

Command and Control of Cathodic Protection Systems via the Internet

Eng. Elie Elgressy

Introduction:

Israeli Standard 4571, Cathodic Protection for Underground Fuel Storage Tanks, took effect in December 2000. This standard requires installation of cathodic protection for underground fuel storage tanks at gas stations, and constitutes one of the conditions for obtaining Form 4.

In addition, a local authority is entitled to demand that a plant install a cathodic protection system for a fuel storage tank as a condition for obtaining or renewing a business license.

Israeli Standard 4571 makes it possible to install a cathodic protection system using sacrificial anodes or impressed current.

After Israeli Standard 4571 was issued, some fuel companies installed a number of cathodic protection systems using the sacrificial anode method at several Paz, Ten, Dor Alon, Delek, and other gas stations. At the same time, cathodic protection systems using impressed current were installed. The result was a foregone conclusion: a total failure stemming from a lack of protection in all the protection systems that had been installed with the sacrificial anode method.

It was necessary to replace the protection system with one that uses sacrificial anodes instead of impressed current.

The reasons for the failure stemmed from recommendations the gas stations accepted, thought it was possible to protect with protection currents of only tens of milliamperes and that it was permissible to install partitions.

Note: Note: According to the Electricity Law, one should and must address the law's existing requirements with respect to the topic of grounding protection and grounding from static electricity.

Israeli Standard 4571 Cathodic Protection for Underground Fuel Storage Tanks contains a reference to the Electricity Law.

My comments on this note stem from the existing dangers to human life as a result of installation of partitioning devices at fuel facilities

that can cause electrocution and power surges liable to develop during a malfunction via fuel pumps, metering equipment, and the like. It is possible to buy electronic patching devices that are installed between the partition that allows the passage of AC current, not DC current,

these patching devices do not meet the Electricity Law requirements since it is prohibited to install an electronic device that serves as patching for the electrical continuity instead of permanent patching.

It is permissible to install partitions in underground piping in place where there is no danger of electrocution and in piping that does not use the grounding electrode, and it is possible to install partitions in a tank farm, provided that the tank farm is not connected to the electrical system and there is no danger of electrocution as a result of installation of the partitions.

In any case, before disconnecting the electrical continuity, one must consult with the authorized individuals.

Following an attempt to install hundreds of cathodic protection systems in Israel at fueling stations owned by the fuel companies,

the attempt showed that the impressed current protection method is the most effective and least expensive method for protecting all the tanks at a gas station.

The required average value of protection currents for a gas station is approx. 4 amperes, the currents can range from 300mA to

8500mA and at a drive voltage between 2V and 35V, depending on the size of the station.

It is clear that at these values only the impressed current protection system can provide the solution.

Command and Control of Protection Systems via the Internet

To ensure that a cathodic protection system is operating properly, professionals must carry out periodic inspections in the field. This activity increases maintenance costs. In most cases, no attention is paid to a malfunction in a cathodic protection system since the malfunction does not cause a shutdown of the station.

In recent years, scientists have developed a protection system kit consisting of a 10A/50V power supply, control of current from 5mA to 10A, with a computerized controller including an integral modem with Quad Band GSM/GPRS transmission methods

with the possibility of connecting up to three half-cells, in addition to an integral interrupter for performing remote metering.

The kit consists of an anode from a TI MMO conductor about ten meters long (depending on the number of tanks) threaded through a cloth sleeve for scratch protection. The anode conductor is inserted into the ground with an electrolyte that serves as a back-fill that was developed for this purpose and is inserted along with the anode into the ground via telescopic rods with the aid of a jackhammer, without the need for drilling.

The protection potential is measured by means of an electronic interrupter installed in the computerized controller.

The ON/OFF times are fully controllable.

The controller contains a data logger that records all the values received from the interrupter, e.g. potential received from the half-cell, protection currents, and the drive voltage from the power supply at the frequency of milliseconds.

All the measurements are received on a graph in an Excel file.

The command and control can be carried out from anywhere in the world via a home computer, laptop or cell phone.

In Israel and other countries, cathodic protection systems of this type are being used with great success.

To see an example of an Internet-operated protection system, please visit: www.elgressy-international.com

After entering the site, click on Communication System and then Cathodic Protection.