

The subject of underground leaks at service stations is one of growing concern to petroleum marketers. Large sums of money, time, and effort are exhausted on a continuing basis in the location and correction of leaking tanks and lines.

The purpose of this study is to review the major problem areas as we know them, consolidate available data on each area, develop alternative solutions to each problem, evaluate the alternatives, and draw general conclusions which should provide guidelines for the solutions of specific field problems. Some of the areas are conspicuously lacking in basic research, and these will be pointed out as we progress through the study. They will be further accented in the final section, which deals with areas needing additional study.

Underground leaks occur for one of three reasons:

- (1) Corrosion;
- (2) Rupture;
- (3) Loose Fittings.

Loose fitting and rupture failures occur as a result of several easily definable situations. Faulty installation in which fittings are not properly secured, failure to replace temporary bung covers, and improperly backfilled trenches are primary causes for this type of problem. Violent natural phenomena, such as earthquakes, result in massive shifts in the sub-soil which can easily loosen fittings and/or rupture lines and tanks. More subtle soil movements, such as those along natural fault lines without an actual quake, fill settlement (particularly in the tank hole), and subsidence can cause problems; and maintenance personnel should keep a wary eye out for tell tale signs, notably heaving and/or settlement in paved and unpaved areas, shifts in fill locations, and canting or shifting of aboveground equipment. Care in installation or at least recognition of these unusual situations which might have resulted in a leak should substantially reduce the likelihood and magnitude of these types of leaks. However, the nature of leaks resulting from corrosion is such that the continued process makes the instantaneous point in time at which failure occurs imperceptible. Thus corroding tanks and lines probably exhibit the highest potential danger to the environment and most extensive long range costs.

Corrosion can be prevented; but to understand how, we must understand what corrosion is and how it works.