

1.0 **GENERAL**

1.1 **System Description**

- .1 The University of British Columbia owns and operates its own natural gas distribution system. All parts of the system are non-interruptible (firm gas) service, except the supply to the steam plant.
- .2 There are three pressure zones within North Campus part of the system (north of 16th Avenue) as follows:
 - .1 1.8 kPa (7" water) low pressure.
 - .2 34 kPa (5 psig) medium pressure.
 - .3 83 kPa (15 psig) high pressure.
 - .4 414 kPa (60 psig) high pressure.
 - .5 The UBC Okanagan campus operates low and medium pressure zones.
- .3 The south campus (south of 16th Avenue) operates at 83 kPa (12 psig).
- .4 Steel gas piping system throughout UBC Campus has a complete cathodic protection system.

2.0 **MATERIALS AND DESIGN REQUIREMENTS**

2.1 **Responsibilities**

- .1 UBC Energy & Water Services (EWS) is primarily responsible for operation, maintenance, and overall stewardship of the natural gas distribution system. The demarcation of UBC Energy & Water Services point of service is as shown on Gas Meter standard drawing found under Division 33 section listings here:
http://www.technicalguidelines.ubc.ca/technical/divisional_specs.html.
- .2 Where there is no gas meter for a given building, UBC Energy & Water Services demarcation point is the last valve outside the building wall.
- .3 UBC Energy & Water Services is not responsible for any part of the gas piping or equipment inside buildings.
- .4 For all natural gas pipeline and service projects, the Project Designer must incorporate all specific requirements for metering, design and materials and execution of this section into the contract drawings in the form of job-specific notes. Only making reference to UBC Technical Guidelines in the drawings is not sufficient.

2.2 **Natural Gas Distribution Standards**

- .1 The latest revisions of the following standards shall apply to natural gas distribution at UBC:
 - .1 UBC Sustainability Development Policy #5
(<http://universitycounsel.ubc.ca/policies/index/>).
 - .2 B.C. Gas Safety Act.
 - .3 Canadian National Gas Code.
 - .4 National Association of Corrosion Engineers (NACE)
 - .5 CGA Standard (as applicable).
 - .6 CSA Standard (as applicable).

2.3 Natural Gas Service Connections

- .1 The first step to install any new or substantially modified connections to the natural gas distribution system at UBC is to complete a Utility Service Connection Application. This and other forms can be found at <https://energy.ubc.ca/community-services/contractors-developers/>.
- .2 Any new connections to the gas distribution system will be reviewed for consistency with UBC Energy & Water Services standards.
- .3 Project design drawings shall provide building load (list of appliances with nameplate capacities in m³/hour) and required pressure.
- .4 The Designer shall obtain the gas service records by contacting the Records Clerk at Infrastructure Development, Records, and develop proposed service connection location(s). Service connections may be possible to more than one gas main fronting the site.

2.4 Metering

- .1 Natural gas meters are required for all buildings. All meters shall be temperature compensated. Gas meter design requirements are as shown in Standard Documents - GasMeterStd.dwg, the location of which is referenced in section 2.1.1 above. Revenue gas meters shall have reading in m³, shall be provided with PFM regulator, ISO 9001 (smaller meters) or with electronically compensated pressure and temperature (larger meters).
- .2 The mean atmospheric pressure for PFM (Pressure Factor Measurement) is 100.71 kPa for all revenue natural gas meters on UBC Campus.
- .3 As indicated on the drawing standard, the meter assembly is to be procured and supplied by UBC Energy & Water Services at the project's expense. The project will provide a purchase order for Energy & Water Services to purchase the meter hardware. There will be no additional markup or procurement fees.
- .4 The project is responsible for providing any required protection, such as installing a lockable enclosure and/or bollards as per UBC Energy & Water Services approval.

2.5 Seismic Protection

- .1 The decision whether to install seismic shutoff valves is the responsibility of the project consultants. Buildings which meet the following criteria may not benefit significantly by installing a seismic shutoff valve:
 - .1 Building is structurally designed for current seismic codes.
 - .2 Restraints installed on all gas equipment (e.g. water heaters, air heating units) and piping.
 - .3 Flexible connections installed on all gas equipment.
- .2 Buildings which use natural gas for emergency power or other emergency needs are recommended not to install seismic valves.
- .3 When installed, the following valves are required: California Seismic™ (formerly Koso™) valves for horizontal orientation: Safe-T-Quake valves for vertical orientation. Seismic gas valve shall be supported with two (2) brackets secured to a building wall or equivalent.
- .4 Regardless, UBC Energy & Water Services requires that seismic restraints be used on all gas equipment (i.e. water heaters) and main gas piping in the building.

- .5 UBC Energy & Water Services requires that flexible gas connections be used on all gas equipment in the building.

2.6 Design and Materials

- .1 Design piping pressure: 415 kPa (60 psig).
- .2 Connections shall be to the highest available pressure.
- .3 New underground piping shall be SDR11 Series 125 Polyethylene, manufactured to CAN 3-B137.4M86. New underground valves shall be PSV polyethylene shut off valves with butt fusion outlet ends, to accommodate SDR 11 pipe, conforming to ASTM D-2513. Pipe fittings shall be butt heat fusion polyethylene manufactured to ASTM D-3261-85.
- .4 New aboveground piping up to shall be minimum Schedule 40, ASTM A53 steel piping. Up to, but not including the gas meter assembly, all piping shall be painted yellow. All piping up to 2" size shall be socket welded, manufactured to ASTM A182. New piping over 2" may be butt welded. All aboveground valves shall be bronze plug-type shutoff valves with threaded outlet ends to accommodate A53 steel pipe, and conforming to ASTM B62.

2.7 Permits

- .1 Permits by B.C. Gas Safety Branch and inspections/witness by B.C. Gas Safety Inspector of pressure testing and purging are the sole responsibility of the project.

2.8 Notification

- .1 The Mechanical Utilities Engineer (Telephone: 604-822-3274) and Utilities Head Plumber (Telephone: 604-822-5986) shall be notified in writing 24 hours in advance of any planned pressure testing of a new gas service pipe. Failure to provide notice may result in installed services to be re-excavated for inspection.

3.0 EXECUTION REQUIREMENTS

- .1 Minimum soil cover shall be 600 mm.
- .2 Warning tape at 300 mm below grade level shall be provided.
- .3 Minimum 1.0 m wall to wall horizontal clearance is required from all other services. Clearance from building footings shall be approved by EWS and be a minimum of 3 m per MMCD General Design guideline clause 1.3.
- .4 When crossing electric ductbank, run pipe above electrical ductbank with minimum vertical clearance 150 mm from the top of electric ductbank. Crossing angle shall be 90° degree. If crossing of electric ductbank cannot be done in this manner, then encase natural gas pipe in one larger plastic pipe projecting minimum 500 mm from either side of the electric ductbank.
- .5 Contractor shall provide and install a top tracer wire attached to underground polyethylene pipe.
- .6 Continuity of the existing cathodic protection system shall be maintained when any additions or replacements are undertaken.

- .7 Hot tapping may be done only with written permission from the Mechanical Utilities Engineer, UBC Energy & Water Services. Phone: 604-822-3274.
- .8 Purge pipe with nitrogen after new service pipe is installed.
- .9 For pipe bedding use clean granular pipe bedding, graded gravel, 10 mm (minus), MMCD type:
 - .1 Bottom bedding shall be a quarter of pipe diameter or 100 mm thick, whichever is larger. Top bedding shall be minimum 300 mm thick. Side bedding shall be a minimum 225 mm to maximum 300 mm thick
 - .2 Trench backfill is to be as per MMCD specifications or as approved by UBC EWS.
- .10 No trees shall be planted within 1,200 mm of underground gas piping.
- .11 Shutdowns must be requested in writing adhering to UBC's campus- wide standard procedures. Refer to <http://www.buildingoperations.ubc.ca/resources/policies-procedures-forms/>.
- .12 Connections to existing gas distribution system may be made by a qualified and EWS approved Contractor with a UBC EWS approved design.
- .13 See also Energy & Water Services' Natural Gas Service Installation work procedure, at <https://energy.ubc.ca/community-services/contractors-developers/>.
- .14 Gas distribution valves and meter stations on the UBC Energy & Water Services system may only be operated by UBC Energy & Water Services.
- .15 Records of pipe sizes and inverts shall be provided to Infrastructure Development, Records; and to UBC Energy & Water Services; in accordance with Sections 01 78 39 Project Record Documents and 33 00 10 Underground Utilities Services of these guidelines.

*****END OF SECTION*****