NREA

DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380-0001

IN REPLY REFER TO

6280
LFL/2-503
8 JAN 1987

From: Commandant of the Marine Corps

Subj: PCB TRANSFORMER/LEAKING UNDERGROUND STORAGE TANKS

Ref: (a) CMC ltr 6280 over LFL/6-94 of 25 July 1986
(b) MCO P11000.5E

1. In response to reference (a) and recent activity efforts to identify high fire risk PCB transformers and leaking underground storage tanks, additional FY87 O&M,MC M2 funds have been budgeted to correct these environmental deficiencies. We request projects developed in accordance with reference (b) be submitted for supplemental FY87 funding. The manpower constraints faced by many activities due to managing to payroll are understood. We request the activity environmental staff coordinate and assist to the maximum extent possible, facilities/public works personnel in the development and execution of these projects.

2. For planning purposes, the following guidance is provided for prioritizing project development.

a. PCB Transformers: Funding priority will be given to those identified in response to reference (a) as having fire risk greater than 50. (It is noted, should efficiency in project development/execution suggest inclusion of transformers below 50, such projects will be considered if rationale is provided).

b. Underground Storage Tanks: Funding priority will be given to tanks posing an imminent threat to groundwater, whether or not it is used as a drinking water source. The M2 funding is to be used for replacement of operationally required tanks. Consideration should be given to closure and consolidation of fueling activities wherever possible. Should closure of a tank be the preferred solution, closure projects should be submitted separately from tank replacement projects as Defense Environmental Restoration Account (DERA) funding will be pursued. Contaminated soil disposal associated with tank replacement will normally be funded using DERA. It is noted many activities have phased programs underway to identify leaking tanks. We suggest projects for tank replacement be developed as the requirements are identified rather than waiting for completion of the entire testing program.

Subj: PCB TRANSFORMER/LEAKING UNDERGROUND STORAGE TANK REPLACEMENT PROJECT

3. Our points of contact regarding this subject are Mr. Paul Hubbell (LFL) A/V 227-1890 and Major John Winchester (LFF-2) A/V 224-1425.

NEIL J. BROSS
By direction

DISTRIBUTION:
COMMARCORBASESPAC
CG MCB Camp Pendleton
CG MCB Camp Butler
CG MCAS Cherry Pt/COMCABEAST
CG MCAS El Toro/COMCABWEST
CG MCB Camp Lejeune
CG MCAGGC 29 Palms
CO Camp H. M. Smith
CO Camp Elmore
CO MCAS New River
CO MCAS Beaufort
CO MCAS Yuma
CO MCAS Tustin
CO MCAS Kaneohe Bay
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DDS
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6280/10
FAC
T-6244

11 Apr 86

Assistant Chief of Staff, Facilities, Marine Corps Base, Camp Lejeune
Public Works Officer

PHASE I LEAKING UNDERGROUND STORAGE TANKS STUDY

f: (a) PHONECON btwn Mr. Hubbell CMC/LFL and Mr. Alexander, MCB of 3 Apr 86

cl: (1) LANTDIV speedltr 6280 over 1142:DPG dtd 25 Mar 86

1. The purpose of this design effort is to develop a scope of work with project documentation and cost estimates for:

a. Basewide leak detection system

b. Basewide monitoring well system

c. Follow-up hydrogeology study, if needed.

2. Per the enclosure, LANTDIV has advised that funding IAO $50K in FY 86 or 87 is needed for the subject study. Per the reference CMC will pursue funding for this work and will coordinate funding with LANTDIV.

3. Request a representative from your staff be appointed as the point of contact for the A & E performing this study. Mr. Alexander of this office will provide background information regarding notification to the State of North Carolina on existence of underground tanks.

R. A. TIEBOUT

Copy to:
BMO
NREAD
EnvEngr

Subj: PHASE I LEAKING UNDERGROUND STORAGE TANK (LUST) STUDIES

Distribution:
NAVSHIPYD Norfolk
NSC Norfolk (Craney Island)
NSC Norfolk (Yorktown)
WPNSTA Yorktown
NAS Oceana
NAVPHIBASE Little Creek
FCTCLANT Dam Neck
NAVSECGRUACT Northwest
NAVRADSTA Driver
NAVHOSP Portsmouth
NSC Norfolk Cheatham Annex
AFXTRACTY Camp Peary
NAVORDSTA Louisville
NAVRADSTA R Sugar Grove
ABL Cumberland
NAVRESCEN Baltimore
NAVSTA Roosevelt Roads
NAVSECGRUACT Sabana Seca
[redacted]
MCAS Cherry Pt
NAVAIREWORKFAC Cherry Pt
NAS Norfolk
NSC Norfolk
FLETRACEN Norfolk
PWC Norfolk
NAVAIREWORKFAC Norfolk
NAVSTA Norfolk

(804) 444-3561

6280
1142DPG

12 NOV 1985

From: Commander, Atlantic Division, Naval Facilities Engineering Command
To: Commander, Naval Facilities Engineering Command

Subj: LEAKING UNDERGROUND STORAGE TANKS (LUST) PROGRAM

Ref: (a) NAVFACENGCOM ltr 11223/GFC of 8 Oct 85

1. In accordance with reference (a) the following LUST Program Phase I Activity Assessment priorities list, with cost estimates, is hereby provided:

	Activity	Priority	Cost Est. ($000)*
VA:	COMNAVBASE Norfolk	I	50
	NAVSHIPYD Norfolk	I	30
	NSC Craney Island	I	20
	NSC Yorktown	I	10
	WPNSTA Yorktown	I	10
	NAS Oceana	II	10
	NAVPHIBASE Little Creek	II	10
	FCTCLANT Dam Neck	II	5
	NAVSECGRUACT Northwest	II	5
	NAVRADSTA Driver	II	5
	NAVHOSP Portsmouth	II	5
	NSC Cheatham Annex	II	5
	AFXTRACTY Camp Peary	II	10
KY:	NOS Louisville	I	20
WV:	NAVRADSTA S Sugar Grove	II	10
	ABL Cumberland (in WV)	I	20
MD:	NAVRESCEN Baltimore	II	5
PR:	NAVSTA Roosevelt Roads (and outlying sites)	I	50
	NAVSECGRUACT Sabana Seca	II	10
NC:	MARCORB Camp Lejeune	I	50
	NCAS/NAVAIREWORKFAC Cherry PT	I	50
	21 Activities	I:	310
		II:	80
		Total:	390

* Assuming local contractors (i.e. minimum travel and per diem); i.e. final cost could approach $500K.

J. R. BAILEY
By direction

Blind Copy to: 114, 114S, 09BS(w/o encl), Doc #5208A/vmh

IV. LUST REPORTS DISTRIBUTION GUIDELINE

Refer to Attachment F for guidance.

V. ACTIVITIES MAILING LIST

Refer to Attachment G for guidance.

5. A/E shall identify all regulated substance underground storage tanks, compile a listing of those facilities missed during the initial inventory and submit to EIC required data on the EPA enclosed form, Attachment B. Note: Information provided shall be based on reasonably available records or in the absence of such records, activities' personnel knowledge and recollection.

6. A/E shall meet with representatives from the activities to present details of site investigation.

7. A/E shall review all relevant records.

a. Inventory record review

b. History of known or potential loss areas

c. Location of known losses

d. Volumes or rates, times, substance types and causes.

e. Location of underground utilities (e.g., electric lines, water lines, sanitary and storm sewers).

8. A/E shall make recommendations to perform the following work for base-wide leak detection, groundwater monitoring, tank testing, required repair, lining replacement or retrofit operations and cleanup.

9. A/E shall prepare corrective project documentation to include Pollution Control Report (PCR), Step II-Submission and an Engineering Cost Estimate for Environmental Restoration (ER) project.

10. A/E shall prepare report along with project documentation (including tank tables, site maps, and priorities) and a Scope of Work (e.g., specifications) for :

a. Base-wide leak detection system.

b. Base-wide monitoring well system.

c. Phase II (specify sites and types of hydrogeology work).

III. MILESTONES (CALENDAR DAYS)

Initial Contractor/Government Meeting: 14 days after award

Draft Report: 180 days after award

Final Report: 60 days after receipt of comments on Draft Report

5. The A/E is responsible for obtaining permission and clearance from the appropriate station security personnel to enter and perform the required field work. EIC will provide the list of activity contacts during the initial contractor/government meeting identified in Section III.

6. The A/E is responsible for recording all minutes of all meetings and provide a copy of the minutes to the Engineer-In-Charge (EIC).

7. The A/E shall forward all submissions to the EIC via the LANTNAVFACENGCOM project manager.

8. The A/E shall submit to LANTNAVFACENGCOM Code 114 all documentation (associated photographs, original drawings, registration forms, etc.) upon request.

II. PERFORMANCE REQUIREMENTS

A. General

The work consists of collecting and evaluating all existing evidence to determine potential contamination from underground tanks storing regulated substances at applicable Kentucky, Maryland, North Carolina, Virginia, and Puerto Rico naval activities. Accomplishment of work will be based on presently available information. Detailed investigation/evaluation utilizing leak/contamination detection and repair/cleanup will be accomplished by a separate contract.

B. SPECIFIC

The work shall be perform in two steps: Record research/verification/update and recommended abatement/cleanup methods for corrective project documentation.

The data submittal shall include:

Pre-Site Investigation

1. Thoroughly review all revelant state regulations and familiarize with their Notification Program requirements.

2. Meet with Government representatives and present a detailed plan of action which includes activity visit dates and milestones for accomplishing all steps of the work.

3. Two copies of a plan of action shall be submitted to the EIC in accordance with Section III and shall include work milestones and activities scheduled visits.

On-Site Investigation

4. Upon receipt of underground storage tanks notification data on all applicable activities from EIC, A/E shall review and verify information.

PHASE I
SCOPE OF WORK
LEAKING UNDERGROUND STORAGE TANKS (LUST)

I. INTRODUCTION

The Resource Conservation and Recovery Act (RCRA), Subtitle I, Sections 9001 through 9010 added by PL 98-616, Hazardous and Solid Waste Amendments of 1984 at 40 CFR 280 regulates the use and management of underground storage tanks. Regulations require that all such facilities storing regulated substances (i.e., petroleum and hazardous substances) to have been registered with appropriate state agency by 8 May 1986. Attachment B describes form used (EPA Form 7530-1 (11-85))) and lists applicable state agency mailing addresses.

A. STUDY OBJECTIVES

The objective of this study is to collect and evaluate all existing evidence to determine potential contamination by underground tanks storing regulated substances and provide recommendations. Location of the work shall be at the following Priority I installations: COMNAVBASE Norfolk, NAVSHIPYD Norfolk, NSC Norfolk (Craney Island), NSC Norfolk (Yorktown), WPNSTA Yorktown, ABL Cumberland, NAVORDSTA Louisville, MARCORB Camp Lejeune, MCAS/NAVAIREWORKFAC Cherry Point and NAVSTA Roosevelt Roads. A/E will also develop and prepare corrective project documentation.

B. SPECIAL INSTRUCTION

1. Evaluation will involve, but not limited to, notification data verification, records review, conclusive information gathering omitted during the initial notification reporting process and recommendations for base-wide leak detection, groundwater monitoring, tank testing, required repair, lining replacement or retrofit operations and cleanup.

2. Cost estimates shall be provided in sufficient detail to allow commencement of design by another A/E (e.g., Material and Labor Cost Estimate should be thoroughly broken down on LANTDIV NORVA Form 4-11012/5 (Rev. 12/80) (Attachment C). Deficiency corrective project documentation shall be prepared in accordance with LANTDIVINST 11019.2D (Attachment D). Step II Submission for special project documentation shall be prepared in accordance with OPNAVINST 11011.20E (Attachment E).

4. A schedule of all field work will be coordinated with the activity representative.

Attachment A

Encl (1)

OPNAV 5216/145 (Rev. 3-78)
0107 LF 052 1625
USE FOR URGENT LETTERS. ONLY

Naval Speedletter

DO NOT CLEAR THROUGH COMMUNICATIONS OFFICE

TYPE OF MAIL	CLASSIFICATION	DATE
X REGULAR ☐ REGISTERED ☐ AIR ☐ CERTIFIED ☐ SPECIAL DELIVERY		25 Mar 86

IN REPLY REFER TO ADDRESS & PHONE NO.:
1142:DPG:drd 6280 445-2932

• Distribution (on page 3) •

INSTRUCTIONS

1. Message type phraseology is permissible.

2. Both addresses must be appropriate for window envelope or bulk mailing, as intended. Include attention codes, when known. Use dots and brackets as guides for window envelope addresses.

3. Give priority to processing, routing, and action required. Avoid time-consuming controls.

4. In order to speed processing, a readily identifiable, special window envelope, OPNAV 5216/145A, Speedletter Envelope, is provided for unclassified speedletters where bulk mailing is not used. Other window envelopes also may be used. In bulk mail, speedletters should be placed on top of regular correspondence.

STANDARD REFERENCES AND ENCLOSURES, IF ANY; TEXT AND SIGNATURE BLOCK

Subj: PHASE I LEAKING UNDERGROUND STORAGE TANK (LUST) STUDIES

Ref: (a) LANTNAVFACENGCOM spdltr 1142WLC 6280 of 4 Dec 85
(b) LANTNAVFACENGCOM ltr 6280 1142WLC of 13 Mar 86 (NOTAL)

Encl: (1) Phase I LUST Study Scope of Work (w/o Attachments B through G)
(2) LANTNAVFACENGCOM ltr 6280 1142 of 12 Nov 85

1. References (a) and (b) discussed the importance of complying with the LUST regulations (e.g., $10K/tank fine for not providing the Notification information).

2. The next step after the Notification is to perform a Phase I LUST Study similar to the Initial Assessment Surveys (IASs) that were performed under the Navy Assessment and Control of Installation Pollutants (NACIP) Hazardous Waste Program. Via the Phase I LUST Study (please see the enclosure (1) Scope) an A&E will verify the Notification information, review records, perform interviews and provide a Report with project documentation (including site maps, cost estimates, and priorities) and Scopes of Work (e.g., specifications) for:

a. Basewide leak detection system
b. Basewide monitoring well system
c. Follow-on (Phase II) studies (e.g., specify sites and types of hydrogeology work).

COPY TO Copy to: ~~COMNAVBASE Norfolk, CMC (LFF-2), COMNAVSEASYSCOM, COMNAVAIRSYSCOM,~~ COMNAVSUPSYSCOM, CINCLANTFLT, COMNAVSURFLANT, COMNAVAIRLANT, COMSUBLANT, COMNAVTELCOM, COMNAVCAMSLANT

• Commander
Atlantic Division
Naval Facilities Engineering Command
Norfolk, VA 23511-6287 •

← ADDRESS REPLY AS SHOWN AT LEFT, OR, REPLY HEREON AND RETURN

CLASSIFICATION

d. Repairs and Cleanups

3. LANTNAVFACENGCOM is obtaining and will administer a central contract for the Phase I LUST Studies. However, activity funds are requested. The approximate amount for your activity is provide via enclosure (2). For COMNAVBASE Norfolk activities cost breakdown is:

a. NAVAIREWORKFAC Norfolk	$20K
b. NAS Norfolk	$ 5K
c. NSC Norfolk	$10K
d. PWC Norfolk	$ 5K
e. FLETRACEN Norfolk	$ 5K
f. NAVSTA Norfolk	$ 5K

NOTE: For Cherry Point, the cost breakdown between MCAS and NAVAIREWORKFAC is $25K each.

4. Please advise LANTNAVFACENGCOM Code 1142 in writing by 30 April 1986 whether FY-86 or FY-87 funds are available for this work. Negative replies are requested.

5. LANTNAVFACENGCOM Point-of-Contact is Mr. Wallace Carter (804) 445-2933, AUTOVON 565-2933.

J. R. Bailey

J. R. BAILEY
By direction

OPNAV 5216/144 (REV. 6-70)
S/N 0107-LF-778-8097

DEPARTMENT OF THE NAVY

Memorandum

DATE: 21 Feb 86

FROM: Supervisory Ecologist Danny Sharpe

TO: Distribution List

SUBJ: Underground Hazardous Material Storage Tanks

Encl. (1) Excerpts from Pollution Engineering on Underground Storage Tanks

1. The enclosure from the February, 1986 issue of Pollution Engineering is both interesting and applicable to local activities, and is provided for information.

Distribution List:
BMO, PWO, ENV ENG, SUP CHEMIST

Special Report: Underground Storage Tank Control

PN CHEREMISINOFF, JG CASANA AND RP OUELLETTE

One of the primary sources of groundwater contamination is from leaking underground storage tanks storing all categories of liquids including: gasoline, fuels, process chemicals, hazardous and toxic chemicals and dilute wastes. Many hazardous liquids do not biodegrade or decompose. Therefore, once a substance has leaked into the underground environment, it will remain a hazard until removed.

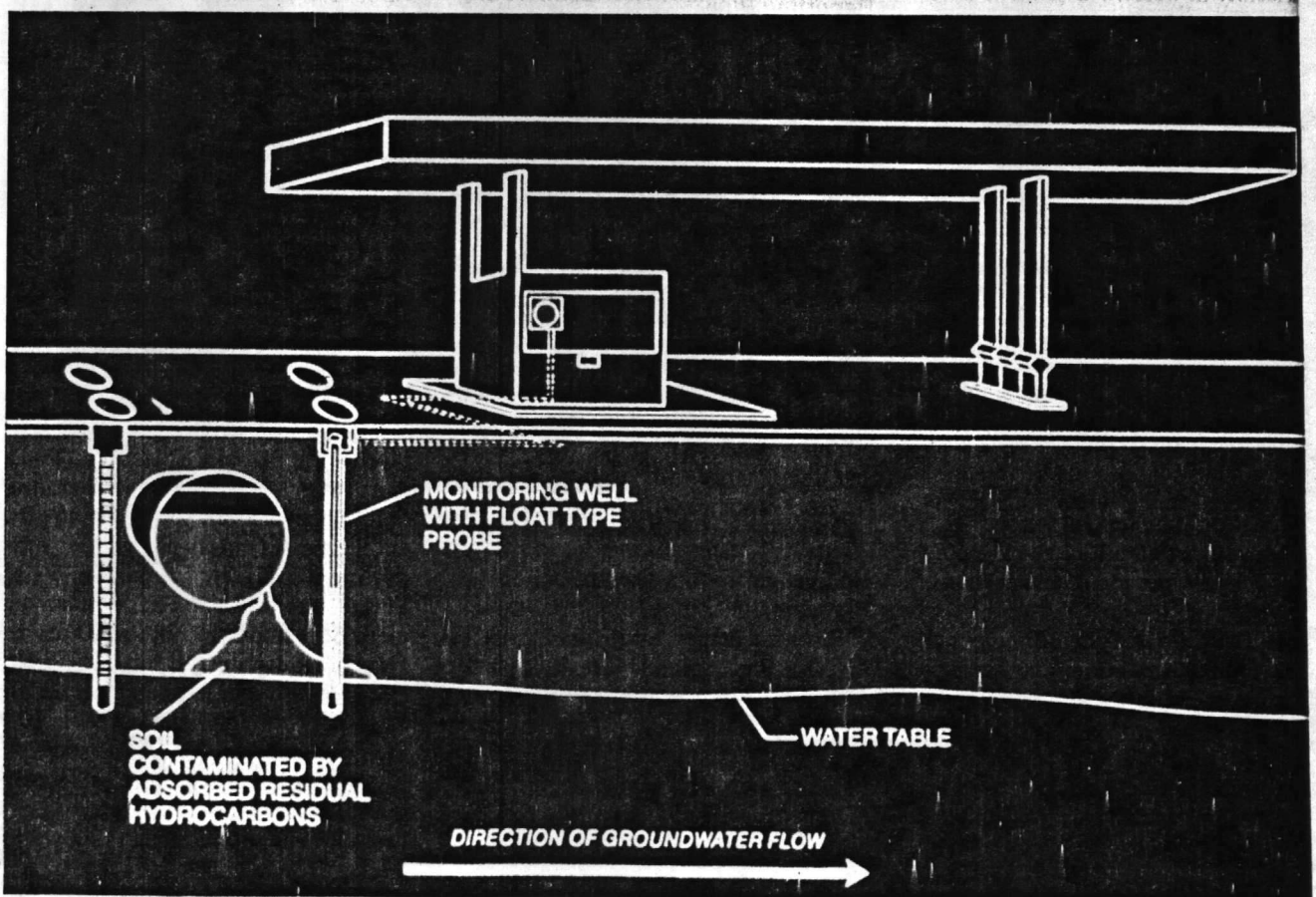
Below-ground storage systems present potentially serious problems of contamination due to likelihood of undetected leakage. By all accounts, there are more than 2 million underground tanks in the United States used to store and dispense liquids. Major user categories of underground tanks include farms, retail gasoline stations, military and fleet users. Facilities such as refineries, process industries, and airports tend to use above-ground tanks.

Corrosion is the major factor contributing to leaks in steel tanks. The basic alternatives available to inhibit leaks in underground storage tanks due to corrosion are:

- Prevention of the corrosion process by cathodically protecting the tank;
- Use a double walled tank; or
- Use a fiberglass tank or other polymeric or corrosion resistant material.

Use of various combinations of these options is also possible. Typically, the total installed cost of the various alternatives may add from 20 to 100 percent to that for a basic steel tank.

Tank testing devices are currently available and more are under development. Typically, a tank leak test will cost $500/tank plus travel expenses. Inventory records may often identify tank leaks. Then, an inspection by entering the tank may verify whether a corrosion related leak has occurred. If the tank is not equipped for personnel inspection, the initial cost of installing a manway to facilitate periodic cleaning and inspection may



Over 2 million undergound storage tanks have the potential of leaking and contaminating groundwater supplies. Through the use of instrumentation and containment devices, serious incidents may be prevented.

be justified. Cleaning can have the added advantage of reducing internal steel tank corrosion which can result from water and sludge accumulation.

Depending on soil conductivity and other local factors, an unprotected steel tank may leak in as little as 2 years, but may last 20 years or longer. Factors that tend to accelerate corrosion include:

- High water table;
- Saline groundwater; and
- Moist soil conditions.

Areas in the United States with the highest external corrosion potential are largely in the northeast and southeast. Those with lowest corrosion potential are in the Great Plains and Rocky Mountains. Areas which exhibit both a significant corrosion potential and potable groundwater supplies which tend to be most vulnerable to contamination are Florida, New England and the Great Lakes states. Of course, any area of the country may have its potable groundwater supplies threatened when an underground storage tank begins to leak.

There are many site specific factors that can affect the rate of corrosion for a given tank. For example, electrical potential is necessary in the subsurface environment to drive the corrosion process. The presence of stray currents, buried metal objects, and natural variations on the soil characteristics such as pH can all contribute to the electrical potential at a given site. Also, the lack of oxygen in the soil adjacent to the tank can enhance the growth of anaerobic bacteria which accelerates the corrosion process. However, since fuel tanks are not usually buried far below surface level, sufficient oxygen is normally present to prevent the growth of anaerobic bacteria. Finally, the installation and operation practices for a given tank can affect corrosion. For example, lining the excavation pit with inert, porous sand or gravel can reduce the electrical conductance in the immediate vicinity of the tank. Table 1 shows corrosion potential ranking criteria.

Costs and Warranty Data

Table 2 presents cost and warranty information for tanks by material of construction. In addition, transportation and installation can add between $5,000 and $10,000 to the total installed cost of a tank. Although the costs shown are site dependent, steel tank installation costs can be up to $1,000 less than those for fiberglass. It is important to note that several tank manufacturers are now offering improved warranties over those shown in the Table. The tank purchaser should shop carefully to obtain the best warranty available.

Causes of Steel Tank Corrosion

Bare and bituminous coated steel tanks have been traditionally used for underground storage. Bituminous coating (asphaltum) provides only a limited degree of corrosion protection. The primary factor affecting the rate of corrosion is high electrical conductivity (low resistivity) in the subsurface environment due to soil moisture. Other factors that can increase the rate of corrosion are: (1) the presence of the dissolved ions in the soil moisture; (2) the lack of oxygen in the subsurface environment which promotes bacterial growth; and (3) the existence of scratches on the tank surface which

Table 1. Corrosion Potential Ranking Criteria

Ranking	Criteria
Very high	Shallow saline water table
High	Shallow non-saline water table plus high soil moisture
Moderate	Shallow water table or high soil moisture
Low	None of the above

Table 2. Comparison of Tank Costs and Warranties

Tank	Cost for 10,000 Gallon Tank, FOB Plant	Warranty
1. Asphalt Coated Steel	$ 3,000	1 yr unconditional
2. Fiberglass Coated Steel	6,000	20 yr unconditional
3. Fiberglass Coated, Double-Walled Steel	14,000	20 yr unconditional
4. Epoxy Coated steel, Sacrificial Anode	4,500	20 yr limited
5. Fiberglass (standard)	4,500	30 yr unconditional
6. Fiberglass (alcohol blends)	5,000	1 yr unconditional
7. Tank Relining (all steel tanks)	5,000	10 yr limited warranty

Notes:

1. Unconditional Warranty refers to tank replacement and/or repair costs.
2. Limited Warranty refers to a pro-rated refund of the purchase price.
3. The standard fiberglass tank warranty is based on gasoline blends with: no more than 10% ethanol; 4.75% methanol with 4.75% GTBA; but no blends containing only methanol.
4. Alcohol Blend Fiberglass Tank refers to unlimited ethanol/methanol blends.
5. Costs and warranties shown are representative of the industry.
6. A 10,000-gallon tank is the most common size used for new installations.

accelerate the corrosion process at that point, see figure 1. When steel tanks corrode, they are serving as one part of an underground electrical circuit which is driven by an electrical potential. There are a number of ways in which an electrical potential may arise, including varying soil conditions, interconnections of several dissimilar metals, stray current, and the influence of either older or newer tanks.

The National Fire Protection Association's (NFPA) Flammable and Combustible Liquids Code and the Uniform Fire Code define corrosive soil as that having a resistivity of 10,000 ohm-centimeters or less. However, corrosion may occur in soils of higher resistivity, especially where the soil is heterogeneous or where bi-metallic couples are involved. Examples of the latter case include interconnection between steel tanks and a copper grounding system.

Use of clean, high resistivity backfill (e.g., sand) enhances corrosion control but is not sufficient protection, since infiltration of water may impart to the sand a resistivity similar to that of the surrounding soil. Street deicing chemicals penetrating and saturating the soil will lower its resistivity. Stray current corrosion may result when tanks are buried near cathodic protection rectifiers, factories or shops using direct current, or direct current railways or transit systems. Installation of new tankage near existing buried tanks may cause the development of dissimilar surface corrosion cells, with the new tanks being anodic to the old ones. Figures 1 and 2 illustrate electrochemical corrosion and corrosion causes by differences in oxygen and moisture content of soils.

Design Alternatives

Protection systems

Unprotected and asphaltum coated steel tanks offer the lowest initial cost alternatives. They can be purchased from steel plate fabricators and usually a warranty of no more than one year normally accompanies these tanks. Over the past 10 to 15 years, various tank systems have been developed to inhibit corrosion in steel tanks, and fiberglass tanks have taken a major share of the market. Alternatives to the use of unprotected tanks include:

Cathodic protection. Applying an induced electrical current to the subsurface environment in the vicinity of the tank to reverse the electrical potential, thus preventing tank corrosion. Both galvanic and impressed current cathodic protection are used for buried tanks and piping. The NFPA recommends that steel tanks and piping with or without coating be protected by cathodic protection; the Uniform Fire Code requires that both coatings and cathodic protection be used.

Galvanic Cathodic Protection. This control system creates a current reversal in the vicinity of the tank to prevent external tank corrosion in steel tanks. A sacrificial anode, usually consisting of magnesium or zinc, is attached to the tank. This creates a localized bi-metallic cell in which the anode is consumed and ions are transported to the tank, which becomes the cathode. At this point, there is no tendency for metal ions from the tank to enter the soil, and thus the tank does not corrode. This system is usually used to protect the tank only, and insulation is required at the tank/piping interface. An advantage of the system is that no external power supply is required. If the system is properly designed, anode replacement is not required for at least five to ten years. The rate of anode consumption is inversely related to the corrosivity of the local environment.

Since the system is passive, it is not always possible to induce adequate current to prevent tank corrosion, especially in moist soils. Current requirements may be sharply reduced, however, by coating the tank with fiberglass, epoxy, or other electrical insulating material. Therefore, galvanic cathodic protection is an ideal fail-safe control for coated tanks to prevent localized corrosion that might otherwise result from coating surface imperfections.

Impressed Current Cathodic Protection. When steel tanks corrode, they are serving as one part of an underground electrical circuit that may be driven by naturally occurring differences in soil characteristics, the presence of dissimilar metals, or stray electrical current. As previously mentioned, galvanic cathodic protection is not always adequate to inhibit corrosion in highly corrosive environments. Impressed current cathodic protection employs an induced electrical current to the soil in the vicinity of the tank. The current is adjusted to provide the voltage necessary to prevent tank corrosion. Unlike galvanic cathodic protection, an external power supply is required. Impressed current cathodic protection can prevent corrosion from both the tanks and the ancillary piping. Maintenance is equivalent to that required to burn a 100-W light bulb continuously. However, power requirements are greater for an uncoated

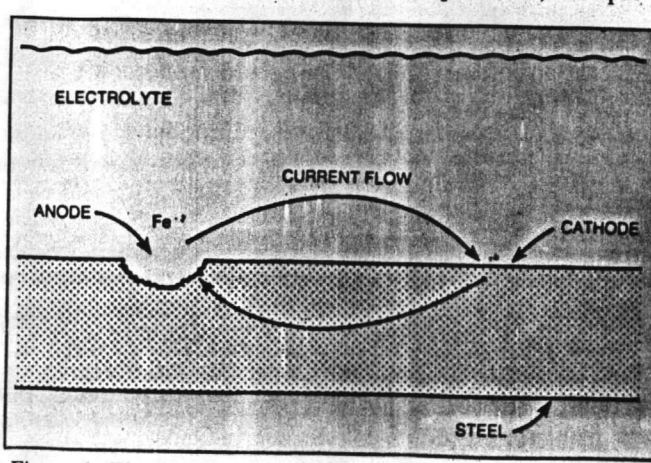


Figure 1. Electrochemical corrosion.

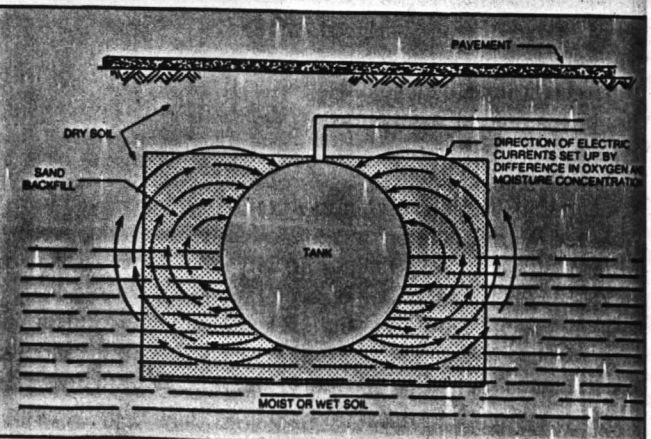


Figure 2. Corrosion caused by differences in oxygen and moisture in soils.

steel tank.

Cathodic protection current may fail because of anode deterioration, broken lead wires, rectifier malfunction, or power interruption. Also changes in underground structure configuration or deteriorization of coatings may change current requirements. Therefore, system maintenance is essential in providing long term protection. Impressed current rectifiers should be checked monthly and adjusted if necessary. Once a year, potential measurements should be made to determine if rectifier adjustments are needed. A properly installed and maintained cathode protection system should provide lasting protection from external corrosion to a well-coated tank.

Fiberglass Coated Steel Tanks

Fiberglass coated steel tanks represent an attempt to provide maintenance-free corrosion protection. A standard steel tank is coated with a 100 mm thickness of fiberglass reinforced plastic to shield the tank surface from the soil environment. The coating is tested for its coverage by the manufacturer using a spark testing device. Fiberglass coated steel tanks normally have a 20-yr warranty against leakage. As long as the thickness of the fiberglass coating is at least the stated minimum at all points, the tank will provide excellent protection. However, the existence of any pinholes in the fiberglass coating can concentrate electrical current at that point and result in highly accelerated localized corrosion. A similar result can occur if the coating is damaged during shipping or installation. This potential for localized corrosion can be minimized by combining fiberglass coating with cathodic protection.

Double-Walled Fiberglass Coated Steel Tanks

A doubled-walled fiberglass coated steel tank provides added protection against leaks. As the name implies, the tank consists of one steel tank inside another with a fiberglass coating over the outer tank. In addition, an automatic leak detection system may be offered to signal the presence of any water or hydrocarbons in the cavity between the inner and outer tanks. A 20-yr warranty is normally offered for this type of tank system. The system is potentially subject to the same corrosion problems discussed earlier because of possible imperfections in the fiberglass coating; however, the risk of leakage is reduced by having an inner tank and detection system.

The double-walled fiberglass coated steel tank has only recently been introduced in this country. A similar system has been used in Europe for more than a decade. The chief difference between the European and American systems lies in the leak detection system used to monitor the cavity between the steel layers. The American system uses an electronic moisture dectector while in the European system, the cavity between the two tanks is filled with a liquid, and leaks are detected by monitoring of changes in liquid characteristics.

The electronic monitoring system adds about $1,500 to the cost of one tank and about $300 to each additional tank. The monitor can distinguish between hydrocarbons and water in the cavity. A float device activates an alarm to signal a leak. Conceivably, the combination of cathodic protection and a double-walled fiberglass coated steel tank could further reduce corrosion potential, particularly in highly corrosive soil environments.

Jacketed Steel Tank

Another means available to inhibit corrosion is to place polyethylene as a loose fitting jacket around the tank. Advantages to jacketing are that it can be used to protect piping and can locate a leak anywhere in the system. However, the system is largely unproven, and there are some questions remaining pertaining to the long-term durability of the seals under field conditions.

Coated and Electrically Protected Steel Tanks

The Steel Tank Institute's Sti-P3 tank is an example of an outstanding system that employs the concepts of both protective coating and altering local currents to resist corrosion. A protective coating of epoxy or urethane isolates the steel tank from the soil environment. The coated tank is combined with a sacrificial anode connected to the tank as described earlier. The sacrificial anode system provides protection against localized corrosion at any pinholes or scratches which may exist in the protective coating.

Steel Tank Repair

The primary method for repairing steel tanks is lining the interior of the tank with epoxy-based resins, isophthalic polyester-based resins, or some other coating that is compatible with fuel products. After all liquid has been removed and the tank is purged with air to evacuate vapors, (since a person must enter the tank to perform the repairs). The interior of the tank surface is then carefully prepared. Preparation includes removal of sludge deposits and abrasion basing to free the interior surface of all oil, grease, dirt, scale, rust, oxides, paint, or other foreign matter. The interior surface is then brushed, blown with compressed air, and vacuumed. These minimum procedures are essential to achieving satisfactory adhesion of the lining material to the interior surface; otherwise, the lining is not likely to adhere to the tank interior surface. After the lining material is applied, the tank is tightness tested using air pressure or other means.

Lining does not add significant structural strength to a tank. Lining is not suitable for repairing tanks with: (1) Open seams more than 3 inches long; (2) perfora-

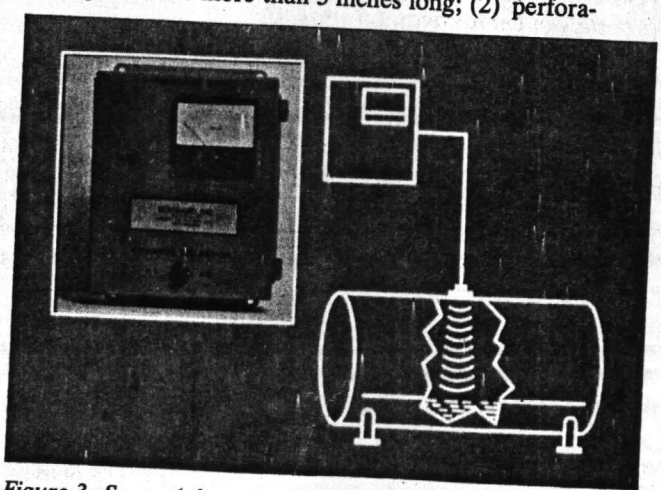


Figure 3. Sonar (ultrasonic echo ranging) instrument capable of displaying the contents of horizontal cylindrical tanks directly in gallons as opposed to methods which only display actual depth of fluids. (Courtesy of Bernhard Inc.).

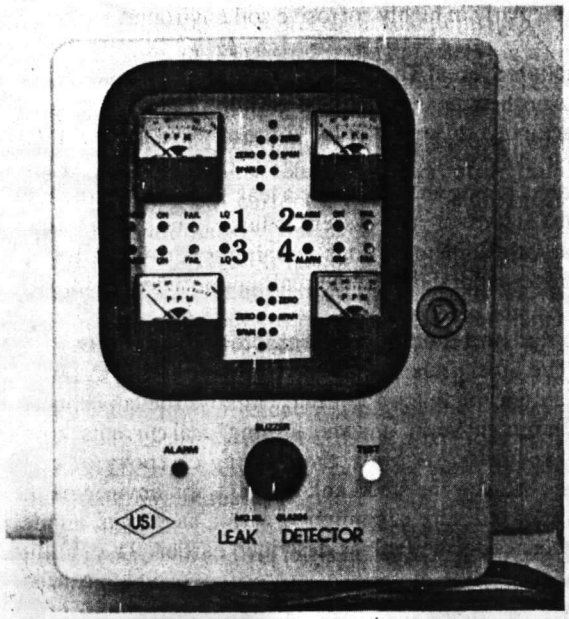


Figure 4. Detector for tank leak monitoring. (Courtesy of U.S. Industrial Products Co., Norwalk, CT).

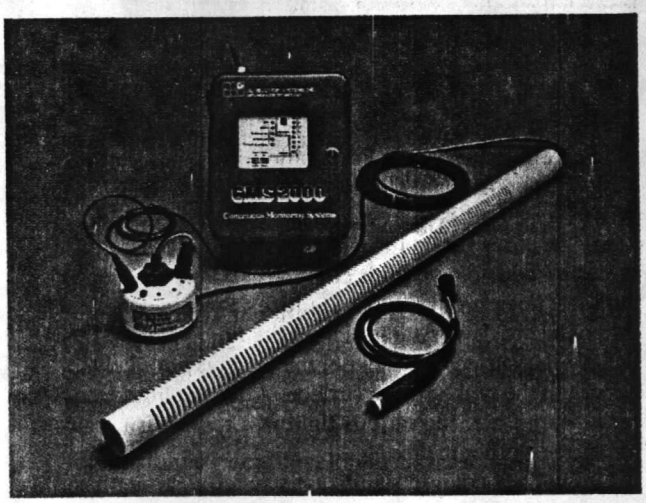


Figure 5. Continuous groundwater monitoring system. (Courtesy of Oil Recovery Stems Inc.).

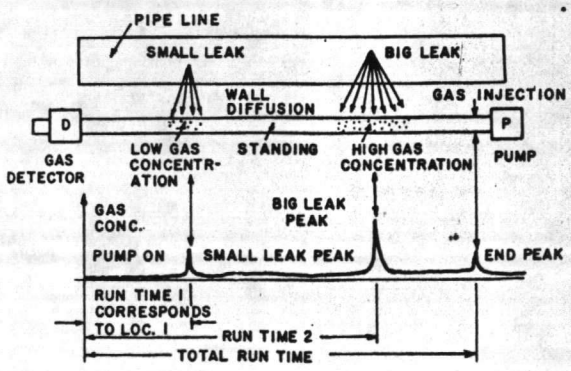


Figure 6. New alarm systems permit early detection of small leaks. The Leakage Alarm System for pipeline has proven highly reliable for long distances. (Courtesy of Teledyne Geotech, Dallas, TX).

tions larger than about 1½ in. diameter; or (3) more than 5 perforations in a given square foot of surface area. Tank lining is performed by numerous companies, and company certification or mandatory specifications are not normally required. Tank lining costs about $2,000 for a 4,000-gal tank and $4,000 to $5,000 for a 10,000-gal tank. An additional cost of $500 to $1,000/tank is required if a manway has to be constructed for tank entry.

Internal Steel Tank Corrosion

The discussion of steel tank corrosion causes and controls has thus far been limited to external tank corrosion. However, the buildup of water and/or sludge on the bottom of steel tanks can contribute to internal corrosion. Magnesium anodes or zinc strips may also be applied to the interior of steel tanks to inhibit internal corrosion. Conceivably, the methods discussed for steel tank repair could be adapted to periodically clean the inside of tanks to inhibit internal corrosion. The drawbacks of this approach include possible safety hazards. Recommended methods for preparing a tank for safe entry and for cleaning the inside of a tank prior to repair must be followed. It is also possible that periodic entry and cleaning may result in the early identification of leaks or potential leaks through visual inspection.

Fiberglass Tanks

Fiberglass tanks offer the distinct advantage of eliminating corrosion without the need for special corrosion prevention systems. However, their relative lack of structural strength requires more stringent installation specifications to avoid tank rupture due to uneven loads. The dominant U.S. manufacturer of fiberglass tanks maintains a certified list of tank installers for their customers.

Piping Leaks

A significant portion of underground storage system leaks occurs in the ancillary piping associated with the tank. As with tank leaks, corrosion appears to be the major cause of pipe leaks. However, other causes include breakage (which may result from improper installation practices) and loose pipe fittings. Impressed current cathodic protection systems can protect both tank and piping from corrosion, while galvanic cathodic protection systems normally only protect the tank and not the piping. In one adaptation of impressed current cathodic protection, a flexible wire-like polymeric anode with copper coating is placed alongside the pipe. The high surface area of the device and its close proximity to the piping can reduce power costs and minimize stray current.

Materials of construction

Materials selection for tank construction, underground tank protection and storage is the critical consideration in planning any installation. Materials of choice should retain their structural integrity for the life of the installation under any conditions expected to be encountered. Structural requirements for tanks and liners are met by many common materials: steel, polyvinyl chloride, and iron. The use of corrosion resistant materials may be required for specific conditions.

Parameters that affect corrosion may include pH,

specific conductance, alkalinity, hardness, total dissolved solids, chloride and trace metals. Metallic corrosion problems may be encountered under either oxidizing or reducing conditions and are aggravated by high dissolved solids content. Other materials (e.g., plastics) may deteriorate under the influence of dissolved chemical substances or by direct contact with wastes. Potential problems also exist due to microbial attachment and growth and sorptive capacity of exposed materials for the chemical species. Therefore, the best material for a tank must retain its integrity in aerobic, unsaturated surface zone to conditions in the saturated zone.

The corrosive and leaching properties of groundwater on tank exteriors as well as stored contents must also be considered. The critical system variables that must be considered and controlled include:

- Chemical composition of the solution, including pH;
- Temperature; and
- Surface area exposed.

Leachate and groundwater at industrial waste handling areas are often difficult to characterize due to diversity of the sites, wastes and other conditions. Profiles of two broad categories of contaminated groundwater compositions are shown in Table 3.

The most widely used materials of construction for tanks include:

- Low carbon steel; galvanized steel; stainless steel 304 and 316. Most existing underground tanks are made of carbon steel and unprotected from corrosion with either a liner or cathodic treatment. Stainless steels are predictably the most chemical resistant of the ferrous materials but may be chloride ion sensitive which can cause pitting corrosion, especially over long-term acidic conditions exposure.
- Teflon; PVC (plasticized and unplasticized); polypropylene; polyethylene (conventional, linear); polymethylacrylate (Lucite or Plexiglas); Viton; silicone and Neoprene; fiberglass reinforced polyesters. Generally superior performance can be expected of polymeric materials under acidic or high-dissolved solids conditions. As the organic content of solutions increases, direct attack on the polymer matrix or more subtle effects due to solvent absorption/adsorption/ or leaching may be expected.

Control Alternatives

The number of control alternatives applicable to existing tanks is fewer than for new tanks. For example, an existing tank cannot be easily equipped with secondary containment. There are, however, several secondary containment alternatives for new tanks. Leak deterrence and leak detection controls do exist though and are readily applicable to existing tanks as shown in Table 4 and for new tanks in Table 5.

Leak Detection

Leak detection controls can reduce the costs of cleanup by detecting leaks early.

Double-Walled Steel Tank with Fiberglass Coating and Interstitial Monitoring. Double-walled steel tanks consist of one tank inside another with a cavity between the tanks to contain any leaks. A continuous automatic leak detection system may be installed in the cavity to detect the presence of water or hydrocarbons. This de-

Table 3. Chemical Composition of Contaminated Groundwater Near Hazardous Waste Sites

	High organic/ low inorganic		Low organic/ high inorganic
pH	6-8		3-6
TOC	> 10		—
COD	25-41,000		—
TDS	1,000-2,000		1,000-13,000
Phenols	0.5-3	Zn	1-100
Organic Bases	0.8-25	Cd	1-8
Aromatic Hydrocarbons	0.1-14	Cr	1-200
Chlorinated Aliphatic Hydrocarbons	0.1-150	As	10-10,000

All values in $mg \cdot L^{-1}$, except for pH
— denotes insufficient data to present a range of values

Table 4. Leak Control Alternatives for Existing Tanks

Leak detection controls	Leak deterrence controls: Interior tank lining	Galvanic cathodic protection	Mandatory tank replacement
Annual tank integrity testing	•	•	•
Groundwater monitoring	•	•	•
Manual daily inventory control	•	•	•
Continuous inventory control	•	•	•
Soil vapor zone monitoring (equipment purchase)	•	•	•
Soil vapor zone monitoring (outside service)	•	•	•

Table 5. Leak Control Alternative for New Tanks

Leak deterrence controls

1. Exterior fiberglass coating of steel tanks
2. Galvanic cathodic protection of steel tanks
3. Impressed current cathodic protection of steel tanks
4. Standard fiberglass tanks
5. 100% methanol-resistant fiberglass tanks
6. Fiberglass piping

Leak detection/containment controls

1. Double-walled steel tank with fiberglass coating, cathodic protection, and continuous interstitial monitoring
2. Double-walled fiberglass tank with continuous interstitial monitoring
3. Annual tank integrity testing
4. Groundwater monitoring
5. Manual daily inventory control
6. Continuous automatic inventory control
7. Soil vapor zone monitoring with equipment purchase
8. Soil vapor zone monitoring by outside service
9. Tank system pit liner with continuous monitoring

tection system allows time to remedy the situation prior to release to the environment. The high degree of protection afforded by this system makes it especially suitable to areas that are particularly vulnerable to groundwater contamination.

Double-Walled Fiberglass Tank with Interstitial Monitoring. The fiberglass version of the double-walled tank has the anti-corrosion strengths and potential structural drawbacks of fiberglass described previously. It is also especially suitable for highly vulnerable areas.

Groundwater Monitoring. Groundwater monitoring can be an effective means of identifying a tank leak, particularly in areas of shallow groundwater. Laboratory tests for benzene, xylene, and toluene (components of gasoline) can be performed on groundwater samples. Another option would be an inspection only for the sight or smell of petroleum products in the sample. While this method reduces costs, it also increases subjectivity and makes effective monitoring more difficult.

Soil Vapor Zone Monitoring. Portable soil vapor zone monitoring equipment can be purchased and used to periodically detect the presence of hydrocarbons in the soil.

Tank System Pit Liner with Continuous Monitoring. Tank system pit liners have the advantage of containing leaks from both the tank and the piping. A continuous monitoring device similar to that used in a double-walled tank can provide early warning of leaks and allow action to be taken prior to release into the soil of the liquid volume contained by the liner. The liner system appears to offer a significant initial cost advantage over a double-walled tank. However, the liner can still allow some contamination of soil, which can result in higher remedial costs when a leak occurs.

Standpipe Method. The Petro-tite test is probably the oldest and most common tank testing device now in use. The tank is overfilled into a standpipe, and the changes in liquid level in the standpipe are observed for up to 12 hr. Liquid is added to or removed from the standpipe as needed to keep the liquid level constant, and any additions or removals are recorded. The tank contents are continuously mixed with a circulating pump. Liquid is withdrawn from the top of the tank and injected near the bottom of the tank. Prior to injection, the liquid temperature is continuously monitored and recorded so that liquid volume changes due to thermal expansion or contraction can be accounted for. Cost of testing is about $350/tank, and the stated accuracy is 0.05 gal/hr. The equipment can be purchased and is relatively simple to operate.

Buoyancy Device. The Leak Lokator is another tank testing device. It was originally developed by Sun Oil Co. A sensor is suspended in the tank, and the buoyancy of the device is used to detect any changes in liquid level. The system operates on the principle that the weight of the sensor when suspended in the tank is equal to its actual weight minus the buoyancy force on the portion of the sensor suspended in the liquid. Any change in the liquid level above the sensor will alter the buoyancy force and the weight of the sensor. An analytical balance connected to a strip chart automatically measures and records the weight of the sensor throughout the test. The sensor is a hollow tube partially filled with liquid. Evaporation effects tend to be compensated for if evaporation from the liquid in the tube equals evaporation from the tank. Temperature changes are monitored by a probe in the center of the tank and continuously recorded. The effects of thermal expansion/contraction can then be estimated by use of the liquid's coefficient of expansion. The test takes only a few hours, and unlike the standpipe method, the tank does not need to be overfilled. The test can be run several times using different liquid levels to identify the location of the leak. The price for the test is about $500/tank. The equipment is not available for purchase. The stated accuracy is 0.05 gph.

Sonar Device. Vacutect is a sonar system originally developed by Athabasca Research, Ltd., Edmonton, CN. In this system, a hydrophone is inserted into the tank and connected to a microprocessor outside the tank. The internal pressure of the tank is then incrementally reduced. Air bubbles entering the tank as a result of the reduced internal pressure are detected by the hydrophone. The characteristic sound made by bubbles allows the system to estimate the size and location of holes in the tank.

Auxiliary sensors are also available which can detect bubbles of water entering the tank when the hole occurs below the water table. The water sensor detects the presence and depth of water in the bottom of the tank. When water is detected in the bottom of a tank, the internal pressure is reduced to compensate for the amount of fuel on top of the water. This effectively places the water at atmospheric pressure and induces the flow of water into the tank if any openings exist in the tank walls. The sensor then detects and records any water level changes in the tank.

The sonar test for air bubbles takes about 20 minutes, while the test for water intrusion may take up to three hours. Custom-made vans contain the microprocessing and recording equipment. The Vacutect system is reportedly capable of detecting and locating holes as small as 1/4000 in. diameter. The system is not capable of estimating leakage rates. The test appears to be relatively simple to perform and costs about $400/tank. The system described is not available for sale, however, and sonar systems are available.

Helium Testing Devices. To perform this test, all tank openings are sealed and helium is injected into the tank at a pressure of 0.5 psi. Helium is a relatively small and mobile molecule which readily passes through any holes in the tank. A portable mass spectrometer is used to detect the presence of any helium at the ground surface. The test can take up to several hours. The systems are relatively new and are offered by several firms.

Pressure Measuring Device. The Ezy Chek system is marketed by Horner Creative Metals, Inc. Air bubbles are injected 3 or 4 in. below the liquid surface in the tank. A probe monitors the pressure at the point where the bubbles are released. This pressure is automatically recorded on a chart. When the chart indicates a change in pressure, liquid can be added or removed until the original reading is attained. A temperature probe is inserted into the tank and readings are taken every 15 minutes. Testing personnel can use these temperature readings later to estimate changes in volume due to thermal effects by knowing the liquid's coefficient of expansion. The test can be run at different liquid levels to determine whether the leak is in the piping or in the tank. The stated accuracy is up to 0.01 gph, but the ac-

curacy decreases as the liquid level in the tank is lowered. The test costs about $200 to $250/tank, and the equipment sells for approximately $7500.

Hydrostatic Testing. Many variations of this test exist; however, all use the same principle of increasing the tank pressure via a standpipe, hand pump, or similar device. The pressure is then observed, with a reduction in pressure signifying a leak. The base cost of the test is similar to that of other methods (about $500/tank). A major disadvantage of this test is that it may create leaks or worsen existing leaks because of the increase in pressure in the tank.

Laser Device. The American Petroleum Institute (API) recently funded a research program to investigate the feasibility of using a laser system to detect small differences in tank levels. The findings of the program showed that the concept was feasible. However, leak detection accuracy of the system was detemined to be 0.1 gph, which is less sensitive than the stated accuracy of 0.05 gph for other systems. However, the authors have found no documentation to verify that other systems can consistently attain their stated accuracy levels. The laser system also proved quite complicated to operate. The approach has never been developed commercially and, therefore, is not an option at this time.

Capacitance Probe. Mooney Equipment Company, New Orleans, LA, has recently introduced a capacitance probe that reportedly can measure level changes of 0.01 to 0.02 in., which reduces the required testing time. The stated accuracy of the system is 0.02 gph. The device is being tested by Underwriters Laboratory, but no results are available at this time. The complete test unit can be purchased for $3800.

Atmospheric Pressure Test. This system is currently being developed by Shell Canada. The concept is to insert a one-inch tube into a full tank and isolate the remainder of the tank openings from the atmosphere. Should the tank leak, any pressure change in the void space will be reflected by the liquid level in the tube. The smaller the original void space, the greater the sensitivity to detect a leak. As with the laser device, this system is not commercially available at this time.

Inventory Methods. Daily inventory of product purchases and sales can identify discrepancies in product storage. However, practical problems with the inventory method include: (1) Careful inventory recording is not the norm in the industry; (2) discrepancies due to over- and under-deliveries, theft, incorrect measurement, evaporation, and spillage, and inaccurate pump meters can and do occur; and (3) only major discrepancies are apparent and slow leaks may not be identified.

Warren Rogers Associates has developed a statistical computerized package to evaluate a month of daily inventory data. The program will identify discrepancies in inventory but cannot positively identify that the reason for discrepancy is a leaking tank. Several other computer software programs are described in the January 1986 issue of *PE*.

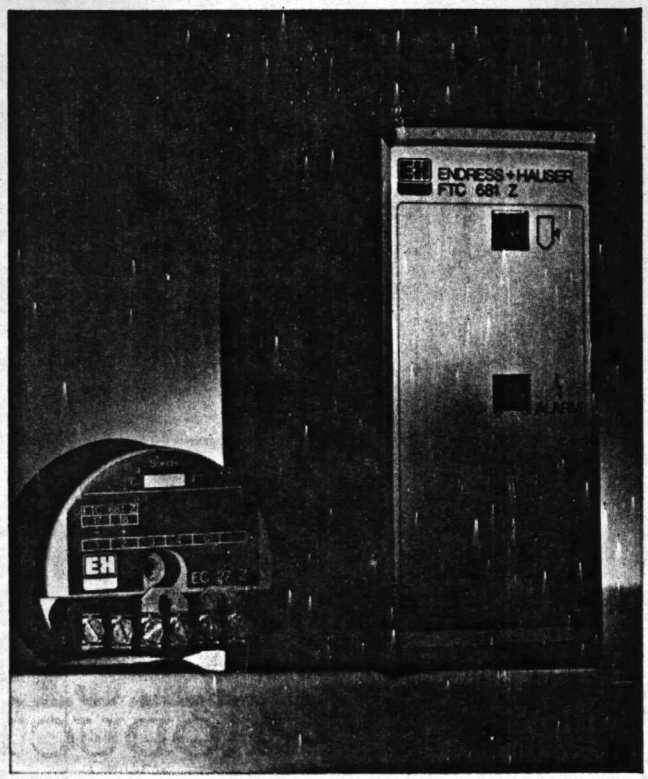
Inspection

Tanks sometimes appear to be leaking according to various tests, only to be found not leaking upon tank excavation and inspection. Visual inspection to identify tank leaks prior to excavation can be performed by inspectors entering the tank. If the tank is equipped with a manway, the cost of cleaning and inspection is about $1000/tank. However, installation of a manway is often required; this increases the cost of an inspection by several hundred dollars on a one-time basis. In the long term, though, periodic cleaning and inspection to positively identify tank leaks may be cost effective. It has the added advantage that periodic removal of sludge from the tank retards internal corrosion.

Legislative/Regulatory Outlook

The passage of P.L. 98-616 (in October 1984) has required the U.S. EPA to regulate underground tanks storing hazardous chemical products. Much of the intent initially was aimed at underground petroleum product tanks. It is expected that regulatory effort will, however, be directed to underground tanks, whether they contain hazardous chemicals or fuels. Thousands of industrial plants and municipalities are affected, not only because they have tanks holding gasoline, diesel fuel, and heating oil, but also chemical products. **PE**

Paul N. Cheremisinoff is Professor of Environmental Engineering and Director of the Physical Treatment Div.—University Cooperative Center for Research in Hazardous and Toxic Substances, New Jersey Institute of Technology, Newark, NJ; John G. Casana is Branch Manager, Underground Storage Tanks, Versar Inc., Springfield, VA; and Robert P. Ouellette, PhD, is vice president of Corporate Development, Versar Inc., Springfield, VA



For critical overspill and pump protection duties, the FTC 681Z self-checking capacitance level switch is widely used for oil/condensate, oil/water separation and leakage detection in semi-sub bouyancy tanks. (Courtesy Endress + Hauser, Greenwood, IN).

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Encl: (1) Draft 15 N.C. Admin Code 2 M.0100, Criteria and Standards Applicable to Underground Storage Tanks 28 Feb 1986

1. The enclosure is forwarded for your information and review. Please advise this office of significant issues involved in meeting these draft regulations.

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NORTH CAROLINA ADMINISTRATIVE CODE
TITLE 15

DEPARTMENT OF NATURAL RESOURCES
AND
COMMUNITY DEVELOPMENT

ENVIRONMENTAL MANAGEMENT DIVISION

SUBCHAPTER 2M
UNDERGROUND STORAGE TANKS
SECTION .0100
CRITERIA AND STANDARDS APPLICABLE TO UNDERGROUND STORAGE TANKS

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FEBRUARY 28, 1986

ENVIRONMENTAL MANAGEMENT

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SECTION .0100 - Criteria and Standards Applicable to Underground Storage Tanks

SECTION .0100 - CRITERIA AND STANDARDS APPLICABLE TO UNDERGROUND STORAGE TANKS

.0101 AUTHORIZATION

The Environmental Management Commission is authorized, under the provisions of Chapter 143, Article 21, and 21A of the General Statutes of North Carolina to develop and adopt such standards and regulations as necessary to provide protection and preservation of the water resources of the State by the prevention of pollution of those resources from underground storage tanks containing oil or hazardous substances.

History Note: Statutory Authority G.S. 143-215.3; 143B-282(2); Eff.

.0102 SCOPE

These regulations establish general and specific requirements and standards governing the registration, construction, installation, monitoring, repair, closure, corrective action, reporting and financial responsibility for underground tanks which are used for the storage of hazardous substances or oil.

History Note: Statutory Authority G.S. 143-215.3(a);
143B-282;
Eff.

.0103 EXEMPTIONS

The following are exempted from the requirements and standards established by these regulations for registration, construction, installation, monitoring, reporting and financial responsibility. The requirements for repair, closure and corrective action shall apply.

(1) any farm or residential tank of 1,100 gallons or less capacity when used for storing motor fuel for noncommercial purposes;

(2) any tank of 1,100 gallon or less capacity when used for storing heating oil for air conditioning purposes where consumed on the premises;

(3) any septic tank;

(4) any pipeline, including gathering lines, which are regulated under the following:

(a) the Natural Gas Pipeline Act of 1968;

(b) the Hazardous Liquid Pipeline Safety Act of 1979, or which is an intrastate pipeline facility regulated under State laws comparable to the provisions of the laws referred to in subsections (4)(a) and (4)(b) of this rule;

(5) any surface impoundment, pit, pond or lagoon;

(6) any storm water or wastewater collection system;

(7) any flow-through process tank;

(8) any liquid trap or associated gathering lines directly related to oil or gas production and gathering operations;

(9) any storage tank situated in an underground area such as a basement, cellar, mineworking drift shaft or tunnel, if the storage tanks is situated upon or above the surface of the floor;

(10) any pipes connected to any tank described in subdivisions (1) through (9) of this rule;

(11) any underground tank taken out of operation on or before January 1, 1974.

History Note: Statutory Authority G.S. 143-215.3; 143B-282; Eff.

.0104 DEFINITIONS

The definition of any word or phrase used in these regulations shall be the same as given in G.S. 143-213 and G.S. 143-215.77 except that the following words and phrases shall have the following meanings:

(1) "ANSI" means American National Standards Institute.

(2) "ASME" means American Society for Mechanical Engineers.

(3) "ASTM" means American Society for Testing and Materials.

(4) "Commission" means the Environmental Management Commission as organized under General Statute Section 143B-282, et seq.

(5) "Department" means the Department of Natural Resources and Community Development.

(6) "New tank" means any tank installed after the effective date of these regulations.

(7) "Nonoperational storage tank" means any underground storage tank in which a regulated substance was not deposited or from which a regulated substance was not dispensed after November 8, 1984.

(8) "NACE" means National Association for Corrosion Engineers.

(9) "Operator" means any person in control of, or having responsibility for, the daily operation of any regulated underground storage tank.

(10) "Owner" means any person who has the legal or rightful title whether the possessor or not.

(11) "Person" means any individuals, trusts, firms, partnerships, associations, public or private institutions, municipalities or political subdivisions, governmental agencies, or private or public corporations organized or existing under the laws of this State or nay other state or country.

(12) "Regulated substances" means:

(a) any substance defined in section (101)(14) of the Comprehensive Environmental Response, Compensation

and Liability Act but not including any substance regulated as a hazardous waste under subtitle C, of the Resource Conservation and Recovery Act of 1976, and

(b) oil in any form including, but not limited to, petroleum, crude oil, diesel oil, fuel oil, gasoline, lubrication oil, oil refuse, oil mixed with other waste, oil sludge, petroleum related products or by-products, and all other liquid hydrocarbons, regardless of specific gravity, whether singly or in combination with other substances.

(13) "Release" means any spilling, leaking, emitting, discharging, escaping, leaching or disposing from an underground storage tank into or upon any waters, tidal flats, beaches, or lands within this State, or into any sewer, surface water drain, or other waters that drain into the waters of this State.

(14) "Substantial modification" means the installation of any addition to, or change of, a tank which alters its on-site storage capacity by 10% or more, significantly alters its physical configuration, or alters the capacity to inhibit or detect leaks.

(15) "Substantial repair" means any repair to a tank, excluding piping, which involves excavation of the tank.

(16) "Tank" means any totally enclosed container used to

store regulated substances."

(17) "Underground storage tank" means any one or combination of tanks, including underground pipes connected thereto, which is used to contain an accumulation of regulated substances and the volume of which, including the underground pipes connected thereto, is 10 percent or more beneath the surface of the ground and which has not been exempted under rule .0103 of this subchapter.

(18) "UL" means Underwriters Laboratories Inc.

(19) "Waters" means any stream, river, creek, brook, run, canal, swamp, lake, sound, tidal estuary, bay, reservoir, waterway or any other body or accumulation, surface or underground, public or private, natural or artificial, which is contained within, flows through, or borders upon this State, or any portion thereof, including those portions of the Atlantic Ocean over which this State has jurisdiction.

History Note: Statutory Authority G.S. 143-215.3; 143B-282; Eff.

.0105 REGISTRATION

(a) Existing Tanks

(1) Tanks used for storage of a regulated substance after January 1, 1974 and which have not been

removed from the ground, shall be registered by the owner with the Department by May 8, 1986 unless such tanks are exempted under Rule .0103.

(2) Registration will be effected by completion and submission by the tank owner, on forms provided by the Department, information which will include, but not be limited to, the following:

(A) ownership;

(B) name and address of operator (if different from owner);

(C) age of tank;

(D) location;

(E) storage capacity;

(F) type(s) of materials of which tank and associated piping are constructed;

(G) types of substances currently or last stored;

(H) usage of tank if still existing at time of notification; and

(I) description of internal and external protection.

(3) Any owner who brings an existing storage tank back into operation after the date of the initial notification shall register the tank with the Department within 30 days of the date on which the change of operational status occurred and shall provide the Department with the following

information:

(A) the date upon which the tank became operational, and

(B) the information specified in subsection (a)(2) of this rule.

(4) Tanks for which notice was given pursuant to section (103)(c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 are exempt from the registration of this subsection.

(5) Beginning on the effective date of this rule and for eighteen months thereafter, any person who deposits a regulated substance in an underground storage tank shall, notify the owner or operator of the owner's registration requirements pursuant to subsection (a)(2) of this rule.

(6) Any owner notified under subsection (a)(5) of this rule shall, within 30 days notify the Department as specified in subsection (a)(2) of this rule.

(b) New Tanks

(1) Any underground tank which will be used to store a regulated substance and which is installed after the effective date of these regulations shall be registered with the Department by the owner within 30 days of the date of such installation.

(2) Registration will be effected by completion and submission by the tank owner of the information specified in subsection (a)(2) of this rule.

(3) Any person who sells a tank intended to be used as an underground storage tank shall notify the purchaser of such tank of the owner's registration requirement pursuant to subsection (a)(2) of this rule.

History Note: Statutory Authority G.S. 143-215.3; 143B-282.
Eff.

.0106 TANK AND PIPING DESIGN AND CONSTRUCTION

(a) Any underground storage tank and associated piping, installed after the effective date of these regulations, for the purposes of storing regulated substances (whether of single or double wall construction), shall:

(1) be constructed in a manner to prevent releases due to corrosion or structural failure for the operational life of the tank;

(2) be cathodically protected against corrosion, or constructed of glass fiber-reinforced plastic, or steel clad with a glass fiber-reinforced plastic; and

(b) Tanks shall be used in accordance with and meet the requirements of the ASTM, API, ANSI and UL Standard applicable to the specific product stored.

(c) Piping valves and fittings attached to underground storage tanks shall:

(1) meet the specifications and limitations of:

(A) ASTM A395-80 if constructed of nodular steel, or of

(B) ANSI B31 if constructed of any other material.

(2) have liquid tight joints which shall be welded, flanged, or threaded, except that flexible connectors meeting the requirement of NFPA 30 may be used.

History Note: Statutory Note: G.S. 143-215.3; 143B-282; Eff.

.0107 CATHODIC PROTECTION

(a) Cathodic protection systems shall be of either the sacrificial anode type or impressed current type meeting requirements as follows:

(1) sacrificial anode-type system shall:

(A) meet the requirements of ULC 603.1-M-1982 as a minimum;

(B) be electrically isolated;

(C) be designed and installed to permit periodic measurement of the structure-to-soil potential, and be tested six weeks after installation or new excavation in the area, and annually thereafter using ASTM Method G57-78.

(D) not used for bare-steel tanks.

(2) impressed current-type shall:

(A) be designed so that the impressed current

source cannot be de-energized at any time including during closure of the facility, except during power failures or to perform service work on the storage system or the impressed current cathodic protection system;

(B) be equipped with a continuously operating meter to show that the system is working. The operator shall verify, at least once a month, that it is operating;

(C) be checked by a qualified person at least once a year to measure the structure-to-soil and structure potentials, the rectifier voltage and the current output;

(D) be connected to all metal structures within the electrical field;

(E) utilize a rectifier with an output capacity sized to provide the amount of current needed to protect the entire tank and piping system;

(b) Monitoring the effectiveness of cathodic protection for tank and piping systems shall be accomplished by using copper-copper sulfate electrodes to measure the structure-to-soil difference in voltage, which must measure 850 millivolts negative to be considered effective.

(c) If any checks or tests indicate that the system is not functioning effectively, the cause shall be determined and the necessary repairs made within 60 days of test.

representatives during normal business hours on the premises where the tank is located.

History Note: Statutory Authority G.S. 143-215.3; 143B-282; Eff.

.0108 TANK INSTALLATION CRITERIA

(a) All tanks shall be installed in accordance with the manufacturers suggested procedures for installation and as a minimum shall be:

(1) installed in excavations sufficiently large to provide a minimum clearance of 12 inches (in the case of steel tanks) and 18 inches (for fiberglass reinforced plastic or steel tanks) in all horizontal directions. The excavation shall be deep enough to provide for a gravel backfill below the bottom of the tank of at least 12 inches. The bottom of the excavation shall be graded to provide at least a five degree slope along the longest axis of the excavation;

(2) lifted and gently lowered into the excavation using the lift lugs installed by the manufacturer. Dropping or rolling the tank into the excavation is not acceptable. Tanks installed in an excavation containing water shall be securely anchored or weighted to prevent floatation with contents removed. For tanks that are to be anchored

to an underlying solid slab at least 12 inches of pea gravel should separate the slab from the bottom of the tank. Anchors should be electrically isolated from the tank;

(3) set and leveled on a firm base of and surrounded by at least 12 inches of well rounded pea gravel.

(4) covered with a minimum of two feet of backfill, or with not less than a foot of backfill, on which shall be placed a slab of reinforced concrete not less than four inches thick. When tanks are, or likely to be subjected to traffic, they shall be protected from damage by at least three feet of backfill, or not less than 18 inches of compacted backfill plus at least six inches of reinforced concrete or eight inches of asphaltic concrete. Concrete capping shall extend at least one foot horizontally beyond the outline of the tank in all directions. The permeability of the backfill shall be less, than that of the upper two feet of the surrounding undisturbed soil;

(5) all temporary supports must be removed prior to final backfilling;

(6) access manholes shall not rest directly on top of the tank;

(7) all tanks shall be fitted with an overflow prevention device.

(b) Tanks must have secondary containment when installed within:

(1) an excavation made into bedrock;

(2) the hydrostatic cone of influence of a public water supply well; or

(3) 300 feet of any water supply well or WS-1 or WS-2 classified stream.

(c) Where required, secondary containment measures will consist of:

(1) double walled tanks constructed of materials of sufficient density, thickness and composition to prevent structural weakening of the outside wall. An electrical or mechanical leak detection system shall be emplaced in the interstitial space between the inner and outer tanks walls and must be cathodically protected;

(2) an excavation pit lining composed of natural or synthetic materials having a permeability no greater than 0.25 ounces per square foot in any 24 hour period:

(A) the floor of the lined pit shall be sloped to a sump from which a sample can be taken to determine if the contents of the tank are leaking into the lined pit;

(B) the size of the lined excavation shall be of sufficient size to contain 100 percent of the volumn of the emplaced tank in addition to the

tank;

(C) the top of the lined pit shall be capped with an impervious cover to prevent entrance of fluid into the pit;

(D) an electrical or mechanical leak detection system shall be installed in the sump area to detect an leakage;

(3) secondary containment for piping that will consist of either:

(A) double-walled piping containing an interstitial leak detection system, or

(B) trenches lined with either a natural or synthetic material of not greater permeability than stated in subsection (c)(2) of this rule. The top of the trench shall be capped with an impervious material.

(d) Regulated substances shall not be introduced into a newly installed tank until the tank is tested in accordance with Rule .0110, and the requirements of Rule .0105 have been met.

History Note: Statutory Authority G.S.
Eff.

.0109 PIPING INSTALLATION CRITERIA

(a) All integral systems shall be installed, used, and maintained in a manner which will prevent releases.

(b) All integral piping systems shall be constructed in accordance with the applicable sections of API 1615.

(c) All integral piping systems shall be designed, constructed and installed in a manner which will permit periodic testing of the entire system including tanks.

(d) Piping shall have secondary containment as required for tanks under Rule .0108(b)

(e) A flexible coupling shall be used to attach the piping to the tank.

(f) Each owner or operator of any integral piping system shall test the piping whenever the associated tank is tested. All tests shall be conducted in accordance with API 1110, or other equivalent methods.

History Note: Statutory Note G.S.
Eff.

.0110 REPAIR

(a) Prior to the installation of a liner material in a buried tank as a part of a corrective action to control or prevent an unauthorized emission, the tanks owner must demonstrate that:

(1) the tank shall provide structural support for the interior lining;

(2) the tank to be lined has been cleansed so that no residuals remain on the surface to be lined;

(3) that the tank, if made of glass fiber, has not been

compressed more than one percent of the original diameter;

(4) that the tank, if made of steel, has been abrasive-blasted completely free of scale, rust or foreign matter to SSPC-SP 5-63 (S.SS.a3) standards and that all the following applu:

(A) no open split or seam longer than three inches;

(B) no perforation larger than 1 1/2 inches in diameter;

(C) no more than five perforations within any one square foot area;

(D) no more than twenty or more perforations in any 500 square foot area;

(E) no failure or opening within six inches of any seam or weld;

(F) the tank has never been previously lined;

(G) the lining material is compatible with both the tank material and the material to be stored in the tank;

(H) the liner will maintain its bond to the tank material for the period of the warranty;

(I) the coefficient of thermal expansion of the liner material is compatible with the tank material and thus will not cause inordinate stress due to temperature changes;

(J) every precaution has been taken to ensure all fluids, solids and gaseous vapors have been

thoroughly purged from the tank and any connected piping;

(K) a 1/4 inch steel striker plate with minimum dimensions of 8 inches by 8 inches has been installed under the fill tube and gauging tube if not striker plates previously existed.

(b) Prior to filling the repaired tank with a regulated substance and after installation of the liner material, the tank shall be hydrostatically tested for mechanical integrity in accordance with Rule .0111.

History Note: Statutory Authority G.S.
Eff.

.0111 TESTING

(a) Tanks and associated piping installed after the effective date of these regulations shall, before being covered, enclosed, or placed in operation, be hydrostatically tested to 150 percent of the maximum anticipated pressure of the system, or pneumatically tested to 100 percent of the maximum anticipated pressure of the system, but in either case not less than 50 pounds per square inch gauge at the highest point of the system.

(b) If a pneumatic test is performed, all joints and connections must be sprayed with a soap solution, and the test must be maintained for a time sufficient to complete visual

inspection for all joints and connections, but not less than 10 minutes.

(c) For tanks tested for tightness hydrostatically or with air pressure the test pressure shall be not less than 3 pounds per square inch and not more than 5 pounds per square inch after installation but before being covered or placed in use.

(d) Pneumatic tests shall not be performed after regulated substances have been placed in a tank.

(e) The Department may require the owner or operator to hydrostatically test for tightness if:

(1) accurate daily inventory records have not been maintained as specified in Rule .0112; or

(2) stored regulated substances and/or their vapors have been detected in leak detection systems, or in neighboring structures, sewers, wells, or other on-or-off property locations or noted discrepancies in inventory records.

(f) Results of tests performed pursuant to this rule must confirm tank and/or piping tightness prior to placing the tank into operation. Results which show less than .05 gallons per hour leakage will be acceptable.

History Note: Statutory Authority G.S. 143-215.3; 143B-282; Eff.

.0112 MONITORING

(a) Owners and operators of underground storage tanks shall maintain an inventory record of the regulated substances stored in those tanks.

(b) An inventory record:

(1) shall consist of separate daily inventory entries for each tank showing:

(A) the type(s) of substance stored;

(B) the amount of stored substance received;

(C) the amount of stored substance withdrawn;

(D) the amount of stored substance in the tank; and

(E) any gains or losses of the stored substance.

(2) shall show the level of water in the tank as measured weekly;

(3) need not be maintained on those days when no substance is deposited or withdrawn from the tank, provided that such a period does not exceed fifteen (15) days.

(c) Inventory measurements shall only be made by gauge or gauge stick or by readout from an automatic system.

(d) Loses or gains from each day's inventory period shall be averaged once a week and, should the averaged daily inventory indicate a loss or gain from the tank which exceeds one percent of tank capacity or 50 gallons, whichever is less, that cannot be explained or accurately accounted for, the operator shall, within 24 hours after the averaged inventory records indicated a gain or loss, conduct an investigation by taking the following actions in order:

(1) recalculate the inventory starting at a point where the record shows no loss or gain in excess of the allowable limits stated in (d) above;

(2) inspect any reasonable accessible physical components of the tank or associated piping, meters or dispensers for evidence of a leak;

(3) check any associated meters or dispensers for calibration;

(4) report, to the Department, within 72 hours of the completion of the investigation, the failure of steps (A) through (C) to accurately account for the recorded loss or gain, and within seven (7) days hydrostatically test the tank and reports the results to the Department within 24 hours of completion of the test; and

(5) Take corrective action, as specified in Rule .0114, if the results of the hydrostatic test indicate that the gain or loss recorded is due to failure of the tank or associated piping.

(e) Tanks and associated piping installed, substantially modified or substantially repaired after the effective date of these regulations must be equipped with a means of detecting, in addition to inventory, any leakage of the stored substance. The leak detection system may consist of:

(1) continuously operating detectors strategically placed in the excavation along the piping and tank, within the tank, or within the secondary

containment; or

(2) wells or detectors placed in an impervious underground catchment basin where piping or tanks are installed; or

(3) two wells when two or more tanks are installed in the same excavation or one well when only one tank installed, and located at the end of the excavation having the lowest elevation and wells located along the piping at intervals not exceeding 50 feet.

(b) Wells shall be:

(1) located within the gravel backfill;

(2) installed in a borehole at least six inches larger than the diameter of the casing;

(3) a minimum of two inches in diameter;

(4) screened with .02 inch maximum slots from the bottom of the borehole to within two feet of the ground surface;

(5) backfilled with a clean sand or gravel to the top of the screen and grouted the remaining distance;

(6) constructed of a material which is compatible with the substance stored;

(7) equipped with a locking air and watertight cap;

(8) be of a sufficient depth that:

(A) the bottom of the casing extends at least one foot into undisturbed soil beneath the

excavation but no deeper than ten feet below the bottom of the excavation; or

(B) the casing extends to within six inches of the bottom of a secondary containment, but not in contact with the containment walls.

(9) developed upon completion of installation until the water is clear and relatively sand free, if screened below the water table;

(10) protected from traffic with a water-tight manhole and cover.

(11) equipped with a continuously operating leak detection device;

(12) tested at least once weekly with a portable device inserted into the well whose detection limits are at least equal to continuously functioning devices; or

(13) sampled at least once weekly by the removal of at least one cup of fluid from a well screened below the water table, using a Kemmerer-type sampler or a sampler of similar design. The fluid shall be taken from the surface of the water table. The fluid shall:

(A) be poured into a clean, clear glass container kept for the purpose, and examined for signs of an oily sheen, layer or odor or pollutant;

(B) be tested at the site with an instrument whose detection limits at least equal

available continuously operating in-ground detectors; or

(C) be sent to a laboratory whose detection limits at least equal those in (c) below.

(c) Continuously operating leak detection devices shall be capable of detecting any releases of five hundredth (.05) of a gallon per hour or less. Detectors shall be checked daily for operation and indication of any leaks;

(d) All records of monitoring shall be retained in permanent form on the premises for at least three years and be available for inspection by Departmental representatives during normal working hours.

History Note: Statutory Authority G.S.

Eff.

.0113 CORRECTIVE ACTION

(a) When an anomaly is noted in any monitoring or inventory results, which is not explainable by causes other than from releases; the operator shall immediately notify the Department and investigate the source of the anomaly. The investigation shall not stop until the source of the anomaly has been found.

(b) Every operator shall take appropriate corrective action in response to a release from their underground storage tank facilities as may be necessary to protect human health and the environment, including the following requirements:

(1) if a discharge or leak is discovered, the leak must be contained as soon as practicable and the tank contents removed to prevent further leakage;

(2) no person shall put back into service any underground tank facility which has had a release or has otherwise failed, for the purpose of reusing the facility, without:

(A) containing the leak;

(B) performing or having the repairs performed in a manner which restores the structural integrity of the tank and/or piping; and

(C) testing or having the tank tested.

(c) Every operator shall prepare a contingency plan for effective action to minimize releases of regulated substances from their underground storage facility;

(d) Every owner or operator shall comply with closure standards that will ensure against any future release from an underground storage tank being closed or otherwise taken out of operations;

(e) The owner of a tank from which a release has occurred may be required by the Department to conduct a hydrogeologic investigation to determine the areal and vertical extent of impact and reclaim, recover and properly dispose of the released substance and other materials contaminated by it, restore the environment to a condition and quality acceptable to the Department, and repair damage caused by the release.

(f) When a confirmed tank failure occurs, the Department may require all tanks at the same location to be evaluated within 180 days to determine whether similar conditions to those which caused the confirmed tank failure exist. If an additional tank failure is detected, the owner or operator shall act in accordance with this section.

History Note: Statutory Authority G.S. 143-215.3; 143B-282; Eff.

.0114 FINANCIAL RESPONSIBILITY (Reserved)

.0115 CLOSURE

(a) Temporarily Out of Operation. A tank may be placed temporarily out of operation only when it is intended that the tank will be returned to operation.

(1) Any tank which is to be taken temporarily out of operation shall continue to be subject to the requirements for operational tanks, or perform the following steps in succession:

(A) all regulated substances contained in the tank must be removed;

(B) the fill line, gauge opening, and pump suction must be capped or plugged, using appropriate sealing compound on pipe fittings. If fill line and gauge openings are equipped with caps which can be securely locked, the locking of

these caps is sufficient;

(C) the vent line shall remain open.

(2) any tank temporarily out of operation for more than 180 days which has had the regulated substances removed, must be tested in accordance with Rule .0111 prior to being placed back into operation.

(b) Permanently Out of Operation. Any tank taken out of operation and not intended to be used again must be abandoned according to one of the following methods:

(1) In-Place Abandonment of Tanks. The following steps shall be carried out successively:

(A) all regulated substances and associated sludge and vapors must be removed from the tank;

(B) the suction, inlet, gauge and vent lines must be disconnected;

(C) fill the tank completely with a clean inert solid material, and

(D) cap remaining piping below grade.

(2) Tank Removal

(A) remove all regulated substances and associated sludge and vapors from the tank;

(B) disconnect and remove the suction, inlet, gauge and vent lines;

(C) cap or plug open ends of remaining lines; and

(D) close all openings in the tank with pipe plugs before the tank is removed from the ground.

Remove the tank, and backfill the excavation with clean inert material (such as sand, clay and/or gravel).

(2) collect and analyze, for stored product four subsurface samples and take appropriate corrective action if analytical results are positive.

(c) The owner or operator of any tank which has been abandoned or placed temporarily out of operation shall notify the Department within 30 days of tank closure.

History Note: Statutory Authority G.S.
Eff.

.0116 PENALTIES

Any person who violates any rules under this subchapter or order issued pursuant thereto shall be subject to penalties provided in G.S. 143-215.6.

History Note: Statutory Authority G.S.
Eff.

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APR 2 3 1986

ADMINISTRATIVE MESSAGE

ROUTINE

R 221521Z APR 86 ZYB

FM LANTNAVFACENGCOM NORFOLK VA

TO MCAS NEW RIVER NC

INFO CG MCB CAMP LEJEUNE NC

UNCLAS//N11010//

FAC ROUTING	ACTION	INFO	INT.
FACO			
4A			
4B			
4C			
4D			
4E			
4FC			
4LC			
SEC			
CLK			

SUBJ: CONSTRUCTION OF UNDERGOING USED OIL AND POL STORAGE TANKS

A. MCAS NEW RIVER 222010Z MAR 86
B. LANTNAVFACENGCOM 122126Z MAR 86
C. CBG MCB CAMP LEJUENE NC LTR 6280/9 FAC 14 MAR 86

1. IN RESPONSE TO REF A, USE OF DOUBLE WALL STORAGE TANKS DESCRIBED REF B BASED ON ENGINEERING JUDGEMENT. REF C FORWARDED DRAFT REGULATIONS WHICH DO PERMIT SINGLE WALL AND DOUBLE WALL UNDERGROUND STORAGE TANKS. MONITORING IS REQUIRED FOR BOTH TYPES OF TANKS. FOR SINGLE WALL TANKS A MONITORING WELL IS REQUIRED. FOR DOUBLE WALL TANKS MONITORING CAN BE ACCOMPLISHED BETWEEN THE WALLS. GENERALLY, THE DOUBLE WALL TANK IS MORE DESIRABLE THAN SINGLE WALL PLUS MONITORING WELL. UP TO 2500 GALLON CAPACITY, THE COST OF A DOUBLE WALL TANK AND SINGLE WALL TANK PLUS MONITORING WELL ARE APPROXIMATELY EQUAL.

2. USE OF DOUBLE WALL TANKS REPRESENTS OUR BEST ENGINEERING JUDGEMENT FOR MOST SITUATIONS, PROVIDES A BASIS FOR CONSISTENCY IN DESIGN AND ESTABLISHES POLICY GUIDANCE WITH RESPECT TO UNDERGROUND OIL STORAGE. THIS POLICY WILL BE EVALUATED FOR APPLICABILITY TO EACH INDIVIDUAL PROJECT. ROUTINE EVALUATION FOR COMPLIANCE WITH CURRENT REGULATIONS AND GOOD ENGINEERING PRACTICE WILL BE MADE.

3. INDIVIDUAL PROJECT DESIGNS WILL INCORPORATE APPROPRIATE PROVISIONS FOR OPERATIONAL AND MAINTENANCE REQUIREMENTS. WE ALWAYS STRIVE TO DESIGN FACILITIES WHICH PROVIDE A SAFE,

BFAC(2)...INFO FOR CG MCB CAMP LEJEUNE(7) 11010/ 1/0332
BCOS(1) BPWO(1) BSDO(1) CEO3(1) OICB(1)

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CSN:AUIA00349 LANTNAVFACENGC

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ENVIRONMENTALLY ACCEPTABLE WORKPLACE.

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AdW Davy DDS
- Becker DDB
File AT LAB ——

6280/10
FAC
02 JUN 1986

From: Commanding General, Marine Corps Base, Camp Lejeune
To: Commanding Officer, Marine Corps Air Station, New River, Jacksonville, North Carolina 28545-5000 (Attn: S-4)
Base Maintenance Officer
Public Works Officer

Subj: UNDERGROUND STORAGE TANKS, SUBMISSION OF NC NOTIFICATION

Ref: (a) CG, MCB ltr 6280/10 FAC dtd 14 May 86

Encl: (1) Packet w/Instructions and Notification Forms, dtd 13 Jan 86

1. Effective 8 May 1986, a notification within 30 days of installation for each new tank is required for submission to N.C. Division of Environmental Management. As described in the enclosure, request your office forward the completed forms for new tanks attached to a cover letter for my signature. Instructions for completion of the forms are provided in the enclosure. The reference provided the initial notification for 86 existing tanks.

2. For further information on this matter, please contact Mr. Bob Alexander, ext 3034.

T. J. DALZELL
By direction

Blind copy to:
MCEXO
NREAD (w/o Encl)
EnvEngr (w/o Encl)

Docket 328

File AT 4+8