HELLENIC GAS
TRANSMISSION
SYSTEM OPERATOR

357-359, MESSOGION AVE.,
15231 ATHENS, GREECE
Tel.: 210 6501258
Fax : 210 6501551

TECHNICAL JOB SPECIFICATION
499/3
REVISION 0
DATE 05/04/2011

HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

MEASURING-UP AND AS BUILT DOCUMENTATION

QUALITY ASSURANCE PAGE

CHANGES LOG

REVISIONS LOG

0	05-04-2011	FIRST ISSUE	PQ DPT.	V.G.
Rev. No	Rev. Date	REASON FOR CHANGE	Made By	Approved By

CONTENTS

REFERENCE DOCUMENTS

Job Spec. No. 180/1
[Welding Inspection]

Job Spec. No. 181/2
[Pressure Testing]

Job Spec. No. 199/4
[Welding]

DIN 824
[Technical drawings; Foldings to Filling Size]

1.0 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).

2.0 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. The list also indicates the responsibility of Contractor, Supervision or the OWNER, to submit the parts of the documentation.

3.0 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.

4.0 FORMAT OF DOCUMENTATION

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

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

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

5.0 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).

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

6.0 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 finalise 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
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)

6.4.2 AUTHORIZED NDT DOCUMENTATION

- RADIOGRAPHS
- RADIOGRAPHIC INSPECTION REPORTS
- ULTRASONIC EXAMINATION REPORTS.
- MAGNETIC PARTICLE EXAMINATION REPORTS.
- 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).
- GROUNDBED 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:

- PIPE COATING REPORTS (FIELD)

- VALVES AND FITTINGS COATING REPORTS

(See **APPENDIX F, Fig. 1 and 2**).

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 HOPE 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 I.F.C. 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.

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. One copy of the above red marked as built drawings shall

be returned to Contractor with or without Supervision's comments in order to be included in the final as-built drawings.

Contractor shall include all Supervision's Comments in the final as-built drawings and shall issue to Supervision two (2) transparencies and six (6) copies of all final as-built drawings with transmittal form. (See **APPENDIX A, Fig. 3**).

Contractor shall also issue to Supervision all final as built drawings in digital form (CAD) in CD ROMS.

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	
CATHODIC PROTECTION SYSTEM	
- Electrical Power	73
- Cathodic Protection Dwg	78
SPECIAL CABLES INSTALLATION	
- Instrument	65
VARIOUS LIST	
- List of tangential intersection points (k)	96
- List of class location classification	08
- List of hot and field bends	08

- List of crossings 58
- List of measuring posts 78
- 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

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 documentation package.

6.10.4 LONGITUDINAL SECTIONS AND RECORDING PLAN

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

- 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. 2.**

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
- 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 or6m/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

The Contractor shall submit 2 (two) sets of photographs documentation, plus the negatives, of all the stations.

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.

APPENDIX A

APPENDIX A - Fig. 1 (example)

HELLENIC GAS TRASMISSION 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 :

APPENDIX A - Fig. 2 (example)

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 :

APPENDIX A - FIG. 3 (example)

AS - BUILT DRAWING TE LOG

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

SPREAD :
SECTION :
REF. K :
REF. :
REPORT :
DATE :
PAGE :

Drawing No	Sheet No	Revision	Description	From Km to Km	From "K" to "K"	Remarks

NOTES:

CONTRACTOR
NAME
SIGNATURE ____________________

SUPERVISION
NAME
SIGNATURE ____________________

APPENDIX A - Fig. 4 (example)

REFERENCE DRAWINGS	
5112-340-00-55-07 sh 2 of 2	SECTION 3400 - RECORDING PLAN
5112-190/340-4-98-01	LIST OF TANGENTIAL INTERSECTION POINTS (KI)
5112-190/340-4-58-01/11	LIST OF CROSSINGS
5291-STD-00-11-08	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

REV.	DATE	DESCRIPTION	DRAWN	CHK'D	ENGR	DEPT. HEAD
2	01.09.97	AS BUILT				
1	05.08.97	ISSUE FOR CONSTRUCTION				
0	04.06.97	FIRST ISSUE				

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

APPROVED FOR CONSTRUCTION:
REV 1 DATE 05.08.97

SUPERVISION :

"AS BUILT"
CONTRACTOR :

CONTRACTOR :

SIGNATURE

DATE

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 REVISION	1 OF 2 SHEET
ACAD CODE : ..	AS BUILT:		

APPENDIX A - Fig. 5 (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

REV.	DATE	DESCRIPTION	DRAWN	CHK'D	ENGR	DEPT. HEAD
2	21.06.00	AS BUILT				
1	31.01.00	ISSUE FOR CONSTRUCTION				
0	23.12.99	FIRST ISSUE				

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

APPROVED FOR CONSTRUCTION:
REV 1 DATE 31.01.00

SUPERVISION :

"AS BUILT"
CONTRACTOR :

CONTRACTOR :

SIGNATURE

DATE

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 REVISION	2 OF 2 SHEET
ACAD CODE : ..	AS BUILT:		

DESFA

APPENDIX A - FIG. 6 (example)

LEVELS OF PIPE AND GROUND TOP BETWEEN

OWNER
PROJECT
CONTRACT No.
SUPERVISION
CONTRACTOR

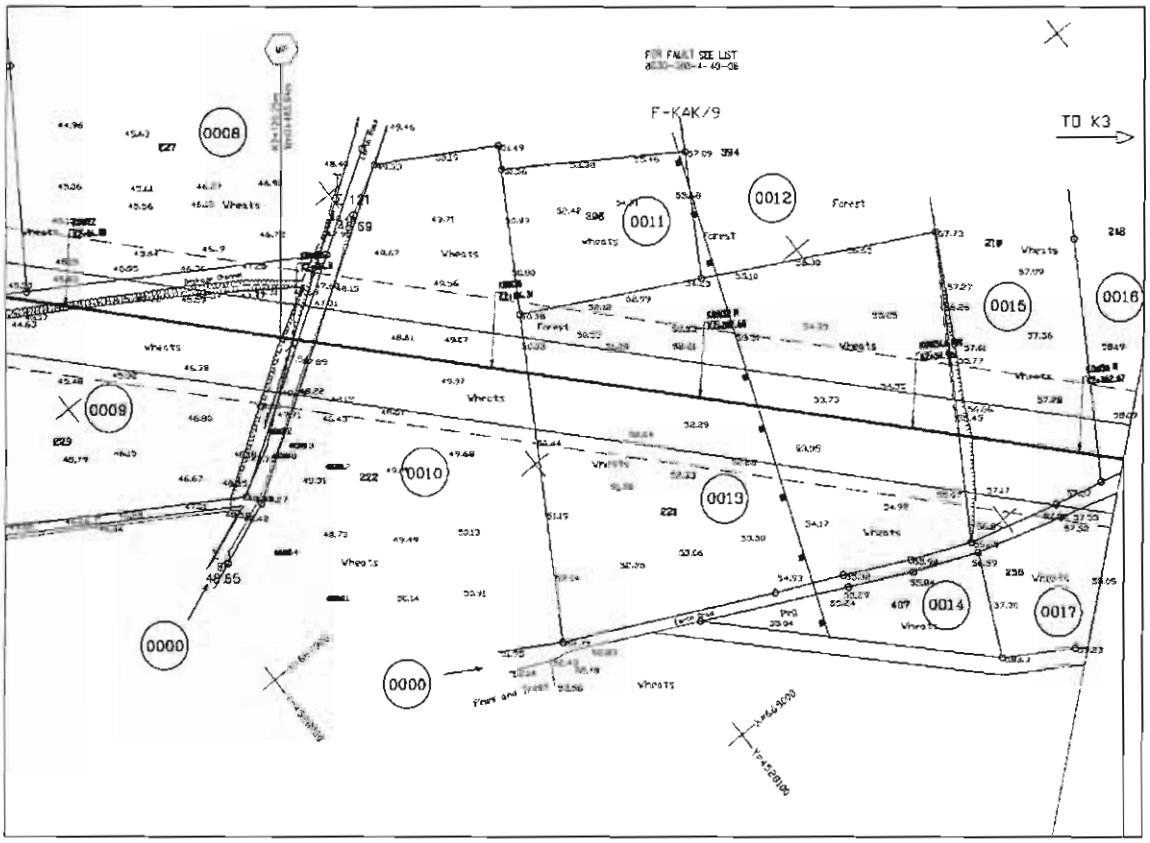
SPREAD
SECTION
REF.K POINT
REF. DRAWINGS
REPORT NO.
DATE

WELD JOINT NUMBER	LEVEL OF THE PIPE TOP(m)	LEVEL OF THE GROUND TOI (m)	STATION K+(m)	HORIZONTAL DISTANCE (m)	PIPE LENGTH (m)	COORDINATES OF K (E,N,Z,)	COORDINATES OF HORIZONTAL BENDS (E,N,Z,)	START & END OF BENDS	NOTES
1	2	3	4	5	6	7	8	9	10

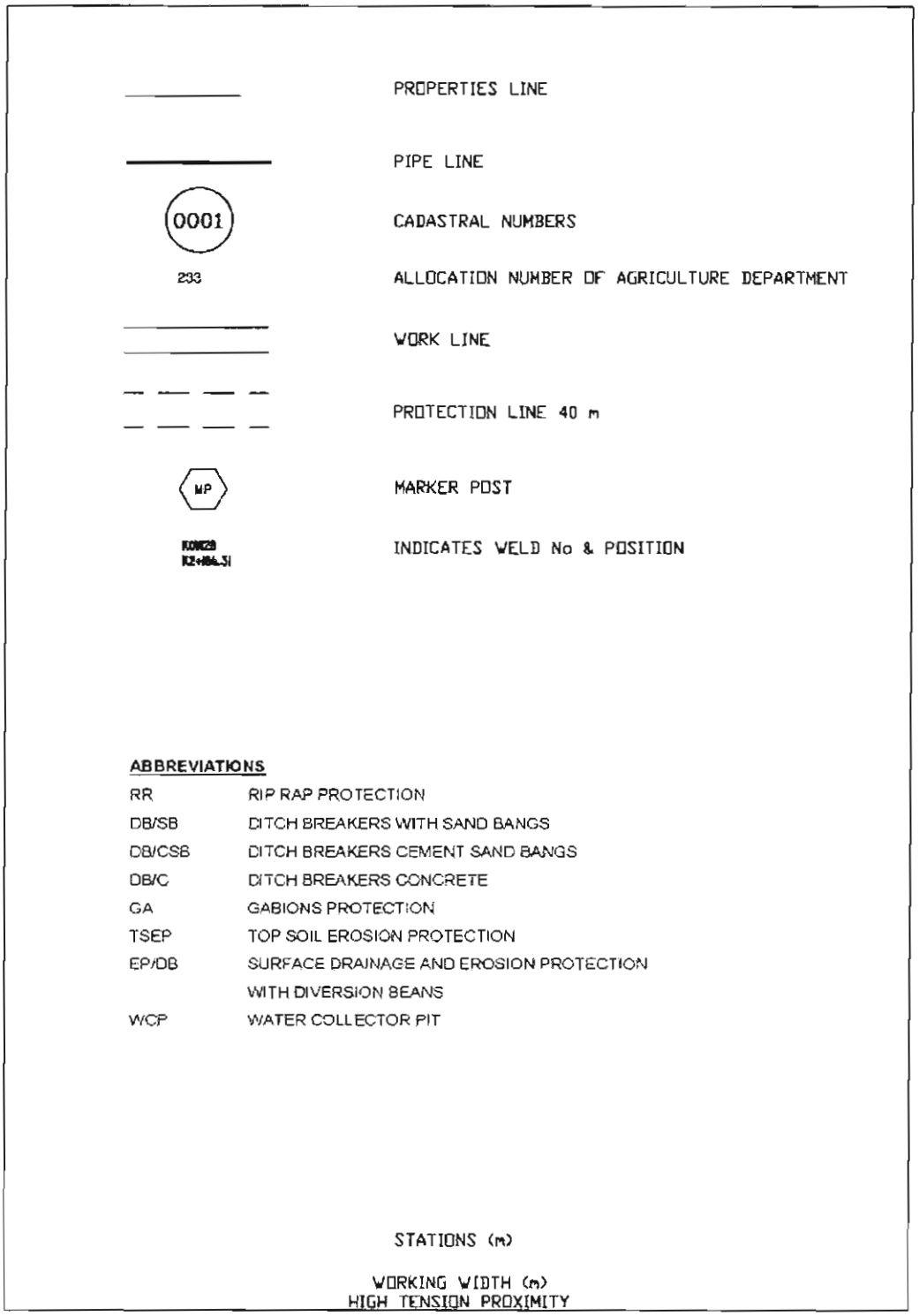
CONTRACTOR

SUPERVISION

APPENDIX A - Fig. 7 (example)



APPENDIX A - Fig. 8 (example)



APPENDIX B

APPENDIX B - FIG. 1 (example)

DESFA
Hellenic Gas Transmission System Operator

PIPE 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 :

DATE	PIPE NO	WELD NO.	PIPE LENGTH (m)	CHAINAGE (K.P.)	PIPE DIAM (mm)	PIPE W.T (mm)	CLASS LOCATION DESIGN FACTOR	PIPE SPEC	PART TO BE BUILT - IN				CHAINAGE OF CROSSING ITEM / BEND ETC	MANUF/RER	COATING	NDT				MARKER POST		CATH PROT MEAS.POST	REMARKS
									NO	PART	MATERIAL	CROSSING ITEM / FITTING	DIMENSIONS OF CASING BEND TYPE / ANGLE			X-RAY	US	MPT	OTHER	NO	AS-BUILT CHAINAGE	TYPE	

NOTES :

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

APPENDIX B - FIG. 2 (example)

DESFA

PIPE 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 :

DATE	PIPE NO	PIPE LENGTH (m)	PIPE DIAM (in)	PIPE W.T (mm)	CLASS LOCATION DESIGN FACTOR	PIPE SPEC.	WELD NO	CHAINAGE (Km.P)	PART TO BE BUILT - IN				CHAINAGE OF CROSSING ITEM / BEND ETC	MANUF/RER	COATING	NDT				MARKER POST		CATH PROT MEAS.POST		REMARKS
									NO	PART	MATERIAL	CROSSING ITEM / FITTING	DIMENSIONS OF CASING BEND TYPE / ANGLE			X-RAY	US	MPT	OTHER	NO.	AS-BUILT CHAINAGE	TYPE	

NOTES :

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

APPENDIX B - FIG. 3 (example)

DESFA
Hellenic Gas Transmission System Operator

PIPE 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 :

EQUIPMENT, VALVES, FITTINGS, BENDS					WELD NO	CHAINAGE (Km P.)	PART NO.	MATERIAL	CROSSING ITEM / FITTING	DIMENSIONS OF CASING BEND TYPE / ANGLE	CHAINAGE OF CROSSING ITEM / BEND ETC.	MANUF/RER	COATING	NDT				MARKER POST		CATH PROT MEAS POST	REMARKS
ITEM/ TYPE	NUMBER	LENGTH (m)	DIAM. (in)	WT (mm)										X-RAY	US	MPT	OTHER	NO	AS-BUILT CHAINAGE	TYPE	

NOTES :

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

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
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

APPENDIX C

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 :

APPENDIX C - FIG. 2 (example)

PERMIT FOR PIPELINE WATERFILLING & HYDROTESTING

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

APPENDIX C - FIG. 3 (example)

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

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 _____

DESFA

APPENDIX C - FIG. 5 (example)

CLEANING ACCEPTANCE CERTIFICATE

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

SUBSECTION No. :
LOG SHEET No. :
DATE OF CLEANING :
SUBSECTION LENGTH :

DATE OF ACCEPTANCE : .....

CONTRACTOR	SUPERVISION :
NAME: _____	NAME: _____
SIGNATURE	SIGNATURE

APPENDIX C - FIG. 6 (example)

PIGGING AND GAUGING PLATE LOG

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

SPREAD :
SECTION :
REF. K :
REF. DWG' :
REPORT :
DATE :
PAGE :

SUBSECTION NUMBER				TYPE		NUMBER UNIT	TIME		RESULTS / CONDITION
FROM	TO	LENGTH	ROW NUMBER	PIG	GAUGE		LAUNCH	RECEIPT	

NOTES :

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

APPENDIX C - FIG. 7 (example)

PRESSURE TEST REPORT
WATER FILLING RECORDS

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 .....

DATE TIME	TOTAL COUNT (m^3)	SUPPLY FLOW RATE (m^3/h)	WATER TEMPE-RATURE (^oC)	pH VALUE	DATE TIME	TOTAL COUNT (m^3)	SUPPLY FLOW RATE (m^3/h)	WATER TEMPE-RATURE (^oC)	pH VALUE

FOR CONTRACTOR
NAME .....
.....
SIGNATURE

FOR SUPERVISION
NAME .....
.....
SIGNATURE

FOR OWNER
NAME .....
.....
SIGNATURE

DESFA
Hellenic Gas Transmission System Operator

APPENDIX C - FIG. 8 (example)

PRESSURE TEST REPORT
STABILIZATION

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 .....

DATE TIME	PRESSURE		TEMPERATURE		THERMOBROBES (^{O}C)										AVERAGE TEMP. OF THE SECTION (^{O}C)
	P_1 (bar)	P_2 (bar)	Air (^{O}C)	Pipewall (^{O}C)	1	2	3	4	5	6	7	8	9	Tra	

FOR CONTRACTOR
NAME .....
.....
SIGNATURE

FOR SUPERVISION
NAME .....
.....
SIGNATURE

FOR OWNER
NAME .....
.....
SIGNATURE

DESFA
Hellenic Gas Transmission System Operator

APPENDIX C - FIG. 9 (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 .....

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 = _____ mm^3 / kg bar

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

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

= _____ l / bar

TEST RESULTS :

	1	2	3
$P_1 - P_2$			
$\Delta V (A_b)$			
$\Delta V (A_b) / \Delta V (A)$			

FOR CONTRACTOR	FOR SUPERVISION	FOR OWNER
NAME	NAME	NAME .....
.....	.....	.....
SIGNATURE	SIGNATURE	SIGNATURE

DESFA
Hellenic Gas Transmission System Operator

APPENDIX C - FIG. 10 (example)

PRESSURE TEST REPORT
EVALUATION OF TIGHTNESS TEST

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

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 deviaton $\Delta V(R) = +$ _____ l / h

TEST RESULTS :

	Time	Date	Press. (bar)	Average temperature Ground C	pipewall C	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_____

	Vr_i (m^3)
Earth covered segments	
Exposed segments	

$\frac{t_1 + t_2}{2}$ = $\frac{(t_1.\ \text{ground} * Vr_i \text{ covered} / \Sigma Vr_i + t_1 \text{ pipewall} * Vr_i \text{ exposed} / \Sigma Vr_i)}{2}$

\+ $\frac{(t_2.\ \text{ground} * Vr_i \text{ covered} / \Sigma Vr_i + t_2 \text{ pipewall} * Vr_i \text{ exposed} / \Sigma Vr_i)}{2}$

= _____ ^oC

$\frac{P_1+P_2}{2}$ = _____ bar ==> B _____ mm^3 / kg ^oC

FOR CONTRACTOR	FOR SUPERVISION	FOR OWNER
NAME	NAME	NAME .....
.....	.....	.....
SIGNATURE	SIGNATURE	SIGNATURE

DESFA
Hellenic Gas Transmission System Operator

APPENDIX C - FIG. 11 (example)

PRESSURE TEST REPORT
EVALUATION OF TIGHTNESS TEST

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

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

$$+ Vr_i / 1000 = \_\_\_\_\_ l$$

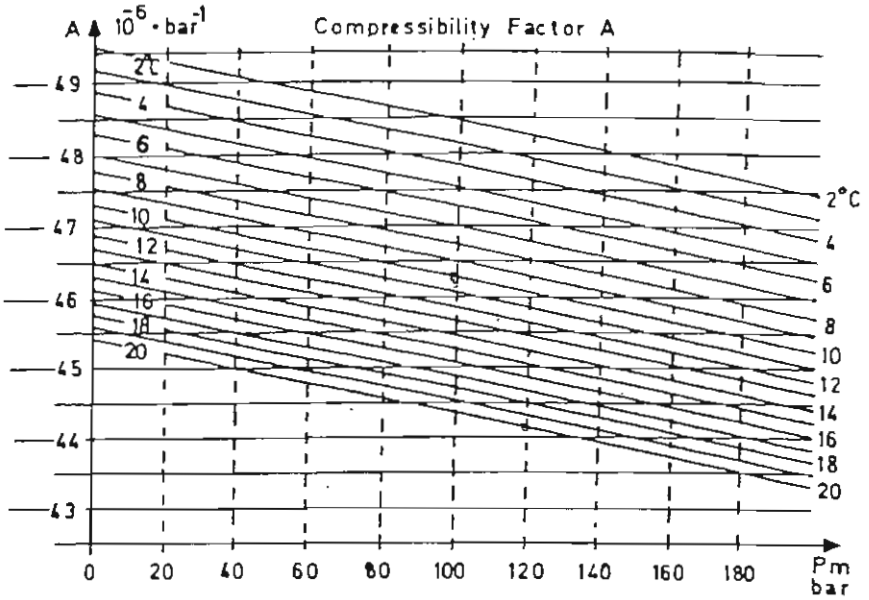
Test time h = _____ hours $\Delta V (R) = \Delta V / h =$ _____ l / h

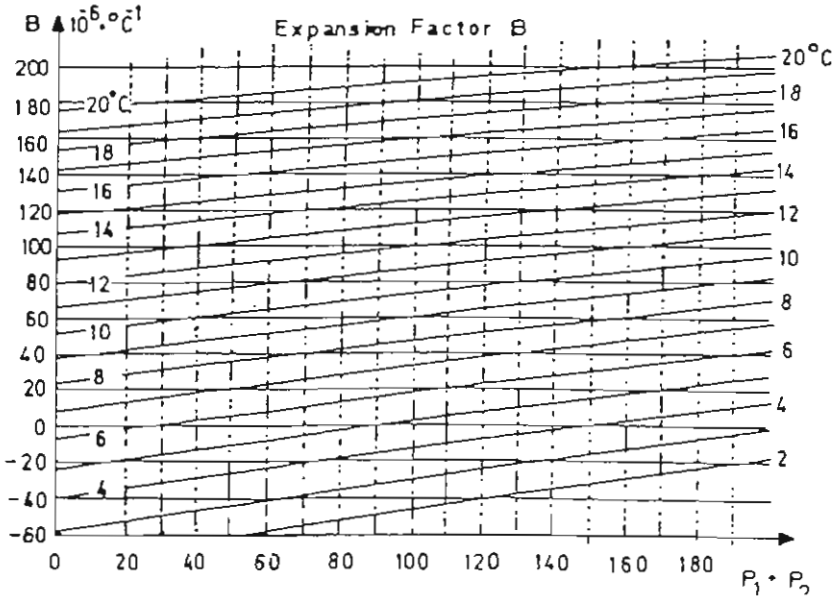
(B is plotted on the Expansion Factor Chart on page 4 of 4)

REMARKS :

FOR CONTRACTOR	FOR SUPERVISION	FOR OWNER
NAME	NAME	NAME .....
.....	.....	.....
SIGNATURE	SIGNATURE	SIGNATURE

APPENDIX C – FIG. 12





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 / mm^2) : 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

DESFA
Hellenic Gas Transmission System Operator

APPENDIX C - FIG. 14 (example)

TIGHTNESS CALCULATION

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 \

PIPPELINE DATA :
LENGTH .....(meter) : 7104.00
DIAMETER .....(inch NPS) : 36
PIPE YIELD STRENGTH....(N / mm^2) : 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 (^{O}C) : 19.73
Temperature End (^{O}C) : 19.86
Delta Temperature (^{O}C) : + 0.13

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

The Test is Acceptable ! ! ! ! ! !

APPENDIX C - FIG. 15 (example)

PRESSURE TEST REPORT
STRENGTH TEST

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

TIME	ΔV TOTAL	ΔV	P	TIME	ΔV TOTAL	ΔV	P

FOR CONTRACTOR	FOR SUPERVISION	FOR OWNER
NAME	NAME	NAME .....
.....	.....	.....
SIGNATURE	SIGNATURE	SIGNATURE

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX C - FIG. 16

PRESSURE TEST REPORT
HYDROSTATIC STRENGTH TEST

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

PIPPELINE DATA :
LENGTH ..... (meter) : 7104.00
DIAMETER ..... : DN 900
PIPE YIELD STRENGTH....(N / mm^2) : 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	9196	1.20	333.64	11.0	15:44:00
16	37.64	397.9	9592	1.11	356.55	13.8	15:45:00
17	38.68	382.4	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

(example)

APPENDIX C - FIG. 17

PRESSURE TEST REPORT
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 .....

DATE TIME	DEADWEIGHT TEST (Bar)		TEMPERATURE Air (^{o}C)	TEMPERATURE Pipewall (^{o}C)	THERMOBROBES (^{o}C) 1	2	3	4	5	6	7	8	9	T_m

FOR CONTRACTOR
NAME .....
.....
SIGNATURE

FOR SUPERVISION
NAME .....
.....
SIGNATURE

FOR OWNER
NAME
.....
SIGNATURE

APPENDIX C - FIG. 18 (example)

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

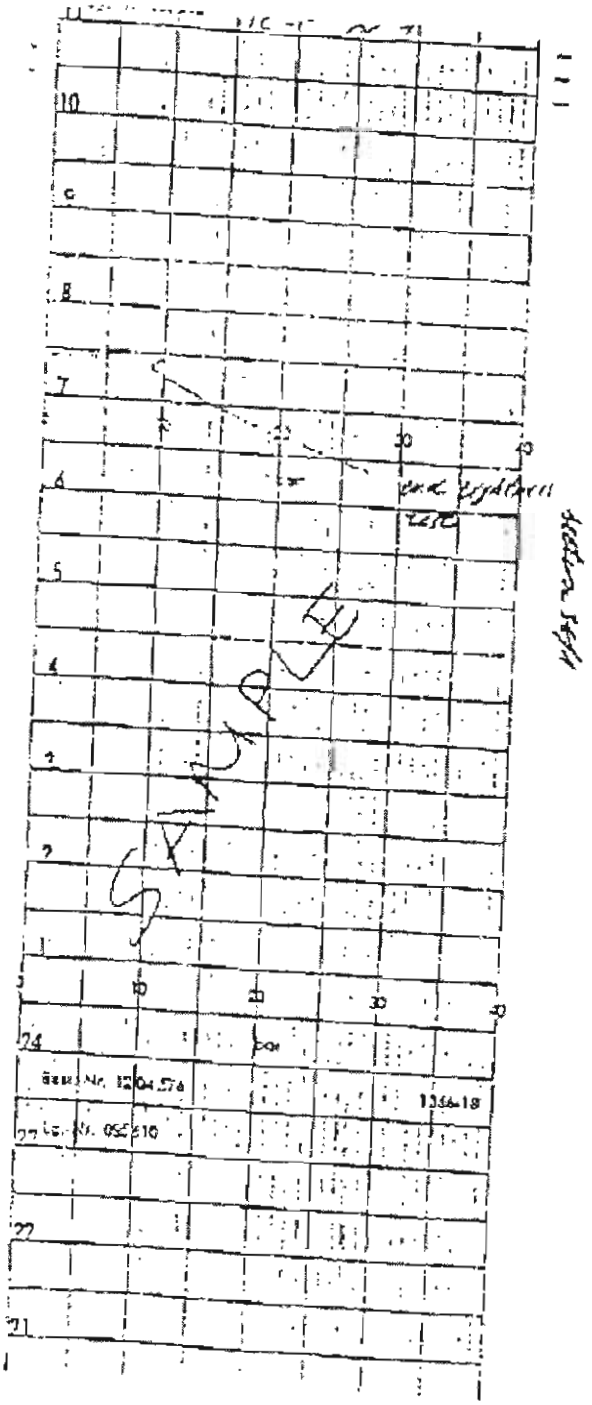
PROJECT ..... : Greece Gas
OWNER ..... : DESFA
LINE SECTION ..... : 36 - 1
FILE NAME ..... : 36 - 2
FILE DIRECTORY ..... : C : \ DESFA \ TEST \

PIPPELINE DATA :
LENGTH .....(meter) : 7104.00
DIAMETER ..... : DN 900
PIPE YIELD STRENGTH....(N / mm^2) : 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		1/1/1900 3:00	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

APPENDIX C – FIG. 19



APPENDIX C - FIG. 20 (example)

PRESSURE TEST REPORT
FAULT REPORT

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

PIPELINE SECTION No			
START FROM : Km ..... K point		END TO : Km ..... 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

(example)

DESFA

APPENDIX C - FIG. 21

PRESSURE TEST REPORT
FAULT REPORT

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

(example)

APPENDIX C - FIG. 22

PRESSURE TEST REPORT
REPORT ON HYDROTESTING SECTION, CROSSING ETC

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

UNIT..... km.....

K point.....

MATERIAL COMPONENTS

S1	Dxt	Unit	Amount	S1	Dxt	Unit	Amount

Volume of section (unit)..... m^3

Process of testing

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

FOR CONTRACTOR	FOR SUPERVISION	FOR EMPLOYER
NAME	NAME	NAME .....
.....	.....	.....
SIGNATURE	SIGNATURE	SIGNATURE

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX C - FIG. 23

PRESSURE TEST REPORT
INSTRUMENT CALIBRATION REPORT

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

Instrument Type _____
Range Scale _____
Serial Number _____

CALIBRATED INSTRUMENT		CERTIFIED INSTRUMENT
GAUGE READING	DIFFERENCE	APPLIED PRESSURE

The above mentioned pressure gauge has been calibrated against a certified deadweight tester ser. No_____ which has valid calibration cerificate certified to greek National Standards.

FOR CONTRACTOR	FOR SUPERVISION	FOR EMPLOYER
NAME	NAME	NAME .....
.....	.....	.....
SIGNATURE	SIGNATURE	SIGNATURE

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX C - FIG. 24

sheet 1/3

PRESSURE TEST REPORT SUMMARY

OWNER	: HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)	SPREAD	:
		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	FOR SUPERVISION	FOR OWNER
NAME	NAME	NAME .....
.....	.....	.....
SIGNATURE	SIGNATURE	SIGNATURE

(example)

APPENDIX C - FIG. 25

sheet 2/3

PRESSURE TEST REPORT SUMMARY

OWNER	: HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)	SPREAD	:
		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	FOR SUPERVISION	FOR OWNER
NAME	NAME	NAME .....
.....	.....	.....
SIGNATURE	SIGNATURE	SIGNATURE

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX C - FIG. 26

sheet 3/3

PRESSURE TEST REPORT SUMMARY

OWNER	: HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)	SPREAD	:
		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	FOR SUPERVISION	FOR OWNER
NAME	NAME	NAME .....
.....	.....	.....
SIGNATURE	SIGNATURE	SIGNATURE

(example)

APPENDIX C - FIG. 27

PRESSURE TEST REPORT
PIPE - LOG SUMMARY

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

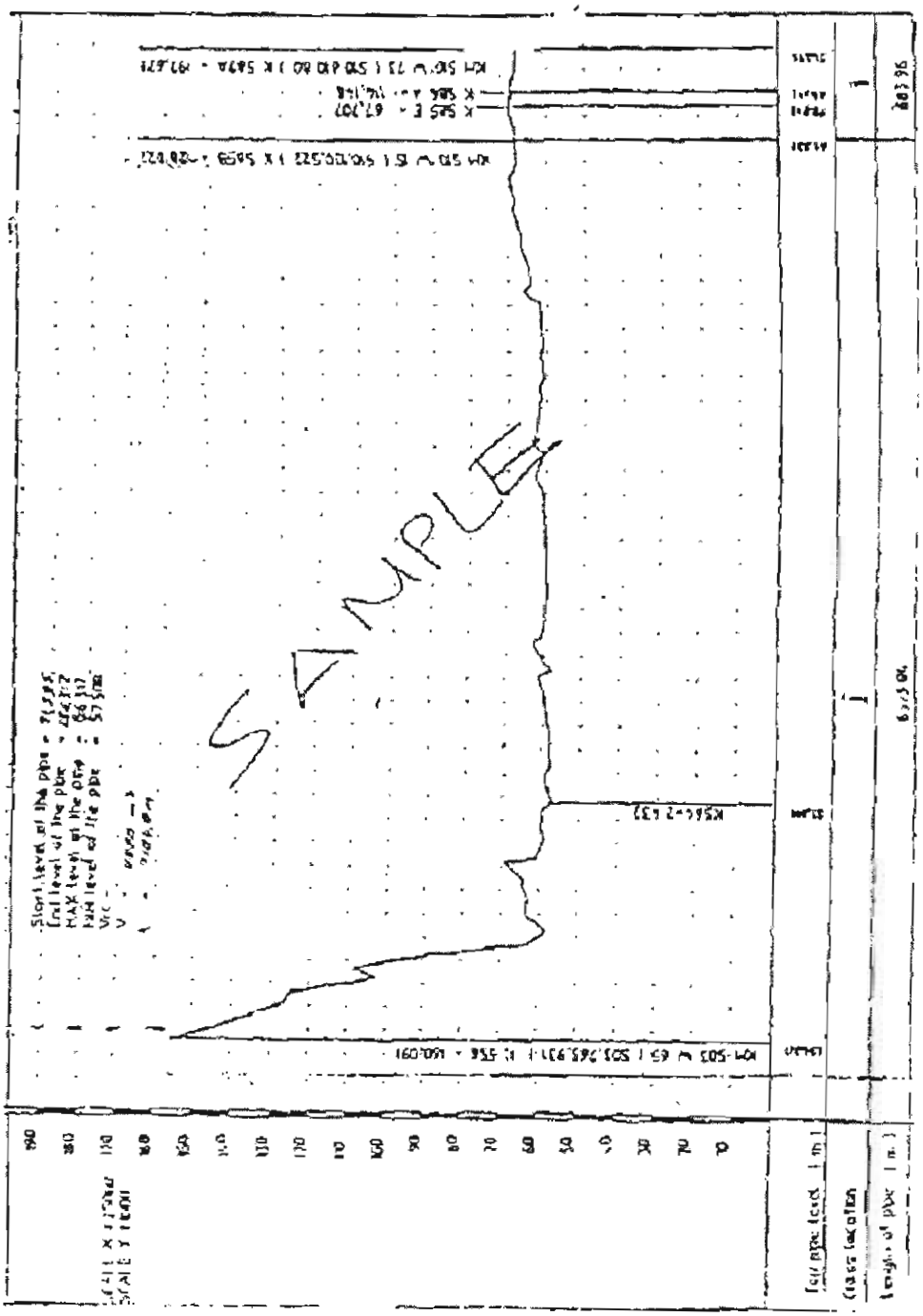
HIGH POINT

LOW POINT

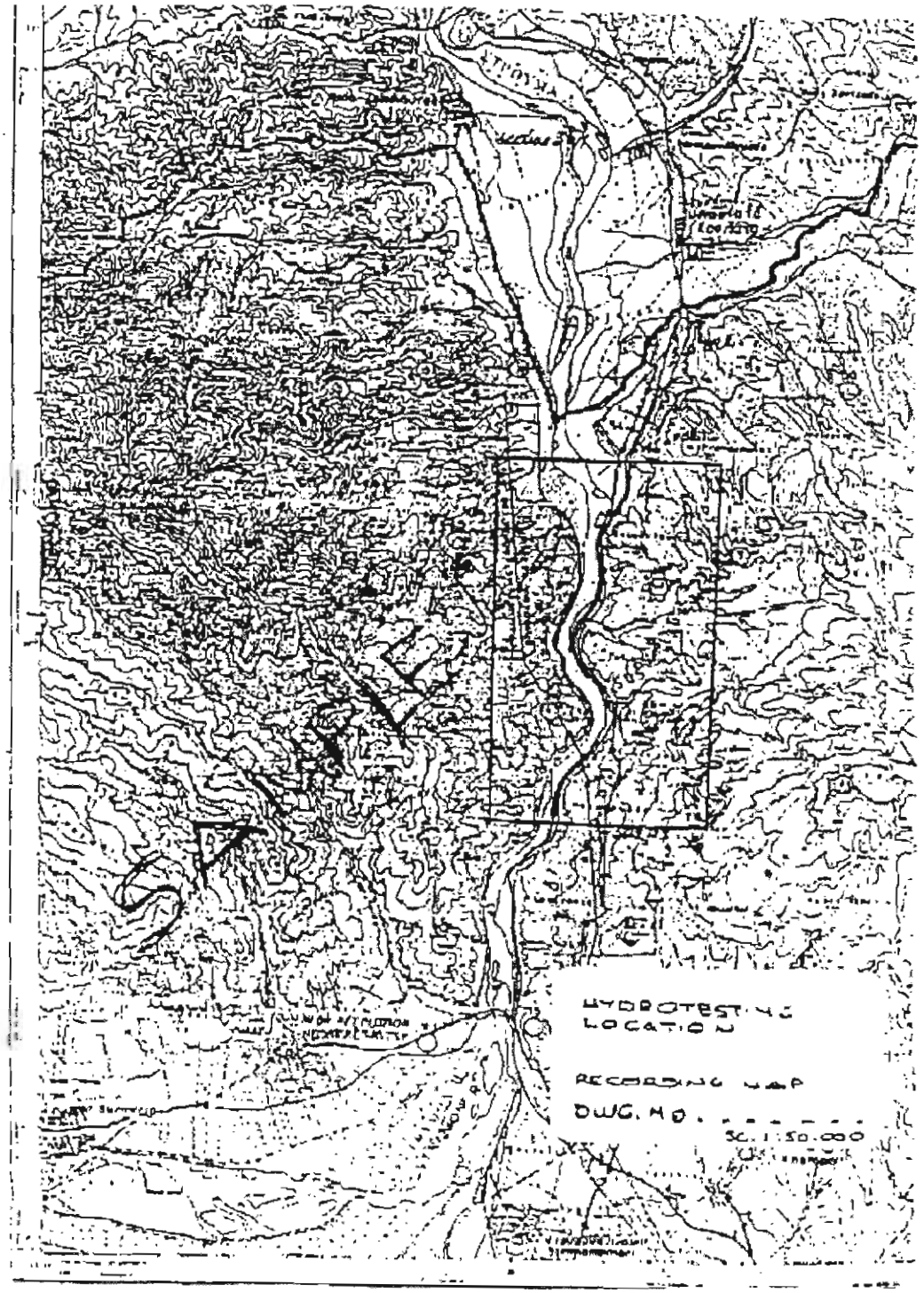
E LOCATION OF PRESSURING EQUIPMENT

FOR CONTRACTOR	FOR SUPERVISION	FOR OWNER
NAME	NAME	NAME .....
.....	.....	.....
SIGNATURE	SIGNATURE	SIGNATURE

APPENDIX C – FIG. 28



APPENDIX C – FIG. 29



(example)

DESFA
Hellenic Gas Transmission System Operator

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 (^{O}C)	Remarks
					P (bar)	dew point (^{O}C)		

FOR CONTRACTOR
NAME .....
.....
SIGNATURE

FOR SUPERVISION
NAME .....
.....
SIGNATURE

FOR OWNER
NAME .....
.....
SIGNATURE

APPENDIX D

(example)

APPENDIX D - FIG. 1

DESFA
Hellenic Gas Transmission System Operator

WELDING LOG

OWNER : HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.
PROJECT : GREEK GAS PIPELINE
CONTRACT : .....
SUPERVISION : .....
CONTRACTOR : .....

SPREAD :
SECTION :
REF. K :
REF. DWG' :
REPORT :
DATE :
PAGE :

WELDING DATE	PIPE			WELD JOINT NO.	WELDER'S NO.	WPS NO.	AMB TEMP (°C)	PREH. TEMP. (°C)	OBSERVANCE OF PROCESS (FOREMAN's SIGNATURE)	WELD JOINT ACCEPTANCE		JOINT REPAIR OR REMOVAL		JOINT ACCEPTANCE AFTER REPAIR	
	NO.	DIA	W.T.							VISUAL INSPECTION (FOREMAN's SIGNATURE)	N.D.E. REPORT (NO./DATE)	REPAIRED OR REMOVED (DATE)	FOREMAN's SIGNATURE	VISUAL INSPECTION (FOREMAN's SIGNATURE)	N.D.E. REPORT (NO./DATE)
NOTES :															

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

(example)

DESFA

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	total number of welds
_____	_____ = %	on _____ welds	_____ = 100 %
_____	_____ = %	= _____ %	numbers of welds tested by non-destructive methods
_____	_____ = %	of certificates for results	_____ = 100 %

WELDERS :

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

REMARKS :

CONTRACTOR
NAME _____
SIGNATURE

SUPERVISION
NAME _____
SIGNATURE

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX D - FIG. 3

NON - CONFORMANCE 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 :

NDE REJECTION REPORT NO./DATE	DESCRIPTION OF DEFECTS	PIPE NO.	WELD NO.	WELDER'S NO.	REPAIR		N.D.E.		DESTRUCTIVE EXAMINATION	
					YES	NO	ACC.	REJ.	ACC.	REJ.
REMARKS :										

CONTRACTOR

NAME

SIGNATURE

SUPERVISION

NAME

SIGNATURE

(example)

APPENDIX D - FIG. 4

VOLUMES FOR :

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

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX D - FIG. 5

TIE - IN REPORT

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

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX D - FIG. 6

RADIOGRAPHIC INSPECTION REPORT

OWNER : HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT : .....
SUPERVISION : .....
CONTRACTOR : .....

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

DIAMETER : | THICKNESS : | STEEL GRADE :

INSPECTION TECHNIQUE : | SOURCE : | EQUIPMENT :

WELDING LOG. NO.	PIPE NO.	WELD JOINT NO.	WELDER NO.	FILM NO.	FILM LOCATION	SENSITIVITY	DENSITY	DEFECTS		Final Conclusion : Acceptable - OK Repair - R To be cut out - CO
								LOCATION	CLASSIFICATION	

REMARKS :

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX D - FIG. 7

ULTRASONIC EXAMINATION 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. :
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.	WELDER NO.	Coordinates and description of discovered defects :	Final Conclusion : Acceptable - OK Repair - R To be cut out - CO

REMARKS :

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX D - FIG. 8

MAGNETIC PARTICLES INSPECTION 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. :
DATE :
PAGE :

DIAMETER : | THICKNESS : | STEEL GRADE :

TYPE OF FLAW DETECTOR : | CONTRAST COATING :

MAGNETIZING FORK : | MAGNETIC INDICATOR :

WELDING LOG. NO.	PIPE NO.	WELD JOINT NO.	WELDER NO.	Coordinates and description of discovered defects :	Final Conclusion : Acceptable - OK, Repair - R, To be cut out - CO

REMARKS :

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX D - FIG. 9

LIQUID PENETRANT INSPECTION 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. :
DATE :
PAGE :

DIAMETER : | THICKNESS : | STEEL GRADE :

MEANS OF INSPECTION Removed Fluid
Penetrant
Developer

WELDING LOG. NO.	PIPE NO.	WELD JOINT NO.	WELDER NO.	Coordinates and description of discovered defects :	Final Conclusion : Acceptable - OK Repair - R To be cut out - CO

REMARKS :

CONTRACTOR SUPERVISION

NAME NAME

SIGNATURE SIGNATURE

APPENDIX E

(example)

DESFA

APPENDIX E - FIG. 1

CATHODIC PROTECTION

PIN BRAZING AND CABLE CONNECTION MEASURING POST 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. :
DATE :
PAGE :

MEASURING POST LOCATION (K POINT km)	CHAINAGE (km)	MEASURING POST TYPE	CABLING							TESTS				DATE INSTALLED
			PIN BRAZING	LAYING AND SECURE ON PIPE	CABLE COLOUR MARKING	CONNECTION TO CASING WHEN APPLICABLE	CONNECTION TO SECONDARY STRUCTURES (TYPE K5 ONLY)	SECURE BLACK CABLE FOR MEASURE POST	GROUNDING (TYPE K5 ONLY) MEASURED RESISTANCE (Ohms)	GROUNDING (TYPE K5 ONLY) GROUND WIRE LENGTH (mm)	NATURAL POTENTIAL READING (mV)	CABLE TEST BEFORE BRAZING (Ohms)	CONTINUITY TESTS AFTER BRAZING (Ohms)	ENCAPSULATION HOLIDAY TEST RESULTS	

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

(example)

DESFA

APPENDIX E - FIG. 2

CATHODIC PROTECTION

MEASURING POSTS INSTALLATION 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. :
DATE :
PAGE :

MEASURING POST LOCATION (K POINT km)	CHAINAGE (km)	MEASURING POST TYPE	MEASURING POST INSTALLATION IN GROUND	CABLE CONNECTION TO MEASURING POST	SEMICONTACTOR OVERVOLTAGE PROTECTION (TYPE KG ONLY)	SACR TYPE ANODE (K 33 ONLY)		POLARIZATION BROBE TYPE (K9 ONLY)	IDENTIFICATION PLATE	DATE INSTALLED
						CABLE SLEEVES FOR ANODE	SACRIFICIAL ANODES (QUANTITY)			

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

(example)

APPENDIX E - FIG. 3

CATHODIC PROTECTION

INSTALLATION OF MEASURING POST & CABLE CONNECTIONS RECORD SHEET

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

C.P. AREA :
SPREAD :
SECTION :
REF. K POINT :
REF. DWG :
REPORT No. :
DATE :
PAGE :

S/N	MEASURING POST TYPE	LOCATION OF MEASURING POST		DATE OF INSTALLATION	DISTANCE (m) TO CABLE CONNECTION JOINTS		
		K point + m	Km		A	B	C

NOTES :

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

(example)

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 : _____

(example)

APPENDIX E - FIG. 5

CATHODIC PROTECTION
SOIL RESISTIVITY MEASUREMENTS

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

SPREAD :
SECTION :
REF. K. POINT :
LOCATION (km) :
REF. DWG's :
REPORT No. :
DATE :
PAGE :

MAIN FORMULA FOR SOIL RESISTIVITY
$\rho = 2 n . a . R .$ (only if a = 6)

REF. K POINT	KM	DISTANCE BETWEEN ELECTRODES a (a)	FORMULA FACTOR f f = 2n.a	READING OF INSTRUMENT (Ωha)	INSTRUMENT FACTOR	RESISTANCE R (Ωha)	SOIL RESISTIVITY ρ.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

(example)

APPENDIX E - FIG. 6

CATHODIC PROTECTION

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

OWNER	: HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)	SPREAD	:
		SECTION	:
PROJECT	: GREEK GAS PIPELINE	REF. KM	:
CONTRACT NO.	:	REF. DWG's	:
SUPERVISION	:	REPORT No.	:
CONTRACTOR	:	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 ..... m^2

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 (Ohm) - is = I / A (mA / m^2)

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

CONTRACTOR	SUPERVISION
NAME	NAME
SIGNATURE	SIGNATURE

(example)

APPENDIX E - FIG. 7

CATHODIC PROTECTION
TEST REPORT FOR RIVER CROSSING

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

SPREAD
SECTION
REF K. POINT
REF Km
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
NAME :

SUPERVISION
NAME :

(example)

DESFA

APPENDIX E - FIG. 8

CATHODIC PROTECTION
TEST REPORT FOR ROAD / RAILWAY CROSSING WITH CASING

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

Location	Casing nominal diameter W. Thick.	
Casing No	Casing length	
Name of casing	Uncoated	YES I NO I 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 Ωhms	1 Resistance measurements between pipe-casing Ωhms	1 Resistance measurements between pipe-casing Ωhms
	2 Potential measurements $^{u}Cu / Cuso_4$ = V	2 Potential measurements $^{u}Cu / Cuso_4$ = V
	3 Voltage between pipe-casing ΔU = V	3 Voltage between pipe-casing ΔU = V

ARE C.P. RESULTS SATISFACTORY ? YES I NO I

Instrument used :	*REMARKS:*
Serial No :	
Certificate No :	

CONTRACTOR	SUPERVISION
NAME	NAME

(example)

APPENDIX E - FIG. 9

CATHODIC PROTECTION

NATURAL POTENTIAL RECORD SHEETS

(PRECOMMISIONING 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

(example)

APPENDIX E - FIG. 10

CATHODIC PROTECTION

GROUNDBED RECORD SHEETS

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

GROUNDBED LOCATION : KM. :

GROUNDBED TYPE : WATER DEPTH :

ANODE AREA No.	RESISTANCE TO REMOTE EARTH
GROUNDBED	

REMARKS :

Work carried out by :
Name :
Signature :
Date :

CONTRACTOR
NAME

SIGNATURE

SUPERVISION
NAME

SIGNATURE

(example)

APPENDIX E - FIG. 11

CATHODIC PROTECTION

INSULATION JOINT TEST RESULTS

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

SIGNATURE

SUPERVISION
NAME

SIGNATURE

APPENDIX F

(example)

APPENDIX F - FIG. 1

PIPE COATING REPORT

OWNER : HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA S.A.)
PROJECT : GREEK GAS PIPELINE
CONTRACT : ....
SUPERVISION : ....
CONTRACTO : ....

SPREAD :
SECTION :
REF. K :
REF. DWG' :
REPORT :
DATE :
PAGE :

PIPELINE SECTION		PIPE NO.	WELD JOINT NO.	DIAM (IN)	LENGTH (M)	SURFACE PREPARATION	TYPE OF COATING	COATING INSPECTION			CONCLUSION (O.K. / R)	REMARKS
FROM	TO							H. DETECTOR (Kv)	ADHESION (kg/cm^2)	THICKNESS (mm)		

NOTES :

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

(example)

APPENDIX F - FIG. 2

VALVES COATING 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. :
DATE :
PAGE :

DIAMETER (INCH)	VALVE LOCATION (K.P.)	SURFACE PREPARATION	TYPE OF COATING	COATING INSPECTION			FINAL CONCLUSION (OK / R)	REMARKS
				H. DETECTOR (KV)	ADHESION (kg/cm^2)	THICKNESS (mm)		

NOTES :

CONTRACTOR
NAME
SIGNATURE

SUPERVISION
NAME
SIGNATURE

(example)

DESFA

APPENDIX F - FIG. 3

INSTALLATION OF
HDPE PIPE (CONDUIT) FOR FIBRE OPTIC CABLE

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

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX F - FIG. 4

HDPE PIPE TESTS REPORT (CHECK LIST)

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

FROM K POINT. TO K POINT. LENGTH :

PIGGING TEST SPHER DIAM. DATE :

AIR TEST REPORT

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

(example)

DESFA
Hellenic Gas Transmission System Operator

APPENDIX F - FIG. 5

NO. .....
PROTOCOL
for
RIVER CROSSINGS

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

(example)

DESFA

APPENDIX F - FIG. 6

NO. .....

PROTOCOL
for
AUGER BORED CROSSINGS

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

(example)

APPENDIX F - FIG. 7

BORING REPORT
SURVEYING DATA

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

(example)

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 ΚΑΛΛΙΕΡΓΗ	
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 — Contractor

..... (signature) — ..... (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 αγροτεμάχιό μου, ΔΗΛΩΝΩ ΟΤΙ το αγροτεμάχιό 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 — Ο Ανάδοχος

..... (signature) — ..... (signature)

(example)

DESFA

APPENDIX F - FIG. 9

REPORT No

MARKER POST INSTALLATION REPORT

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