



## DOBSON OILFIELD SERVICES (1993) INC. SAFE JOB PROCEDURE

### 4-(A) HYDRO TESTING PROCEDURE for CSA-Z662

#### SCOPE

This procedure covers the hydro testing of gas and oil high-pressure piping and pipeline systems. It incorporates CSA Z662 Code Section 8 (latest edition) to describe all aspects of the test. The supervisors shall be familiar with the Code. The Code is recognized as a minimum, so there may be additional Owner requirements to follow as well. All testing conducted using this procedure, shall be supervised by the Owner representative.

#### HIGH PRESSURE HYDRO TEST PREPARATION (SUMMARY ONLY)

1. All personnel working in the immediate area shall be notified of the test 24 hours prior to testing.
2. All pipelines shall be lowered in and backfilled and above ground piping secured in place.
3. Blinds and blanks will be installed to isolate facilities from pressure test.
4. Test pressure requirements for the job shall be obtained from the Project Engineer.
5. Any Owner specific procedures shall be reviewed and incorporated.
6. All personnel involved in the test shall review the requirements of the applicable Code and make sure it is clearly understood.
7. All test equipment shall be inspected for wear or damage and to ensure pressure ratings are not exceeded by the test pressure.
8. Warning signs and barricades shall be setup at all entry points and crossings to restrict access and to warn of danger.
9. All personnel present shall be informed of all intended activities at a pre-job safety meeting.
10. No traveling shall be allowed on the right of way until pipeline has achieved test pressure and the test has been allowed to stabilize.
11. Road crossings shall be marked at each point by proper warning signs.
12. Unauthorized personnel shall not be allowed within 5 meters of pipeline under test.

#### PRESSURING OF PIPELINE (SUMMARY ONLY)

1. Follow all steps as outlined in CSA-Z662 applicable to the type of test being performed. Above ground piping and below ground piping have different requirements. The Code may be revised from time to time so this document shall follow the Code.
2. Test manifold(s) and temporary test piping that are reused shall have been designed and tested in accordance with Clause 8.9
3. Pressure in the pipeline should be increased slowly to approximately 3450 kPa (500 psig) and allowed to stabilize for 30 minutes to monitor for leakage.
4. Inspect all welds, flanges, threads and other possible leak sources. Mark all leaks for repair.
5. Depressurize carefully and repair all leaks found. Repeat the test until the system is tight at 3450 kPa (500 psig).
6. Increase the pressure to 6900 kPa. (1000 psig.) and thereafter in increments of 3450 kPa. (500 psig.) until the test pressure is reached. The pressure shall be increased in steps, providing enough time for the pressurized piping system to equalize strains.
7. The minimum hold time at each increment shall be 10 minutes. During each hold period, check for leakage by monitoring the ability of the system pressure to remain constant during the hold time.
8. Follow the Code for the required strength test time.
9. Follow the Code for the required leak test time. (if applicable)

#### DE-PRESSURING – as per CSA Z662 (latest edition)

1. **Depressurizing** - The system will be **slowly** and **safely** depressurized.
2. If the flow of pressure from the pipeline has ceased **DO NOT** assume it is de-pressured. Check for remaining pressure at another source such as a gauge point.



## DOBSON OILFIELD SERVICES (1993) INC. SAFE JOB PROCEDURE

### #4 - (A) CONT.

#### TEST INSTRUMENTATION REQUIRED BY DOBSON OILFIELD

Minimum instrumentation for each test section shall be as follows:

- 2-24 hour pressure recorders as required.
- 2 dead weight testers or gauges as required.
- supply of charts for pressure and temperature recorders.
- all chart recorders shall be verified before and after each test.
- other test instruments shall be verified periodically.
- Contractor shall ensure radio communications are available along test sections and instrumentation section for verification of pressure.



## DOBSON OILFIELD SERVICES (1993) INC. SAFE JOB PROCEDURE

### 4-(B) PNEUMATIC TESTING PROCEDURE for CSA-Z662

#### SCOPE

This procedure covers the pneumatic testing of gas and oil high-pressure piping and pipeline systems. It incorporates CSA Z662 Code Section 8 (latest edition) to describe all aspects of the test. The supervisors shall be familiar with the Code. The Code is recognized as a minimum, so there may be additional Owner requirements to follow as well. All testing conducted using this procedure, shall be supervised by the Owner representative.

Due to the large energy storage in compressed gas and hence the potential hazard of a sudden release of this energy, pneumatic testing should be avoided if at all possible.

#### HIGH PRESSURE AIR TEST PREPARATION (SUMMARY)

1. All personnel working in the immediate area shall be notified of the test 24 hours prior to testing.
2. All pipelines shall be lowered in and backfilled and above ground piping secured in place.
3. Blinds and blanks will be installed to isolate facilities from pressure test.
4. Test pressure requirements for the job shall be obtained from the Project Engineer.
5. Any Owner specific procedures shall be reviewed and incorporated.
6. All personnel involved in the test shall review the requirements of the applicable Code and make sure it is clearly understood.
7. All pipe and fittings shall be inspected for suitability and to ensure the test pressure does not exceed the ratings of the pipe and components.
8. All test equipment shall be inspected for wear or damage and to ensure pressure ratings are not exceeded by the test pressure.
9. Warning signs and barricades shall be setup at all entry points and crossings to restrict access and to warn of danger.
10. All personnel present shall be informed of all intended activities at a pre-job safety meeting.
11. No traveling shall be allowed on the right of way during test.
12. Road crossings shall be monitored by personnel at each point and by proper warning signs.
13. Unauthorized personnel shall not be allowed near the pipeline under test from the time the pipeline is first raised above 50% of the specified minimum yield strength of the pipe, until the pressure is reduced to 110% of the intended maximum operating pressure.

#### PRESSURING OF PIPELINE or PIPING

10. Follow all steps as outlined in CSA-Z662 applicable to the type of test being performed. Above ground piping and below ground piping have different requirements. The Code may be revised from time to time so this document shall follow the Code.
11. Test manifold(s) and temporary test piping that are reused shall have been designed and tested in accordance with Clause 8.9
12. Wrap all flanged connections with masking tape. Make a small hole for leak testing.



## DOBSON OILFIELD SERVICES (1993) INC.

### SAFE JOB PROCEDURE

#### #4 - (B) CONT.

13. Pressure in the pipeline should be increased slowly to approximately 172 kPa (25 psig) and allowed to stabilize for 30 minutes to monitor for leakage.
14. Soap test all welds, flanges, threads and other possible leak sources. Mark all leaks for repair.
15. Depressurize carefully and repair all leaks found. Repeat the leak test (steps 4-6 ) until the system is gas tight at 172 kPa (25 psig).
16. Increase the pressure to 345 kPa. (50 psig.), check for leaks. If the system is still tight, start pressurizing the system at a steady rate until test pressure is reached. All personnel should maintain a safe distance from all parts of the piping under test. No one should approach the pipeline until the pressure is dropped to at least 110% of the intended MOP.
17. Follow CSA Z662 for the strength and leak tests as required.
18. If a leak is detected at any time; the leak is to be marked, the system safely depressurized, the leak repaired and the test begun again (step 6).
19. Care shall be exercised at all times in the use and placement of the monitoring equipment and test header.

#### DE-PRESSURING – as per CSA Z662 (latest edition)

14. **Depressurizing** - The system will be **slowly** and **safely** depressurized.
15. If the flow of pressure from the pipeline has ceased **DO NOT** assume it is de-pressured. Check for remaining pressure at another source such as a gauge point or another remote point away from blow down point. Expanding gas causes a substantial drop in temperature and often results in frozen liquid in valves giving the appearance of a flat or de-pressured pipeline when there is still substantial pressure remaining.

#### TEST INSTRUMENTATION REQUIRED BY DOBSON OILFIELD

Minimum instrumentation for each test section shall be as follows:

- 2-24 hour pressure recorders as required.
- 2 dead weight testers or gauges as required.
- supply of charts for pressure and temperature recorders.
- all chart recorders shall be verified before and after each test.
- other test instruments shall be verified periodically.
- Contractor shall ensure radio communications are available along test sections and instrumentation section for verification of pressure.



## DOBSON OILFIELD SERVICES (1993) INC. SAFE JOB PROCEDURE

### 4-(C) HYDRO TESTING PROCEDURE for B31.3

#### SCOPE

This procedure covers the hydro testing of gas and oil high-pressure piping systems built to ASME B31.3 (latest edition). It incorporates ASME B31.3 Code Section 345 (latest edition) to describe all aspects of the test. We will follow Dobson Oilfield Services Quality Control Manual to document the test. The supervisors shall be familiar with the Code and the Manual. There may be additional Owner requirements to follow as well. All testing conducted using this procedure shall be supervised by the Owner representative.

#### HIGH PRESSURE HYDRO TEST PROCEDURE (SUMMARY ONLY)

16. All personnel working in the immediate area shall be notified of the test 24 hours prior to testing.
17. Test pressure requirements for the job shall be obtained from the Project Engineer. (Dobson QC Manual Exhibit 7.1)
18. Any Owner specific procedures shall be reviewed and incorporated.
19. All personnel involved in the test shall review the requirements of the applicable Code and make sure it is clearly understood.
20. All personnel present shall be informed of all intended activities at a pre-job safety meeting.
21. Warning signs and barricades shall be setup at all entry points to restrict access and to warn of danger.
22. Piping shall be prepared for test. (Dobson QC Manual Exhibit 15.2)
23. All test equipment shall be inspected for wear or damage and to ensure pressure ratings are not exceeded by the test pressure.
24. Perform pressure test
25. Piping shall be prepared for use after a successful test. (Dobson QC Manual Exhibit 15.2)
26. All charts and documents filled out and signed off by Owner Representative and Contractor Supervisor. (Exhibit 15.2 or Pressure Test Affidavit)

#### PRESSURING OF PIPING (SUMMARY ONLY)

20. Follow and document all forms as outlined in Dobson Oilfield Services QC Manual (Section 15) and ASME B31.3 (latest edition). This Manual and Code may be revised from time to time so this document shall follow the Code.
21. Test manifold(s) and temporary test piping that are reused shall have been designed and tested in accordance with CSA Z662 Clause 8.9
22. Pressure in the piping should be increased slowly to approximately 3450 kPa (500 psig) and allowed to stabilize for 30 minutes to monitor for leakage.
23. Inspect all welds, flanges, threads and other possible leak sources. Mark all leaks for repair.
24. Depressurize carefully and repair all leaks found. Repeat the test until the system is tight at 3450 kPa (500 psig).
25. Increase the pressure to 6900 kPa. (1000 psig.) and thereafter in increments of 3450 kPa. (500 psig.) until the test pressure is reached. The pressure shall be increased in steps, providing enough time for the pressurized piping system to equalize strains.



## DOBSON OILFIELD SERVICES (1993) INC.

### SAFE JOB PROCEDURE

#### #4 - (C) CONT.

26. The minimum hold time at each increment shall be 10 minutes. During each hold period, check for leakage by monitoring the ability of the system pressure to remain constant during the hold time.
27. Follow the Code for the required leak test time.

#### DE-PRESSURING

27. **Depressurizing** - The system will be **slowly** and **safely** depressurized.
28. If the flow of pressure from the piping has ceased **DO NOT** assume it is de-pressured. Check for remaining pressure at another source such as a gauge point.

#### TEST INSTRUMENTATION REQUIRED BY DOBSON OILFIELD

- Minimum instrumentation for each test section shall be as follows:
- 2 calibrated gauges as required. (QC Manual 15.3)
  - 2-24 hour pressure recorders as required.
  - 2 dead weight testers as required.
  - supply of charts for pressure and temperature recorders.
  - Contractor shall ensure radio communications are available along test sections and instrumentation section for verification of pressure.



## DOBSON OILFIELD SERVICES (1993) INC.

### SAFE JOB PROCEDURE

#### 4-(D) PNEUMATIC TESTING PROCEDURE for B31.3

##### SUBJECT TO ABSA APPROVAL

##### (Low Pressure)

##### SCOPE

This procedure covers the pneumatic testing of gas and oil high-pressure piping systems constructed to ASME B31.3 (latest edition). It incorporates ASME B31.3 Code Section 345 (latest edition) to describe all aspects of the test. We will follow Dobson Oilfield Services Quality Control Manual to document the test. The supervisors shall be familiar with the Code and the Manual. There may be additional Owner requirements to follow as well. All testing conducted using this procedure, shall be supervised by the Owner representative.

##### LIMITATIONS

This standard procedure shall have been accepted by ABSA before pneumatic testing commences. If the volume of the piping system is greater than 0.5 cubic metres (18 cubic feet) or if the pneumatic test pressure exceeds 2069 kPa. (300 psig.), then a **job specific** pneumatic test procedure shall be submitted to ABSA and their acceptance obtained prior to the test.

##### **Particular care must be taken to minimize the chance of brittle failure during a pneumatic leak test.**

The metal temperature shall be maintained at a minimum of 17 degrees C (30 degrees F) above the minimum design metal temperature for the piping. (See ASME B31.3 paragraph 345.5.1 and figure 323.2.2)

Due to the large energy storage in compressed gas and hence the potential hazard of a sudden release of this energy, pneumatic testing should be avoided if at all possible.

##### HIGH PRESSURE AIR TEST PREPARATION (SUMMARY)

29. Approval for the test shall be obtained from Alberta's Boiler Branch. (If test is greater than 300psig or the volume exceeds 18.5 cu.ft. or .5m<sup>3</sup>)
30. Approval for the test shall be obtained from the Project Engineer.
31. Any Owner specific procedures shall be reviewed and incorporated.
32. All personnel working in the immediate area shall be notified of the test 24 hours prior to testing.
33. Blinds and blanks will be installed to isolate facilities from pressure test.
34. **A pressure relief device shall be provided**, having a set pressure not higher than 110% of the test pressure. The pressure relief device shall be sized to relieve the maximum output of the pressure source to prevent excessive testing pressure.
35. All personnel involved in the test shall review the requirements of the applicable Code and make sure it is clearly understood.
36. All pipe and fittings shall be inspected for suitability and to ensure the test pressure does not exceed the ratings of the pipe and components.
37. All test equipment shall be inspected for wear or damage and to ensure pressure ratings are not exceeded by the test pressure.
38. All piping shall be secured in place.
39. Warning signs and barricades shall be setup at all entry points and crossings to restrict access and to warn of danger.
40. All personnel present shall be informed of all intended activities at a pre-job safety meeting.
41. Unauthorized personnel shall not be allowed near the piping under test from the time the piping is first raised above 50% of the specified minimum yield strength of the pipe, until the pressure is reduced to 110% of the intended maximum operating pressure.



## DOBSON OILFIELD SERVICES (1993) INC.

### SAFE JOB PROCEDURE

#### #4 - (D) CONT.

##### PRESSURING OF PIPING

28. Follow all steps as outlined in Dobson Oilfield Services QC Manual and ASME B31.3 (latest edition) The Code and the Manual may be revised from time to time so this document shall follow the Code.
29. Test manifold(s) and temporary test piping that are reused shall have been designed and tested in accordance with CSA Z662 Clause 8.9 except that they shall have been tested to 1.5 times test pressure.
30. Wrap all flanged connections with masking tape. Make a small hole for leak testing.
31. Pressure in the pipeline should be increased slowly to approximately 172 kPa (25 psig) and allowed to stabilize for 30 minutes to monitor for leakage.
32. Soap test all welds, flanges, threads and other possible leak sources. Mark all leaks for repair.
33. Depressurize carefully and repair all leaks found. Repeat the leak test (steps 4-6 ) until the system is gas tight at 172 kPa (25 psig).
34. Increase the pressure to 345 kPa. (50 psig.) and thereafter in increments of 345 kPa. (50 psig.) until the test pressure is reached. The pressure shall be increased gradually in steps, providing enough time for the pressurized piping system to equalize strains.
35. The minimum hold time at each increment shall be 10 minutes. During each hold period, check for leakage by monitoring the ability of the system pressure to remain constant during the hold time. The pneumatic test report shall be completed, denoting all hold pressures and the time shall be logged at each step.
36. If a leak is detected at any time; the leak is to be marked, the system safely depressurized, the leak repaired and the test begun again (step 6).
37. Care shall be exercised at all times in the use and placement of the monitoring equipment and test header.

##### DE-PRESSURING – as per Dobson Oilfield Services QC Manual (Section 17)

42. **Depressurizing** - The system will be **slowly** and **safely** depressurized.
43. If the flow of pressure from the piping has ceased **DO NOT** assume it is de-pressured. Check for remaining pressure at another source such as a gauge point or another remote point away from blow down point. Expanding gas causes a substantial drop in temperature and often results in frozen liquid in valves giving the appearance of a flat or de-pressured pipeline when there is still substantial pressure remaining.

##### TEST INSTRUMENTATION REQUIRED BY DOBSON OILFIELD

Minimum instrumentation for each test section shall be as follows:

- pressure relief valve set not higher than 110% of test pressure.
- 1-24 hour pressure recorder as required.
- 2-calibrated gauges as required.
- 2 dead weight testers as required.
- supply of charts for pressure and temperature recorders.



## DOBSON OILFIELD SERVICES (1993) INC. SAFE JOB PROCEDURE

### 4-(E) PNEUMATIC TESTING PROCEDURE for B31.3 SUBJECT TO ABSA APPROVAL ON A PER JOB BASIS (High Pressure)

#### SCOPE

This procedure covers the pneumatic testing of gas and oil high-pressure piping systems constructed to ASME B31.3 (latest edition). It incorporates ASME B31.3 Code Section 345 (latest edition) to describe all aspects of the test. We will follow Dobson Oilfield Services Quality Control Manual to document the test. The supervisors shall be familiar with the Code and the Manual. There may be additional Owner requirements to follow as well. All testing conducted using this procedure, shall be supervised by the Owner representative.

#### LIMITATIONS

This job specific test procedure shall have been accepted by the Owner and an ABSA Safety Codes Officer before pneumatic testing commences. The volume of the piping system is either greater than 0.5 cubic metres (18 cubic feet) or the test pressure exceeds 2069 kPa. (300 psig.) or both. Sensitive leak tests must meet requirements of ASME Section V, Article 10.

#### **Particular care must be taken to minimize the chance of brittle failure during a pneumatic leak test.**

The metal temperature shall be maintained at a minimum of 17 degrees C (30 degrees F) above the minimum design metal temperature for the piping. (See ASME B31.3 paragraph 345.5.1 and figure 323.2.2)

Due to the large energy storage in compressed gas and hence the potential hazard of a sudden release of this energy, pneumatic testing should be avoided if at all possible.

#### HIGH PRESSURE AIR TEST PREPARATION (SUMMARY)

44. Approval for the test shall be obtained from an ABSA Safety Codes Officer. (If test is greater than 300psig or the volume exceeds 18.5 cu.ft. or .5m<sup>3</sup>)
45. Approval for the test shall be obtained from the Project Engineer.
46. Any Owner specific procedures shall be reviewed and incorporated.
47. All personnel working in the immediate area shall be notified of the test 24 hours prior to testing.
48. Blinds and blanks will be installed to isolate facilities from pressure test.
49. **A pressure relief device shall be provided**, having a set pressure not higher than 110% of the test pressure. The pressure relief device shall be sized to relieve the maximum output of the pressure source to prevent excessive testing pressure.
50. All personnel involved in the test shall review the requirements of the applicable Code and make sure it is clearly understood.
51. All pipe and fittings shall be inspected for suitability and to ensure the test pressure does not exceed the ratings of the pipe and components. (Fittings and pipe must be registered in Canada and bear a CRN number)
52. All test equipment shall be inspected for wear or damage and to ensure pressure ratings are not exceeded by the test pressure.
53. All piping shall be secured in place.
54. Warning signs and barricades shall be setup at all entry points and crossings to restrict access and to warn of danger.
55. All personnel present shall be informed of all intended activities at a pre-job safety meeting.
56. Unauthorized personnel shall not be allowed near the piping under test from the time the piping is first raised above 50% of the specified minimum yield strength of the pipe, until the pressure is reduced to 110% of the intended maximum operating pressure.



## DOBSON OILFIELD SERVICES (1993) INC.

### SAFE JOB PROCEDURE

#### #4 - (E) CONT.

#### PRESSURING OF PIPING

38. Follow all steps as outlined in Dobson Oilfield Services QC Manual and ASME B31.3 (latest edition) The Code and the Manual may be revised from time to time so this document shall follow the Code.
39. Test manifold(s) and temporary test piping that are reused shall have been designed and tested in accordance with CSA Z662 Clause 8.9 except that they shall have been tested to 1.5 times test pressure.
40. Wrap all flanged connections with masking tape. Make a small hole for leak testing. (Low pressure only)
41. Pressure in the pipeline should be increased slowly to approximately 172 kPa (25 psig) and allowed to stabilize for 30 minutes to monitor for leakage.
42. Soap test all welds, flanges, threads and other possible leak sources. Mark all leaks for repair.
43. Depressurize carefully and repair all leaks found. Repeat the leak test (steps 4-6 ) until the system is gas tight at 172 kPa (25 psig).
44. Increase the pressure to 345 kPa. (50 psig.) and thereafter in increments of 345 kPa. (50 psig.) until the test pressure is reached. The pressure shall be increased gradually in steps, providing enough time for the pressurized piping system to equalize strains.
45. The minimum hold time at each increment shall be 10 minutes. During each hold period, check for leakage by monitoring the ability of the system pressure to remain constant during the hold time. The pneumatic test report shall be completed, denoting all hold pressures and the time shall be logged at each step.
46. If a leak is detected at any time; the leak is to be marked, the system safely depressurized, the leak repaired and the test begun again (step 6).
47. Care shall be exercised at all times in the use and placement of the monitoring equipment and test header.

#### DE-PRESSURING – as per Dobson Oilfield Services QC Manual (Section 17)

57. **Depressurizing** - The system will be **slowly** and **safely** depressurized.
58. If the flow of pressure from the piping has ceased **DO NOT** assume it is de-pressured. Check for remaining pressure at another source such as a gauge point or another remote point away from blow down point. Expanding gas causes a substantial drop in temperature and often results in frozen liquid in valves giving the appearance of a flat or de-pressured pipeline when there is still substantial pressure remaining.

#### TEST INSTRUMENTATION REQUIRED BY DOBSON OILFIELD

Minimum instrumentation for each test section shall be as follows:

- pressure relief valve set not higher than 110% of test pressure.
- 1-24 hour pressure recorder as required.
- 2-calibrated gauges as required.
- 2 dead weight testers as required.
- supply of charts for pressure and temperature recorders.