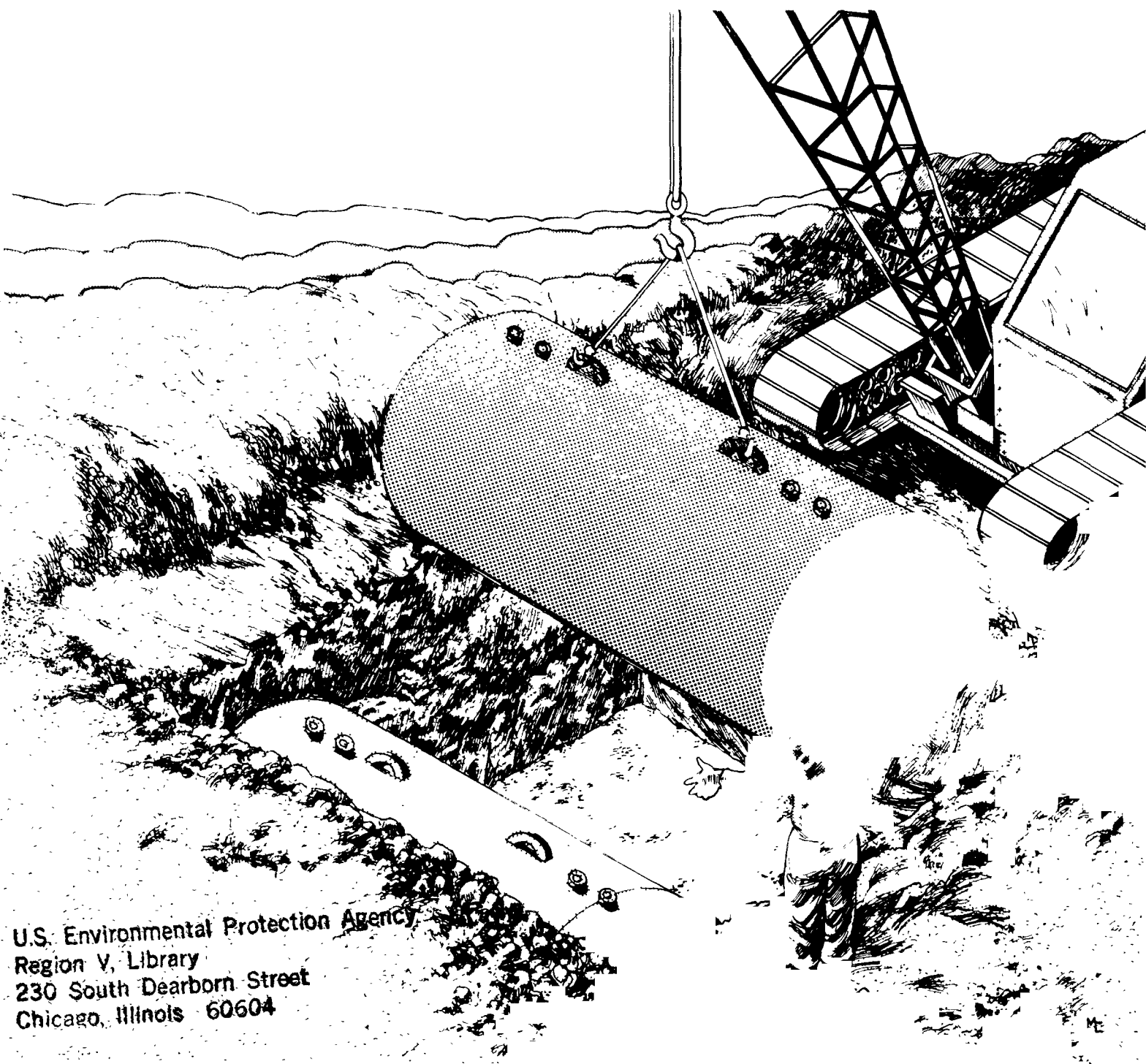




Designing and Installing Underground Storage Tanks Under the New Federal Law



U.S. Environmental Protection Agency
Region V, Library
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Chicago, Illinois 60604

LEAKING TANKS: A NATIONAL PROBLEM

In recent years, thousands of leaking underground storage tanks have been discovered and thousands more probably will be found. Underground tanks containing motor fuels and hazardous chemicals are found in many places, including service stations, transportation and delivery services, manufacturing plants, and even dry cleaners. Petroleum or chemical leaks from underground tanks or pipes create environmental and safety hazards and cost tank owners and operators a lot of money. For these reasons, proper design and installation of tanks is important to prevent future damage to the nation's resources.

A TEMPORARY SOLUTION: THE INTERIM PROHIBITION

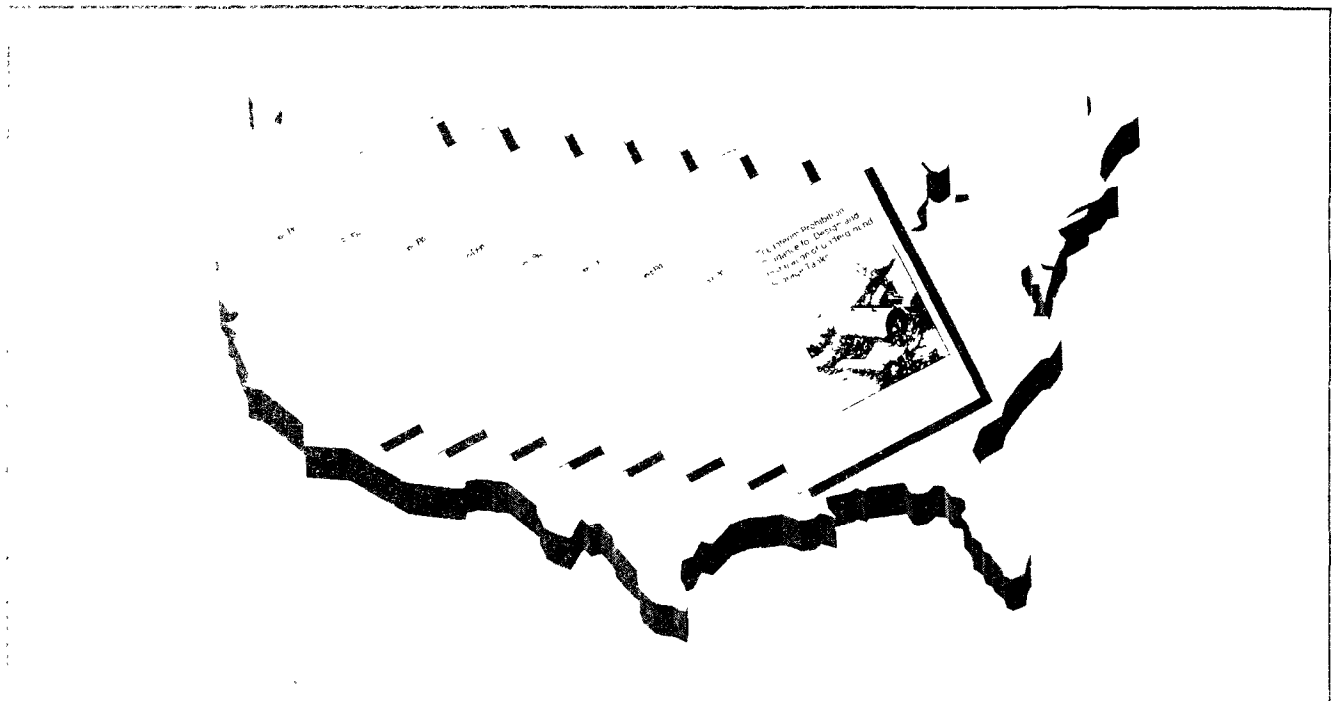
In response to this situation, Congress passed a law regulating underground tanks containing petroleum products or hazardous chemicals. The U.S. Environmental Protection Agency is studying the leaking underground storage problem and, in 1987, will **propose** standards for all new and existing tanks and regulations for leak detection, prevention, and corrective action. **Final** standards and regulations will be issued in 1988 after a period of public comment.

In the **interim**, the law requires that any tanks and piping installed after May 7, 1985 be designed, constructed, and installed to ensure prevention of leaks. Called the "Interim Prohibition," this part of the law bans bare steel tanks and requires controls for:

- Corrosion protection;
- Structural integrity; and
- Chemical compatibility

WHAT DOES ALL THIS MEAN?

This brochure explains each of these requirements and various ways to comply with them. For those wanting more detailed information, "*The Interim Prohibition: Guidance for Design and Installation of Underground Storage Tanks*" can be obtained by sending in the attached business reply card. Answers to the most frequently asked questions about the Interim Prohibition are provided on the back of this brochure.



CORROSION: WHAT YOU CAN DO ABOUT IT

What is Corrosion?

The external surface of a steel tank, when it comes in contact with the soil, will naturally seek to return to its original state, iron oxide, or the more commonly known term, rust. This is a complex electrochemical process that creates a flow of current between two materials with different electrical characteristics. Metal corrodes under almost any naturally occurring soil condition, but the rate of corrosion is affected by the amount of oxygen and moisture in the soil and other site-specific factors.

How Can Corrosion Be Controlled?

The Interim Prohibition identifies three different methods of corrosion control:

- Cathodic protection;
- Noncorrosive materials of construction; (i.e., fiberglass reinforced plastic) and,
- Noncorrosive coating of steel.

The Interim Prohibition also allows the use of other corrosion controls if "...they are designed in a manner to prevent the release or threatened release of any stored substance." Regardless of the technology chosen, corrosion protection is required for both the piping and the tank.

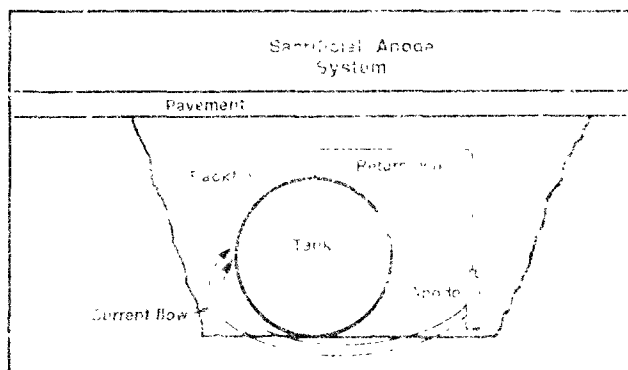
Cathodic Protection

Cathodic protection reverses the electrical forces that cause corrosion and can be achieved in two ways:

- Connecting zinc or magnesium anodes to a steel tank, (sacrificial anode system); or
- Applying a continuous electrical current to the tank (impressed current system).

You can check the effectiveness of either of these systems by measuring voltage between the tank and the soil. In both systems this voltage must be checked periodically for damage requiring repairs.

Galvanized (zinc coated) pipe was developed and is effective for above ground use. However, it does not satisfy EPA's Interim Prohibition



requirements for corrosion protection of underground storage tanks because zinc coating only provides a limited amount of protection.

Noncorrosive Materials of Construction

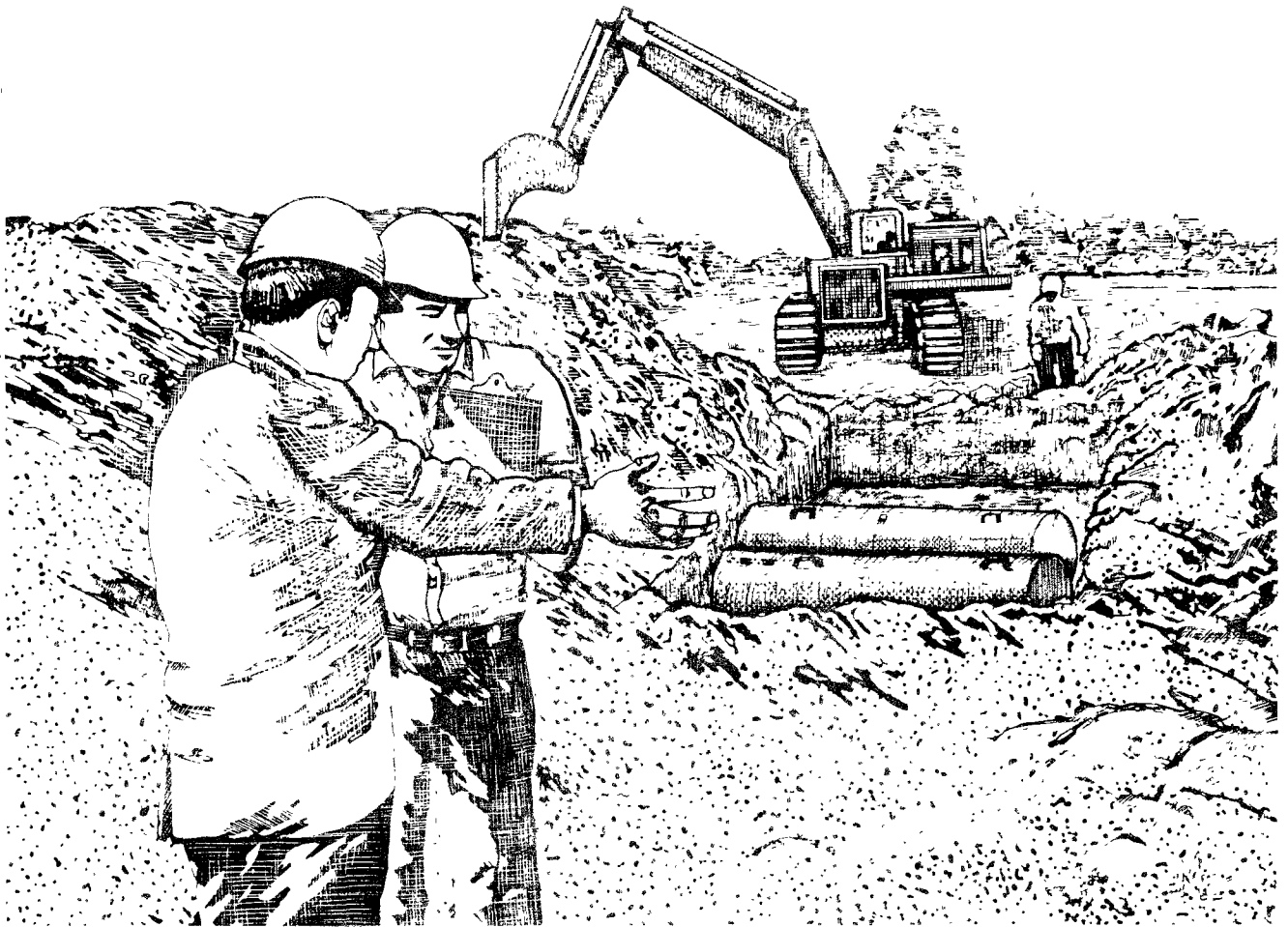
The Interim Prohibition allows tanks and piping to be constructed of noncorrosive materials as an alternative to cathodic protection. The most widely used noncorrosive material in the manufacture of tanks and piping is fiberglass reinforced plastic (FRP). Tank systems constructed of FRP satisfy the corrosion protection requirements of the Interim Prohibition. It is the only material that contains sufficient corrosion resistance without additional cathodic protection or coating.

Noncorrosive Coating

Another type of protection that complies with the Interim Prohibition is a steel tank coated with fiberglass reinforced plastic. There is some debate among corrosion control experts regarding the advisability of using any coating without cathodic protection; however, the Interim Prohibition allows the use of "steel clad with a noncorrosive material." Only FRP-coated steel is acceptable. The key factors in the success of this coating include its thickness, insulating strength, durability, and good bonding to the steel. Manufacturers' standards currently require:

- A minimum thickness of completed coating equal to 0.10 inch; and
- Electric testing to ensure complete coating of the tank.

These should be considered minimum standards for acceptability of fiberglass reinforced plastic coatings. As consensus codes or other national standards become available, they may supplement or replace these minimum standards.



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STRUCTURAL INTEGRITY: PROPER INSTALLATION IS CRUCIAL

The Interim Prohibition requires that tanks be properly installed so structural failure does not occur. One of the keys to achieving this is proper selection and installation of the backfill material used to support the tank. For fiberglass reinforced plastic tanks, the backfill provides as much as 90 percent of the tank's support. For both steel and fiberglass tank systems, failure to properly backfill the tank can cause structural damage and result in contamination of soil and ground water, and serious liability.

Tank manufacturers provide installation instructions which should be strictly followed. Many states and local jurisdictions have additional requirements which tank owners and installers also must follow. Check with your fire, health, and environmental agencies for requirements.

The EPA's guidance document is limited in scope. A manual covering all aspects of tank installation has recently been developed by the Petroleum Equipment Institute (PEI), "Recommended Practices for Installation of Underground Liquid Storage Systems." Single copies of PEI RP 100-86 cost \$10.00 (\$8.00 for PEI members). Quantity discounts are available for 25 or more copies. Order prepaid from: Petroleum Equipment Institute, P.O. Box 2380, Tulsa, OK 74101.

The American Petroleum Institute (API) also has a booklet of recommended practices, "Installation of Underground Petroleum Storage Systems" (#1615), published in 1979. It can be purchased for \$4.00 from API, 1220 L Street, NW, Washington, D.C. 20005.

COMPATIBILITY: WILL YOUR PRODUCT DISSOLVE YOUR TANK'S INTERIOR?

The liquid stored in a tank must not dissolve the material of the tank's interior or coating. Some stored liquids do; this is called chemical incompatibility. Incompatibility can result in cracks and openings in the tank that allow chemicals to seep into the soil. Common examples of chemicals that are incompatible with specific types of tank liners and construction materials are:

Mineral acids including nitric, hydrochloric, and dilute sulfuric acids which are incompatible with steel.

Sulfuric acid (95 percent), nitric acid (50 percent), hydrofluoric acid (40 percent), aromatic solvents, and chlorinated solvents which are incompatible with some types of fiberglass reinforced plastic.

Organic solvents which are incompatible with chlorinated rubber liners.

Request Form

☐ Yes, send me the guidance document. ☐ No, thank you.

☐ Please put me on the mailing list for future information on USTs.

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| <input type="checkbox"/> Industry | <input type="checkbox"/> Media | <input type="checkbox"/> Small Business |
| <input type="checkbox"/> Insurance | <input type="checkbox"/> Tank Installer | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Gas Station | <input type="checkbox"/> Tank/Parts Manufacturer | _____ |

Separate along perforation

ANSWERS TO QUESTIONS ABOUT THE INTERIM PROHIBITION

- Q. How will the proposed regulations affect a tank designed and installed in compliance with the Interim Prohibition?
- A. The regulations, as proposed, are the same as the Interim Prohibition Standards for new tanks, but will also include regulations for leak detection and reporting, corrective action, and financial responsibility. Tank owners and operators should read the final regulations very carefully so they will know what they must do to comply with them.
- Q. Are any classes of tanks entirely exempt from the Interim Prohibition?
- A. Yes. Tanks that are specifically exempt include tanks storing heating oil for use on the premises, residential and farm tanks storing motor fuels if the tank volume is 1,100 gallons or less, and tanks whose volume (including piping) is less than 10 percent beneath the surface of the ground.
- Q. Is a tank installed in noncorrosive soil exempt from the corrosion protection requirement of the Interim Prohibition?
- A. Possibly. If soil tests conducted in accordance with ASTM Standard G57-78 show that soil resistivity is 12,000 ohm/cm or more, a storage tank without corrosion protection may be installed. The tank must still comply with the structural integrity and compatibility requirements of the Interim Prohibition.
- Q. Are double-walled tanks, lined tanks, or tanks with other secondary containment systems exempt from the corrosion protection requirements of the Interim Prohibition?
- A. No.
- Q. Does the Interim Prohibition apply to "recycled" tanks?
- A. Yes. A tank that is removed and reinstalled at the the same or another location is subject to the Interim Prohibition.
- Q. What is the penalty for noncompliance with the Interim Prohibition?
- A. The maximum penalty is \$10,000 per tank for each day of violation.
- Q. How can I obtain more information?
- A. You can call the EPA toll free Hotline at (800) 424-9346 or direct at (202) 382-3000. To receive the Interim Prohibition Guidance Document and be put on the mailing list for copies of EPA's proposed regulations and other information, return the attached card.



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