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and Storage of Gas

Twenty-sixth session, 15 September 1995
Item 3 of the provisional agenda

MAINTENANCE OF THE GAS TRANSPORTATION PIPELINE SYSTEMS

(Reply to the questionnaire, transmitted by the
Government of Italy)*

* In accordance with the decision of the Meeting of Experts at its twenty-fifth session held in September 1994 (ENERGY/WP.3/GE.3/8, para. 5(a)).

1. REGULAR PIPELINE MAINTENANCE

Part maintenance systems and internals

1.2 Maintenance of pipelines

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

1. From every week to every month on pipelines in which the helicopter survey is not performed.

Every year on pipelines in which the helicopter survey is performed.

2. See 1.2.1.1 (walking and driving are the same survey).

3. Every week on the principal transportation pipelines.

Every month on the regional transportation pipelines.

4. Only when necessary.

5. The survey of the r.o.w. for detection of leakages is not performed like regular survey; it is performed in particular cases by flame ionized gas detectors.

1.2.2 Survey of landslides areas

1. Inclinometers

2. Measurements of stress in the pipeline by strain gauges.

3. Regular system are drainage of water and retaining structures.

Drainage of water is carried out by small ditches and by underground draining trenches. Retaining structures usually used are concrete block walls and gabion walls.

1.2.4. Checking and maintenance of river and/or road crossings

1. Every week or every month a visual inspection is performed from the banks.

Every year a detailed checking is performed.

Maintenance is performed on the basis of the results of checking.

2. Every week or every month a visual inspection is performed from the banks.

From every six months to every five years the depth of the river bottom is checked.

3. Every year the detection of gas leakages is performed.

1.2.5 Keeping of records on computers

Planning of maintenance is performed on personal computer.

Registration and statistic of maintenance is not performed on personal computer.

1.3. Cathodics protection (CP) and insulation of the pipelines

1.3.1 Measurements of CP potential

The measurement of CP potential is performed by the Cu-CuSO₄ referent cell method; this measurement is performed every month.

In the presence of stray currents 24 hours CP potential measurements are performed with frequency from every month to every four months.

1.3.2 Survey of the insulation status

The survey of the general status of insulation is performed comparing the CP currents in different ages of the pipeline.

Pearson Survey and DC Transversal Gradient are also employed but only when necessary.

1.3.3 Provision made if error is found

1. Pipeline and casing in touch

The touch between the pipeline and casings is removed.

2. Influence or interference of another facility

In the case of influence or interference of railway lines unidirectional drainages are performed.

In the case of influence or interference of another facility first an electric survey is performed to define the gravity then a provision is performed such as coating strengthening or modification to the cathodic protection system.

3. Interruption or reduction of CP current

Individuation of the fault and repair.

4. Diode breakdown in the draining installation

Repair.

5. Significant insulation damage (what criterion)

No particular criteria exists to define a significant insulation damage.

In the case of finding of insulation damage an increase of CP current or a repair is performed.

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

1.4.1 Regular checking of SBV operation

1. Every year.

2. Every year.

3. Such devices are not used.

1.4.2 SBV instrumentation equipment checking

Checking of actuators is performed every two months.

1.4.3 Checking of tightness (method used)

Every two months on remote control SBV.

Every year on local control SBV.

Checking of tightness is performed by ultrasonic gas detector.

1.5 Special winter operations on distribution facilities

1.5.1 Cleaning (pigs, balls ...) - frequency, purpose

Pipeline cleaning is performed by pigs. It is usually used before intelligent pig inspections to remove liquids and solids from pipeline.

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

Dew-point of water gas is measured continually at border stations of pipeline system by means of hygrometers and only when necessary along the pipeline system by means of mobile dew-point testing devices. Tolerable limit is 80 ppm.

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

1.5.4 Inhibition of hydrate formation (if used - which system and inhibitor?)

Inhibition of hydrate formation is performed by controlled methanol injection to pipeline.

1.6 Maintenance of electric installations and grounding

1.6.1 Control of electric installations

From every six months to every year.

1.6.2 Measurements of the grounding system of the above ground installations

Every year.

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

1.7 On-line inspection (pigging operation)

1.7.1 Regular/random system used

Regular system is used to detect metal losses.

1.7.2 If regular system is used, what is frequency and purpose?

Frequency from every three to every five years.

The purpose is to detect metal losses and to point out differences from previous inspections.

1.7.3 Type of intelligent pig used

Magnetic flux leakage intelligent pig type for detecting metal losses.

2. MAINTENANCE TECHNOLOGICAL EQUIPMENT

2.1 Gas dehydration plant

There are no gas dehydration plants in the gas transmission system.

2.2 Gas preparation and compressor plant

2.2.1 Check-up of valves

Every year.

2.2.2 Lubrication of valves

Every year.

2.2.3 Check-up of regulation valves

Every six months.

2.2.4 Check-up of vessels under pressure

Every year.

2.2.5 Safety valves control

Every year.

2.2.6 Alarm equipment control

Every year.

2.2.7 Fire protection system check-up

Every six months.

2.2.8 Anti-pumpage protection system of compressor check-up

Every three months.

2.3 Cooling system

2.3.1 Visual investigation

Every year.

2.3.2 Working parameters control

Every two hours during normal working time.

2.3.3 Pressure drop measurements

Every two hours during normal working time.

2.3.4 Cooling system cleaning

Only when necessary

2.3.5 General repair (criteria applied)

Only when necessary.

2.4 Compressor units

General part

2.4.1 Philosophy

The maintenance system used is based on the producers' instructions; producers' instructions are based on operational time.

Part maintenance and intervals

2.4.2 Lubrication system check-up

Every year.

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

For Heavy Duty compressor units maintenance is performed every 8,000 and 16,000 hours operational time; a complete overhaul is performed every 32,000 hours operational time.

For Yet compressor units check-up is performed every six months or 4,000 hours operational time; maintenance is on condition.

2.4.4 Regular diagnostic system (which type is used, intervals)

Not performed but is under consideration.

2.4.5 Statistics of disturbances

1. Is it used for servicing coordination? How?

Yes, mainly for management of spare parts and for defining priority and modality of checking and maintenance with producers.

2. Is it used for discussion with producer?

Yes.

3. REGULAR MAINTENANCE OF MEASUREMENT AND REGULATION SYSTEM (MRS)

3.1 Maintenance of MRS

3.1.1 Check-up of MRS and telemetric lines, checking of interconnections with local MRS

Gas pipeline transportation system is remote-controlled by the SCADA system at the dispatching centre, which provides automatically the checks of measurement acquisition every minute and performs diagnostic checks of the telemetric system.

However, a field check is performed every six months.

3.1.2 Adjustment of regulation and protection system

Every two months.

3.1.3 Restoration of vital parts of MRS

Only when necessary.

3.1.4 Measuring equipment control (interval, range, is there any State-official order?)

- | | |
|--|---|
| 1. Orifice | Every four months. |
| 2. Turbine meter | Not used. |
| 3. Rotating piston meter | Not used. |
| 4. Vibration gas meter | Not used. |
| 5. Ultrasonic gas meter | Not used. |
| 6. Mechanical corrector | Every six months. |
| 7. Electronic corrector | Every six months. |
| 8. Control and calibration of pressure, temperature and other instrumentation equipment and transducers: | Control every six months, calibration every year. |

There is no official State order.

3.2 Checking and adjustment of the station telemetry indicators

Checking every six months and adjustment every year.

3.3 Checking and adjustment of heating system and heating exchangers

Every two months.

3.4 Border station control

3.4.1 Visual check-up of installation

Every two weeks.

3.4.2 Control and adjustment of measuring equipment

Control every month and adjustment every six months.

3.4.3 Comparative control of the measured gas quantities

Yes, by double measurement and calculation lines.

4. GENERAL INFORMATION OF SYSTEM USED FOR REGISTRATION AND STATISTIC OF MAINTENANCE AND DAMAGES

Maintenance activities are planned on personal computer.

Damages are recorded on personal computers.

4.1 Do you use any system of planning and control of the maintenance works on PC with specially adapted software?

Yes.

4.2 What is the frequency of damages on your pipeline system?

4.3 Sources of damage of high pressure main pipelines

1. Damage of cathodic protection, defective CP system

No.

2. Mechanical by "third party"

Yes.

3. Agricultural activities

Yes.

4. Natural causes (landslides, earthquakes, etc.)

Yes.

4.4 Gradual improving of pipelines and MRS gravity of checking (with ageing of them - state the contents of modification of control system)

The maintenance system does not depend on the age of pipelines and MRS.

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.

4.5.5 On-duty at home

Yes for limited distances.

4.5.6 Responsibility of chief on duty

Yes.

4.5.7 Information system for the officials

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

4.6 Repair on the pipeline under pressure (methods used for temporary and
for stable repair)

The method used depends on the kind and extent of the damage.

Non-welded sleeves filled with pressurized epoxy resin are a method
used as stable repair.

5. EXCHANGE OF EXPERIENCES

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