



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

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OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

SUBJECT: *List of Integrity Assessment Evaluations for Underground Storage Tanks - Third Edition*

FROM: Anna Hopkins Virbick, Director / s /
Office of Underground Storage Tanks

TO: State UST Program Contacts
UST/LUST Regional Program Managers
Vendors Appearing on *List*

This cover memorandum transmits the updated subject list (attached) and information about its appropriate use. The *List of Integrity Assessment Evaluations* is now in its third edition, and includes four evaluations. The *List* is based on completeness reviews by an Integrity Assessment Evaluations Work Group, consisting of three state and two EPA UST program staff. Please note the disclaimers and limitations in the *List*. In places where the UST program implementing agency follows EPA guidance and references the *List*, we believe that it is helpful to owners, regulators, and vendors of assessments.

EPA's July 25, 1997 guidance (available from this office) serves as a basis for the *List*; please refer to it for detailed background information. The guidance spells out two recommended options for alternative assessments performed after March 22, 1998 for the upgrading of bare steel USTs with cathodic protection. One of the two options (Option B) is integrity assessment by a vendor procedure that has been successfully evaluated and certified by a qualified independent third party to meet specified performance criteria. The *List* addresses procedures that can be used under Option B. (For clarification of how the new ASTM G 158 Standard Guide applies to Option A of our guidance regarding national codes of practice, please see our memorandum of October 9, 1998, available from this office.)

Two minor revisions to our guidance should be noted. One revision is that EPA guidance no longer includes a maximum probability of false alarm under Option B. EPA realizes false alarm information has value, particularly to owners, and believes it should be reported. However, this information is not key to limiting environmental risk, so EPA has eliminated the recommended maximum. The other revision is that, while the original guidance recommended that the third party evaluator be a qualified test laboratory, university, or not-for-profit research

organization, EPA recognizes that private consultants and for-profit organizations can perform valid evaluations as well. Of course, it remains vital that the evaluator be qualified and have no current or pending financial or organizational conflicts of interest.

Whenever there are additions or changes, updates will be distributed in hard copy and posted at www.epa.gov/swerust1/ustsystem/altasses.htm. We welcome comments and new information. Please direct questions and comments to David Wiley of this office. He can be reached by phone at (703)603-7178, by fax at (703)603-9163, by e-mail at wiley.david@epa.gov, or by U.S. Mail at the letterhead address. As before, we thank the state members of the Work Group for their great willingness and ability to assist. We hope our distributing the *List* is helpful to you.

Attachment: * *List of Integrity Assessment Evaluations for Underground Storage Tanks - Third Edition*

cc: Katherine Nam, OGC
Joan Olmstead, OECA
Carolyn Esposito, NRMRLab, Edison, NJ
Dan Sullivan, NRMRLab, Edison, NJ
Members of Work Group on Integrity Assessment Evaluations
Larry Magni, American Petroleum Institute
George Schick, Chair, ASTM G01.10
Victor Chakur, Chair, ASTM G01
Bruce Noe, ASTM Headquarters
Marc Katz, National Association of Convenience Stores
Bob Renkes, Petroleum Equipment Institute
Kristen Manos, Petroleum Marketers Association of America
Mark Morgan, Petroleum Transportation & Storage Association
Roy Littlefield, Service Station Dealers of America
Tom Osborne, Society of Independent Gasoline Marketers of America

cc, cover only:
EPA UST/LUST Regional Program Managers' Supervisors
OUST Managers (via e-mail)
OUST Desk Officers (via e-mail)

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List of Integrity Assessment Evaluations for Underground Storage Tanks - Third Edition

January 22, 1999

Background

EPA's guidance on alternative integrity assessments under 40 CFR 280.21(b)(2)(iv) was issued July 25, 1997, and remains in effect with only minor revisions. This guidance spelled out two options for alternative assessments performed after March 22, 1998. "Option A" is adherence to a national code of practice. The other option in the guidance — "Option B" — is integrity assessment by a vendor procedure that has been successfully evaluated and certified by a qualified independent third party to meet specified performance criteria regarding detection of perforations and of either internal or external damage. The *List of Integrity Assessment Evaluations* addresses procedures under Option B.

The *List of Integrity Assessment Evaluations* is based on reviews by the Integrity Assessment Evaluations Work Group, which consists of state and EPA UST program staff. The current members are Russ Brauksieck of the New York Department of Conservation, Pejman Eshraghi of the Arizona Department of Department of Environmental Quality, Jeff Tobin of the Montana Department of Environmental Quality, and Paul Miller and David Wiley, both of EPA's Office of Underground Storage Tanks.

Please note that while this list is similar in format to the *List of Leak Detection Evaluations*, its content is completely different.

Content

The *List of Integrity Assessment Evaluations* contains only evaluations of procedures that have been certified by third parties to meet the criteria in the EPA's July 25, 1997 guidance, as revised. The evaluations must have been performed by an independent third party, with the actual condition of tanks unknown to the vendor at the time the tank is assessed, and in accordance with EPA's test protocol or a protocol deemed equivalent to it. (See EPA's "Test Protocol For Evaluating Integrity Assessment Procedures For Underground Storage Tanks," EPA 510-B-98-004, for details.)

In keeping with minor revisions to EPA's guidance, listing does not limit the probability of false alarm, and it allows qualified, independent consultants or for-profit organizations to be third party evaluators.

It is preferable that results are reported both with leak status of the tank unknown to the vendor, and then with leak status known to the vendor. If both types of results are reported, the results without leak data known to the vendor do not need to meet the performance criteria.

In addition, please note that both alternative (methods other than human entry) and traditional, human-entry procedures can be reviewed for listing.

Disclaimers

The *List of Integrity Assessment Evaluations* does not apply to all regulated underground storage tanks (USTs). Its applicability to a particular UST site depends on whether or not the

UST program implementing agency has adopted EPA's July 25, 1997 guidance regarding alternative integrity assessments. Users should check with the applicable implementing agency — usually the state environmental agency — to see what requirements apply and how relevant this list is for a particular site or area.

Neither EPA nor the Work Group will accept or approve any integrity assessment procedures for any particular UST or group of USTs. Approval or acceptance of assessment procedures is the responsibility of the implementing agency, which should be contacted regarding the approval or acceptance of assessment procedures in a particular area.

Please remember that the *List* has inherent limitations. It is based on evaluations, which are one-time events based on a partial sample of the affected population of USTs, according to protocols that cannot test all possible applications of a procedure. Therefore, appearance on the *List* does not mean that a particular procedure will work at any particular site. For these reasons, the *List* should not be your only source of information on this important subject.

Updates

The Work Group updates the *List* periodically, as new evaluations and information are reviewed. The Work Group welcomes comments and new information. Any questions about the *List* or submittals of evaluations to be listed should be directed to David Wiley. He can be reached by phone at (703)603-7178, by fax at (703)603-9163, or by e-mail at wiley.david@epa.gov.

Corrpro Companies, Inc., and Warren Rogers Associates, Inc.

Revised 01-22-99

Procedure: MTCF® (Mean Time to Corrosion Failure®)

Method: CORROSION MODELING

Brief Description: MTCF® is a noninvasive procedure which analyzes corrosion-inducing characteristics of an UST site (excavation), and uses a statistical model to determine the expected leak-free life of USTs at a site.

Summary of Results: Number of Tanks/Sites: 42 sites

Baseline	Vendor Result (per site)			Totals
	Suitable	Unsuitable	Inconclusive	
Suitable	7	1	0	8
Unsuitable	0	34	0	34
Totals	7	35	0	42

Proportions (with 95% Confidence Intervals in parentheses):

Correct Decision Rate: 97.6% (87.4% to 99.9%)
 Proportion of Correct Approval: 87.5% (47.3% to 99.7%)
Proportion of Correct Detection*: **100.0% (91.6% to 100.0%)**
 Proportion of False Alarms: 12.5% (0.3% to 52.7%)
 Proportion of Missed Detections: 0% (0.0% to 8.4%)
 Proportion of Inconclusive Results on All Sites, for Suitable Sites, and for Unsuitable Tanks: Not Applicable

* The first value in this row must be at least 95% to meet EPA recommendation.

Limitations on Results: The performance estimates are only valid when the procedure is performed in accordance with the vendor's standard operating instructions used in this evaluation. The procedure applies to tanks and not to associated pipelines. A determination cannot be made if there has been auger refusal during field boring.

Comments: Given a simple random sample from a normally distributed population, you can be 95% confident that the "95% Confidence Interval" contains the true value. This evaluation supercedes the one previously listed.

Corrpro Companies, Inc.
 1090 Enterprise Dr.
 Medina, OH 44256
 (330)723-5082

Evaluator: Kevin C. Garrity, P.E.
 CC Technologies Services, Inc.
 6141 Avery Rd.
 Dublin, OH 43016
 Date of Evaluation: 10-01-98

Warren Rogers Associates, Inc.
 747 Aquidneck Ave.
 Middletown, RI 02882
 (800)972-7472

International Lubrication and Fuel Consultants, Inc.

As of 06-01-98

Procedure: Tank Environmental Profiling® (TEP)
Method: CORROSION MODELING

Brief Description: TEP is a noninvasive forensic investigation procedure which analyzes hydrocarbon concentrations and other physical and chemical soil characteristics around an UST to determine if it is suitable for cathodic protection.

Summary of Results: Number of Tanks/Sites: 49 tanks

Baseline	Vendor Result (per tank)			Totals
	Suitable	Unsuitable	Inconclusive	
Suitable	26	1	0	27
Unsuitable	0	22	0	22
Totals	26	23	0	49

Proportions (with 95% Confidence Intervals in parentheses):

Correct Decision Rate: 98.0% (89.2% to 99.9%)
Proportion of Correct Approval: 96.3% (81.0% to 99.9%)
Proportion of Correct Detection*: **100.0% (87.3% to 100%)**
Proportion of False Alarms: 3.7% (0.1% to 19.0%)
Proportion of Missed Detections: 0.0% (0% to 12.7%)
Proportion of Inconclusive Results on All Sites, for Suitable Sites, and for Unsuitable Tanks: Not Applicable

* The first value in this row must be at least 95% to meet EPA recommendation.

Limitations on Results: The performance estimates are only valid when the procedure is performed in accordance with the vendor's standard operating instructions used in this evaluation. The procedure applies to tanks and not to pipelines. If fresh hydrocarbons indicate a leak and tanks contain identical product then electrically continuous tanks must be electrically isolated and tanks with sacrificial cathodic protection must be isolated or internally inspected. Results are valid only when ILFC and certified TEP practitioners perform the procedure.

Comments: Given a simple random sample from a normally distributed population, you can be 95% confident that the "95% Confidence Interval" contains the true value. Certified TEP practitioners were involved in the assessments that were a part of this evaluation, sending data and samples to ILFC for suitability and design.

International Lubrication and Fuel Consultants, Inc.
P.O. Box 15212, Rio Rancho NM 87174
1201 Rio Rancho Blvd. Ste C, Rio Rancho NM 87124
(505)892-1666 or (800)237-4532

Evaluator: Navid Mojtabai, Ph.D.
New Mexico Institute of Mining and Technology
Socorro, NM 87801 (505)835-5836
Date of Evaluation: 05-04-98

Tanknology-NDE, Inc.

Revised 01-22-99

Procedure: Petroscope™

Method: VIDEO INSPECTION (along with leak detection and site corrosion survey)

Brief Description: The Petroscope™ procedure is directed toward identifying significant corrosion evidence, structural defects, and active corrosion to determine if a tank is unsuitable for cathodic protection. It is part of the Four Part Assessment.

Summary of Results: Number of Tanks/Sites: Not applicable -- plates used.

Baseline	Vendor Result (per tank)			Totals
	Suitable	Unsuitable	Inconclusive	
Suitable	61	3	0	64
Unsuitable	2	38	0	40
Totals	63	41	0	104

Proportions (with 95% Confidence Intervals in parentheses):

Correct Decision Rate: approx. 95.2% (91.1% to 99.3%)
 Proportion of Correct Approval: ≤95.3% (86.9% to 99.0%)
Proportion of Correct Detection*: **95.0% (83.1% to 99.4%)**
 Proportion of False Alarms: 4.7% (1.0% to 13.1%)
 Proportion of Missed Detections: ≤5.0% (0.6% to 16.9%)
 Proportion of Inconclusive Results on All Sites, for Suitable Sites, and for Unsuitable Tanks: Not Applicable

* The first value in this row must be at least 95% to meet EPA recommendation.

Limitations on Results: The procedure applies to tanks, not to pipelines. The performance estimates are only valid when the procedure is performed in accordance with the vendor's standard operating instructions for the Four Part Assessment, including a valid leak detection test, "Petroscope™ General Protocol For USTs," and "Corrosion Site Survey General Requirements for Testing and Instrumentation of UST Systems." The Petroscope™ evaluation was done on plates with the entire surface visible; thus no product, sludge, or other obstruction can be present under this evaluation. The Petroscope™ evaluation used distances of 15, 20, and 28 feet, thus it cannot be used beyond 28 feet under this evaluation. No subcontractors or others were involved in the assessments in this evaluation, thus no subcontractors can be used under this evaluation. Total Petroscope™ data collection time is > 20 minutes per tank.

Comments: Given a simple random sample from a normally distributed population, you can be 95% confident that the "95% Confidence Interval" contains the true value. The evaluation was conducted in a lab, using sample plates cut from exhumed tanks.

Tanknology-NDE™
 8900 Shoal Creek, Bldg. 200
 Austin, TX 78757
 (800)888-8563

Evaluator: Joseph A. Lehmann, P.E.
 Ken Wilcox Associates, Inc.
 1125 Valley Ridge Dr., Grain Valley, MO 64029
 (816)443-2494 Date of Evaluation: 03-23-98

UST Environmental Services, Inc.

As of 01-22-99

Procedure: Tank Suitability Study (TSS)
Method: CORROSION MODELING

Brief Description: TSS is a noninvasive procedure which analyzes the corrosion condition of an UST and the corrosive characteristics of the environment around it. A model is used to determine the UST's expected leak-free life, and whether it is suitable for cathodic protection.

Summary of Results: Number of Tanks/Sites: 73 tanks

Baseline	Vendor Result (per tank)			Totals
	Suitable	Unsuitable	Inconclusive	
Suitable	41	2	0	43
Unsuitable	1	29	0	30
Totals	42	31	0	73

Proportions (with 95% Confidence Intervals in parentheses):

Correct Decision Rate: 95.9% (88.4% to 100.0%)
 Proportion of Correct Approval: 95.3% (84.2% to 100.0%)
Proportion of Correct Detection*: 96.7% (82.8% to 99.9%)
 Proportion of False Alarms: 4.7% (0.0% to 15.8%)
 Proportion of Missed Detections: 3.3% (0.1% to 17.2%)
 Proportion of Inconclusive Results on All Sites, for Suitable Sites, and for Unsuitable Tanks: Not Applicable

* The first value in this row must be at least 95% to meet EPA recommendation.

Limitations on Results: The performance estimates are only valid when the procedure is performed in accordance with the vendor's standard operating instructions used in this evaluation. The procedure applies to tanks and not to pipelines. Results are valid only when UST Environmental Services performs the procedure. Known analytical ranges for the model variables are as follows: soil resistivity, 3200 ohm/cm³ to 1,100,000 ohm/cm³; total chloride, 10 mg/kg to 343 mg/kg; soil pH 3.6 to 11.4; total sulfide 10 mg/kg to 48 mg/kg; and total solids, 78% to 99.8%.

Comments: Given a simple random sample from a normally distributed population, you can be 95% confident that the "95% Confidence Interval" contains the true value. The main criterion is that the model's predicted life minus 1.5 years must exceed the current tank age.

UST Environmental Services, Inc.
P.O. Box 844
Lakeland, FL 33802-0844
(800)992-1293

Evaluator: Arthur W. Hayes, Ph.D., P.G.
A.W. Hayes & Associates
2017 Leisure Dr., Winter Haven, FL 33881
(941)294-8455
Date of Evaluation: 06-26-98

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