TEST REPORT FOR RIVER CROSSING (WITH TEMP, IMPR, CURRENT)

OWNER : HELLENIC GAS TRANSMISSION
SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
SUPERVISION :
CONTRACTOR :

SPREAD :
SECTION :
REF. KM :
REF. DWG's :
REPORT No. :
DATE :
PAGE :

RIVER'S NAME :
TYPE OF PIPE COATING :
TYPE OF JOINT COATING :
PIPE NOMINAL DIAMETER :m Wall THICKNESS :mm
LENGTH OF FABRICATED PIPE :m
LENGTH OF PIPE IN THE GROUND : CONDITION OF PIPE :
TYPE OF SOIL : PIPE SURFACE TO BE PROTECTED : A m²

TEST RESULTS

NATURAL POTENTIAL (NORTH SIDE) U Cu/CuSo₄ = V
NATURAL POTENTIAL (SOUTH SIDE) U Cu/CuSo₄ = V
RESISTANCE OF PIPE LIVE TO SOIL RA = Ohm
SPECIFIC SOIL RESISTIVITY Rho = Ohm cm

TIME (min)	U CuSo ₄ "OK" / V	U CuSo ₄ "OFF" / V	ΔU (V)	"I" CURRENT (μA)	RA (Ohms)	is μA / m ²	ru Ohms.m ²
3							
6							
9							
12							
15							
18							
30							

NOTES : U "OFF" measured after each 1 min period. Time interruption less than 5 sec.
Polarisation : U "OFF" Less / Equal - 0,9 V (max 1 hour)
ΔU = (U "ON") - (U "OFF")

$$RA = dV / I \text{ (Ohm)} \quad - \quad is = I / A \text{ (mA / m}^2\text{)}$$

Are the C.P. results Satisfactory : YES / NO

CONTRACTOR
NAME

SIGNATURE

SUPERVISION
NAME

SIGNATURE



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		APPENDIX E - FIG. 7	
CATHODIC PROTECTION			
TEST REPORT FOR RIVER CROSSING			
OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	
PROJECT	: GREEK GAS PIPELINE	REF K. POINT	
CONTRACT NO.	:	REF Km	
CONTRACTOR	:	REF DWG	
		REPORT No.	
		DATE	
		PAGE	
Rivers name		Type of joint coating	
Type of pipe coating		Length of fabricated pipe	
Pipe nominal diameter	Wall thick. mm	Condition of pipe	
Pipe reinforced in concrete		YES ☐ NO ☐	
1st PHASE		2st PHASE	
AFTER COMPLETION OF CONCRETING		AFTER PIPELINE INSTALLATION IN RIVER	
1	Resistance measurements Pipeline / Reinforcement Ωhms	1	Resistance measurements Pipeline / Reinforcement Ωhms
		2	Natural potential measurements on both sides $U_{Cu} / CuSO_4 =$ V
		3	Resistance measurement to earth Ωhms
		4	Distance of measuring electrode depending the pipe length installed
		5	Soil resistivity measurements on both sides As per form 19.4 attached
		6	After installation of a temporary impressed current system As per form 19.5 attached
ARE C.P. RESULTS SATISFACTORY ? YES ☐ NO ☐			
REMARKS:			
CONTRACTOR		SUPERVISION	
NAME :		NAME :	



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APPENDIX E - FIG. 8

CATHODIC PROTECTION TEST REPORT FOR ROAD / RAILWAY CROSSING WITH CASING

OWNER : HELLENIC GAS TRANSMISSION
SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
CONTRACTOR :

SPREAD
SECTION
REPORT No.
DATE
PAGE

Location	Casing nominal diameter	W. Thick.
Casing No	Casing length	
Name of casing	Uncoated	YES | NO | I |
Date installed	Type of coating	
	Carrier pipe length	

1st PHASE	2st PHASE	3st PHASE
When pipe is inside casing	When Tie in works are completed on both sides	When pipe is backfilled on both sides
1 Resistance measurements between pipe-casing Ω hms	1 Resistance measurements between pipe-casing Ω hms	1 Resistance measurements between pipe-casing Ω hms
	2 Potential measurements ${}^u\text{Cu} / \text{CuSO}_4 = \text{V}$	2 Potential measurements ${}^u\text{Cu} / \text{CuSO}_4 = \text{V}$
	3 Voltage between pipe-casing $\Delta U = \text{V}$	3 Voltage between pipe-casing $\Delta U = \text{V}$
ARE C.P. RESULTS SATISFACTORY ? YES | NO |		
Instrument used : Serial No : Certificate No :		REMARKS:

CONTRACTOR
NAME

SUPERVISION
NAME



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APPENDIX E - FIG. 9

CATHODIC PROTECTION

NATURAL POTENTIAL RECORD SHEETS (PRECOMMISSIONING WORKS ONLY)

OWNER : HELLENIC GAS TRANSMISSION
SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
SUPERVISION :
CONTRACTOR :

SPREAD :
SECTION :
REPORT No. :
DATE :
PAGE :

		PIPE / SOIL POTENTIAL U / Cu / CuSO ₄ in V				REMARKS
M.P. TYPE	K POINT	KM	PIPE	CASING	FOREIGN	
INSTRUMENT : SERIAL NO. : CERT. NO. :						

CONTRACTOR
NAME

SIGNATURE

SUPERVISION
NAME

SIGNATURE



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APPENDIX E - FIG. 11

CATHODIC PROTECTION INSULATION JOINT TEST RESULTS

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF K. POINT	:
CONTRACT NO.	:	LOCATION (km)	:
SUPERVISION	:	REF DWG' s	:
CONTRACTOR	:	REPORT No.	:
		DATE	:
		PAGE	:

Manufacturer :	Serial No. :	Size :	Km. :	CONTR. SIGN	SUP. SIGN
Test Data	RESISTANCE	Dates			
Before Weld					
After Welding					
Before Backfill					
After Backfill					
Before Hydro - Test					
After Hydro - Test					
COMMENTS :					
Instrument used :					
Serial No. :					
Calib. Certified No :					
Test carried out By : Name : Signature : Date :					

CONTRACTOR
NAME

SUPERVISION
NAME

SIGNATURE

SIGNATURE



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APPENDIX F

(example)

[illegible]

(example)

[illegible]



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APPENDIX F - FIG. 3

INSTALLATION OF HDPE PIPE (CONDUIT) FOR FIBRE OPTIC CABLE

OWNER	:	HELLENIC GAS TRANSMISSION	SPREAD	:
	:	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	:	GREEK GAS PIPELINE	REF K. POINT	:
CONTRACT NO.	:	.....	REF DWG' s	:
SUPERVISION	:	.....	REPORT No.	:
CONTRACTOR	:	.....	DATE	:
			PAGE	:

PIPELINE SECTION		HDPE PIPE INSTALLATION COMPLETED	TESTS COMPLETED	REMARKS
FROM	TO			

NOTES :

CONTRACTOR

NAME :

SIGNATURE

SUPERVISION

NAME :

SIGNATURE



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HDPE PIPE TESTS REPORT (CHECK LIST)									
OWNER	: HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)	SPREAD	:	SECTION	:	REF. K POINT	:	REF. DWG' s	:
PROJECT CONTRACT NO.	:	GREEK GAS PIPELINE	:	REPORT No.	:	DATE	:	PAGE	:
SUPERVISION	:	CONTRACTOR	:	DATE	:	PAGE	:		:
AIR TEST REPORT									
FROM K POINT.		TO K POINT.		LENGTH :					
PIGGING TEST		SPHER DIAM.		DATE :					
DATE INSTALLATION	DATE TESTED	TEMP. (°C)	PRESSURE (BAR)	FINAL PRESSURE (BAR)	TIME	REMARKS			
INSTRUMENTS :									
SERIAL No. :									
CERTIFICATE No. :									
NOTES :							THIS FORM IS SUPPORTING (APPENDIX F-Fig3) REPORT No.....		
CONTRACTOR							SUPERVISION		



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 DESFA Hellenic Gas Transmission System Operator		APPENDIX F - FIG. 5	
<u>NO.</u> <u>PROTOCOL</u> <u>for</u> <u>RIVER CROSSINGS</u>			
OWNER	: HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)	SPREAD	:
PROJECT	: GREEK GAS PIPELINE	SECTION	:
CONTRACT NO.	:	REF K. POINT	:
SUPERVISION	:	REF DWG' s	:
CONTRACTOR	:	REPORT No.	:
		DATE	:
		PAGE	:
- River Crossing Name and Number : - Location : - Pipe Diameter :			
		SIGNATURE	DATE
- Acceptance of Trench / Diving Survey		.....	.....
- Acceptance of Welds		.....	.....
- Acceptance of Hydr. Pressure Test		.....	.....
- Acceptance of Concrete Coating or Concrete Saddles		.....	.....
- Acceptance of Concrete Coated Field Joints		.....	.....
- Acceptance of Pipe Lowering & Final Diving Survey after Lowering		.....	.....
- Acceptance of Backfilling		.....	.....
- Reinstatement		.....	.....
REMARKS : The River Crossing has been completed in accordance with the Project Specifications and Drawings			
CONTRACTOR		SUPERVISION	
NAME : _____		NAME : _____	
SIGNATURE		SIGNATURE	



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APPENDIX F - FIG. 6

NO.
PROTOCOL
for
AUGER BORED CROSSINGS

OWNER	: HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)	SPREAD	:
PROJECT	: GREEK GAS PIPELINE	SECTION	:
CONTRACT NO.	:	REF K. POINT	:
SUPERVISION	:	REF DWG' s	:
CONTRACTOR	:	REPORT No.	:
		DATE	:
		PAGE	:

- Location	:	.....
- Boring Number as per Index	:	.....
- Type of Crossing	:	.....
- Casing Diameter	:	.....
- Casing Length	:	.....
- Acceptance of Welds	:	signature date
- Acceptance of C.P.	:	signature date
- Site Cleaning - Reinstatement	:	signature date

REMARKS :

The Auger Crossing has been completed in accordance with the Specifications and Drawings

CONTRACTOR

NAME :

SIGNATURE

SUPERVISION

NAME :

SIGNATURE



Hellenic Gas Transmission System Operator S.A.
357-359 Messogion Av., GR 152 31 Halandri
Tel.: 213 088 4000
Fax: 210 674 9504
Email: desfa@desfa.gr

TECHNICAL SPECIFICATION

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(example)



APPENDIX F - FIG. 7

BORING REPORT SURVEYING DATA

OWNER : HELLENIC GAS TRANSMISSION
SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT NO. :
SUPERVISION :
CONTRACTOR :

SPREAD :
SECTION :
REF K. POINT :
REF DWG' s :
REPORT No. :
DATE :
PAGE :

Location :
Crossing No. :
Name of Crossing :

LEVELS	DESIGN	AS BUILT
Front end pipe		
Rear end pipe		
Inclination		

LENGTHS		
Front end pipe / CL crossing		
Rear end pipe / CL crossing		

HORIZONTAL DEVIATION		
Front end pipe		
Rear end pipe		

ALIGNMENT CHECK (every 4 meters)

REMARKS :

CONTRACTOR

NAME :

SIGNATURE

SUPERVISION

NAME :

SIGNATURE



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 DESFA Hellenic Gas Transmission System Operator		APPENDIX F - FIG. 8	
OWNER : HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)			
PROJECT : GREEK GAS PIPELINE			
CONTRACT NO. :			
SUPERVISION :			
CONTRACTOR :			
REINSTATEMENT PROTOCOL ΠΡΩΤΟΚΟΛΛΟ ΑΠΟΚΑΤΑΣΤΑΣΗΣ			
SUPERVISION :		SECTION : REF DWGS :	PROTOCOL No : ΑΡ. ΠΡΩΤΟΚΟΛΛΟΥ : ISSUE DATE : ΗΜΕΡΟΜΗΝΙΑ :
LOCATION OF LAND ΤΟΠΟΘΕΣΙΑ ΑΓΡΟΤΕΜΑΧΙΟΥ			
CADASTRAL PROPERTY No ΚΤΗΜΑΤΟΛΟΓΙΚΟΣ ΑΡ. ΑΓΡΟΤΕΜΑΧΙΟΥ			
LANDOWNER / CULTIVATOR ΦΕΡΟΜΕΝΟΣ ΙΔΙΟΚΤΗΤΗΣ Ή ΚΑΛΛΙΕΡΓΗΤ			
HOME ADDRESS ΔΙΕΥΘΥΝΣΗ ΚΑΤΟΙΚΙΑΣ			
Today the the undersigned Mr. / Mrs with ID No following the express statement of Contractor, that all activities construction of the Natural Gas Pipeline have been fully completed and that no other work be executed in the afore mentioned land plot belonging to me, DECLARE THAT my land plot as well as any existing therein structures, which were damaged or destroyed during the construction works have been fully and satisfactorily reinstated by Contractor and I have not any further claim to him.			
The Landowner / Cultivator (signature)		Contractor (signature)	
Σήμερα την ο κάτωθι υπογεγραμμένος με Α.Δ.Τ. μετά τη ρητή δήλωση του Αναδόχου ότι οι δραστηριότητές του κατασκευή του αγωγού Φυσικού Αερίου περατώθηκαν πλήρως, και ότι ουδεμία άλλη εργασία πρόκειται πλέον να πραγματοποιηθεί στο παραπάνω αναφερόμενο αγροτεμάχιο μου, ΔΗΛΩΝΩ ΟΤΙ το αγροτεμάχιο μου, καθώς και οι τυχόν υπάρχουσες εντός αυτού κατασκευές, τυχόν εβλάβησαν ή καταστράφηκαν κατά τη διάρκεια των εργασιών, αποκαταστάθηκαν ικανοποιητικά και ουδεμία άλλη απαίτηση έχω από αυτόν.			
Ο Φερόμενος Ιδιοκτήτης ή Καλλιεργητής (signature)		Ο Ανάδοχος (signature)	



Hellenic Gas Transmission System Operator S.A.
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(example)



APPENDIX F - FIG. 9

REPORT No

MARKER POST INSTALLATION REPORT

OWNER	: HELLENIC GAS TRANSMISSION	SPREAD	:
	SYSTEM OPERATOR (DESFA S.A.)	SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. K POINT	:
CONTRACT NO.	:	LOCATION (km)	:
SUPERVISION	:	REF. DWG's	:
CONTRACTOR	:	REPORT No.	:
		DATE	:
		PAGE	:

S/N	MARKER POST LOCATION (REV. 10)		DISTANCE FROM PIPELINE	TANGENT DISTANCES		REMARKS
	K point + m	km		SOUTH-EAST	NORTH-WEST	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

CONTRACTOR

NAME :

SIGNATURE

SUPERVISION

NAME :

SIGNATURE