

Municipalities in British Columbia have billions of dollars invested in their buried infrastructure systems. Inspection and maintenance of the infrastructure is a key asset management tool that municipalities use to protect this investment.

Levelton Consultants Ltd. has the capabilities to inspect and test municipal water systems using External Corrosion Direct Assessment (ECDA). ECDA is a four-step procedure requiring the integration of pre-assessment data; data from multiple indirect field inspections; and data from pipe external surface inspections conducted in accordance with NACE International Standard Practice SP0502-2008 "Pipeline External Corrosion Direct Assessment Methodology".

The basic procedure is as follows:

Step 1: Pre-Assessment

The Pre-Assessment step collects historic and current data to determine whether ECDA is feasible; defines areas on pipelines where ECDA can be used; and selects indirect inspection tools. The required data is typically available in construction record drawings, Owner operating and maintenance histories, corrosion survey/inspection records, and previous integrity inspections.

Step 2: Indirect Inspection

Once the pre-assessment step has been completed, this step utilizes above-ground inspections to identify and define the severity of coating faults and other anomalies, corrosive soil conditions and the status of the level of cathodic protection (if the pipeline is cathodically protected).



Pipeline Current Mapper & A-frame

Two or more indirect inspection tools are used over the entire pipeline length to provide improved detection reliability under the wide variety of conditions that may be encountered along the pipeline right-of-way.



The inspection tools can include:

- Close interval pipe-to-soil potential survey to detect variations in pipe potential that could be attributed to corrosion activity on pipelines without cathodic protection. If a pipeline is cathodically protected with an impressed current system, the systems can be interrupted electronically to obtain more accurate “Instant Off” potentials to assess whether the pipeline is receiving adequate cathodic protection.
- Direct current voltage gradient survey to locate coating defects.
- Electromagnetic inspection using a Pipeline Current Mapper (PCM) that measures changes in the magnetic field around a pipe to detect defects in the external pipe coating. The PCM will map the magnitude and direction of current on a pipeline. Once the pipe has been located, the magnitude and direction of current can be mapped at predetermined intervals along the length of the pipeline. Once the original set of data is collected, the data is downloaded to a PC and the software provides a graphical profile of the collected data. From this profile the magnitude and location of faults can be identified. Further investigation in the area of the faults using the A-frame accessory will pinpoint the location of the fault within one meter.
- Soil conductivity (resistivity) surveys to assess the corrosiveness of soils.

Quality sub-meter GPS is used to integrate the multiple streams of data that are collected and to provide precise information regarding the location of pipeline anomalies.

Step 3: Direct Examination

This step involves the analysis of the indirect inspection data to categorize the severity of the anomalies and to select locations along the pipeline for excavation and inspection. The data from the direct examinations are combined with indirect inspection data to identify and assess the impact of external corrosion on the pipeline. The inspection may include pipe wall thickness measurements; corrosion pit depth measurements; and the inspection and testing of the pipeline coating.

In addition, this step can include recommended repair procedures, mitigation of corrosion protection faults and assessment of the remaining life of the pipeline.

Step 4: Post-Assessment

Post-Assessment covers the analyses of data collected from the three previous steps to assess the effectiveness of the ECDA process on the pipeline and to determine reassessment intervals.



Ultrasonic thickness inspection grid on steel pipeline