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NAB LITTLE CREEK
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PRECISION INTEGRITY TESTING TRACER TIGHT LEAK TEST TANK 1551 NAB LITTLE CREEK VA
8/1/2003
ENVIRONMENTAL TECHNOLOGY, INC.

PRECISION INTEGRITY TESTING
TRACER TIGHT® LEAK TEST
OF TANK 1551
NAB LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Prepared for:

Naval Facilities Engineering Command, Atlantic Division
1510 Gilbert Street
Norfolk, Virginia 23511- 2699
Contract No. N62470-03-D-4001
Delivery Order No. 0001

Prepared by:

Environmental Technology, Incorporated
441 South Independence Boulevard, Suite 4
Virginia Beach, Virginia 23452
(757) 499-2175

August 2003

It is recommended that this document containing valuable historical information, be retained for the life of the tanks.

NAB Little Creek 03-8

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Signatures:

Inspector: _____
Wayne K. Bailey
Tracer Cert #80001

Engineer: _____
Vincent D. Elko, PE

1.0 INTRODUCTION

1.1 Purpose of Project

Environmental Technology, Inc. (ETI) was contracted by Naval Facilities Engineering Command, Atlantic Division to perform integrity testing on an underground storage tank (UST) Tank 1551 at NAB Little Creek, Virginia Beach, Virginia. Tightness testing is required to achieve compliance with the Final Governing Standards (FGS). The precision integrity testing as outlined in this report satisfies this requirement for tightness testing.

FGS defines an "existing" UST system as having been installed prior to October 1, 1994. Therefore, all "new" USTs would have an installation date after October 1, 1994. FGS requires that all existing underground tanks and associated piping, which do not have associated leak detection equipment, be tightness tested on an annual basis. All "new" USTs must have a leak detection system; thus, integrity testing of the tanks is not required. However, all new pressurized UST piping must utilize either an annual tightness test or monthly monitoring. New suction piping shall have either a line tightness test conducted every three (3) years or use monthly monitoring.

The purpose of this testing is to locate an underground petroleum tank which may be leaking product and causing harm to the environment.

1.2 Project Scope

Integrity testing was performed on one (1) underground storage tanks (UST), Tank 1551. The testing was performed May 16, 2003 through July 28, 2003.

1.3 Project Team

ETI subcontracted with Tracer Research Corporation to perform this integrity testing.
Field testing and oversight was provided by ETI personnel with experience in this specialized form of testing.

1.4 Qualifications of Testing Procedures Used

The testing procedures used were those defined as the *Tracer Tight*® leak detection method. Determination of leakage is based on the criteria established in the *Tracer Tight®* third party evaluation, which meets the criteria set forth in NFPA 329 for a precision leak test. According to EPA standard test procedures for evaluating leak detection methods, this method is capable of detecting leaks of 0.05 gallons per hour with a Probability of Detection (PD) of 97.1% and Probability of False Alarm (PFA) of 2.9%.

1.5 *Tracer Tight*® Concept

Tracer Tight ® testing is a patented process performed by mixing a very low concentration of a chemical tracer, with the product inside a tank or pipeline followed by the detection of that tracer, underground. The highly volatile tracer distributes itself throughout the product and into the vapor space above. It has no impact on the chemical or physical properties of the product.

If a tank or pipeline leaks, the tracer is released into the soil and disperses in all directions through the air porosity of the soil by molecular diffusion. After the tracer has had time to diffuse and migrate away from the leak, soil gas samples are collected from the area surrounding the tank or pipeline. Leak detection probes are driven into the soil adjacent to the tank or pipeline and a small amount of soil gas is pulled by vacuum through each probe. Samples of this soil gas are collected and analyzed for the presence of the tracer and hydrocarbons.

2.0 INTEGRITY TESTING

This Section provides a general description of the actions involved in the integrity testing process. For more specific information concerning these procedures refer to Attachment A.

2.1 Probe Installation

The Tracer Tight® test utilizes a galvanized pipe that is driven below the ground surface into the backfill of the system to be tested. Each probe installed has a sphere of influence of ten to twelve feet.

Probes set are spaced approximately 24 feet apart and approximately 3 feet from the shell of the tank. Each probe set consist of a 14 foot probe and a 4 foot probe, Probes 1 through 12 are 14 feet in depth and probes 13 through 24 are 4 feet in depth. All 4 foot probes and probes 11 and 12 were installed on May 5, 2003.

2.2 Inoculation

Inoculation is the introduction of a highly volatile liquid or gaseous compound, a tracer, into the product of the tank. Inoculation of the UST was performed on May 16, 2003 with Tracer A. Based upon the size of the tank, the target concentration of tracer in the fuel was one PPM.

3.0 TEST RESULTS

This Section provides an overview of the results derived from the integrity testing process. For more detailed information concerning the findings refer to Attachment A.

3.1 Leak Detection of Tracer Gas

Tank 1551 passed the integrity test.

3.2 Detection of TVHC

Tank 1551 showed no detection of TVHC in any of the samples.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The tank passed the integrity test.

4.2 Recommendations

4.2.1 Required Repairs

Based on results of the integrity testing, there are no repairs required to the tank.

4.2.2 Recommended Repairs

Based on results of the integrity testing, there are no repairs recommended to the.

4.2.3 Future Testing

In accordance with the requirements of Final Governing Standards, integrity testing must be performed on underground tanks and associated piping on a regular basis. Refer to FGS and previous Section 1.1 for an outline of the testing intervals based on installation date of storage system, presence of other leak detection equipment or monitoring, and whether piping conveys product via suction or pressure. Also, it is recommended that the tank be kept as full as possible during the 48-hour period following inoculation. This condition aids in dispersing the Tracer compound as required for these tests.

Appendix A

Tracer Tight® Leak Test Report

PRAXAIR

3755 N. Business Center Drive
Tucson, Arizona 85705
Toll Free (800) 989-9929
Tel: (520) 888-9400
Fax: (520) 293-1306

Tracer Tight® Leak Test

(1) Giant Underground Storage Tanks

NAVAL AMPHIBIOUS BASE, LITTLE CREEK, VA
Virginia Beach, VA

Prepared for:

Environmental Technology Inc.
441 S. Independence Blvd., Suite 4
Virginia Beach, VA 23452

Tel: (757) 499-2175

Attention: Mr. Wayne Bailey

Submitted by:

Praxair Services, Inc.
Paul Burke - Sr. Project Manager

Paul Burke

E-Mail: **Paul_Burke @ Praxair.com**
Website: http://www.TracerResearch.com

Site Location: **WHIDBEY ISLAND NAS** Tracer Job No.: **23030G-AN03**

Inoculation Information:

	Inoculation:	Sampling:
Start Date:	May 16, 2003	June 6, 2003
Completion Date:	May 16, 2003	July 1, 2003
	Job Completion Date:	**July 28, 2003**

Note: Background Samples were collected before the Inoculation Event.

Annual Testing Results:

Facility:	System:	Type:	Volume:	Product:	Tracer:	Result:	
1551	**1551**	**GUST**	**567,000 gal**	**DFM**	**A**	**Passed**	

*Probes set are spaced approximately 24 feet apart and approximately 3 feet from the shell of the tank. Each probe set consist of a 14 foot probe and a 4 foot probe, Probes 1 through 12 are 14 feet in depth and probes 13 through 24 are 4 feet in depth. All 4 foot probes and probes 11 and 12 were installed on 6/5/03.

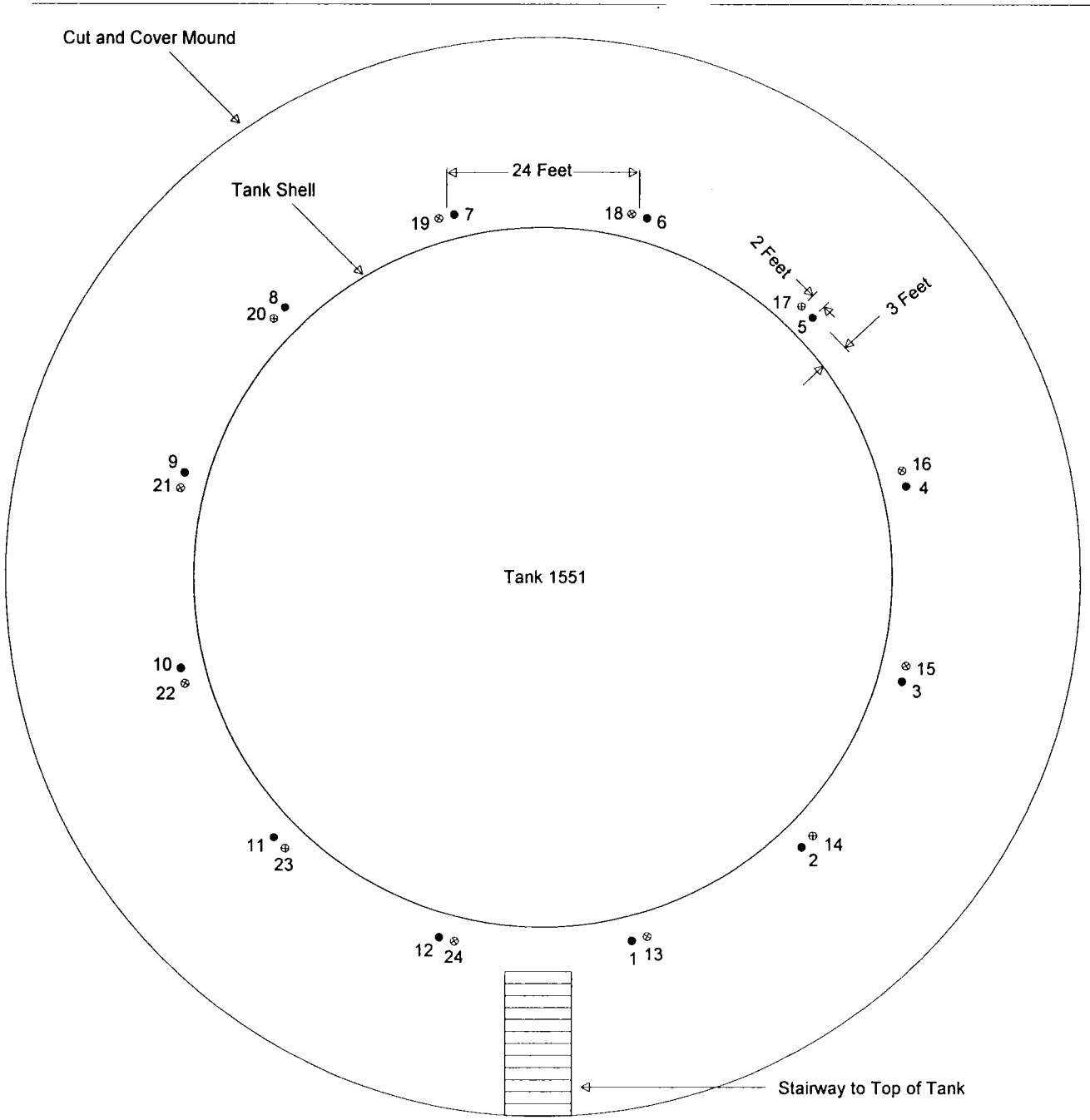
Paul Burke

Paul Burke - Sr. Project Manager
Date: 07/28/2003

Praxair Services, Inc. certifies that the above systems have been tested by means of Tracer Tight®, which meets the criteria set forth in NFPA 329 for a precision test. The Tracer Tight® method is capable of detecting leaks of 0.05 gph with a probability of detection of 97.1% and a probability of false alarm of 2.9%. If you have any questions or concerns, please call Praxair Services, Inc. at 800-989-9929 ext.236.

Appendix B

Engineering Drawings



Remarks/Legend:

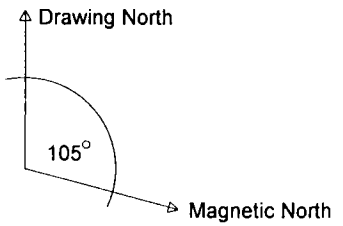
● - 14 Foot Probe

⊗ - 4 Foot Probe

View is Top Down

Tank Diameter: 88 Feet
Tank Height: 13 Feet

Probe sets are spaced approximately 24 feet apart and approximately 3 feet from the tank shell. All 4 foot probes and probes 11, 12 and 13 were installed on 06/05/03. Individual probes are spaced approximately 2 feet on center.



Company:
NAB Little Creek, Virginia Beach, VA

Drawn By:
Environmental Technology, Inc.

Date:	Rev. No.:	Scale:
06/13/03	N/A	1/240 feet

Drawing Title:
Tracer Probe Locations

Tank Description:
Tank 1551

Appendix C

Results of U.S. EPA Standard Evaluation

Results of U.S. EPA Standard Evaluation

Nonvolumetric Tank Tightness Testing Method

This form tells whether the tank tightness testing method described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA "Standard Test Procedure for Evaluating Leak Detection Methods: Nonvolumetric Tank Tightness Testing Methods." The full evaluation report also includes a form describing the method and a form summarizing the test data.

Tank owners using this leak detection system should keep this form on file to prove compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

Method Description

Name Tracer Tight®

Version

Vendor Tracer Research Corporation

(address) 3855 North Business Center Drive

(city) Tucson (state) Arizona (zip) 85705 (phone) 602/888-9400

Evaluation Results

This method, which declares a tank to be leaking when tracer is detected outside the tank at concentrations greater than 3×10^{-5} times the tracer concentration in the tank has an estimated probability of false alarms [P(FA)] of a 0.0 % based on the test results of 0 false alarms out of 22 tests. A 95% confidence interval for P(FA) is from 0 % to 13 %

The corresponding probability of detection [P(D)] of a 0.05 gallon per hour leak is 100 % based on the test results of 45 detections out of 45 simulated leak tests. A 95% confidence interval for P(D) is from 92.4 % to 100 %

The corresponding probability of detection [P(D)] of a 0.1 gallon per hour leak is 100 % based on the test results of 93 detections out of 93 simulated leak tests. A 95% confidence interval for P(D) is from 96.2 % to 100 %

Does this method use additional modes of leak detection? ☒ Yes ☐ No If Yes, complete additional evaluation results on page 3 of this form.

Based on the results above, and on page 3 if applicable, this method ☒ does ☐ does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.10 gallon per hour at P(D) of 95% and P(FA) of 5%).

Test Conditions During Evaluation

The evaluation testing was conducted outside a 55 -gallon ☒ steel ☐ fiberglass tank that was 22 inches in diameter and 34 inches long, installed in silty clay native soil backfill.

The ground-water level was 0 inches above the bottom of the tank.

Test Conditions During Evaluation (continued)

The tests were conducted with the tank 38/0.0 percent full.

The temperature difference between product added to fill the tank and product already in the tank ranged from NA °F to NA °F,
with a standard deviation of NA °F.

The product used in the evaluation was regular leaded gasoline

This method may be affected by other sources of interference. List these interferences below and give the ranges of conditions under which the evaluation was done. (Check None if not applicable.)

☒ None

Interferences	Range of Test Conditions

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendors instructions for using the method are followed.
- The tank contains a product identified on the method description form.
- The tank capacity is NA gallons or smaller. *NO SIZE LIMITATION*
- The difference between added and in-tank product temperatures is no greater than + or - NA degrees Fahrenheit.

☒ Check if applicable:

Temperature is not a factor because Tracer Tight is an external leak detection method

- The waiting time between the end of filling the test tank and the start of the test data colleciton is at least NA hours.
- The waiting time between the end of "topping off" to final testing level and the start of the test data collection is at least NA hours.
- The total data collection time for the test is at least NA hours.
- The product volume in the tank during testing is NA % full.
- This method ☒ can ☐ cannot be used if the ground-water level is above the bottom of the tank.

Other limitations specified by the vendor or determined during testing:

Soil must be permeable enough to yield at least 0.15 cfm of air through a 3/4" nominal diameter probe under a vacuum of 15" of Hg.

Nonvolumetric TTT Method Tracer Tight®
Version

>Safety disclaimer: This test procedure only addresses the issue of the methods ability to detect leaks. It does not test the equipment for safety hazards.

Additional Evaluation Results (if applicable)

This method, which declares a tank to be leaking when water ingress is detected has an estimated probability of false alarms [P(FA)] of N/A % based on the test results of false alarms out of N/A tests. Note: A perfect score during testing does not mean that the method is perfect. Based on the observed results, a 95% confidence interval for P(FA) is from 0 % to N/A %.

The corresponding probability of detetecton [P(D)] of a N/A gallon per hour leak is N/A % based on the test results of N/A detections out of N/A simulated leak tests. Note: A perfect score during testing does not mean that the method is perfect. Based on the observed results, a 95% confidence interval for P(D) is from N/A % to 100 %.

>Water detection mode (if applicable)

Using a false alarm rate of 0% the minimum water level that the water sensor can detect with a 100% probability of detection is 0.008 inches.

Using a false alarm rate of 5% the minimum change in water level that the water sensor can detect with a 95% probability of detection is 0.19 inches.

Based on the minimum water level and change in water level that the water sensor can detect with a false alarm rate of 5% and a 95% probability of detection, the minimum time for the system to detect an increase in water level at an incursion rate of 0.10 gallon per hour is 1836 minutes in a 75,000 - gallon tank.

Certification of Results

I certify that the nonvolumetric tank tightness testing method was installed and operated according the the vendors instructions. I also certify that the evaluation was performed according to the standard EPA test procedure for nonvolumetric tank tightness testing methods and that the results presented above are those obtained during the evaluation.

Curtis W. Bryant
(printed name)

Curtis W. Bryant
(signature)

May 20, 1992
(date)

Control Strategies Engineering
(organization performing evaluation)

12550 West Manville Road
Tucson, Arizona 85743
(city, state, zip)

(602) 682-8726
(phone number)