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WORKING PARTY ON GAS

Meeting of Experts on the Transport
and Storage of Gas

Twenty-fifth session, 6-7 September 1994

MAINTENANCE OF THE GAS TRANSPORTATION PIPELINE SYSTEMS

(Replies to the questionnaire, transmitted by the
Government of the Czech Republic)*

1. Regular pipeline maintenance

General part

1.1 Philosophy

1.1.1 Do you have any system of checking and/or maintenance of pipelines based on the age of the pipeline? If yes, which one?

There is not a widely spread maintenance system based on the age of pipeline. On main pipelines the frequency of on-line inspection is higher.

Some selected pipelines are rehabilitated, when part of a job is hydrotesting (stress-test).

* In accordance with the decision of the Meeting of Experts at its twenty-fourth session, held in September 1993 (ENERGY/WP.3/GE.3/6 para. 5 (a)).

- 1.1.2 Is there any relationship between economical and technical factors in considering on operating life of pipeline?

No

- 1.1.3 Is there any regulation (by law, by state-official order ...) for checking/maintaining/repairing/reconstructing system?

Yes (State official order)

Part maintenance systems and intervals

1.2 Maintenance of pipeline

1.2.1 Survey of right of way (r.o.w.)

- | | |
|---|---|
| .1 walking | twice a month |
| .2 driving | twice a month |
| .3 using of helicopters | twice a month transit pipelines
4 x a year pipelines PN 64 |
| .4 clearing of the r.o.w. and
accesses to the plants | when necessary |
| .5 detection of leakages | flame ionization detector |

1.2.2 Survey of landslide areas, how is it performed?

- | | |
|---|--|
| .1 geodetical measurements | twice a year |
| .2 measurements on pipeline | one site - strain-gauges
4 x a year |
| .3 regular system of stabilization
of landslide area | not used |

1.2.3 Survey of inundated areas

No

1.2.4 Checking and maintenance of river and/or road crossings

- | | |
|---|--------------|
| .1 bridges (corrosion protection, steel material check-ups) | once a month |
| .2 underwater crossing | once a year |
| .3 casings | once a year |

1.2.5 Keeping of records on computers

- | | |
|-------------------|----------|
| .1 statistics | not used |
| .2 working orders | not used |

1.3 Cathodic protection (CP) and insulation of the pipelines

1.3.1 Measurements of CP potential (method used)

Once a year, critical sites once a month, Cu/CuSO₄ cell

1.3.2 Survey of insulation status (method used)

Current demand, Pearson survey, AC signal attenuation

1.3.3 Provision made if error is found on

- | | | |
|----|--|--|
| .1 | pipeline and casing in touch | repair if possible |
| .2 | influence or interference of another facility | electro-drainage
self-controlled CP |
| .3 | interruption or reduction of CP current | repair |
| .4 | diode breakdown in the draining installations | repair |
| .5 | significant insulation damage (what criterion) | repair |
| | criterion $U > -0,85 \text{ V}$ | |

1.4 Maintenance of section and branch-off valves (SBV)

1.4.1 Regular control of SBV operation

- | | | |
|----|--|-------------|
| .1 | local control | 4 x a year |
| .2 | remote control | 4 x a year |
| .3 | line damage automatic shut-off system check-up | once a year |

1.4.2 SBV instrumentation equipment control

Twice a year

1.4.3 Control of tightness (method used)

Only exceptionally

1.5 Special winter operations on distribution facilities

1.5.1 Measurement of dew-point of water in gas (method used, tolerable limit)

- 8 °C/40 bar, dewscope, LiCl cell

1.5.2 Control of hydrate formation (drying/inhibiting/other method)

Inhibiting

1.5.3 Inhibition of hydrate formation (if it is used)

Controlled injection of methanol to gas stream

1.6 Maintenance of electric installations and grounding

1.6.1 Control of electric installations

Once a year

1.6.2 Measurements of the grounding system of the above-ground installations

Once after three years

1.6.3 Check-up of the gas ramp in a boiler room and control of the pump drive

Once a month

2. Maintenance of technological equipment

2.1 Gas dehydration plant

Non-dehydration plant on gas transmission system

2.2 Gas preparation and compressor plant

2.2.1	Check-up of valves	visual once a day function once a month
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2.2.2	Lubrication of valves	once a month
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2.2.3	Check-up of regulation valves	6 x a year
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2.2.4	Check-up of vessels under pressure	once after 3 years
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2.2.5	Safety valves control	once a year
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2.2.6	Alarm equipment control	twice a year
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2.2.7	Fire protection system check-up	4 x a year
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2.2.8	Anti-pumping protection system of compressor check-up	once a year
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2.3 Cooling system

2.3.1	Visual investigation	once a day
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2.3.2	Working parameters control	24 x a day
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2.3.3	Pressure drop measurement	not performed
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2.3.4 Cooling system cleaning

.1	external surface	once a year
.2	internal surface	not performed

2.3.5 General repair (criteria applied) if leaking

2.4 Compressor units

General part

2.4.1 Philosophy

A combined system is used - the checking and maintenance is done after producer recommendation, but the realization of repair depends on results of operational diagnostics, e.g. vibrodiagnostic, tribochemistry and flue gases analysis.

Part maintenance and intervals

2.4.2 Lubrication system check-up once a day

2.4.3 System of check-up and maintenance if time-based

- .1 intervals every 15,000 operating hour
- .2 extent depending on operating hour

2.4.4 Regular diagnostic system twice a year above-mentioned

2.4.5 Statistics of disturbances

- .1 Is it used for servicing coordination?
Yes - for spare parts planning
- .2 Is it used for discussion with producer?
Yes

3. Regular maintenance on measurement and regulation system (MRS)

3.1 Maintenance of MRS

3.1.1 Check-up of MRS and lines adjustment

Once a month

3.1.2 Adjustment of regulation and protection system

4 x a year

3.1.3 Restoration of vital parts of MRS

If needed

3.1.4 Measuring equipment control

- .1 orifice twice a year (ISO 5167)
- .2 turbine meter once every 5 years
- .3 rotating piston meter not performed
- .4 vibration gas meter not installed

- .5 ultrasonic gas meter not installed
- .6 mechanical corrector not installed
- .7 electronic corrector 12 x per year
- .8 control and calibration of pressure, temperature and other instrumentation equipment and transducers 12 x per year
- 3.2 Control and adjustment of the station telemetry indicators
4 x a year
- 3.3 Control and adjustment of MRS of heating system and heat exchangers
Once a year
- 3.4 Border station control
- 3.4.1 Visual check-up of installation
Once a day
- 3.4.2 Control and adjustment of measuring equipment
Once a month
- 3.4.3 Comparative control of the measured gas quantities
Output/input balance
- 4. General information of system used for registration and statistics of maintenance and damages
Chronological order registration
- 4.1 Do you use any system of planning and control of the maintenance works on PC with specially adapted software?
No
- 4.2 What is the frequency of damages on your pipeline system in a:
 - .1 1 year period negligible
 - .2 10 year period once
- 4.3 Sources of damage of high pressure main gas pipelines
 - .1 Damages of cathodic protection, defective CP system
Yes
 - .2 Mechanical by "third party"
Yes (minimally - once in 10 years)

.3 Agricultural activities

No

.4 Natural causes (landslides, earthquakes etc.)

Yes (once in 25 years)

Also huge microbiologically induced corrosion observed

4.4 Gradual change of pipeline and MRS gravity control (with ageing of them - state the contents of modification of control system)

No system defined

Using on-line inspection preferably on older pipelines

In selected cases rehabilitation of old pipelines comprising hydrotesting (stress-test) is performed

4.5 Elimination of disturbances and damage

4.5.1 Technological programmes for elimination of damages

Yes

4.5.2 Design system modification on operation and maintenance knowledge

Yes

4.5.3 Safety instruction for the gas pipelines systems

Yes

4.5.4 Training of damage repair team

Yes (once a year)

4.5.5 On-duty at home

Yes

4.5.6 Responsibility of chief on duty

Up to stop transmission

4.5.7 Information system for the persons

Yes

4.5.8 Cooperation with public organizations in the case of pipeline breakdown (police, firemen, etc.)

Yes

- 4.6 Repairs on the pipelines under pressure (methods used for temporary and for stable repair)

Steel/epoxy glass-grit filled sleeves used as definitive repair

- 5. Exchange of experiences

- 5.1 Systems of regular pipelines and MRS check-up

- 5.2 Causes and statistic frequency of damages affecting the pipelines

- 5.3 Hazard elimination programmes

- 5.4 General remarks

All exchanges of experience at above-mentioned topics will be appreciated.
