

# Appendices

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## Appendix A: Technical and Engineering Pipeline Assessment Requirement Clauses per CSA Z662

Technical and engineering pipeline details are required for all known design specifications for the pipeline, and the start and end points of the pipeline. The start and end points are not just from lease to lease, but the exact start and end point of the pipeline. Requirements listed here reference Clauses, Tables and Figures in CSA Z662 available at the [Canadian Standards Association](http://www.csa.ca) website.

- Engineering assessment required by CSA Z662.
- Table 4.2: to support the use of a higher value being used for location factor on a gas pipeline.
- Clause 4.3.12.2 for pressure test design of components not listed in Z662-11.
- Clause 4.4.3 to determine spacing for isolating valves, unless spaced according to Table 4.7.
- Clause 5.1.3 for use of materials other than as specified in the standards.
- Clause 5.2.4/5.2.5.1 for use of materials other than Table 5.3.
- Clause 5.6.1 for reuse of materials in a different system than they were removed from.
- Clause 9.1.3 for exclusion of certain corrosion control practices.
- Clause 10.3.1.1 to confirm which sections are suitable for use where conditions which can lead to failure are discovered.
- Clause 10.3.1.2 to determine which portions may be susceptible to failure prior to operating at a higher pressure than the established operating pressure. This may include changes which are below MOP.
- Clause 10.3.7.1 prior to a change in service fluid. This is any change in service fluid.
- Clause 10.3.8 prior to upgrading to a higher MOP.
- Clause 10.3.9.1 prior to pressure testing existing piping to make sure the line will not be adversely affected and that the line can sustain the proposed pressure.
- Clause 10.7.1 where a change in class location occurs to allow for meeting anything other than the higher class location requirements.
- Clause 10.8.1 where an existing pipeline is crossed by a road or railway where not updating the design to accommodate.
- Clause 10.8.3 to confirm that a pipeline can sustain the anticipated surface load for any crossings other than road or rail.
- Clause 10.9.2.4 to return an above ground tank to service following a repair without a hydrostatic test.

- Clause 10.10.1.4 to determine suitable operating pressure where defects may make the pipeline unsuitable for normal operating pressure.
- Clause 10.10.2.1 to use a different maximum length and depth of corrosion limit than specified in Figure 10.1.
- Clause 10.10.2.7 to determine that a corroded area is acceptable which does not meet the criteria of other clauses in 10.10.2.
- Clause 10.10.4.2 to determine dents other than those listed are acceptable.
- Clause 10.10.5 to determine surface cracks to be acceptable.
- Clause 10.10.7 to determine weld defects to be acceptable.
- Clause 10.11.4.3 to support design and installation of repair sleeves.
- Clause 10.12.1.1 to support a temporary repair method (welding or non-welding).
- Clause 10.15.2.1 prior to reactivating a pipe.
- Clause 12.4.1.4 to support designs in gas distribution systems which use a weak link in the event of excessive pullout force.
- Clause 12.4.2.4 to determine the chemical factor for liquid hydrocarbons between 0.5 and 1 for polyethylene piping design pressure calculations.
- Clause 13.1.2.16 to demonstrate adequate corrosion resistance of some types of risers or couplings on composite lines for the life of the pipeline where cathodic protection will not be provided.
- Clause 13.2.2.12 to thermoplastically line previously in service pipes (unless a leak test is run).
- Clause 13.2.8.3 to support continued use of the pipeline following a liner breach on thermoplastically lined pipe.
- Clause 13.3.3.6 to demonstrate adequate corrosion resistance of some types of risers or couplings on Polyethylene lines for the life of the pipeline where cathodic protection will not be provided.
- Clause 16.8.7 for any sour lines where there is a possibility of a change in service fluid composition or operating conditions to determining whether the pipeline is suitable for the new conditions.
- Clause 16.10.3.2 for any gas pipelines being returned to service after an extended period of non-use prior to admission of sour fluids.
- Clause 17.4.7 for above ground installations on composite reinforced steel pipelines to ensure suitability.
- Clause 17.10.3 to determine that a corroded area is acceptable which does not meet the criteria of 10.10.2.

- Clause N.13.1 where inspection, testing, patrol or monitoring indicates conditions or imperfections which might lead to failure or damage incidents with significant consequences. To be performed to N.13.2.2.

## Appendix B: Detailed Engineering Application Requirements for Gas Plants

The following checklists highlight details of submissions required to assist in the review of gas plant applications submitted to the Commission. As part of an application for a gas plant, applicants must submit two paper copies of the following materials to the Commission's Kelowna office, in addition to completing an application in the Application Management System.

### Summaries and Descriptions

- Dehydrator Engineering & Operations Sheet (DEOS).
- Description of the plant (i.e. DBM) and the proposed processes, including total processing capacity and design flow rates (inlet, recovered products, fuel gas, emissions).
- A plant material balance at design conditions.
- A gas processing plant proliferation review that includes the rationale for constructing the newly proposed plant after consideration of existing active plants and pipeline infrastructure feeding into active plants within a 50 km radius.
- If acid gas is to be discharged to a subsurface formation, a brief description of that proposal must be supplied along with a copy of the reservoir approval issued by the Commission.
- Summary of site surface run-off water management.
- Summary of inlet separator/slug catcher capacity considerations including maximum slug volume and level controls and shutdowns.
- Summary of prime mover starter systems and associated pump drives, and if natural gas is utilized, confirm that the vented gas is connected to the flare system or is conserved.
- Summary of why pressure relief devices (i.e.: PSV's) are not connected to the plant flare system, if applicable.
- Description of the provisions for facility security and fire prevention and protection.
- List of hazardous materials that will be stored and a description of the storage method.
- Total kilowatt rating of all compressor prime movers powered with natural gas.
- Total amount of H<sub>2</sub>S and CO<sub>2</sub> emissions from all sources at the facility in tonnes per day.
- Description of how the plant has been designed to process gas from in-line testing of wells with potential liquid slugs and CO<sub>2</sub> spikes.

- Summary of plant supervision model including operator response time if not manned 24 hours per day.
- Noise Impact Assessment (NIA). Refer to the BC Noise Control Best Practices Guideline. Attach NIA Report to application.
- Summary of how light pollution has been identified, considered and mitigated.
- Plant blowdown philosophy and how consideration has been made to ensure that high pressure gas is not trapped in the facility during an emergency.
- Summary of the facility shutdown philosophy.

If the proposal includes a sulphur processing facility, include a written submission that:

- Describes the proposed control measures to limit the release of sulphur dust and entrained gases.
- Describes the proposed method to degasify produced liquid sulphur and to dispose of sulphur compounds and other vapours associated with such processes.
- Describes how sulphur volumes will be measured and reported.

#### Drawings, Diagrams and Maps

- Plot plan drawing.
- Complete plant piping and instrumentation drawings (P&ID's).
- Process flow diagram (PFD) of the plant and set of plant PFDs.
- Map(s) showing:
  1. Facility being applied for.
  2. All other existing plants and sulphur handling facilities at the site or in the area (within 50 km).
  3. All occupied dwellings and surface improvements in the area (within 10 km).
  4. All lakes, streams, and other surface bodies of water in the area (within 10 km).
  5. All settlements in the area (within 20 km).
  6. General land use (forested, farming, other) in the area (within 10 km).
- Metering block diagram (i.e.: metering schematic) detailing:
  1. All meters in the plant (production accounting and non-production accounting).
  2. Meter types (i.e. orifice, turbine, ultrasonic, coriolis).
  3. All production accounting meters in the plan on a list or table on the metering schematic. This will typically be a subset of all of the plant meters. This list should be cross referenced to the meters shown on the metering schematic by meter number and/or meter description. Also, types of

measuring devices used to determine levels and/or volumes in tanks or production vessels for production accounting purposes should be included, (e.g. level gauge, level transmitter, pressure transmitter inlet piping header to plant inlet separators).

4. All stream (plant and inlet header) block valves and normal operational state (normally open or normally closed), that can cause a change in fluid flow that will impact the production accounting model.
  5. Fuel gas lines (plant and/or field).
  6. Pilot gas and dilution gas streams to plant flare stacks. Include tie in points in the plant.
  7. All plant piping that can impact the production accounting model.
  8. Fluid injection streams. E.g. water, acid gas.
  9. All delivery streams.
  10. Flare stacks and incinerator stacks.
- Gathering block diagram (i.e.: gathering system schematic) detailing:
    1. Type of primary well production (oil or gas).
    2. Wellsite locations, indicated by the legal surface location.
    3. Wellsite configuration (three phase separation, two phase separation, wet meter). This may be typical if all wellsites are the same.
    4. All field meters and types. E.g. orifice meter, turbine, etc.
    5. Types of measuring devices used to determine levels and/or volumes in tanks or production vessels for production accounting purposes.
    6. All field fuel gas streams and meters. If no meter is installed, indicate how volume is determined for reporting purposes for a given stream.
    7. Field flare streams. If no meter is installed, indicate how volume is determined for reporting purposes for a given stream.
    8. All field process equipment. E.g. compressors, separators, tanks, etc.
    9. Gathering system offload streams that permit volumes to deliver to processing that is different from the plant applied for.
    10. Gathering system onload streams that permit volumes to be received from other reporting facilities, gas plants or gathering systems.
    11. Return fuel gas streams from a plant, facility or other processing equipment.
    12. Gathering system block valves and piping that may impact the production accounting model.

13. All piping streams block valves and normal operational state (Normally Open or Normally Closed) that can cause a change in fluid flow that will impact the production accounting model.
14. A composite analysis of the inlet gas under normal operating conditions and the maximum H<sub>2</sub>S content of the raw inlet gas in moles per kilomole.

#### Plans

- Fracture sand management plan. Include the strategies incorporated to capture and monitor for fracture sand returns and associated erosion from the well to the plant sales.
- Fugitive Emissions Management Plan for the proposed plant.
- Air monitoring plan. This may include passive or real time plant/perimeter detection for H<sub>2</sub>S and/or SO<sub>2</sub>, wind speed and direction monitoring.
- Storage tank secondary containment plans (production and non-production storage). Include location of truck loading lines.
- Emergency Response Plan or summary of progress to date, with a timeline for ERP submission.

Flare/incinerator/vent stack data submission. This submission must include:

- Stack height and diameter.
- Predicted normal and maximum emissions of SO<sub>2</sub> /hr.
- Rate and calculated volume of potential H<sub>2</sub>S releases.
- Results of gas/vapour dispersion modeling for lit and unlit conditions.
- Maximum expected rates for continuous flaring, and volumes/compositions of flared streams.
- Maximum stream velocity in metres per second at the flare metering point.
- Description of the flare metering configuration proposed to measure both.
- Purge gas within the meter range and accuracy lower limit.
- Blowdown situation, within the upper limit of the manufacturers specifications and required published Commission uncertainties.
- Description of how plant processing will conserve gas volumes by avoiding tie-in to the flare and/or incinerator stack (vapor recovery considerations).
- Description of how plant ESD procedures will limit emissions.
- Description of the flame-out detection system configuration for the flare stack/incinerator equipment, and if it is set up to alarm and/or shutdown process.



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- Appropriate isopleths for the various levels of H<sub>2</sub>S and SO<sub>2</sub>.
  - Description of the design to prevent flashback of flame back into process (e.g.: positive pressure system, flame arrestor).
  - Description of how the facility complies to API Standard 521, if applicable

## Appendix C: Facility Changes Requiring an Amendment

The following lists equipment and examples of facility changes requiring the submission of a facility permit amendment for the addition of temporary or permanent equipment on Crown or private land.

- Amine sweetening package - process gas
- Amine sweetening package - fuel gas
- Bullet - condensate storage
- Bullet - LPG storage
- Capacity - gas/liquids throughput permit increase
- Compressor
- Condensate stabilization unit
- Cooler/heat exchanger
- Debutanizer unit
- Deethanizer unit
- Depropanizer unit
- Dehydrator - glycol (process & fuel gas)
- Dehydrator - molecular sieve
- Flare stack
- Generator - (gas/diesel)
- Permitted H<sub>2</sub>S increase
- Incinerator
- Meter equipment related to production accounting
- Pump (used to transport hydrocarbon liquid (oil, LPV or HPV) in a pipeline, pump fresh water, or LACT using pumps)
- Pump jack (gas and electric)
- Process refrigeration unit
- Facility storage (pit or tank)
- Treater – Oil

## Appendix D: Facility Changes Where No Amendment or NOI is Needed

The following list includes examples of facility changes that do not require a Notice of Intent or amendment. These changes can be made under the authority of the existing facility permit (if not requiring new land).

- Analyzer
- Blow Case (without compressor)
- Coalescer
- Dehydrator - instrument air
- Field header
- Filter
- Generator - solar/fuel cell
- Generator - thermo electric
- Heater
- Instrument air compressor unit
- Line heater
- Meter - non accounting
- Odourization pot
- Other/miscellaneous - minor
- Piping changes at the facility not impacting measurement or air emissions
- Plunger lift
- Pump (except those referenced in Appendix C)

## Appendix E: Aggregate Operation Application Process

