Impressed current cathodic protection systems

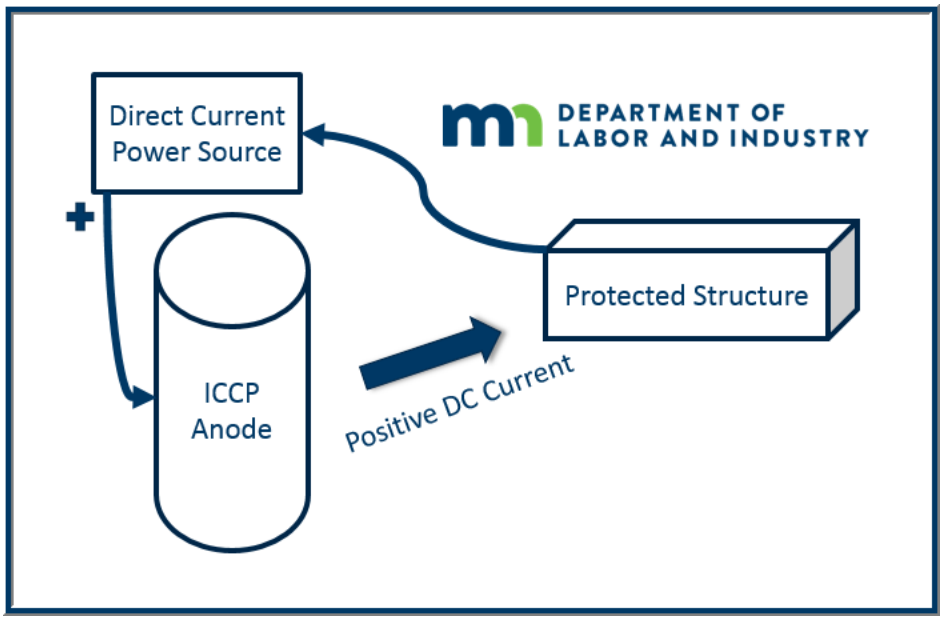
Corrosion of metal underground storage tanks is a normal, natural process that is the result of an electrochemical reaction in which current flows from areas where corrosion is occurring (anodic areas) to areas where it is not (cathodic areas). A cathodic protection system reverses the process.

An impressed current cathodic protection controls the corrosion of a metal surface by making it the cathode of an electrochemical cell. The method of protection connects the metal to be protected to a more easily corroded "sacrificial metal" to act as the anode.

Impressed current cathodic protection (ICCP) systems are typically installed to prevent corrosion of metal underground storage tanks and associated metal piping systems.

With an impressed current system, current is discharged from anodes placed in the same electrolyte (soil) in which the tank and piping to be protected are buried. The ICCP system requires the installation of an external power supply which produces a DC output. Galvanic or sacrificial anode type cathodic protection systems perform the same function except they use naturally occurring galvanic current instead of current derived from a separate supply of electricity.

Note: In response to numerous inquiries, the following information is provided to clarify existing statutes, rules, and National Electrical Code (NEC) requirements.



The installation of ICCP systems is subject to the following requirements:

Equipment approval

All electrical equipment, including transformer/rectifier power supply units, must be listed by a Nationally Recognized Testing Laboratory (NRTL) or otherwise be certified according to the provisions of Minnesota Rules Part 3801.3620. All cables and conductors that are installed in a direct burial application approved for direct burial use, and be specifically identified or approved for use with cathodic protection systems.

Electrical licensing

The electrical wiring associated with the installation of ICCP systems is required to be performed by properly licensed employees of electrical contractors licensed by the Minnesota Department of Labor and Industry, with the following exceptions: auguring holes for anodes, placement of anodes, connection of cathode cables to piping and tanks, trenching, and placement of the anode and cathode cables in a trench.

The installation of all other electrical wiring and equipment, including but not limited to branch circuits for rectifiers, transformer/rectifier power supply units, junction boxes and raceways for system cables, must be performed by properly licensed employees of a licensed electrical contractor.

Electrical inspection

The licensed electrical contractor responsible for the electrical installation must file a Request for Electrical Inspection form and inspection fee with the department at or before commencement of the electrical work.

Where electrical wiring and system cabling will be concealed or buried, the electrical inspector must be notified sufficiently in advance to permit completion of an inspection before concealment or back-filling. The inspection must include all electrical work, including the work allowed to be performed in accordance with the exceptions outlined in the previous paragraph.

Direct buried cables and conductors shall be installed in accordance with NEC Table 300.7(A). The minimum burial depth for direct buried cables and conductors shall be 24 inches. Lesser burial depths shall be permitted where cables and conductors rise for terminations or splices, or where access is otherwise required.

The installation of cables and conductors in shallow grooves or saw-cuts in paving material is not acceptable.

Raceways associated with impressed current cathodic protection systems that extend into hazardous (classified) areas shall be installed in compliance with NEC Sections 501.10 and 501.15.