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TRANSPORTADORA DE GAS DEL PERU
CAMISEA NATURAL GAS AND NGL TRANSPORTATION SYSTEM



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AREA:L

LOWERING-IN & BACKFILLING

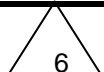
CONSTRUCTION SPECIFICATION

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2794-L-SP-00045

ESC. S/E

JOB: E100-50113



REVISION



CONSTRUCTION SPECIFICATION

LOWERING-IN & BACKFILLING

2794-L-SP-00045

REV. 6


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CAMISEA NATURAL GAS AND NGL TRANSPORTATION SYSTEM

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1.0- PURPOSE

This specification establishes the criteria to carry out the lowering-in and backfilling of the pipeline.

2.0- SCOPE

This specification applies to the Camisea NG and NGL pipelines.

3.0- DEFINITIONS

Lowering-in is the action of laying the pipe inside the trench. The pipe shall be checked prior to lowering-in in order to ensure that the pipe coating, joints coating and joints welds are not damaged and are according to the corresponding specifications.

The backfilling shall be performed following the guidelines described herein bellow.

4.0- REFERENCES

2794-L-SP-00038	Field Joint Coating & Pipe Coating Repair
2794-L-SP-00009	Ditching
2794 L-TP-00-001	Apertura de Pista
2794-L-TP-00-002	Apertura y Tapada de Zanja

5.0- RESPONSIBILITIES

5.1- The Line Supervisor shall:

Enforce this procedure and provide the necessary equipment for the execution of the activities.

5.2- The Foreman shall:


Comply with this procedure and ensure that the activities are safe and adequately performed in order to assure quality and safety.

5.3- The Quality Manager shall:


Ensure that the works performed fulfill this specification.

6.0- LOWERING-IN

6.1 The bottom of the ditch shall be prepared to receive the pipe, and every hard material found that could damage the coating shall be removed. In those cases where the bottom of the ditch is rocky, the pipe shall be installed on a bed of fine selected material (thickness = 0.15 m) or trapezoidal sacks (thickness = 0.15 m) filled with selected fine material placed every 3 meters shall be used to support the pipeline.

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- 6.2** The lifting equipment shall be adequate and enough to allow a safe lowering-in operation.
- 6.3** The pipe shall be tied, lifted and lowered-in by means of side-booms. The side-booms shall have a lowering-in belt system or roli-cradles specifically designed to prevent damage to the pipe coating.
- 6.4** If it were necessary to interrupt the lowering-in operation for a long period, the pipe shall be placed on its initial support until operation re-starts. The lowering-in belt system shall be removed.
- 6.5** The pipe shall be laid as close as possible to the center of the ditch. Overbends shall be installed in such a manner that the pipe at the point of the bend shall clear the bottom of the ditch. Sagbends shall rest on the bottom of the ditch. At sidebends, pipe shall be installed to lie toward but not against the outside wall of the ditch.
- 6.6** The use of mechanical means to force the lowering-in operation shall not be allowed.
- 6.7** The equipment shall be enough in capacity and quantity to perform the lowering-in operation. Their location and distribution will be the adequate to prevent dropping, sliding, overturning or buckling of the pipe section being handled.
- 6.8** At the end of the day, the ends of the pipes shall be covered with nightcaps.
- 6.9** Prior to lowering-in, the pipe coating shall be 100% checked with a holiday detector. Holiday test device will be set at 20 kV with a full encirclement contact-electrode. Defective areas shall be repaired in accordance with the specification 2794-L-SP-00038.
- 7.0- PREPARATION FOR BACKFILLING**
- 7.1** Surveyors shall be assigned to perform as-built survey before padding or backfilling.
- 7.2** After lowering-in, the following items shall be checked and any necessary corrections or repairs will be performed:
- 7.2.1** No rocks, boulders, large clods, trash, stumps or other debris are in the trench.
- 7.2.2** The pipe coating is not damaged.
- 7.2.3** There is enough clearance between the pipe and the walls of the ditch, at least 6” (0,15 m) at each side of the pipe, in order to perform the backfilling operation without leaving voids.

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- 7.3** In rocky areas, the pipeline should be protected from falling rocks immediately after lowering-in. Rock shields and/or wood beams may be used.

If selected backfilling material cannot be obtained from excavated soil, it shall be hauled from other places or a padding machine shall be used to obtain it.

Segregated topsoil from the RoW shall not be used as padding material.

8.0- BACKFILLING

- 8.1** The backfilling will be performed as soon as possible after the lowering-in. In order to prevent the movements of the pipe into the ditch due to temperature changes, the backfilling shall be performed at all bends and up to 50 feet (15 m) at both sides of them.

- 8.2** Precautions shall be taken during the backfilling operation in order to prevent any damage to the coating.

In rocky areas, the pipe shall be padded with 6" (0.15 m) of selected material placed around it. The padding material shall consist of earth, sand, fine bank run gravel, or a combination of these materials. Before the placing, the selected material shall be sifted; the size of the sieve or screen shall be **38 x 38 mm (1 1/2" x 1 1/2")**.



No rocks, clods, or other hard objects shall be allowed in the padding material.

- 8.3** The backfilling of the rest of the trench shall be completed. In rocky areas, precautions shall be taken during the backfilling operation to minimize the voids in the backfill. Stones with any dimension exceeding 12" (0,30 m) shall not be allowed in the backfill.

The backfill shall then be bladed to conform a neatly rounded crown of approximately 8" (0,20 m) of thickness at the center of the trench.


Special precautions shall be taken at the crossings of terraces, levees, channels and ditches in order to provide a relatively watertight backfilling material to prevent erosion or infiltration into the backfill.

- 8.4** In sloping areas, a typical procedure will be used to erect ditch breakers (see drawing 2794-L-TP-00-011).

Topsoil shall not be used to fill sacks.

- 8.5** After performing the final lowering-in, the backfilling shall be completed as soon as possible. Where practical, any water in the ditch shall be removed prior to backfilling.

- 8.6** Backfilling shall be completed before the start of the hydro-testing operations.

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9.0- FINAL GRADING


The RoW shall be restored to its original contour. Natural drainage channels shall also be restored.

The backfill of the trench shall be centered and neatly rounded to conform a crown of approximately 8" (0,20 m) of thickness above normal ground level. However, this crown shall be modified when is necessary to allow the normal drainage of the surface.

10.0- SAFETY

SESMA (Safety, Health and Environmental) Accident Prevention at Work

- ◆ Prior to the start of the activities, the Foreman shall properly inform the workers about the potential risks of the works described in this procedure, by means of a Daily Safety Dialog (DSD).
- ◆ A daily Job Safety Analysis shall be prepared, describing all the stages, the risks and the preventive measurements.
- ◆ Prior to the beginning of the activities the characteristic of the terrain shall be checked, including firmness, consistency, and the possibility of a landslide shall be excluded.
- ◆ All equipment and all the lifting elements. shall have the periodic revisions updated.
- ◆ The area involved in these tasks shall be delimited, avoiding the presence of workers.
- ◆ No personnel shall be into the trench during the lowering-in operation.
- ◆ If it is necessary to stop the lowering-in, the cradles and supports shall be carefully controlled due to a possible loose of stability.
- ◆ The person in charge of these tasks shall personally and directly supervise these activities.
- ◆ No worker shall remain between the pipe and the trench during the lifting and lowering operations. Before lowering the pipe inside the trench, all the workers shall be properly warned in order to clear the area.
- ◆ The people involved in this activities shall be communicated.
- ◆ Personal safety elements:
 - Hard hat

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- Safety shoes
- Eyes protector
- Gloves
- Reflective jackets

11.0- ENVIRONMENTAL PROTECTION

It will be mandatory for all the personnel to comply with the Environmental Protection measures.