Revision Date: September 11, 1998

Horner Products, Inc.

SIR PRO 1 Version 4.0

STATISTICAL INVENTORY RECONCILIATION TEST METHOD (QUANTITATIVE)

Certification: Leak rate of 0.1 gph with P_D = 98% and P_{FA} = 2%.

Leak Threshold: 0.05 gph. A tank system should not be declared tight if the test result indicates a loss or gain that equals or exceeds this threshold.

Applicability: Gasoline, diesel.
Other more viscous liquids may be tested after consultation with the vendor.

Tank Capacity: Maximum of 33,000 gallons for single tanks. Size limits using an acceptable protocol for manifolded tank systems have not been determined.

Data Requirement: Minimum of 30 days of product level and flow through data.

Comments: Not evaluated for manifolded tank systems using an acceptable protocol.
73% of data sets were from manifolded tank systems.
Of 41 data sets submitted for evaluation, 4 were inconclusive.
Median monthly throughput of tanks evaluated was 22,370 gallons.
Leak rates ranging from 0.05 to 0.216 gph were used in evaluation.
Data sets evaluated were supplied by evaluator.

Horner Products, Inc.
212 Morton St.
104 Little Killarney Beach
Tel: (800) 443-0711

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494
Date of Evaluation: 07/18/95

Results of U.S. EPA Standard Evaluation
Statistical Inventory Reconciliation Method

This form tells whether the statistical inventory reconciliation (SIR) method described below complies with requirements of the federal underground storage tank regulation. The evaluation was conducted by the vendor of the SIR method or a consultant to the vendor according to the U.S. EPA's "Standard Test Procedure for Evaluation Leak Detection Methods: Statistical Inventory Reconciliation 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 SIR Pro 1

Version number V4.0 (for use on single or manifolded tank systems)

Vendor Horner Creative Products, Inc.

212 Morton Street
(street address)

Bay City, Michigan 48706 (800) 443-0711
(city) (state) (zip) (phone)

Evaluation Results

If applicable, vendor's threshold = 0.05 gallon per hour
or vendor's criterion: _____

This statistical inventory reconciliation method reports results on the following basis (check one):

(X) quantitative results (leak rate reported)
( ) qualitative results (pass, fail, inconclusive)

The test results are:

		Reported Results*				
		Tight	Leak	Inconclusive	Total Analyzed	Not Analyzed
Actual	Tight					
	Induced Leak					
	Total					

* Table not applicable to quantitative systems.

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Version V4.0

Evaluation Results (continued)

The proportions of inventory records reported inconclusive are:
5 % among tight tanks (see note below)
2 % among leaking tanks
7 % among all tanks

The probability of false alarms, P(FA), based on the vendor's threshold, is 2 %

For qualitative methods, a 95% confidence interval for P(FA) is from _____ to _____%.

The probability of detection, P(D) is 98 %. This is valid for a leak rate of (check one):
(X) 0.10 gallon per hour
( ) 0.20 gallon per hour

For qualitative methods, a 95% confidence interval for P(D) is from _____ to _____%.

Based on these results, the method (X) does ( ) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency of 0.10 gallon per hour [or 0.20 gallon per hour] at P(D) of 95% and P(FA) of 5%.

Test Conditions During Evaluation

The data evaluation set included data from tanks of the following sizes

Tank Size (gallons)	<5,000	5,000-10,000	10,000-15,000	>15,000	**Total # of Records**
Number of Records	0	0	5	36	41

The tanks had various monthly throughputs.

Percentile of Records	25	50 (median)	75
Monthly throughput (gallons)	11,619	22,370	32,238

The data included 6 records during hot weather months.
13 records during mild weather months.
22 records during cold weather months.

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Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for using the method are followed.
- The tank is no larger than 45,000 gallons.
- The data records cover 23 days or more.
- The method is based on single and manifolded tanks.*
- Other limitations specified by the vendor or determined during testing:

* This method was evaluated using 28 data records from manifolded tanks. The largest manifolded system consisted of four 10,000 gallon tanks for a total volume of 40,000 gallons. The smallest manifolded system was 16,000 gallons.

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

Certification of Results

I certify that the statistical inventory reconciliation method was applied according to the vendor's instructions. I also certify that the evaluation was performed according to the standard EPA test procedure for statistical inventory reconciliation and that the results presented above are those obtained during the evaluation.

H. Kendall Wilcox, President (printed name)	Ken Wilcox Associates, Inc. (organization performing evaluation)
H. Kendall Wilcox (signature)	Independence, MO 64055 (city, state, zip)
May 25, 1995 (date)	(816) 795-7997 (phone number)

Reporting Form For Test Results
Statistical Inventory Reconciliation Method

Method Name and Version: SIR Pro 1 V4.0
Date: May 31, 1995

	Submitted	Results Reported by Vendor			
		If Quantitative		If Qualitative	
Record Code No.	Induced Leak Rate (gal/h)	Estimated Leak Rate (gal/h)	Est.-Ind. Leak Rate (gal/h)	Tank Tight? (Yes, No, or Inconclusive)	Vendor's Comments
1	0	0	0		
2	0.056	0	-0.056		
3	0	0.043	0.043		
4	0	0	0		
5	0.206	0.2	-0.006		
6	0.057	0	-0.057		
7	0	0	0		
8	0	0.043	0.043		
9	0	0	0		
10	0.209	0.2	-0.009		
11	0.113	0.115	0.002		
12	0.05	0.085	0.035		
13	0	0.041	0.041		
14	0	0	0		
15	0.053	0.086	0.033		
16	0	0	0		
17	0	N/A	N/A		
18	0	0	0		
19	0.201	0.2	-0.001		
20	0	0	0		
21	0.052	0.095	0.043		
22	0.1	0.09	-0.01		
23	0.105	0.082	-0.023		
24	0	0	0		
25	0.054	0.049	-0.005		
26	0.211	0.2	-0.011		
27	0.105	0.116	0.011		
28	0.205	0.2	-0.005		
29	0	0	0		
30	0.108	0.092	-0.016		
31	0.057	0.101	0.044		
32	0.208	0.2	-0.008		
33	0	0	0		
34	0.107	N/A	N/A		
35	0.204	N/A	N/A		
36	0.104	0.104	0		
37	0.11	N/A	N/A		
38	0.216	0.2	-0.016		
39	0	0	0		
40	0.055	0.063	0.008		
41	0	0	0		

Description

Statistical Inventory Reconciliation Method

This section describes briefly the important aspects of the statistical inventory reconciliation (SIR) method. It is not intended to provide a thorough description of the principles behind the SIR method and associated computer software.

General Information

Method name: SIR Pro 1

If applicable:

Version and revision number V4.0 (for single or manifolded tanks)

Date May 31, 1995

Vendor Horner Creative Products, Inc.

Vendor address and phone number, including area code:

212 Morton Street

Bay City, Michigan 48706

Contact Jack Horner (800) 443-0711

Data Requirements

Does the method require use of a specified data form provided by the vendor?

( ) yes

(X) no

How are the inventory data recorded:

( ) manually, on provided forms

( ) manually, no forms provided

( ) hand entered into a computer

( ) direct entry from ATGS

(X) other Any method that supplies all necessary data

What is the required number of usable daily inventory records necessary to detect the indicated leak rate (gallon per hour) with 95% confidence?

If the leak rate is 0.10, the number of daily readings is N/A**.

If the leak rate is 0.20, the number of daily readings is N/A**.

** The number of days depends on the quality of the data.

Data Requirements (continued)

What is the vendor's *minimum* number of daily records?

( ) 60 daily records

( ) 90 daily records

(X) other, specify 23

Does the method allow for closure of the station on one or more consecutive days per week?

(X) yes

( ) no

Does the method require meter calibration?

(X) yes; specify how frequently per state requirements

( ) no

Identification of Causes for Discrepancies

Which of the following factors does the method consider? Check the appropriate categories.

	Identify only	Compensate	Not Considered
dispensing meter errors		X	
calibration errors		X	
conversion chart miscalibration		X	
vapor loss			X
thermal effects		X	
others (list)			

Which of the following effects does the method identify and quantify?

	Identify only	Quantify	Not Considered
leak rate		X	
delivery errors	X		
unexplained losses or gains	X		
water inflow	X		
water outflow	X		
dipstick errors	X		
others (list)	X		

Reporting of Leak Status

Is the leak status reported in terms of a leak rate (e.g., gal/h or gal/day)?

(X) yes

( ) no

( ) if the answer to the above question is "No," how are the results reported?

Explain _____

What criterion does the method use to declare that a tank is leaking?

( ) average daily discrepancy exceeds threshold of _____ gal/h

( ) daily discrepancy relative to variability exceeds threshold of _____ gal/h

( ) water level change exceeds threshold of _____ inch

(X) statistically significant continuous loss at the 0.05 level of significance

( ) other (specify) _____

Exceptions

Are there any conditions under which the statistical inventory method is inadequate?

(X) insufficient number of usable records

( ) irregular time intervals between dipstick readings

(X) unacceptable daily variability of inventory records

( ) others (describe briefly) _____

What elements in the record keeping are left to the discretion of the personnel on site?

(X) length of record keeping if beyond minimum requested

(X) others (describe briefly) Daily temperature and water levels may be supplied if available.

( ) none

If applicable, attach a copy of the inventory data collection form(s) as provided to the user by the vendor.