



NOTES:

1.0 GENERAL DESCRIPTION OF EXISTING SYSTEM

1.1 LIQUID CHLORINE FLOWS FROM THE RAIL CARS THROUGH ONE OF TWO PIPES TO THE CHLORINE ROOM. THE CHLORINE IS THEN HEATED TO TRANSFORM IT FROM ITS LIQUID STATE TO A GAS STATE AND IS THEN DIFFUSED INTO THE CITY OF WINNIPEG'S WATER SUPPLY FOR DISINFECTING.

THE EXISTING LIQUID CHLORINE LINES CONSIST OF TWO 38 MILLIMETER DIAMETER SCH. 80 CARBON STEEL PIPES WITH ISOLATION VALVES LOCATED AT THE RAIL CAR OFF LOADING BRIDGE AND WITHIN THE CHLORINE FEED ROOM. AT ANY GIVEN TIME, ONLY ONE PIPE IS IN OPERATION, WITH THE SECOND PIPE ACTING AS A BACK-UP.

2.0 SCOPE OF WORK

- 2.1 SUPPLY AND INSTALL TWO (2) - 38 MILLIMETER DIAMETER SCH.80 CARBON STEEL PIPES AS SHOWN ON THE DRAWING. THE PIPE STANDARD SHALL CONFORM TO ASTM A106 GRADE B CARBON STEEL, AND IN ACCORDANCE WITH ASME B36.10 SEAMLESS WROUGHT STEEL PIPE.
- 2.2 ALL CONNECTIONS SHALL BE SOCKET WELDED. THREADED CONNECTIONS WILL NOT BE ALLOWED.
- 2.3 FITTINGS SHALL BE ASTM CLASS 3000 FORGED STEEL, AND IN ACCORDANCE WITH ASME B16.11 SOCKET WELDED STEEL PIPE.
- 2.4 ENCASE EACH CHLORINE PIPE IN 75mm DIAMETER SCH.40 PVC WHERE EVER THE PIPE IS BURIED.
- 2.5 TRENCHING AND BACKFILL PROCEDURES AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CITY OF WINNIPEG'S STANDARD CONSTRUCTION SPECIFICATIONS.
- 2.6 TEST AND COMMISSION THE NEW LIQUID CHLORINE SUPPLY PIPES AND DECOMMISSION THE EXISTING LIQUID CHLORINE PIPES. THE EXISTING 100# CHLORINE SOLUTION LINE SHALL REMAIN IN SERVICE AND SHALL BE PROTECTED AS REQUIRED FROM POSSIBLE DAMAGE.
- 2.7 THE CONTRACTOR IS RESPONSIBLE FOR SUPPLYING ALL TESTING EQUIPMENT AND MATERIALS.

3.0 INSTALLATION AND COMMISSIONING

- 3.1 ALL CONNECTIONS MADE TO THE EXISTING LIQUID CHLORINE PIPES AND COMMISSIONING OF THE NEW CHLORINE PIPES SHALL BE COORDINATED WITH THE CITY OF WINNIPEG.
- 3.2 THE EXISTING SYSTEM SHALL REMAIN IN OPERATION DURING THE INSTALLATION OF THE NEW LIQUID CHLORINE PIPES. THE CONTRACTOR SHALL CONNECT ONLY ONE NEW LIQUID CHLORINE PIPE AT A TIME. THE FIRST NEW CHLORINE PIPE CONNECTION SHALL BE TO THE EXISTING BACK-UP PIPE. THE NEWLY INSTALLED CHLORINE PIPE SHALL BE COMMISSIONED PRIOR TO TAKING THE SECOND EXISTING (DUTY) LIQUID CHLORINE PIPE OUT OF SERVICE FOR INSTALLATION OF THE SECOND NEW CHLORINE PIPE. DECOMMISSIONING OF THE EXISTING CHLORINE PIPES SHALL FOLLOW THE PROCEDURES DEFINED IN 3.3, 3.4, AND 3.5.
- 3.3 PRIOR TO CUTTING AND CONNECTING TO THE EXISTING CHLORINE PIPES, EACH EXISTING CHLORINE PIPE SHALL BE PURGED USING CLEAN, DRY, OIL-FREE COMPRESSED AIR OR NITROGEN.
- 3.4 CHLORINE PIPE LINE PURGING SHALL INVOLVE PURGING ALL REMAINING CHLORINE THROUGH THE EXISTING CHLORINE EVAPORATOR AND CHLORINATOR. AT NO TIME SHALL CHLORINE (GAS OR LIQUID) BE ALLOWED TO BE EXHAUSTED TO THE ATMOSPHERE.
- 3.5 CONNECTIONS TO THE EXISTING CHLORINE PIPES SHALL INVOLVE CUTTING AND CAPPING THE EXISTING CHLORINE PIPE. CAPPED PIPES SHALL BE LEFT FOR FUTURE REMOVAL UNDER A SEPARATE CONTRACT. CONNECTIONS ARE TO BE MADE AT THE RAIL CAR OFF LOADING AND AT THE ENTRANCE INTO THE CHLORINE ROOM.
- 3.6 INSTALLATION AND COMMISSIONING PROCEDURES FOR THE NEW LIQUID CHLORINE PIPING SYSTEMS SHALL BE IN ACCORDANCE WITH THE CHLORINE INSTITUTE PAMPHLET 6, "PIPING SYSTEM FOR DRY CHLORINE" AND PAMPHLET 60, "CHLORINE PIPELINES". IN GENERAL, CLEANING, PRESSURE TESTING, DRYING AND LEAK TESTING SHALL BE AS FOLLOWS:

3.6.1 CLEANING

EACH NEW CHLORINE PIPE SYSTEM SHALL BE CLEANED USING AN AQUEOUS SOLUTION OF DETERGENTS, SURFACTANTS, COALESCING AGENTS OR INORGANIC SOLUTIONS. CLEANING SHALL REMOVE ALL CUTTING OILS, GREASE AND OTHER FOREIGN MATERIALS. THE CLEANING PROCEDURE SHALL ALSO REMOVE ALL RESIDUES THAT MAY BE LEFT BY THE CLEANING SOLUTION.

3.6.2 PRESSURE TESTING

EACH NEW CHLORINE PIPE SYSTEM SHALL BE TESTED AT A HYDROSTATIC PRESSURE OF 300 PSIG AND BE ABLE TO WITHSTAND THIS TEST FOR 30 MINUTES WITHOUT LEAKAGE OR FAILURE OF ANY KIND. INSPECTION FOR LEAKS DURING TESTING SHALL BE CONDUCTED BY THE CONTRACTOR AND WITNESSED BY THE ENGINEER. ANY LEAKS FOUND IN THE PIPING SYSTEM SHALL BE REPAIRED AND THE PIPING SYSTEM SHALL BE RE-TESTED UNTIL NO LEAKS ARE DETECTED.

3.6.3 DRYING

EACH NEW CHLORINE PIPE SHALL BE DRIED BEFORE BEING PLACED INTO SERVICE. PURGE GAS USED FOR DRYING SHALL BE EITHER NITROGEN OR DRY AIR. THE PIPING SYSTEM SHALL BE DRIED UNTIL THE ENTIRE VENT GAS STREAMS LEAVING HAVE A -40 DEGREES CELSIUS DEW POINT, MEASURED AT NORMAL SYSTEM OPERATING PRESSURE.

3.6.4 LEAK TEST

EACH NEW CHLORINE PIPE SHALL BE LEAK TESTED ONCE DRYING IS COMPLETED. THE FOLLOWING STEPS SHALL BE CONDUCTED FOR THE LEAK TEST:

- 3.6.4.1 PRESSURIZE EACH SYSTEM TO 150 PSIG WITH DRY AIR OR NITROGEN. USE A SOAP SOLUTION TO TEST FOR LEAKS AT JOINTS.
- 3.6.4.2 INTRODUCE CHLORINE GAS (NOT LIQUID) FROM A 150LB CHLORINE GAS CYLINDER INTO THE SYSTEM AND RAISE THE PRESSURE TO APPROXIMATELY 5 PSIG.
- 3.6.4.3 TEST THE SYSTEM FOR LEAKS USING AQUA AMMONIA. CARE MUST BE TAKEN TO ENSURE CHLORINE HAS DIFFUSED THROUGHOUT THE PIPING SYSTEM BEFORE LEAK CHECKING WITH AMMONIA. TESTING USING AQUA AMMONIA SHALL INVOLVE DIRECTING THE VAPOUR FROM THE BOTTLE CONTAINING THE AQUA AMMONIA AT THE SUSPECTED LEAK TO SEE IF A DENSE WHITE CLOUD IS FORMED, THEREFORE CONFIRMING A LEAK. DO NOT SQUIRT LIQUID AQUA AMMONIA ON THE PIPE OR FITTINGS. THE CITY OF WINNIPEG WILL SUPPLY THE AQUA AMMONIA BOTTLE FOR LEAK TESTING.
- IF ANY LEAK IS DETECTED, THE PIPING SHALL BE PURGED OF ALL CHLORINE GAS PRIOR TO BEING REPAIRED. ONCE REPAIRED, THE PIPING SYSTEM SHALL BE RETESTED BY REPEATING STEP 3.6.4.3.
- 3.6.4.4 SLOWLY INCREASE THE CHLORINE GAS PRESSURE AND CONTINUE TO CHECK FOR LEAKS AT SEVERAL INTERMEDIATE PRESSURES UNTIL THE OPERATING PRESSURE OF 80 PSIG IS OBTAINED. IF LEAKS ARE DETECTED, REPAIRS SHOULD BE MADE AND STEP 3.6.4.4 CONTINUED UNTIL THE OPERATING PRESSURE IS ACHIEVED.

3.6.5 IF THE NEW CHLORINE PIPE SYSTEM WAS NOT DISASSEMBLED AND REASSEMBLED DURING THE PRESSURE TESTING AND DRYING PROCESS, STEP 3.6.4.1 MAY BE OMITTED.

3.7 PRESSURE AND LEAK TESTING OF THE LIQUID CHLORINE LINES SHALL BE CONDUCTED AND PASS INSPECTION PRIOR TO ENCASEMENT OF THE LIQUID CHLORINE PIPES IN THE PVC PIPES. AS THIS TEST CONFIRMS THE SUITABILITY OF CONNECTIONS AT FITTINGS, ENCASEMENT OF THE PIPING WITH PVC PRIOR TO THE LEAK TEST WILL BE PERMITTED AS LONG AS ALL CONNECTIONS ARE LEFT TEMPORARILY EXPOSED FOR INSPECTION DURING THE LEAK TEST.

4.0 SAFETY

- 4.1 THE CONTRACTOR SHALL FULLY FAMILIARIZE HIMSELF WITH THE HAZARDS ASSOCIATED WITH HANDLING CHLORINE.
- 4.2 WHEN WORKING WITH OR WITHIN A CONFINED AREA WHERE CHLORINE IS STORED OR HANDLED, THE CONTRACTOR SHALL CARRY OR HAVE IMMEDIATELY AVAILABLE AN ESCAPE TYPE RESPIRATOR.
- 4.3 CONNECTIONS MADE TO THE EXISTING LIQUID CHLORINE LINES SHALL BE CONSIDERED AS AN "INITIAL LINE BREAK", WHICH IS DEFINED BY THE CHLORINE INSTITUTE AS THE FIRST-TIME OPENING OF A LINE THAT CONTAINS OR PREVIOUSLY CONTAINED CHLORINE. UNDER THIS DEFINITION, A SELF CONTAINED BREATHING APPARATUS (SCBA) OR A FULL FACE LINE RESPIRATOR AND GLOVES SHALL BE SUPPLIED AND WORN BY THE CONTRACTOR.
- 4.4 IN THE EVENT OF AN ACCIDENTAL RELEASE OF CHLORINE OR INJURY, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CITY OF WINNIPEG MOPHILLIPS CONTROL CENTRE AT 986-4781 AND THE CONSTRUCTION MANAGER.
- 4.5 EMERGENCY RESPONSE PROCEDURES SHALL FOLLOW THE CHLORINE INSTITUTE PAMPHLET 64 AND BE COORDINATED WITH THE CITY OF WINNIPEG. EMERGENCY RESPONSE EQUIPMENT SUCH AS SCBA SHALL BE AVAILABLE AT ALL TIMES FOR EACH INDIVIDUAL WORKING WITH THE CHLORINE EQUIPMENT.

APECM
 Certificate of Authorization
 Earth Tech Canada Inc.
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THE CITY OF WINNIPEG
 WATER AND WASTE DEPARTMENT
 ENGINEERING DIVISION

WATER TREATMENT PLANT
 DEACON BOOSTER PUMPING STATION

CITY FILE NUMBER
 SHEET 1 OF 1
 CITY DRAWING NUMBER
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CHLORINE LINE RELOCATION