

Guidance On Alternative Integrity Assessment Methods For Steel USTs Prior To Upgrading With Cathodic Protection

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
Mail Code 5401G
JUL 25 1997

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

SUBJECT: Guidance On Alternative Integrity Assessment Methods For Steel USTs Prior To Upgrading With Cathodic Protection
FROM: Anna Hopkins Virbick, Director /s/
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TO: EPA UST/LUST Regional Program Managers
State UST Program Managers

This memorandum provides guidance that pertains only to a relatively small subset of all underground storage tanks (USTs). This subset of USTs consists of steel USTs that are not yet protected from corrosion, that will not be internally lined to meet the 1998 deadline for corrosion protection, and that will be assessed by alternative methods other than either human-entry internal inspection or leak detection before cathodic protection is added.

In our memorandum of October 21, 1996, we recommended to UST program implementing agencies that they continue to follow their current policies regarding allowed integrity assessment methods for this subset of tanks until more information and guidance became available. On March 6, 1997, we circulated additional information and draft guidance. Today's memorandum finalizes our guidance on this subject. The guidance promotes protective and affordable integrity assessments while maintaining regulatory flexibility for implementing agencies.

Guidance On The Use Of Alternative Integrity Assessment Methods

Federal UST regulations require that existing steel tanks without corrosion protection must be assessed for structural integrity before cathodic protection can be added to meet corrosion protection requirements. Basically, tanks that are not structurally sound must not have their operational lives extended. Specifically, the federal UST regulations at 40 CFR § 280.21(b)(2) state that an assessment method may be used to ensure the integrity of steel tanks prior to upgrading with cathodic protection if the assessment method is listed in the regulations or if the implementing agency determines that an alternative assessment method prevents releases in a manner that is no less protective of human health and the

environment than those listed. Today's guidance pertains to determinations of alternative integrity assessment methods that are not listed in the federal regulations.

EPA recommends that implementing agencies determine that an alternative integrity assessment method that meets either Option A or Option B below be considered to prevent releases in a manner that is no less protective of human health and the environment than the methods listed in 40 CFR § 280.21(b)(2)(i) through (iii), which include human-entry internal inspection and, for tanks less than 10 years old, certain leak detection methods.

***Option A.* Ensure tank integrity by using an alternative integrity assessment method that is in accordance with a standard code of practice developed by a nationally recognized association or independent testing laboratory.**

***Option B.* Ensure tank integrity by using a vendor-supplied procedure that has been successfully evaluated and certified by a qualified independent third party to meet specified performance criteria regarding detection of perforations and detection of either internal or external damage. Within Option B, the criteria for proving tank integrity are as follows:**

- 1. Detect *all* perforations; and**
- 2. One of the following:**
 - a) Detect external pits deeper than 0.5 times the required minimum wall thickness, *OR***
 - b) Detect internal pits deeper than 0.5 times the required minimum wall thickness *AND* any internal cracks or separations.**

To meet a criterion, a method must demonstrate a probability of detection of at least 95 percent and a probability of false alarm of no more than 5 percent.

After March 22, 1998, EPA recommends that implementing agencies approve the use only of alternative integrity assessment methods meeting either Option A or Option B. Before March 22, 1998, agencies should maintain their current policies for alternative integrity assessment methods that do *not* meet either Option A or Option B. Also, before March 22, 1998, agencies should allow upgraded tanks that have used alternative integrity assessment methods meeting either Option A or Option B to select a leak detection method from those available after March 22, 1998 (as discussed below in today's guidance).

This guidance is not intended to discourage the use of human-entry internal inspection as an assessment method or tank lining as an acceptable upgrade option. EPA's UST regulations allow for interior tank lining to be used as an upgrade option for tanks lacking corrosion protection (40 CFR § 280.21(b)(1)). This guidance addresses only § 280.21(b)(2)(iv), which regards methods not specifically listed in the federal regulations.

The Difference Between "Method" And "Vendor-Supplied Procedure"

Option A addresses "integrity assessment methods" and Option B addresses "vendor-supplied procedures." Both "methods" and "procedures" share the common essential task of verifying the integrity of the tank, but they differ in the guidance as follows. A "method" is a general technology (such as the use of robotic devices or diagnostic modeling) that is in accordance with a standard code of practice. A

"vendor-supplied procedure" is an application of a technology, usually marketed as a patented brand name and procedure. Under Option B, a "vendor-supplied procedure" must be successfully evaluated and certified by a third party. However, the guidance does not recommend the certifying of each individual contractor who may be the local provider of a "vendor-supplied procedure."

Option A: Standard Codes Of Practice

Option A recommends that each alternative integrity assessment method comply with a standard code of practice developed by a nationally recognized association or independent testing laboratory. Compliance with a standard code is a requirement in almost all other areas of the federal UST technical regulations. Codes of practice are often updated over time, and so the code used must be the code applicable at the time that the alternative assessment is conducted.

The American Society for Testing and Materials (ASTM) has been the most active code body for alternative integrity assessments. A standard is being drafted by a joint task group under Subcommittees E50.01 on Storage Tanks and G01.10 on Corrosion in Soils. The first draft of the "Standard Guide for Three Methods of Assessing Buried Steel Tanks" was recently balloted, and is very similar to the expired ASTM E540, "Emergency Standard Practice for Alternative Procedures for the Assessment of Buried Steel Tanks Prior to the Addition of Cathodic Protection." Since balloting is within G01.10 only, interested parties should contact ASTM's Robert Held at (619) 832-9719 for information about participating in this standard development activity.

Although ASTM committees have been the most active, other nationally recognized associations and independent testing laboratories are not precluded from developing standard codes of practice.

Option B: Evaluation And Certification Process

Option B recommends that each vendor-supplied procedure intended to ensure tank integrity must receive third-party evaluation and certification that it meets criteria for establishing the integrity of a tank. Implementing agencies should allow the use only of those vendor-supplied procedures successfully evaluated and certified by a qualified independent third party to meet specified performance criteria regarding detection of perforations and detection of either internal or external damage.

In an evaluation and certification process, a vendor first contracts with a third party for evaluation. This third party should be a qualified test laboratory, university, or not-for-profit research organization with no financial or organizational conflict of interest. Based on the nature of the performance criteria, evaluations will likely be *qualitative*, but quantitative evaluations also are acceptable. The evaluation is performed first *without* and then *with* information about the leak status of the tank divulged to the vendor. The method's performance characteristics, both with leak data and without, are determined, summarized on a "short form," and certified by the evaluator. Owners and regulators can then use this documentation, along with other information, to make decisions that are right for their particular situations.

We have determined that an independent evaluation and certification process is already available for use in the UST community. This finding is based on discussions with vendors and third-party evaluators and industry's experience with other UST system technologies.

In an evaluation, the determination of whether or not a vendor-supplied procedure meets the criteria may be based in part on leak detection data. This is allowed because protectiveness is based on the performance of the complete vendor-supplied procedure, and leak detection results often play a large role in integrity assessments. However, the performance of a vendor-supplied procedure *without* inclusion of leak detection data should still be reported on the short forms for informational purposes.

As is clear from the recommendations, no integrity assessment methods or vendor-supplied procedures that have been in use before March 22, 1998 should be "grandfathered" or considered exempt from following a standard code or from evaluation after March 22, 1998. However, those vendor-supplied procedures that were part of the 1996 field study conducted by EPA's Edison lab can use applicable data generated in that study as part of a more comprehensive evaluation. In addition, even if a company follows a standard code of practice, it may voluntarily put its vendor-supplied procedure through this evaluation process in order to obtain independent third-party documentation of performance characteristics.

Evaluation Protocols For Option B

More detailed information on evaluation can be found in the "Quality Assurance Project Plan" (QAPP) prepared for EPA's engineering study conducted in 1995 and 1996. We consider the original QAPP written for the EPA field study to be a viable, peer-reviewed evaluation test protocol. We recommend that evaluations conducted in accordance with it be considered valid. However, removal and examination as detailed in the QAPP may not be necessary, at least not for all tanks used in an evaluation. An approach that uses data in lieu of physical testing can be used if all relevant data requirements are factored in. An evaluator may choose alternative evaluation protocols or procedures, because of the potentially high cost of following the QAPP to the letter or because of special characteristics of the vendor-supplied procedure under evaluation. (The QAPP calls for an assessment method to be used on approximately 100 tanks, which are then removed from the ground for testing and inspection.) The development of other protocols is not precluded, but rather is encouraged.

We have investigated the EPA/private sector Environmental Technology Verification program, and found that it probably cannot provide assistance in the needed time frame. EPA will not be involved in the writing of additional protocols or in the funding of evaluations. However, EPA staff will be available to comment on draft protocols and to provide guidance to implementing agencies. In addition, we will provide optional summary forms, or "short forms," for the QAPP, as suggested by commenters. These will help industry give implementing agencies and owners relevant information in a consistent and understandable format.

Evaluation Criteria In Option B

The criteria in Option B above are based on those found in the QAPP. On each criterion, methods must demonstrate a probability of detection of at least 95% and a probability of false alarm of no more than 5%. Note that 100% accuracy is not specified. We have found it protective and cost-effective to rely on a series of multiple, complementary, and high-quality measures to achieve the greatest protection at a reasonable cost.

In addition to a mandatory criterion on perforations, a method must pass evaluation of a criterion for either external or internal damage. We structured the criteria in this way based partly on consistency with internal (human-entry) inspection standard codes. In addition, these criteria are based on our belief that not allowing the upgrading of tanks with either significant interior or exterior damage (unless they are repaired) yields significant benefits over the costs incurred. We do not believe, however, that the additional cost of assessing a tank for both internal and external damage provides a net benefit in significantly greater protection.

A criterion for loss of wall thickness over a wide area of the tank is not included, because our research found that failures due to uniform corrosion are very rare. Likewise, a criterion for tank deformation is not included, because it is generally found to be an issue only in fiberglass tank installations.

Recommended Commencement Date

Setting the recommended commencement date of March 22, 1998 allows time for standards to be developed and evaluations to be conducted, and comes before a significant portion of the anticipated assessment work. We extended the date proposed in our draft guidance in response to comments requesting more time. *Note: the December 22, 1998 deadline for all existing UST systems to meet spill, overfill, and corrosion protection requirements will not be extended.*

Monthly Leak Detection Not Required

We earlier proposed to include stand-alone monthly leak detection monitoring in combination with the integrity assessment options. However, this monitoring is no longer part of our recommendation for integrity assessment methods fulfilling Option A or vendor-supplied procedures fulfilling Option B. We deleted monthly monitoring based on technical merit, consistency, and simplicity. We believe that if an integrity assessment method complies with either a standard code of practice or evaluation procedures as described above, then leak detection monitoring beyond that required in the federal regulations is not warranted on a nationwide basis, and we have not found performance data that indicates otherwise. In addition, deleting the additional monitoring brings all assessment methods in line with each other and simplifies the compliance picture.

If the implementing agency follows today's guidance, compliant USTs (correctly upgraded through alternative assessment, cathodic protection, protected piping, and spill/overfill protection) could follow the requirements of 280.41(a)(1) allowing either stand-alone monthly monitoring or, for up to ten years, the combination of inventory control and tightness testing every five years. Note that the period during which this combination leak detection method is valid may be less than 10 years if the tank itself meets the 1998 standards for corrosion protection before other UST system components meet 1998 standards for spill, overfill, and corrosion protection, as clarified in our memorandum of July 25, 1997, "Applicability Of A Combination Leak Detection Method For Upgraded Underground Storage Tanks."

Recommendation Against Leak Detection As An Integrity Assessment

The question of whether leak detection alone should be used to assess older tanks prior to upgrading with cathodic protection has been raised from time to time. We received numerous comments on this subject, nearly all in agreement that leak detection alone is not sufficient. Although we recognize the important role leak detection generally plays and allow the use of leak detection results in evaluations of integrity

assessment methods, EPA does not recommend that leak detection alone be considered sufficient to assess the integrity of USTs 10 years old or older.

State Program Approval

A decision either to adopt or not adopt EPA's recommendations regarding integrity assessment would not affect the status of state program approval or of an application for approval. This is because EPA is providing recommendations only and not amending its regulatory criteria for state program approval.

Federal And State Consistency

We hope this guidance is accepted by implementing agencies because there are benefits to having consistency across jurisdictions. However, EPA recognizes that State and local requirements may differ from Federal requirements. We have included in Attachment 1 additional items that implementing agencies may consider in developing their integrity assessment policies.

Guidance Intended To Ensure Quality Of Integrity Assessments

EPA believes today's guidance will benefit the UST community and protect human health and the environment by ensuring quality alternative integrity assessments that can lead to extended operational life of older steel tanks. Option A can ensure that alternative integrity assessment methods are valid by being in accordance with national codes of practice. Option B can ensure that vendor-supplied procedures have met rigorous third-party evaluation and certification. However, for these Options to be most successful, UST owners will need to be informed to use only methods that meet code or vendor-supplied procedures that have been certified. Implementing agencies should make concerted attempts to inform their UST owners about what they need to look for to make sure they get a reliable integrity assessment.

Acknowledgments

Our March 6 draft guidance package sought input on the general approach, specific evaluation criteria, costs of evaluations, compliance and enforcement implications, and timing. I thank the state and EPA representatives who provided comments to our draft, including those from Arizona, District of Columbia, Michigan, Tennessee, and EPA's Office of General Counsel. I also thank the many other individuals and organizations that provided comments.

Disclaimer

EPA's Office of General Counsel advises that the policies set out in this document are not final agency action, but are intended solely as guidance. They are not intended, nor can they be relied upon, to create any right, benefit or trust responsibility, enforceable by any party, in litigation with the United States.

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ATTACHMENT 1

ADDITIONAL ITEMS FOR CONSIDERATION IN DEVELOPING INTEGRITY ASSESSMENT POLICIES

Agencies that implement underground storage tank programs may find the following items useful in conjunction with EPA's guidance in constructing their integrity assessment policies:

- Requiring certain documentation be submitted by vendors to UST owners or implementing agencies (or both). An example for human-entry assessments following NLPAs 631 is Form CF-2, "Internal Inspection Affidavit," which must be maintained by the owner, according to the standard. An example for an alternative assessment would be a certification by the vendor that the work meets code or a short form summarizing the evaluation and limitations of a particular method.
- Requiring that companies, individuals, or both be licensed in order to perform assessments.
- Requiring monthly stand-alone leak detection monitoring following assessment and upgrade.
- Limiting the time between assessment and upgrade (for example, limit the time to six months).
- Putting mechanisms in place to make the vendor responsible for a tank failure due to improper assessment.
- Reviewing each vendor-supplied procedure before allowing it to be used, even if a vendor claims the procedure complies with a standard code of practice, to ensure the procedure meets all requirements of the code and of the agency.