Evaluation of the INCON Tank Sentinel ATG with SCALD 2.0 As a Continuous In-Tank Leak Detection System (Models: TS-750, TS-1000, TS-1001, TS-2000, and TS-2001 With Probe TSP-LL2)

Final Report

PREPARED FOR:

INCON (Intelligent Controls)

July 11, 2003

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Saco, ME 04072

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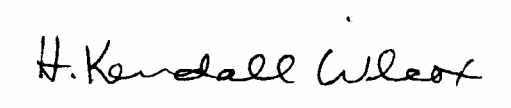
Preface

This report describes a third-party evaluation of the Incon Tank Sentinel ATG with SCALD 2.0 (previously identified as SCALD+) as a Continuous In-Tank Leak Detection System. The evaluation was conducted by Ken Wilcox Associates, Inc. at the Fuels Management Research Center in Grain Valley, Missouri. The forms contained in this report are based on data collected using the EPA protocol "Evaluation Protocol for Continuous In-Tank Leak Detection Systems", Revision 1, January 7, 2000. The evaluation meets the requirements of the Protocol for single and manifolded tanks with a combined volume of up to 49,336 gallons capacity with monthly throughputs of up to 257,818 gallons.

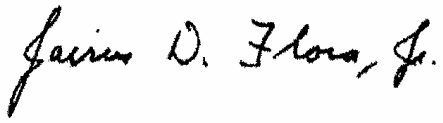
Technical questions should be addressed to Mr. Kevin DeVinney at Incon at 800-872-3455. The report was revised to include additional information requested by the reviewers.

Approved:



H. Kendall Wilcox, Ph.D.
President

Statistical Review by:



Jairus D. Flora, PhD
Statistician

July 11, 2003

The July 2003 revision supercedes all earlier reports. The SCALD 2.0 is a rename of the SCALD+ and uses identical algorithms and data processing procedures. The July version contains new data.

Executive Summary CITLDS Evaluation

Ken Wilcox Associates, Inc., acting as an independent third party, conducted an evaluation of the SCALD 2.0 continuous monitoring system for INCON. The evaluation was conducted using data collected from February 1999 through November 2000. The SCALD 2.0 is a continuous automatic tank gauge type of continuous monitoring method of leak detection. The report was revised July 11, 2003 to respond to comments received from the National Workgroup on Leak Detection Evaluations (NWGLDE).

EVALUATION DATA

The evaluation used data selected from a database with 21 tanks at 12 sites. The sites were located in 9 states and included data from 100 records. The data collected covered the period of February 1999 through November 1999. The available database is documented in Table A1 of the data reporting tables. Table A1 includes information on the tank characteristics including manifolds, vapor recovery, etc. The test data selected used data from 20 tanks at 11 sites in 8 states. The test data used for the evaluation were from the periods as indicated in Table A2. In Table A2, the test numbers correspond to tank period numbers in Table A1.

The selected tank records were stratified on single and manifolded tank systems, and a sufficient number of manifold tank records were randomly selected for use. Subsequently the records were stratified on product and the minimum number of gasoline tank records was randomly selected. The remaining tank records were used to randomly select the remaining records for a database of 45 records. Fifteen zero leak records were used, along with 10 records with a nominal leak rate of 0.1 gal/h and 10 records each for nominal leak rates of 0.1, 0.2, and 0.3 gal/h. The non-zero leak rates were modified to provide three distinct values around the nominal rate. The resulting leak rates were randomly assigned to the test data. The resulting set of test data was checked to ensure that it had a sufficient number of tanks with blending dispensers, stage 2 vapor recovery systems, seasonal variations, and 24-hour sites. Some preference was also given to high throughput stations before the leak rates were considered.

The database of 45 records used for the evaluation had 19 records from manifold tank systems and 26 from single tanks. The database had 30 records from tanks containing gasoline, of which 10 had stage 2 vapor recovery systems.

Fifteen tanks contained diesel fuel. The database had 16 records from tanks with blending dispensers. Forty-three of the 45 records came from tanks that operated on a 24-hour basis.

Reviewing monthly monitoring tests conducted by an ATG that had been previously evaluated provided evidence that the tanks were tight. The data collection sites were selected by the technical personnel at INCON. The sites were chosen such the data collected would meet the required CITLDS Database criteria. The sites were selected by the vendor to provide a range of products and throughput activity, using sites where the vendor's Tank Sentinel ATG was installed and operating.

An INCON Tank Sentinel ATG (models TS-750, TS-1000, TS-1001, TS-2000 or TS-

2001) with the SCALD 2.0 program installed, manufactured by INCON was installed at each site. One model was used at each site and all three models were included. Ken Wilcox Associates obtained the data from the tanks on a compact disk provided by the vendor. A total of 100 data sets were received.

DATA QUALITY

Two data records were selected and inspected by KWA to verify that data were typical. These records were selected to include a delivery and some dispensing activity. The data were reviewed visually. A plot of the level and temperature over time is provided for Tests No. 9 and 100. Test 9 is from a relatively busy tank with a throughput of 206,254 gallons per month while Test No. 100 had a throughput of 5952 gallons per month. These graphs are contained in Attachment B.

The original data records for each tank submitted to the evaluator were usually continuous for a period of time sufficient to conduct several tests. For a few tanks there were some gaps in the records caused by an interruption of the data logging process. Once data logging was interrupted, a technician needed to visit the site and reset the computer program to resume logging. Sometimes the interruption was caused by a loss of power. Occasionally the disk became full and no more data could be stored. Seven records were observed in the data set used for the evaluation. These gaps are identified with an explanation in Attachment C.

LEAK SIMULATION

The leak simulation was done by introducing a volume change into the raw field data corresponding to the induced leak rate. This volume change was computed for each time interval between data recorded by the CITLDS system.

The data records for simulated leaks were modified using an algorithm developed by the vendor. The evaluator checked the algorithm by computing the leak rates for 24 hours on 1 tank records and finding that it differed from the induced leak rates by less than 1 percent. (The simulated leak rates should agree with the nominal leak rates to within the intervals given in Section 6.2.1.)

The leak simulating program was run on tank record 21 with an induced rate of 0.21 gal/h.. The resulting modified record was compared with the original record to document that the leak simulation program modified the product levels appropriately. The CITLDS program was run on the original record (with no leak) and the modified record (with an induced leak) to verify that the CITLDS program estimated a larger leak when one was simulated (see Section 6.2.1). The results are shown in Table S-1.

The leak simulating program was run on tank records 48 and 10 with a zero induced leak rate. The CITLDS program was run on the original record and on the modified record with a zero induced leak rate to verify that the same results were obtained. The results are shown in Table S-2.

Table S-1 Comparison of Leak Simulation Results (One test required)

Record No.	Leak Rate Run 1 (original)	Leak Rate Run 2 (modified)	Difference (Run1-Run2)	Leak Rate Checked From Level Differences
21	0.025	0.235	0.210	0.210

Table S-2. Comparison of CITLDS Algorithm Runs on Zero Induced Leak Record and Original Record

Record No.	Result on Original Record	Estimated Leak From Modified Record
48	0.004	0.004
10	-0.043	-0.043

Large leaks of size 1 to 10 gph were simulated on 10 records. These records were selected at random from the test records and assigned leak rates of 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 gal/h. The large leak rate simulations are reported in Table A3, which identifies the tank records. Large leaks were simulated on all types of tank systems used in the evaluation. The system correctly identified all large leaks as leaks.

STATISTICAL RESULTS

The statistical results that are reported depend on whether the CITLDS is a quantitative or a qualitative system. The SCALD 2.0 system is a quantitative system. The sections below are for quantitative systems. The sections for qualitative systems are not applicable and were not included.

Quantitative Systems.

Variable Leaks

Variable leak rates were simulated in all records that had tank leaks simulated. (The process described in Section 6.3.1 of the protocol was followed.) The mean difference between the reported leak rates for simulated constant and variable leaks was 0.000 gph, and the standard deviation of the difference was 0.0097 gph. Since the mean was greater than zero, the system estimated a larger leak rate on the average when a variable leak was simulated than when a constant leak was simulated as required.

Tank Size

The tanks were divided into large and small tanks at the median size of 12,160 gallons, giving 21 large and 24 small tanks. The bias was computed separately as -0.002 for large and 0.004 for small tanks. The standard deviation of the difference between measured and induced leaks was computed separately as 0.0254 for large and 0.0215 for small tanks. The t-

test comparing the bias was 0.828 , which was not significant at the 5% level. The F-test for comparing the variances of the two groups was 1.38 , which was not significant at the 5% level. As a result of this comparison, the tank size limitation is 1.5 times the 80th percentile of the tank sizes, or 49,336 gallons.

Product Throughput

The tanks were divided into large and small throughputs at the median throughput of 65,000 gallons, giving 22 records with large and 23 records with small throughputs. The bias was computed separately as -.005 for large and 0.006 for small throughputs. The standard deviation of the difference between measured and induced leaks was computed separately as 0.0279 for large and 0.0168 for small throughputs. The t-test comparing the bias was 1.57, which was not significant at the 5% level. The F-test for comparing the variances of the two groups was 2.74, which was significant at the 5% level. As a result of this comparison, the throughput limitation is 1.25 times the 80th percentile of the throughputs, or 257,818 gallons per month

Manifolded and Single Tanks

The manifold and single tank results were compared. There were 26 single tanks and 19 manifolded systems in the test data. The number of records for each size of manifolded system is shown in Table S-3. For qualification for use on manifolded systems, at least 25% of the data must be from manifolded systems. For this evaluation 42.2% of the tank systems were manifolded. To determine the number of tanks that can be tested using this SCALD 2.0 system, minimum number of tanks in the manifold needed to include at least 80% of the manifolded systems. For this evaluation, all of the manifolded systems contained two tanks. The number of tanks is limited to one more than this number. For the SCALD 2.0 system, the number of tanks in a manifold system is limited to 3.

Table S-3. Distribution of Test Records by Number of Tanks in System

Number of tanks in system	Number of test records
1 (Single Tank)	26
2 (Two-tank manifold)	19
3 (Three-tank manifold)	0
4 (Four-tank manifold)	0
5 (Five-tank manifold)	0

The PD and PFA for single and manifolded systems are shown in Table S-3B. The results are listed separately on the Results Form. The PD and PFA for the single tanks takes the bias into account.

Table S-3B. PD and PFA Results

Type of System	Threshold (gph)	PFA	PD at 0.2 gph leak
Single	0.10	< 1%	> 99%
Manifold	0.10	< 1%	> 99%
Combined Data	0.10	< 1%	>99%

The bias was computed separately as –0.0013 for manifold and .0.0023 for single tanks. The standard deviation of the difference between measured and induced leaks was computed separately as 0.0251 for manifold and 0.0223 for single tanks. The t-test comparing the bias was 0.503, which is not significant at the 5% level. The F-test for comparing the variances of the two groups was 1.26 , which *was not* significant at the 5% level. As a result of this comparison, the bias results does not differed for single and manifolded tank systems. This allows the single and manifolded data to be reported with the same PD and PFA values.

SYSTEM HARDWARE

The manufacturer and the model number of each of the systems installed in the field have been listed in Table S-10. Three systems were used to generate data for this evaluation.

Table S-10. Manufacturer and Model Numbers for Systems used in the Evaluation

System Number	Manufacturer	Model Number(s)
1	INCON	TS-1000 with Probe TSP-LL2
2	INCON	TS-1001 with Probe TSP-LL2
3	INCON	TS-2001 with Probe TSP-LL2

The INCON SCALD 2.0 continuous leak detection system was previously evaluated as a shut-down ATG test under the name and version INCON Automatic Tank Gauging System, Version TS-750, TS-1000, TS-1001, TS-2000, and TS-2001 with Probe TSP-LL2. The results of that evaluation are found in "Evaluation of the Incon Automatic Tank Gauging System for Monthly Monitoring of Underground Storage Tanks up to 30,000 Gallons, Models: TS-1000; TS-1001; TS-2001," Volume 1, Final Report, May 14, 1998, by Ken Wilcox Associates, Inc. The water test data are in that report, which showed that the water detector could detect a minimum water level of 0.208 inch with 95% probability and could detect an increase in water level of 0.011 inch with 95% probability, provided that the water was above the minimum detectable level.

The TS-750, TS-1000, TS-1001, TS-2000, and TS-2001 use the same algorithm for conducting continuous leak detection tests. Although the 1998 report mentioned above does not reference the TS-2000, this system was previously evaluated as a shutdown ATG test under the name and version INCON TS-2000 Automatic Tank Gauging System. The results of that evaluation are found in "Evaluation of the INCON TS-2000 Automatic Tank Gauging System for Monthly Monitoring and Annual Tightness Testing" Volume 1, Final Report, May 10, 1991, by Ken Wilcox Associates, Inc.

CONCLUSIONS

Based on these tests, the SCALD 2.0 system manufactured by INCON *meets* the EPA standard for continuous monitoring. See the results reporting form for limitations and more details.

Attachment A

EPA Forms

INCON SCALD 2.0

Results of Alternative U.S. EPA Evaluation Continuous In-Tank Leak Detection System (CITLDS)

This form tells whether the continuous leak detection system (CITLDS) 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 Continuous Leak Detection System Evaluation Protocol. This protocol is deemed equivalent in stringency to the EPA Evaluation Protocols. 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.

CITLDS Description

Name	INCON Tank Sentinel ATG with SCALD 2.0
Version Number	Model TS-750, TS-1000, TS-1001, TS 2000, TS2001 with Probe TSP-LL2
Vendor	Intelligent Controls, 92 Industrial Park Road, P.O. Box 638
	(street address)
	Saco ME 64072 800-872-3455
	(city) (state) (zip) (phone)

Evaluation Results

Quantitative Results For Tank Leak Simulation (Complete this section based on the tank leak simulation data if the CITLDS reports a leak rate. If this section is not applicable, check here ☐ and leave the section blank.)

This CITLDS declares a tank to be leaking when the measured leak rate exceeds a threshold. The threshold, probability of false alarm, PFA, and probability of detection, PD, of detecting an average leak rate of 0.20 gallon per hour or 150 gallons per month, are given in the table below.

The mean difference between the measured and reported leak rate was 0.0023 gph for single tanks and -0.0013 gph for manifolded tanks. The standard deviation was 0.0223 gph for single tanks and 0.0251 gph for manifolded tanks. If the data is combined, the mean difference was 0.0008 gph and the standard deviation was 0.0233 gal/h

System	Threshold	Probability of False Alarm {PFA)	Probability of Detection (PD) of a leak of 0.20 gal/h
Single Tanks	0.10	< 1%	> 99%
Manifolded Tanks	0.10	< 1%	> 99%
Combined	0.10	< 1%	> 99%

Any results that were invalid due to operational difficulties are to be reported. If the data included any invalid results, record that fact here. If not, indicate that. There were 0 invalid results out of 45 records in the data, or 0 %. This means that the system may not provide a conclusive test result 0 % of the time.

If the CITLDS has a water detection function, complete the following:
The minimum water level (threshold) in the tank that the CITLDS can detect is 0.208 inch.
The minimum change in water level that can be detected by the CITLDS is 0.011 inch.

Quantitative Results for Line Leak Simulation (Complete this section based on the line leak simulation data if the CITLDS reports a leak rate. If this section is not applicable, check here ☒ and leave the section blank.)

This CITLDS declares a tank system to be leaking when the measured leak rate exceeds a threshold. The threshold, probability of false alarm, PFA, and probability of detection, PD, of detecting an average leak rate of 0.20 gallon per hour or 150 gallons per month, are given in the table below.

The mean difference between the measured and reported leak rate was _____ gph. The standard deviation was _____ gph.

Threshold	Probability of False Alarm (FA)	Probability of Detection (PD) of leak __ gph

Any results that were invalid due to operational difficulties are to be reported. If the data included any invalid results, record that fact here. If not, indicate that. There were ____ invalid results out of ____ records in the data, or ____%. This means that the system may not provide a conclusive test result ____% of the time.

Qualitative Results for Tank Leak Simulation (Complete this section based on the tank leak simulation data if the CITLDS reports on a pass/fail basis. If this section is not applicable, check here ☒ and leave the section blank.)

	Reported			
Actual Status	Tight	Leaking	Invalid	Total
Tight				
Leaking				

The estimated PFA was _____ with a 95% confidence interval from _____ to _____.

The estimated PD for detecting a leak rate of 0.20 gallon per hour (150 gallons per month) was _____ with a 95% confidence interval from _____ to _____.

Any results that were invalid due to operational difficulties are to be reported. If the data included any invalid results, record that fact here. If not, indicate that. There were ____ invalid results out of ____ records in the data, or ____%. This means that the system may not provide a conclusive test result ____% of the time.

Qualitative Results for Line Leak Simulation (Complete this section based on the line leak simulation data if the CITLDS reports on a pass/fail basis. If this section is not applicable, check here ☒ and leave the section blank.)

	Reported			
Actual Status	Tight	Leaking	Invalid	Total
Tight				
Leaking				

The estimated PFA was _____ with a 95% confidence interval from _____ to _____.

The estimated PD for detecting a leak rate of 0.20 gallon per hour (150 gallons per month) was _____ with a 95% confidence interval from _____ to _____.

Any results that were invalid due to operational difficulties are to be reported. If the data included any invalid results, record that fact here. If not, indicate that. There were ____ invalid results out of records in the data, or ____%. This means that the system may not provide a conclusive test result ____% of the time.

Automatic Monthly Inventory Control Results (If the system is an automatic monthly inventory control system, enter the results in this section. If there is no monthly inventory control function, check here ☒ and leave this section blank.)

The mean of the monthly inventory reconciliation's was _____ gallons per month. The standard deviation was _____ gallons per month. Using the EPA action level of 1% of throughput plus 130 gallons gave the estimated false alarm rate reported below. Also reported is the smallest loss that could be detected with 95% probability using the EPA threshold.

Threshold	Probability of False Alarm (FA)	Size of leak detected with a (PD) of 95%.

Test Conditions During Evaluation

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

Percentile of Records	Min.	25	Median 50	75	80	Max.
Tank Size (gal)	6,084	10,000	12,160	24,000	32,891	41,452

The tanks had various monthly throughputs:

Percentile of Records	Min.	25	Median 50	75	80	Max.
Monthly throughput (gal)	20	17,783	33,979	128,313	206,254	240,837

The temperature difference between product added to fill the tanks and product already in the tank ranged from -17.5 °F to 7.7 °F, with a standard deviation of 4.0 °F.

The tests were conducted with the tank product levels ranging from 14 % to 93.5 % full.

The duration of the CITLDS tests ranged from 0.055 to 15.99 days, with an average duration of 2.2 days (specify appropriate time units, e.g., day or hours).

The system correctly identified 10 leaks of 10 simulated leaks in the 1 to 10 gph range. Note: must be 100% in this range to be acceptable.

For a quantitative system, enter the average difference between the estimated leak rate with a variable simulated leaks minus the estimated rate with a constant simulated leak was 0.000 gph. This difference must be greater than or equal to zero for the system to be acceptable. For a qualitative system, enter the number of leaks identified with variable leak rates N/A and the number identified with constant leak rates N/A. The number with variable leak rates must be at least as large as the number with constant leak rates.

Based on the results reported on pages 1 and 2 of this form, the reported method ☒ does ☐ does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency of an average leak rate of 0.20 gallon per hour or 150 gallons per month from ☒ a tank ☐ or lines (mark applicable boxes) at PD of 95% and PFA of 5%.

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for installing and operating the CITLDS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 49,336 gallons.
- The data records cover 0.055 days or more.
- The monthly throughput is 257,818 gallons or less.
- The difference in temperature between product in the tank and that delivered is 6.0 ° F or less.
- The system ☒ may or ☐ may not be used for manifolded tank systems. If the system may be used for manifolded tank systems, check here ☒ if there was no significant difference in performance between single and manifolded tank systems. If there was a significant difference, enter the PD and PFA for the two types of systems here:

System	PFA	PD
Single Tanks (c = 0.12 adjusted for bias)	No significant difference between Single and Manifolded systems	
Manifolded Tank Systems with up to 2 tanks. (c = 0.10)		
Composite Single and Manifold	< 1%	> 99%

- The minimum product level for the system is 14 % of the tank volume. The maximum product level for the system is 93.5 % of the tank volume.
- Other limitations specified by the vendor or determined during testing:

None

- **Safety disclaimer: This test procedure only addresses the issue of the method's ability to detect leaks.**

Certification of Results

I certify that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to the proposed test procedure for Continuous Leak Detection Systems. In particular, the requirements summarized in Section 6.4 for the data base and in Section 7.8 for the data analysis were followed. Any exceptions are noted below:

- Exceptions to Sections 6.4 and 7.8. If none, state "None."

None

This test procedure is deemed equivalently stringent to EPA published evaluation protocols.

H. Kendall Wilcox, President
(printed name)

Ken Wilcox Associates, Inc.
(organization performing evaluation)

H. Kendall Wilcox
(signature)

Grain Valley, MO 64015
(city, state, zip)

August 27, 2001 (Revised July 11, 2003)
(date)

1 (816) 443-2494
(phone number)

Table A1. Complete Data Base for Evaluation - Sorted by Site, Tank No. and Start Date

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2	3	4	5	6		7		8	9	10	11	12	13	14
Test No.	**Site ID**	**City and State**	**Tank No. at Site**	**Tank Sizes**	**Date and Time at Start of Recond**		**Date and Time at End of Recond**		**No. of Days in Test Record**	**Throughput (gallons/mo) Based on File Throughput**	**Product**	**24Hr. Site?**	**No. of Tanks in Manifold**	**Vapor Rec. ?**	**Blending Disp.?**
1	Palmetto Amoco File 1	Pomaria.SC	3/5	12160/20731	06/27/99	19:31	06/28/99	2:15	0.279	236,085	Diesel	Y	2	N	N
3	Palmetto Amoco File 1	Pomaria.SC	3/5	12160/20731	06/28/99	2:15	06/28/99	4:07	0.077	236,085	Diesel	Y	2	N	N
4	Palmetto Amoco File 1	Pomaria.SC	3/5	12160/20731	06/28/99	4:07	07/03/99	2:11	4.919	236,085	Diesel	Y	2	N	N
8	Palmetto Amoco File 2	Pomaria.SC	3/5	12160/20731	07/07/99	20:40	07/08/99	1:30	0.200	206,254	Diesel	Y	2	N	N
9	Palmetto Amoco File 2	Pomaria.SC	3/5	12160/20731	07/08/99	1:30	07/10/99	3:09	2.069	206,254	Diesel	Y	2	N	N
7	Palmetto Amoco File 2	Pomaria.SC	3/5	12160/20731	07/10/99	3:09	07/13/99	3:00	2.994	206,254	Diesel	Y	2	N	N
5	Palmetto Amoco File 2	Pomaria.SC	3/5	12160/20731	07/13/99	3:00	07/16/99	0:25	2.892	206,254	Diesel	Y	2	N	N
6	Palmetto Amoco File 2	Pomaria.SC	3/5	12160/20731	07/16/99	0:25	07/16/99	5:02	0.192	206,254	Diesel	Y	2	N	N
10	Palmetto Amoco File 2	Pomaria.SC	3/5	12160/20731	07/16/99	5:02	07/21/99	2:11	4.881	206,254	Diesel	Y	2	N	N
16	Palmetto Gazbah File 1	Columbia.SC	2	10029	02/08/99	13:29	02/08/99	16:29	0.124	11,691	Gasoline	Y	1	N	N
17	Palmetto Gazbah File 1	Columbia.SC	2	10029	02/08/99	16:29	02/08/99	23:44	0.302	11,691	Gasoline	Y	1	N	N
18	Palmetto Gazbah File 1	Columbia.SC	2	10029	02/08/99	23:44	02/09/99	2:28	0.112	11,691	Gasoline	Y	1	N	N
19	Palmetto Gazbah File 1	Columbia.SC	2	10029	02/09/99	2:28	02/09/99	4:19	0.076	11,691	Gasoline	Y	1	N	N
20	Palmetto Gazbah File 1	Columbia.SC	2	10029	02/09/99	4:19	02/09/99	6:11	0.076	11,691	Gasoline	Y	1	N	N
21	Palmetto Gazbah File 1	Columbia.SC	2	10029	02/09/99	6:11	02/09/99	11:52	0.237	11,691	Gasoline	Y	1	N	N
22	Palmetto Gazbah File 1	Columbia.SC	2	10029	02/09/99	11:52	02/09/99	21:29	0.401	11,691	Gasoline	Y	1	N	N
23	Palmetto Gazbah File 1	Columbia.SC	4/5	6017/8023	02/10/99	3:29	02/10/99	5:37	0.087	21,766	Gasoline	Y	2	N	N
24	Palmetto Gazbah File 1	Columbia.SC	4/5	6017/8023	02/10/99	5:37	02/11/99	2:16	0.859	21,766	Gasoline	Y	2	N	N
25	Palmetto Gazbah File 1	Columbia.SC	4/5	6017/8023	02/10/99	1:09	02/10/99	3:29	0.096	21,766	Gasoline	Y	2	N	N
13	Palmetto Gazbah File 2	Columbia.SC	4/5	6017/8023	03/02/99	1:19	03/02/99	3:38	0.095	25,566	Gasoline	Y	2	N	N
11	Palmetto Gazbah File 2	Columbia.SC	4/5	6017/8023	03/02/99	3:38	03/03/99	6:11	1.106	25,566	Gasoline	Y	2	N	N
14	Palmetto Gazbah File 2	Columbia.SC	4/5	6017/8023	03/03/99	6:11	03/04/99	21:49	1.651	25,566	Gasoline	Y	2	N	N
12	Palmetto Gazbah File 2	Columbia.SC	4/5	6017/8023	03/04/99	21:49	03/05/99	2:56	0.212	25,566	Gasoline	Y	2	N	N
15	Palmetto Gazbah File 2	Columbia.SC	4/5	6017/8023	03/05/99	2:56	03/06/99	2:48	0.994	25,566	Gasoline	Y	2	N	N
31	Palmetto Gazbah File 3	Columbia.SC	4/5	6017/8023	05/09/99	0:40	05/09/99	3:25	0.113	17,783	Gasoline	Y	2	N	N
32	Palmetto Gazbah File 3	Columbia.SC	4/5	6017/8023	05/09/99	3:25	05/09/99	5:16	0.075	17,783	Gasoline	Y	2	N	N
30	Palmetto Gazbah File 3	Columbia.SC	4/5	6017/8023	05/09/99	5:16	05/10/99	1:45	0.853	17,783	Gasoline	Y	2	N	N
26	Palmetto Gazbah File 3	Columbia.SC	4/5	6017/8023	05/10/99	1:45	05/10/99	5:15	0.146	17,783	Gasoline	Y	2	N	N
27	Palmetto Gazbah File 3	Columbia.SC	4/5	6017/8023	05/10/99	5:16	05/11/99	2:08	0.869	17,783	Gasoline	Y	2	N	N
28	Palmetto Gazbah File 3	Columbia.SC	4/5	6017/8023	05/11/99	2:09	05/11/99	6:10	0.167	17,783	Gasoline	Y	2	N	N
29	Palmetto Gazbah File 3	Columbia.SC	4/5	6017/8023	05/11/99	6:10	05/14/99	1:29	2.805	17,783	Gasoline	Y	2	N	N
33	Palmetto Gazbah File 3	Columbia.SC	4/5	6017/8023	05/14/99	1:29	05/16/99	10:02	2.356	17,783	Gasoline	Y	2	N	N
44	Hoffmans Coneauto File 3	Mosspoint.MS	1	12160	07/16/99	11:37	07/30/99	2:01	13.597	240,837	Gasoline	Y	1	N	Y
34	Hoffmans Coneauto File 1	Mosspoint.MS	2	12160	08/04/99	3:40	08/04/99	5:28	0.074	33,979	Gasoline	Y	1	N	Y
35	Hoffmans Coneauto File 1	Mosspoint.MS	2	12160	08/04/99	5:28	08/05/99	4:08	0.944	33,979	Gasoline	Y	1	N	Y
36	Hoffmans Coneauto File 1	Mosspoint.MS	2	12160	08/05/99	4:08	08/06/99	5:51	1.072	33,979	Gasoline	Y	1	N	Y
37	Hoffmans Coneauto File 1	Mosspoint.MS	2	12160	08/06/99	5:51	08/12/99	4:01	5.924	33,979	Gasoline	Y	1	N	Y
38	Hoffmans Coneauto File 1	Mosspoint.MS	2	12160	08/12/99	4:01	08/12/99	6:06	0.086	33,979	Gasoline	Y	1	N	Y
39	Hoffmans Coneauto File 1	Mosspoint.MS	2	12160	08/12/99	6:06	08/19/99	4:04	6.915	33,979	Gasoline	Y	1	N	Y
40	Hoffmans Coneauto File 1	Mosspoint.MS	2	12160	08/19/99	4:04	08/19/99	5:49	0.072	33,979	Gasoline	Y	1	N	Y
43	Hoffmans Coneauto File 2	Mosspoint.MS	2	12160	09/08/99	2:04	09/13/99	4:00	5.079	34,195	Gasoline	Y	1	N	Y

Table A1. Complete Data Base for Evaluation - Sorted by Site, Tank No. and Start Date

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2	3	4	5	6		7		8	9	10	11	12	13	14
Test No.	**Site ID**	**City and State**	**Tank No. at Site**	**Tank Sizes**	**Date and Time at Start of Recond**		**Date and Time at End of Recond**		**No. of Days in Test Record**	**Throughput (gallons/mo) Based on File Throughput**	**Product**	**24Hr. Site?**	**No. of Tanks in Manifold**	**Vapor Rec. ?**	**Blending Disp.?**
41	Hoffmans Coneauto File 1	Mosspoint.MS	3/4	20731/20731	08/13/99	2:27	08/15/99	8:11	2.238	74,673	Diesel	Y	2	N	N
42	Hoffmans Coneauto File 1	Mosspoint.MS	3/4	20731/20731	08/15/99	8:11	08/19/99	5:40	3.894	74,673	Diesel	Y	2	N	N
59	Caroll Towson File 1	Towson.MD	1	12000	08/05/99	19:44	08/09/99	2:00	3.260	109,461	Gasoline	Y	1	Y	Y
60	Caroll Towson File 1	Towson.MD	1	12000	08/09/99	2:00	08/10/99	4:02	1.085	109,461	Gasoline	Y	1	Y	Y
61	Caroll Towson File 1	Towson.MD	1	12000	08/10/99	4:02	08/10/99	6:18	0.094	109,461	Gasoline	Y	1	Y	Y
45	Caroll Towson File 2	Towson.MD	1	12000	09/01/99	3:07	09/01/99	5:37	0.103	113,832	Gasoline	Y	1	Y	Y
46	Caroll Towson File 2	Towson.MD	1	12000	09/01/99	5:37	09/02/99	5:52	1.010	113,832	Gasoline	Y	1	Y	Y
47	Caroll Towson File 2	Towson.MD	1	12000	09/02/99	5:52	09/06/99	5:49	3.999	113,832	Gasoline	Y	1	Y	Y
48	Caroll Towson File 2	Towson.MD	1	12000	09/06/99	5:49	09/13/99	4:39	6.950	113,832	Gasoline	Y	1	Y	Y
58	Caroll Towson File 3	Towson.MD	1	12000	09/21/99	11:17	09/25/99	5:49	3.771	115,098	Gasoline	Y	1	Y	Y
49	Caroll Towson File 2	Towson.MD	3	10000	08/29/99	4:25	08/29/99	8:36	0.174	65,401	Gasoline	Y	1	Y	Y
50	Caroll Towson File 2	Towson.MD	3	10000	08/29/99	8:37	09/04/99	5:21	5.860	65,401	Gasoline	Y	1	Y	Y
51	Caroll Towson File 2	Towson.MD	3	10000	09/04/99	5:21	09/04/99	8:06	0.114	65,401	Gasoline	Y	1	Y	Y
52	Caroll Towson File 2	Towson.MD	3	10000	09/04/99	8:06	09/05/99	5:38	0.896	65,401	Gasoline	Y	1	Y	Y
53	Caroll Towson File 2	Towson.MD	3	10000	09/05/99	5:38	09/11/99	5:27	5.992	65,401	Gasoline	Y	1	Y	Y
54	Caroll Towson File 2	Towson.MD	3	10000	09/11/99	5:27	09/12/99	5:43	1.011	65,401	Gasoline	Y	1	Y	Y
55	Caroll Towson File 2	Towson.MD	3	10000	09/12/99	5:43	09/13/99	4:29	0.947	65,401	Gasoline	Y	1	Y	Y
56	Caroll Towson File 2	Towson.MD	3	10000	09/13/99	4:29	09/14/99	4:14	0.989	65,401	Gasoline	Y	1	Y	Y
57	Caroll Towson File 2	Towson.MD	3	10000	09/14/99	4:14	09/15/99	0:36	0.847	65,401	Gasoline	Y	1	Y	Y
66	Caroll Timon File 1	Timonium.MD	1	10000	07/28/99	14:36	08/03/99	2:59	5.516	128,313	Gasoline	N	1	Y	N
67	Caroll Timon File 1	Timonium.MD	1	10000	08/03/99	2:59	08/03/99	23:25	0.850	128,313	Gasoline	N	1	Y	N
68	Caroll Timon File 1	Timonium.MD	1	10000	08/03/99	23:25	08/04/99	1:38	0.091	128,313	Gasoline	N	1	Y	N
69	Caroll Timon File 1	Timonium.MD	1	10000	08/04/99	1:38	08/04/99	4:40	0.126	128,313	Gasoline	N	1	Y	N
70	Caroll Timon File 1	Timonium.MD	1	10000	08/04/99	4:40	08/07/99	5:37	3.039	128,313	Gasoline	N	1	Y	N
71	Caroll Timon File 1	Timonium.MD	1	10000	08/07/99	5:37	08/17/99	3:19	9.892	128,313	Gasoline	N	1	Y	N
62	Caroll Timon File 2	Timonium.MD	1	10000	09/12/99	5:56	09/14/99	0:57	1.792	120,642	Gasoline	N	1	Y	N
63	Caroll Timon File 2	Timonium.MD	1	10000	09/14/99	0:57	09/14/99	3:06	0.089	120,642	Gasoline	N	1	Y	N
64	Caroll Timon File 2	Timonium.MD	1	10000	09/14/99	3:06	09/14/99	5:02	0.079	120,642	Gasoline	N	1	Y	N
65	Caroll Timon File 2	Timonium.MD	1	10000	09/14/99	5:02	09/21/99	2:38	6.899	120,642	Gasoline	N	1	Y	N
72	Mascott Clack File 1	Clackamas.OR	2	10000	10/21/99	10:29	10/26/99	23:53	5.557	13,548	Gasoline	N	1	Y	N
73	Mascott Clack File 1	Clackamas.OR	2	10000	10/26/99	23:53	10/27/99	4:56	0.209	13,548	Gasoline	N	1	Y	N
74	Mascott Clack File 1	Clackamas.OR	2	10000	10/27/99	4:56	11/04/99	0:28	7.814	13,548	Gasoline	N	1	Y	N
2	InterstatePumpTank Stretch File 1	FondDuLac.WI	5/6	12000/12000	09/27/99	2:40	09/27/99	4:46	0.085	169,066	Diesel	Y	2	N	N
75	InterstatePumpTank Stretch File 2	FondDuLac.WI	5/6	12000/12000	10/18/99	3:53	10/18/99	7:56	0.167	209,707	Diesel	Y	2	N	N
76	SouthEastPetro Charlott File 1	Charlotte.NC	3	15548	11/01/99	3:07	11/01/99	6:18	0.132	31,204	Gasoline	Y	1	N	N
77	SouthEastPetro Charlott File 1	Charlotte.NC	3	15548	11/01/99	6:18	11/01/99	10:28	0.173	31,204	Gasoline	Y	1	N	N
78	SouthEastPetro Charlott File 1	Charlotte.NC	3	15548	11/01/99	10:29	11/01/99	12:52	0.098	31,204	Gasoline	Y	1	N	N
79	SouthEastPetro Charlott File 1	Charlotte.NC	3	15548	11/01/99	12:52	11/02/99	9:11	0.847	31,204	Gasoline	Y	1	N	N
80	SouthEastPetro Charlott File 1	Charlotte.NC	3	15548	11/02/99	9:12	11/02/99	13:06	0.162	31,204	Gasoline	Y	1	N	N

Table A1. Complete Data Base for Evaluation - Sorted by Site, Tank No. and Start Date

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2	3	4	5	6		7		8	9	10	11	12	13	14
Test No.	**Site ID**	**City and State**	**Tank No. at Site**	**Tank Sizes**	**Date and Time at Start of Recond**		**Date and Time at End of Recond**		**No. of Days in Test Record**	**Throughput (gallons/mo) Based on File Throughput**	**Product**	**24Hr. Site?**	**No. of Tanks in Manifold**	**Vapor Rec. ?**	**Blending Disp.?**
81	Brunswick File 1	Brunswick.ME	2	6084	06/19/99	7:48	06/20/99	5:19	0.895	14,854	Gasoline	N	1	Y	N
82	Brunswick File 1	Brunswick.ME	2	6084	06/20/99	5:19	06/20/99	10:20	0.208	14,854	Gasoline	N	1	Y	N
83	Brunswick File 1	Brunswick.ME	2	6084	06/20/99	10:20	06/21/99	9:17	0.956	14,854	Gasoline	N	1	Y	N
84	Brunswick File 1	Brunswick.ME	2	6084	06/21/99	9:17	06/21/99	17:48	0.355	14,854	Gasoline	N	1	Y	N
85	Brunswick File 1	Brunswick.ME	2	6084	06/21/99	17:48	06/22/99	0:30	0.278	14,854	Gasoline	N	1	Y	N
86	Indy File 1	Indianapolis.IN	1	9728	05/18/99	14:28	05/18/99	16:15	0.073	20	Diesel	Y	1	N	N
87	Indy File 1	Indianapolis.IN	1	9728	05/18/99	16:15	05/18/99	18:05	0.075	20	Diesel	Y	1	N	N
88	Indy File 1	Indianapolis.IN	1	9728	05/18/99	18:05	05/18/99	19:53	0.074	20	Diesel	Y	1	N	N
89	Indy File 1	Indianapolis.IN	1	9728	05/18/99	19:53	05/18/99	21:42	0.074	20	Diesel	Y	1	N	N
90	PlainsPump 208 File 1	Graham.TX	2	9989	10/26/99	2:08	10/26/99	4:19	0.090	15,815	Gasoline	Y	1	N	Y
91	PlainsPump 208 File 1	Graham.TX	2	9989	10/26/99	4:19	11/11/99	4:15	15.997	15,815	Gasoline	Y	1	N	Y
92	PlainsPump 208 File 1	Graham.TX	2	9989	11/11/99	4:16	11/14/99	2:22	2.921	15,815	Gasoline	Y	1	N	Y
93	PlainsPump 208 File 1	Graham.TX	2	9989	11/14/99	2:22	11/19/99	5:13	5.119	15,815	Gasoline	Y	1	N	Y
94	PlainsPump 208 File 1	Graham.TX	2	9989	11/19/99	5:13	11/22/99	2:59	2.907	15,815	Gasoline	Y	1	N	Y
95	PlainsPump 323 File 1	Graham.TX	2	8023	10/05/99	23:41	10/06/99	1:23	0.070	8,332	Gasoline	Y	1	N	Y
96	PlainsPump 323 File 1	Graham.TX	2	8023	10/06/99	1:23	10/06/99	3:09	0.073	8,332	Gasoline	Y	1	N	Y
97	PlainsPump 323 File 1	Graham.TX	2	8023	10/06/99	3:09	10/06/99	5:21	0.090	8,332	Gasoline	Y	1	N	Y
98	PlainsPump 323 File 1	Graham.TX	3	8023	10/04/99	10:43	10/04/99	22:23	0.485	5,952	Diesel	Y	1	N	N
99	PlainsPump 323 File 1	Graham.TX	3	8023	10/04/99	22:23	10/05/99	0:05	0.070	5,952	Diesel	Y	1	N	N
100	PlainsPump 323 File 1	Graham.TX	3	8023	10/05/99	0:05	10/05/99	1:47	0.070	5,952	Diesel	Y	1	N	N

Table A1B. Data Base Selected for Evaluation - Sorted by Site, Tank No. and Start Date

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2	3	4	5	6		7		8	9	10	11	12	13	14
Test No.	**Site ID**	**City and State**	**Tank No. at Site**	**Tank Sizes**	**Date and Time at Start of Recond**		**Date and Time at End of Recond**		**No. of Days in Test Record**	**Throughput (gallons/mo) Based on File Throughput**	**Product**	**24Hr. Site?**	**No. of Tanks in Manifold**	**Vapor Rec. ?**	**Blending Disp.?**
1	Palmetto Amoco File 1	Pomaria.SC	3/5	12,160/20,731	06/27/99	19:31	06/28/99	2:15	0.279	236,085	Diesel	Y	2	N	N
3	Palmetto Amoco File 1	Pomaria.SC	3/5	12,160/20,731	06/28/99	2:15	06/28/99	4:07	0.077	236,085	Diesel	Y	2	N	N
4	Palmetto Amoco File 1	Pomaria.SC	3/5	12,160/20,731	06/28/99	4:07	07/03/99	2:11	4.919	236,085	Diesel	Y	2	N	N
8	Palmetto Amoco File 2	Pomaria.SC	3/5	12,160/20,731	07/07/99	20:40	07/08/99	1:30	0.200	206,254	Diesel	Y	2	N	N
9	Palmetto Amoco File 2	Pomaria.SC	3/5	12,160/20,731	07/08/99	1:30	07/10/99	3:09	2.069	206,254	Diesel	Y	2	N	N
7	Palmetto Amoco File 2	Pomaria.SC	3/5	12,160/20,731	07/10/99	3:09	07/13/99	3:00	2.994	206,254	Diesel	Y	2	N	N
5	Palmetto Amoco File 2	Pomaria.SC	3/5	12,160/20,731	07/13/99	3:00	07/16/99	0:25	2.892	206,254	Diesel	Y	2	N	N
6	Palmetto Amoco File 2	Pomaria.SC	3/5	12,160/20,731	07/16/99	0:25	07/16/99	5:02	0.192	206,254	Diesel	Y	2	N	N
10	Palmetto Amoco File 2	Pomaria.SC	3/5	12,160/20,731	07/16/99	5:02	07/21/99	2:11	4.881	206,254	Diesel	Y	2	N	N
16	Palmetto Gazbah File 1	Columbia.SC	2	10,029	02/08/99	13:29	02/08/99	16:29	0.124	11,691	Gasoline	Y	1	N	N
21	Palmetto Gazbah File 1	Columbia.SC	2	10,029	02/09/99	6:11	02/09/99	11:52	0.237	11,691	Gasoline	Y	1	N	N
22	Palmetto Gazbah File 1	Columbia.SC	2	10,029	02/09/99	11:52	02/09/99	21:29	0.401	11,691	Gasoline	Y	1	N	N
24	Palmetto Gazbah File 1	Columbia.SC	4/5	6017/8023	02/10/99	5:37	02/11/99	2:16	0.859	21,766	Gasoline	Y	2	N	N
28	Palmetto Gazbah File 3	Columbia.SC	4/5	6,017/8,023	05/11/99	2:09	05/11/99	6:10	0.167	17,783	Gasoline	Y	2	N	N
29	Palmetto Gazbah File 3	Columbia.SC	4/5	6,017/8,023	05/11/99	6:10	05/14/99	1:29	2.805	17,783	Gasoline	Y	2	N	N
15	Palmetto Gazbah File 2	Columbia.SC	4/5	6,017/8,023	03/05/99	2:56	03/06/99	2:48	0.994	25,566	Gasoline	Y	2	N	N
31	Palmetto Gazbah File 3	Columbia.SC	4/5	6,017/8,023	05/09/99	0:40	05/09/99	3:25	0.113	17,783	Gasoline	Y	2	N	N
32	Palmetto Gazbah File 3	Columbia.SC	4/5	6,017/8,023	05/09/99	3:25	05/09/99	5:16	0.075	17,783	Gasoline	Y	2	N	N
33	Palmetto Gazbah File 3	Columbia.SC	4/5	6,017/8,023	05/14/99	1:29	05/16/99	10:02	2.356	17,783	Gasoline	Y	2	N	N
44	Hoffmans Coneauto File 3	Mosspoint.MS	1	12,160	07/16/99	11:37	07/30/99	2:01	13.597	240,837	Gasoline	Y	1	N	Y
35	Hoffmans Coneauto File 1	Mosspoint.MS	2	12,160	08/04/99	5:28	08/05/99	4:08	0.944	33,979	Gasoline	Y	1	N	Y
36	Hoffmans Coneauto File 1	Mosspoint.MS	2	12,160	08/05/99	4:08	08/06/99	5:51	1.072	33,979	Gasoline	Y	1	N	Y
38	Hoffmans Coneauto File 1	Mosspoint.MS	2	12,160	08/12/99	4:01	08/12/99	6:06	0.086	33,979	Gasoline	Y	1	N	Y
41	Hoffmans Coneauto File 1	Mosspoint.MS	3/4	20,731/20,731	08/13/99	2:27	08/15/99	8:11	2.238	74,673	Diesel	Y	2	N	N
42	Hoffmans Coneauto File 1	Mosspoint.MS	3/4	20,731/20,731	08/15/99	8:11	08/19/99	5:40	3.894	74,673	Diesel	Y	2	N	N
59	Caroll Towson File 1	Towson.MD	1	12,000	08/05/99	19:44	08/09/99	2:00	3.260	109,461	Gasoline	Y	1	Y	Y
45	Caroll Towson File 2	Towson.MD	1	12,000	09/01/99	3:07	09/01/99	5:37	0.103	113,832	Gasoline	Y	1	Y	Y
48	Caroll Towson File 2	Towson.MD	1	12,000	09/06/99	5:49	09/13/99	4:39	6.950	113,832	Gasoline	Y	1	Y	Y
49	Caroll Towson File 2	Towson.MD	3	10,000	08/29/99	4:25	08/29/99	8:36	0.174	65,401	Gasoline	Y	1	Y	Y
50	Caroll Towson File 2	Towson.MD	3	10,000	08/29/99	8:37	09/04/99	5:21	5.860	65,401	Gasoline	Y	1	Y	Y
51	Caroll Towson File 2	Towson.MD	3	10,000	09/04/99	5:21	09/04/99	8:06	0.114	65,401	Gasoline	Y	1	Y	Y
52	Caroll Towson File 2	Towson.MD	3	10,000	09/04/99	8:06	09/05/99	5:38	0.896	65,401	Gasoline	Y	1	Y	Y
53	Caroll Towson File 2	Towson.MD	3	10,000	09/05/99	5:38	09/11/99	5:27	5.992	65,401	Gasoline	Y	1	Y	Y
70	Caroll Timon File 1	Timonium.MD	1	10,000	08/04/99	4:40	08/07/99	5:37	3.039	128,313	Gasoline	N	1	Y	N
75	InterstatePumpTank Stretch File 2	FondDuLac.WI	5/6	12,000/12,000	10/18/99	3:53	10/18/99	7:56	0.167	209,707	Diesel	Y	2	N	N

Table A1B. Data Base Selected for Evaluation - Sorted by Site, Tank No. and Start Date

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2	3	4	5	6		7		8	9	10	11	12	13	14
Test No.	**Site ID**	**City and State**	**Tank No. at Site**	**Tank Sizes**	**Date and Time at Start of Recond**		**Date and Time at End of Recond**		**No. of Days in Test Record**	**Throughput (gallons/mo) Based on File Throughput**	**Product**	**24Hr. Site?**	**No. of Tanks in Manifold**	**Vapor Rec. ?**	**Blending Disp.?**
78	SouthEastPetro Charlott File 1	Charlotte.NC	3	15,548	11/01/99	10:29	11/01/99	12:52	0.098	31,204	Gasoline	Y	1	N	N
79	SouthEastPetro Charlott File 1	Charlotte.NC	3	15,548	11/01/99	12:52	11/02/99	9:11	0.847	31,204	Gasoline	Y	1	N	N
81	Brunswick File 1	Brunswick.ME	2	6,084	06/19/99	7:48	06/20/99	5:19	0.895	14,854	Gasoline	N	1	Y	N
87	Indy File 1	Indianapolis.IN	1	9,728	05/18/99	16:15	05/18/99	18:05	0.075	20	Diesel	Y	1	N	N
89	Indy File 1	Indianapolis.IN	1	9,728	05/18/99	19:53	05/18/99	21:42	0.074	20	Diesel	Y	1	N	N
91	PlainsPump 208 File 1	Graham.TX	2	9,989	10/26/99	4:19	11/11/99	4:15	15.997	15,815	Gasoline	Y	1	N	Y
92	PlainsPump 208 File 1	Graham.TX	2	9,989	11/11/99	4:16	11/14/99	2:22	2.921	15,815	Gasoline	Y	1	N	Y
94	PlainsPump 208 File 1	Graham.TX	2	9,989	11/19/99	5:13	11/22/99	2:59	2.907	15,815	Gasoline	Y	1	N	Y
96	PlainsPump 323 File 1	Graham.TX	2	8,023	10/06/99	1:23	10/06/99	3:09	0.073	8,332	Gasoline	Y	1	N	Y
100	PlainsPump 323 File 1	Graham.TX	3	8,023	10/05/99	0:05	10/05/99	1:47	0.070	5,952	Diesel	Y	1	N	N

Table A2. Test Data used in the Evaluation

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0

Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2	3	4	5	6	7	8	9	10	11	12	13
Test No.	Tank Size (gal)	First Quiet Period		Last Quiet Period		Total Duration of Quiet Periods days	Max % Product Level During Test	Min % Product Level During Test	No. of Deliveries per File	Highest % Operating Level During Period	Lowest % Operating Level During Period	Highest % Level Period Minus Test
		Start Date	Start Time	Start Date	Start Time							
1	12160/20731	06/27/99	23:42	06/28/99	1:53	0.056	46.467	46.118	15	47.054	46.105	0.586
3	12160/20731	06/28/99	2:42	06/28/99	3:46	0.055	46.118	46.118	15	46.119	46.118	0.001
4	12160/20731	07/02/99	1:40	07/02/99	20:31	0.055	57.936	45.590	15	58.978	41.178	1.042
8	12160/20731	07/07/99	21:08	07/08/99	1:09	0.200	43.001	42.129	19	83.33	31.41	40.329
9	12160/20731	07/10/99	1:01	07/10/99	2:48	0.297	65.315	59.035	19	83.33	31.41	18.015
5	12160/20731	07/15/99	19:10	07/16/99	0:03	0.276	54.758	52.113	19	83.33	31.41	28.572
6	12160/20731	07/16/99	3:37	07/16/99	4:41	0.077	52.119	52.117	19	83.33	31.41	31.211
7	12160/20731	07/12/99	23:19	07/13/99	2:39	0.256	66.756	64.488	19	72.66	6.21	5.904
10	12160/20731	07/20/99	20:10	07/21/99	1:50	1.006	59.450	51.472	19	72.66	6.21	13.210
16	10029	02/08/99	13:37	02/08/99	16:08	0.124	40.379	40.059	4	56.06	32.69	15.681
21	10029	02/09/99	8:59	02/09/99	11:31	0.136	38.386	38.154	4	56.06	32.69	17.674
22	10029	02/09/99	17:40	02/09/99	21:08	0.266	37.696	36.124	4	56.06	32.69	18.364
24	6017/8023	02/10/99	20:41	02/11/99	1:55	0.859	47.837	42.044	4	84.11	29.82	36.273
28	6017/8023	05/11/99	2:53	05/11/99	5:49	0.167	31.257	30.848	4	83.38	29.87	52.123
29	6017/8023	05/13/99	4:18	05/14/99	1:08	0.905	42.311	35.951	4	83.38	29.87	41.069
15	6017/8023	03/05/99	23:30	03/06/99	2:27	0.223	39.656	39.310	2	65.88	41.16	26.224
31	6017/8023	05/09/99	1:20	05/09/99	3:04	0.113	48.945	48.926	4	70.67	36.26	21.725
32	6017/8023	05/09/99	3:50	05/09/99	4:54	0.075	48.930	48.929	4	70.67	36.26	21.740
33	6017/8023	05/16/99	5:51	05/16/99	9:41	0.215	40.947	40.942	4	70.67	36.26	29.723
44	12160	07/22/99	3:42	07/30/99	1:40	13.597	88.851	22.605	29	93.53	23.79	4.679
35	12160	08/05/99	2:32	08/05/99	3:47	0.090	49.115	49.066	16	69.03	22.06	19.915
36	12160	08/05/99	14:59	08/06/99	5:30	0.895	51.613	38.020	16	69.03	22.06	17.417
38	12160	08/12/99	4:21	08/12/99	5:45	0.086	45.887	45.736	16	69.03	22.06	23.143
41	20731/20731	08/13/99	2:49	08/15/99	7:50	2.238	32.714	26.803	18	48.35	13.95	15.636
42	20731/20731	08/16/99	4:19	08/19/99	5:19	3.894	43.170	17.294	18	48.35	13.95	5.180
59	12000	08/08/99	5:21	08/09/99	1:39	3.260	79.805	24.067	6	86.03	25.33	6.225
45	12000	09/01/99	3:54	09/01/99	5:16	0.103	58.034	57.970	17	80.20	17.76	22.166
48	12000	09/09/99	3:06	09/13/99	4:19	6.950	67.786	22.516	17	80.20	17.76	12.414

Table A2. Test Data used in the Evaluation

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0

Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2	3	4	5	6	7	8	9	10	11	12	13
Test No.	Tank Size (gal)	First Quiet Period		Last Quiet Period		Total Duration of Quiet Periods days	Max % Product Level During Test	Min % Product Level During Test	No. of Deliveries per File	Highest % Operating Level During Period	Lowest % Operating Level During Period	Highest % Level Period Minus Test
		Start Date	Start Time	Start Date	Start Time							
49	10000	08/29/99	4:52	08/29/99	8:15	0.174	65.571	64.848	17	84.28	28.81	18.709
50	10000	09/04/99	3:56	09/04/99	5:00	5.860	80.069	33.122	17	84.28	28.81	4.211
51	10000	09/04/99	5:42	09/04/99	7:45	0.114	66.798	66.500	17	84.28	28.81	17.482
52	10000	09/05/99	1:05	09/05/99	5:16	0.896	66.501	53.977	17	84.28	28.81	17.779
53	10000	09/09/99	3:23	09/11/99	5:06	2.956	63.730	43.506	17	84.28	28.81	20.550
70	10000	08/04/99	5:15	08/07/99	5:15	3.039	86.877	20.595	18	91.94	21.68	5.063
75	12000/12000	10/18/99	5:15	10/18/99	7:35	0.167	59.633	57.999	25	90.78	34.92	31.147
78	15548	11/01/99	10:53	11/01/99	12:31	0.098	42.564	42.369	7	72.95	19.30	30.386
79	15548	11/02/99	6:22	11/02/99	8:50	0.430	37.662	33.038	7	72.95	19.30	35.288
81	6084	06/19/99	9:19	06/20/99	4:58	0.895	53.170	41.968	3	68.30	41.45	15.130
87	9728	05/18/99	16:40	05/18/99	17:44	0.075	34.086	34.085	0	35.95	24.75	1.864
89	9728	05/18/99	20:17	05/18/99	21:21	0.074	34.086	34.085	0	35.95	24.75	1.864
96	8023	10/06/99	1:42	10/06/99	2:48	0.073	62.400	62.398	2	73.55	44.44	11.150
91	9989	11/10/99	3:56	11/11/99	3:54	1.934	55.872	45.379	15	68.03	24.34	12.158
92	9989	11/12/99	0:39	11/14/99	2:01	2.921	45.391	30.821	15	68.03	24.34	22.639
94	9989	11/22/99	0:44	11/22/99	2:38	0.185	58.574	58.531	15	68.03	24.34	9.456
100	8023	10/05/99	0:22	10/05/99	1:26	0.070	36.800	36.799	1	52.34	31.38	15.540

Table A3. Reporting Form for Leak Rate Data

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Test No.	Site ID	City and State	Zero Leaks			Constant Leaks			Variable Leaks			Difference. Variable Leak - Const. Leak	Large Leaks		
			Induced Leak	Obs. Zero Leak	Dif. (zero)	Induced Leak	Calc Leak	Dif. (const)	Induced Leak	Calc Leak	Dif. (Var)		Induced Leak	Calc. Leak	Dif.(Large)
1	Palmetto Amoco File 1	Pomaria.SC				0.300	0.284	-0.016	0.300	0.285	-0.015	-0.001			
3	Palmetto Amoco File 1	Pomaria.SC				0.110	0.109	-0.001	0.110	0.123	0.013	-0.014			
4	Palmetto Amoco File 1	Pomaria.SC				0.300	0.307	0.007	0.300	0.297	-0.003	0.010			
5	Palmetto Amoco File 2	Pomaria.SC				0.230	0.223	-0.007	0.230	0.214	-0.016	-0.009			
6	Palmetto Amoco File 2	Pomaria.SC				0.270	0.258	-0.012	0.270	0.267	-0.003	0.009			
7	Palmetto Amoco File 2	Pomaria.SC				0.210	0.200	-0.010	0.210	0.179	-0.031	-0.021			
8	Palmetto Amoco File 2	Pomaria.SC				0.140	0.126	-0.014	0.140	0.126	-0.014	0.000	5.000	4.904	-0.096
9	Palmetto Amoco File 2	Pomaria.SC	0.000	0.043	0.043	0.000	0.043	0.043							
10	Palmetto Amoco File 2	Pomaria.SC	0.000	-0.043	-0.043	0.000	-0.043	-0.043							
15	Palmetto Gazbah File 2	Columbia.SC	0.000	-0.010	-0.010	0.000	-0.010	-0.010							
16	Palmetto Gazbah File 1	Columbia.SC	0.000	0.009	0.009	0.000	0.009	0.009							
21	Palmetto Gazbah File 1	Columbia.SC				0.210	0.235	0.025	0.210	0.235	0.025	0.000			
22	Palmetto Gazbah File 1	Columbia.SC				0.180	0.192	0.012	0.180	0.191	0.011	-0.001			
24	Palmetto Gazbah File 1	Columbia.SC				0.300	0.307	0.007	0.300	0.298	-0.002	-0.009			
28	Palmetto Gazbah File 3	Columbia.SC				0.350	0.365	0.015	0.350	0.366	0.016	0.001			
29	Palmetto Gazbah File 3	Columbia.SC	0.000	0.020	0.020	0.000	0.020	0.020							
31	Palmetto Gazbah File 3	Columbia.SC				0.200	0.202	0.002	0.200	0.203	0.003	0.001			
32	Palmetto Gazbah File 3	Columbia.SC				0.060	0.095	0.035	0.060	0.095	0.035	0.000			
33	Palmetto Gazbah File 3	Columbia.SC				0.340	0.361	0.021	0.340	0.367	0.027	0.006			
35	Hoffmans Coneauto File 1	Mosspoint.MS				0.160	0.144	-0.016	0.160	0.144	-0.016	0.000	4.000	3.964	-0.036
36	Hoffmans Coneauto File 1	Mosspoint.MS	0.000	0.002	0.002	0.000	0.002	0.002							
38	Hoffmans Coneauto File 1	Mosspoint.MS				0.080	0.108	0.028	0.080	0.109	0.029	0.001	7.000	6.987	-0.013
41	Hoffmans Coneauto File 1	Mosspoint.MS				0.070	0.004	-0.066	0.070	0.004	-0.066	0.000			
42	Hoffmans Coneauto File 1	Mosspoint.MS	0.000	0.006	0.006	0.000	0.006	0.006							
44	Hoffmans Coneauto File 3	Mosspoint.MS				0.170	0.110	-0.060	0.170	0.124	-0.046	0.014			
45	Caroll Towson File 2	Towson.MD				0.310	0.318	0.008	0.310	0.319	0.009	0.001	6.000	5.966	-0.034
48	Caroll Towson File 2	Towson.MD	0.000	0.004	0.004	0.000	0.004	0.004							
49	Caroll Towson File 2	Towson.MD	0.000	-0.002	-0.002	0.000	-0.002	-0.002							
50	Caroll Towson File 2	Towson.MD				0.260	0.271	0.011	0.260	0.306	0.046	0.035	2.000	2.001	0.001
51	Caroll Towson File 2	Towson.MD	0.000	0.030	0.030	0.000	0.030	0.030							
52	Caroll Towson File 2	Towson.MD				0.290	0.326	0.036	0.290	0.326	0.036	0.000			
53	Caroll Towson File 2	Towson.MD	0.000	0.021	0.021	0.000	0.021	0.021							
59	Caroll Towson File 1	Towson.MD	0.000	0.002	0.002	0.000	0.002	0.002							
70	Caroll Timon File 1	Timonium.MD				0.150	0.111	-0.039	0.150	0.118	-0.032	0.007	9.000	8.931	-0.069
75	InterstatePumpTank Stretch File 2	FondDuLac.WI	0.000	-0.001	-0.001	0.000	-0.001	-0.001							
78	SouthEastPetro Charlott File 1	Charlotte.NC				0.130	0.144	0.014	0.130	0.144	0.014	0.000			
79	SouthEastPetro Charlott File 1	Charlotte.NC				0.280	0.242	-0.038	0.280	0.239	-0.041	-0.003			
81	Brunswick File 1	Brunswick.ME				0.110	0.116	0.006	0.110	0.116	0.006	0.000	3.000	2.976	-0.024
87	Indy File 1	Indianapolis.IN				0.220	0.222	0.002	0.220	0.223	0.003	0.001	1.000	0.996	-0.004
89	Indy File 1	Indianapolis.IN				0.190	0.198	0.008	0.190	0.198	0.008	0.000	8.000	7.94	-0.060

Table A3. Reporting Form for Leak Rate Data

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Test No.	**Site ID**	**City and State**	**Zero Leaks**			**Constant Leaks**			**Variable Leaks**			**Difference. Variable Leak - Const. Leak**	**Large Leaks**		
			Induced Leak	**Obs. Zero Leak**	**Dif. (zero)**	**Induced Leak**	**Calc Leak**	**Dif. (const)**	**Induced Leak**	**Calc Leak**	**Dif. (Var)**		**Induced Leak**	**Calc. Leak**	**Dif.(Large)**
91	PlainsPump 208 File 1	Graham.TX				0.250	0.243	-0.007	0.250	0.245	-0.005	0.002	10.000	9.925	-0.075
92	PlainsPump 208 File 1	Graham.TX	0.000	0.000	0.000	0.000	0.000	0.000							
94	PlainsPump 208 File 1	Graham.TX				0.090	0.075	-0.015	0.090	0.071	-0.019	-0.004			
96	PlainsPump 323 File 1	Graham.TX				0.120	0.145	0.025	0.120	0.131	0.011	-0.014			
100	PlainsPump 323 File 1	Graham.TX	0.000	-0.007	-0.007	0.000	-0.007	-0.007							
		Mean	0.000	0.005	0.005		std dev=	0.0233		std dev=	0.0258	0.0097			-0.041
		Stdev	0.0000	0.0196	0.0196		bias	0.001		bias	-0.001	0.000			0.0327
		n	15	15	15		c	0.1		c	0.1	0.1			10
							tB	0.224		tB	-0.147	0.277			
							bias is not significant			bias is not significant		not significant			
							t2	4.294668		t2	3.869979	10.33851339			
							t4	4.294668		t4	3.869979	10.33851339			
							PFA	0.000147		PFA	0.000414	3.28233E-10			
							PD	0.999853		PD	0.999586	1.000000			
							n	45		n	30	30			

Table A4. Delivery Records for Data Used in the Evaluation

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2		5	6	13	14	10	12	11	8	9		
Test No's Included in File	**Site and Tank ID**	**Tank No.**	**Date of Start**	**Time of Start (military)**	**Date of End**	**Time of End (military)**	**Start Volume (gal)**	**End Volume (gal)**	**Delivered Volume (gal)**	**Start Temp. (deg F)**	**End Temp. (deg F)**	**Delivery Temp. (deg F)**	**Temp. Difference (deg F)**
1,3,4	Palmetto Amoco File 1	5	06/22/99	16:45	06/22/99	17:15	13541	19838	6,297	77.596	77.542	77.426	-0.170
	Palmetto Amoco File 1	5	06/23/99	9:54	06/23/99	10:22	13422	20282	6,860	77.784	76.567	74.186	-3.598
	Palmetto Amoco File 1	5	06/24/99	7:00	06/24/99	7:32	11567	17977	6,410	76.964	75.562	73.032	-3.932
	Palmetto Amoco File 1	5	06/24/99	13:55	06/24/99	14:34	13727	20410	6,683	75.815	77.109	79.767	3.952
	Palmetto Amoco File 1	5	06/25/99	14:00	06/25/99	14:32	9411	16112	6,701	77.498	77.424	77.320	-0.178
	Palmetto Amoco File 1	5	06/26/99	11:44	06/26/99	12:04	8721	15450	6,729	77.859	76.678	75.147	-2.712
	Palmetto Amoco File 1	5	06/26/99	23:23	06/27/99	0:14	11255	18202	6,947	76.966	76.605	76.020	-0.946
	Palmetto Amoco File 1	5	06/29/99	9:01	06/29/99	9:30	7775	14554	6,779	77.734	76.331	74.722	-3.012
	Palmetto Amoco File 1	5	06/29/99	19:43	06/29/99	20:22	8526	15684	7,158	76.954	78.19	79.662	2.708
	Palmetto Amoco File 1	5	06/30/99	6:13	06/30/99	6:38	13610	20461	6,851	78.209	77.543	76.220	-1.989
	Palmetto Amoco File 1	5	06/30/99	20:08	06/30/99	20:42	11382	18290	6,908	77.821	78.198	78.819	0.998
	Palmetto Amoco File 1	5	07/01/99	5:57	07/01/99	6:18	16311	22900	6,589	78.277	78.323	78.437	0.160
	Palmetto Amoco File 1	5	07/02/99	5:47	07/02/99	6:06	12003	18896	6,893	78.582	78.269	77.724	-0.858
	Palmetto Amoco File 1	5	07/02/99	18:06	07/02/99	18:35	13187	20098	6,911	78.446	80.687	84.963	6.517
	Palmetto Amoco File 1	5	07/03/99	19:38	07/03/99	20:29	11794	18876	7,082	80.385	81.173	82.485	2.100
5,6,8,9	Palmetto Amoco File 2	3	07/06/99	14:55	07/06/99	15:26	10199	16745	6546	79.027	78.867	78.618	-0.409
	Palmetto Amoco File 2	3	07/07/99	11:26	07/07/99	11:48	8602	15502	6900	79.362	77.576	75.349	-4.013
	Palmetto Amoco File 2	3	07/08/99	5:58	07/08/99	6:40	11918	19716	7798	78.136	74.279	68.384	-9.752
	Palmetto Amoco File 2	3	07/08/99	13:55	07/08/99	14:36	18676	24269	5593	75.304	75.732	77.161	1.857
	Palmetto Amoco File 2	3	07/10/99	16:45	07/10/99	17:15	13541	19838	6297	77.894	77.391	76.309	-1.585
	Palmetto Amoco File 2	3	07/11/99	9:54	07/11/99	10:22	13422	20282	6860	77.850	76.000	72.380	-5.470
	Palmetto Amoco File 2	3	07/12/99	7:00	07/12/99	7:32	11567	17977	6410	76.957	74.246	69.354	-7.603
	Palmetto Amoco File 2	3	07/12/99	13:55	07/12/99	14:34	13727	20410	6683	75.048	76.543	79.614	4.566
	Palmetto Amoco File 2	3	07/13/99	14:00	07/13/99	14:32	9411	16112	6701	77.555	77.088	76.432	-1.123
	Palmetto Amoco File 2	3	07/14/99	11:44	07/14/99	12:04	8721	15450	6729	77.553	76.012	74.015	-3.538
	Palmetto Amoco File 2	3	07/14/99	23:23	07/15/99	0:14	11255	18202	6947	76.524	76.537	76.558	0.034
	Palmetto Amoco File 2	3	07/17/99	9:01	07/17/99	9:30	7775	14554	6779	77.897	75.815	73.427	-4.470
	Palmetto Amoco File 2	3	07/17/99	19:43	07/17/99	20:22	8526	15684	7158	76.882	78.574	80.589	3.707
	Palmetto Amoco File 2	3	07/18/99	6:13	07/18/99	6:38	13610	20461	6851	78.507	77.513	75.538	-2.969
	Palmetto Amoco File 2	3	07/18/99	20:08	07/18/99	20:42	11382	18290	6908	77.930	78.248	78.772	0.842
	Palmetto Amoco File 2	3	07/19/99	5:57	07/19/99	6:18	16311	22900	6589	78.335	78.372	78.464	0.129
	Palmetto Amoco File 2	3	07/20/99	5:47	07/20/99	6:06	12003	18896	6893	78.495	78.065	77.316	-1.179
	Palmetto Amoco File 2	3	07/20/99	18:06	07/20/99	18:35	13187	20098	6911	78.405	81.065	86.141	7.736
	Palmetto Amoco File 2	3	07/21/99	19:38	07/21/99	20:29	11794	18876	7082	80.599	80.947	81.527	0.928
7,10	Palmetto Amoco File 2	5	07/06/99	14:55	07/06/99	15:26	10199	16745	6546	78.360	78.690	79.204	0.844
	Palmetto Amoco File 2	5	07/07/99	11:26	07/07/99	11:48	8602	15502	6900	79.210	78.031	76.561	-2.649
	Palmetto Amoco File 2	5	07/08/99	5:58	07/08/99	6:40	11918	19716	7798	78.296	74.867	69.626	-8.670
	Palmetto Amoco File 2	5	07/08/99	13:55	07/08/99	14:36	18676	24269	5593	75.437	76.045	78.075	2.638
	Palmetto Amoco File 2	5	07/10/99	16:45	07/10/99	17:15	13541	19838	6297	77.596	77.542	77.426	-0.170
	Palmetto Amoco File 2	5	07/11/99	9:54	07/11/99	10:22	13422	20282	6860	77.784	76.567	74.186	-3.598
	Palmetto Amoco File 2	5	07/12/99	7:00	07/12/99	7:32	11567	17977	6410	76.964	75.562	73.032	-3.932

Table A4. Delivery Records for Data Used in the Evaluation

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2		5	6	13	14	10	12	11	8	9		
Test No's Included in File	**Site and Tank ID**	**Tank No.**	**Date of Start**	**Time of Start (military)**	**Date of End**	**Time of End (military)**	**Start Volume (gal)**	**End Volume (gal)**	**Delivered Volume (gal)**	**Start Temp. (deg F)**	**End Temp. (deg F)**	**Delivery Temp. (deg F)**	**Temp. Difference (deg F)**
	Palmetto Amoco File 2	5	07/12/99	13:55	07/12/99	14:34	13727	20410	6683	75.815	77.109	79.767	3.952
	Palmetto Amoco File 2	5	07/13/99	14:00	07/13/99	14:32	9411	16112	6701	77.498	77.424	77.320	-0.178
	Palmetto Amoco File 2	5	07/14/99	11:44	07/14/99	12:04	8721	15450	6729	77.859	76.678	75.147	-2.712
	Palmetto Amoco File 2	5	07/14/99	23:23	07/15/99	0:14	11255	18202	6947	76.966	76.605	76.020	-0.946
	Palmetto Amoco File 2	5	07/17/99	9:01	07/17/99	9:30	7775	14554	6779	77.734	76.331	74.722	-3.012
	Palmetto Amoco File 2	5	07/17/99	19:43	07/17/99	20:22	8526	15684	7158	76.954	78.190	79.662	2.708
	Palmetto Amoco File 2	5	07/18/99	6:13	07/18/99	6:38	13610	20461	6851	78.209	77.543	76.220	-1.989
	Palmetto Amoco File 2	5	07/18/99	20:08	07/18/99	20:42	11382	18290	6908	77.821	78.198	78.819	0.998
	Palmetto Amoco File 2	5	07/19/99	5:57	07/19/99	6:18	16311	22900	6589	78.277	78.323	78.437	0.160
	Palmetto Amoco File 2	5	07/20/99	5:47	07/20/99	6:06	12003	18896	6893	78.582	78.269	77.724	-0.858
	Palmetto Amoco File 2	5	07/20/99	18:06	07/20/99	18:35	13187	20098	6911	78.446	80.687	84.963	6.517
	Palmetto Amoco File 2	5	07/21/99	19:38	07/21/99	20:29	11794	18876	7082	80.385	81.173	82.485	2.100
11,12,13	Palmetto Gazbah File 2	4	02/28/99	12:05	02/28/99	12:30	5607	9663	4056	63.774	61.991	59.526	-4.248
	Palmetto Gazbah File 2	4	03/06/99	8:56	03/06/99	9:40	4045	8936	4891	63.915	54.336	46.414	-17.501
14,15	Palmetto Gazbah File 2												
	Palmetto Gazbah File 2	5	02/28/99	12:05	02/28/99	12:30	5607	9663	4056	64.296	63.526	62.462	-1.834
	Palmetto Gazbah File 2	5	03/06/99	8:56	03/06/99	9:40	4045	8936	4891	64.519	57.011	50.802	-13.717
	Palmetto Gazbah File 2												
16,17,18,19	Palmetto Gazbah File 1	2	02/11/99	13:01	02/11/99	13:22	2801	5109	2308	63.665	62.957	62.098	-1.567
20,21,22	Palmetto Gazbah File 1	2	02/16/99	13:12	02/16/99	14:27	3496	5670	2174	64.795	64.043	62.834	-1.961
	Palmetto Gazbah File 1	2	02/22/99	9:44	02/22/99	10:08	3330	4537	1207	65.542	61.776	51.386	-14.156
	Palmetto Gazbah File 1	2	02/25/99	20:37	02/25/99	21:37	3077	5370	2293	64.228	63.097	61.579	-2.649
23,24,25	Palmetto Gazbah File 1	4	02/11/99	12:42	02/11/99	13:14	5969	10041	4072	61.884	61.084	59.911	-1.973
	Palmetto Gazbah File 1	4	02/16/99	12:57	02/16/99	13:37	5590	9645	4055	63.610	61.830	59.376	-4.234
	Palmetto Gazbah File 1	4	02/22/99	9:25	02/22/99	10:09	4424	9356	4932	64.637	55.404	47.122	-17.515
	Palmetto Gazbah File 1	4	02/25/99	20:34	02/25/99	21:01	5438	9830	4392	62.194	59.922	57.109	-5.085
26,27,28,29	Palmetto Gazbah File 3	4	05/11/99	8:30	05/11/99	9:08	4593	8474	3881	69.939	65.319	59.851	-10.088
	Palmetto Gazbah File 3	4	05/14/99	5:07	05/14/99	5:51	5126	9471	4345	69.219	66.710	63.750	-5.469
	Palmetto Gazbah File 3	4	05/19/99	4:59	05/19/99	5:42	3921	8331	4410	71.135	67.805	64.844	-6.291
	Palmetto Gazbah File 3	4	05/22/99	8:02	05/22/99	8:31	4386	9324	4938	70.710	64.957	59.847	-10.863
30,31,32,33	Palmetto Gazbah File 3	5	05/11/99	8:30	05/11/99	9:08	4593	8474	3881	69.614	67.537	65.079	-4.535
	Palmetto Gazbah File 3	5	05/14/99	5:07	05/14/99	5:51	5126	9471	4345	69.184	69.199	69.217	0.033
	Palmetto Gazbah File 3	5	05/19/99	4:59	05/19/99	5:42	3921	8331	4410	70.753	70.771	70.787	0.034
	Palmetto Gazbah File 3	5	05/22/99	8:02	05/22/99	8:31	4386	9324	4938	70.985	65.844	61.278	-9.707
34,35,36,37	Hoffmans Coneauto File 1	2	07/29/99	23:18	07/30/99	0:33	2195	3354	1159	77.368	78.234	79.874	2.506
38,39,40	Hoffmans Coneauto File 1	2	07/31/99	0:31	07/31/99	1:17	2245	4294	2049	77.522	80.576	83.922	6.400

Table A4. Delivery Records for Data Used in the Evaluation

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2		5	6	13	14	10	12	11	8	9		
Test No's Included in File	**Site and Tank ID**	**Tank No.**	**Date of Start**	**Time of Start (military)**	**Date of End**	**Time of End (military)**	**Start Volume (gal)**	**End Volume (gal)**	**Delivered Volume (gal)**	**Start Temp. (deg F)**	**End Temp. (deg F)**	**Delivery Temp. (deg F)**	**Temp. Difference (deg F)**
	Hoffmans Coneauto File 1	2	08/02/99	0:05	08/02/99	1:48	2368	3555	1187	78.528	77.787	76.309	-2.219
	Hoffmans Coneauto File 1	2	08/02/99	23:43	08/03/99	0:19	2678	3869	1191	77.734	75.677	71.052	-6.682
	Hoffmans Coneauto File 1	2	08/03/99	23:30	08/04/99	0:05	2971	4466	1495	76.333	75.962	75.225	-1.108
	Hoffmans Coneauto File 1	2	08/06/99	2:23	08/06/99	2:55	2359	3549	1190	76.535	76.185	75.491	-1.044
	Hoffmans Coneauto File 1	2	08/07/99	5:41	08/07/99	6:39	2019	3207	1188	76.167	76.062	75.884	-0.283
	Hoffmans Coneauto File 1	2	08/09/99	2:13	08/09/99	3:00	993	2183	1190	75.767	77.710	79.331	3.564
	Hoffmans Coneauto File 1	2	08/10/99	0:18	08/10/99	0:45	990	2181	1191	76.899	79.214	81.138	4.239
	Hoffmans Coneauto File 1	2	08/11/99	0:12	08/11/99	0:49	1180	3144	1964	77.695	78.013	78.204	0.509
	Hoffmans Coneauto File 1	2	08/12/99	1:11	08/12/99	2:20	1952	3047	1095	77.710	77.373	76.772	-0.938
	Hoffmans Coneauto File 1	2	08/12/99	23:28	08/13/99	0:24	1984	3970	1986	77.575	78.279	78.982	1.407
	Hoffmans Coneauto File 1	2	08/14/99	4:09	08/14/99	5:12	2733	3932	1199	78.053	78.239	78.663	0.610
	Hoffmans Coneauto File 1	2	08/15/99	0:49	08/15/99	1:59	2714	4691	1977	78.217	79.080	80.265	2.048
	Hoffmans Coneauto File 1	2	08/17/99	0:48	08/17/99	1:29	2420	3601	1181	78.876	79.149	79.708	0.832
	Hoffmans Coneauto File 1	2	08/19/99	2:15	08/19/99	3:09	1533	3525	1992	78.469	77.329	76.452	-2.017
41,42	Hoffmans Coneauto File 1	4	07/29/99	23:22	07/30/99	0:22	7246	9183	1937	77.240	77.209	77.093	-0.147
	Hoffmans Coneauto File 1	4	07/31/99	0:30	07/31/99	1:08	6319	8775	2456	76.676	76.628	76.505	-0.171
	Hoffmans Coneauto File 1	4	08/02/99	0:03	08/02/99	0:52	5144	8100	2956	75.593	75.570	75.530	-0.063
	Hoffmans Coneauto File 1	4	08/02/99	23:40	08/03/99	0:11	6005	8983	2978	75.918	75.875	75.788	-0.130
	Hoffmans Coneauto File 1	4	08/03/99	23:30	08/04/99	0:23	4086	6995	2909	75.447	75.413	75.365	-0.082
	Hoffmans Coneauto File 1	4	08/05/99	1:37	08/05/99	2:35	4528	9469	4941	75.573	73.061	70.759	-4.814
	Hoffmans Coneauto File 1	4	08/06/99	2:28	08/06/99	3:29	7239	9211	1972	73.895	73.905	73.942	0.047
	Hoffmans Coneauto File 1	4	08/07/99	5:29	08/07/99	6:11	6604	9577	2973	74.264	74.274	74.296	0.032
	Hoffmans Coneauto File 1	4	08/09/99	2:11	08/09/99	3:05	5637	8592	2955	74.777	74.772	74.762	-0.015
	Hoffmans Coneauto File 1	4	08/10/99	0:14	08/10/99	0:46	6440	9404	2964	74.935	74.930	74.919	-0.016
	Hoffmans Coneauto File 1	4	08/11/99	0:09	08/11/99	0:52	4380	6825	2445	75.181	75.168	75.145	-0.036
	Hoffmans Coneauto File 1	4	08/12/99	1:09	08/12/99	2:01	4543	7589	3046	75.551	75.528	75.494	-0.057
	Hoffmans Coneauto File 1	4	08/12/99	23:25	08/13/99	0:03	5252	7706	2454	75.750	75.723	75.665	-0.085
	Hoffmans Coneauto File 1	4	08/14/99	4:07	08/14/99	5:08	5337	7834	2497	75.443	75.417	75.361	-0.082
	Hoffmans Coneauto File 1	4	08/15/99	0:47	08/15/99	2:15	5790	8271	2481	75.270	75.234	75.150	-0.120
	Hoffmans Coneauto File 1	4	08/17/99	0:46	08/17/99	1:15	4528	7451	2923	75.489	75.467	75.433	-0.056
	Hoffmans Coneauto File 1	4	08/18/99	1:34	08/18/99	2:12	2832	7759	4927	76.002	78.999	80.722	4.720
	Hoffmans Coneauto File 1	4	08/19/99	2:13	08/19/99	3:13	5814	8259	2445	78.380	78.351	78.282	-0.098
43	Hoffmans Coneauto File 2	2	09/08/99	12:24	09/08/99	13:13	8979	10692	1713	93.364	94.017	97.440	4.076
	Hoffmans Coneauto File 2	2	09/11/99	12:51	09/11/99	13:31	6351	7114	763	93.176	92.773	89.419	-3.757
	Hoffmans Coneauto File 2	2	09/12/99	9:16	09/12/99	10:07	5503	7949	2446	92.590	91.559	89.239	-3.351
	Hoffmans Coneauto File 2	2	09/12/99	14:56	09/12/99	15:21	7413	10432	3019	91.668	92.111	93.199	1.531
	Hoffmans Coneauto File 2	2	09/13/99	21:51	09/13/99	22:33	8539	10574	2035	92.184	90.910	85.564	-6.620
	Hoffmans Coneauto File 2	2	09/14/99	13:51	09/14/99	14:26	9694	10675	981	91.304	91.672	95.308	4.004
44	Hoffmans Coneauto File 3	1	07/16/99	23:09	07/17/99	0:03	3160	8005	4845	89.391	91.045	92.124	2.733
	Hoffmans Coneauto File 3	1	07/17/99	14:31	07/17/99	14:59	3812	10058	6246	90.074	92.692	94.290	4.216

Table A4. Delivery Records for Data Used in the Evaluation

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2		5	6	13	14	10	12	11	8	9		
Test No's Included in File	**Site and Tank ID**	**Tank No.**	**Date of Start**	**Time of Start (military)**	**Date of End**	**Time of End (military)**	**Start Volume (gal)**	**End Volume (gal)**	**Delivered Volume (gal)**	**Start Temp. (deg F)**	**End Temp. (deg F)**	**Delivery Temp. (deg F)**	**Temp. Difference (deg F)**
	Hoffmans Coneauto File 3	1	07/17/99	23:57	07/18/99	0:50	6120	10032	3912	91.694	91.157	90.317	-1.377
	Hoffmans Coneauto File 3	1	07/18/99	15:57	07/18/99	16:18	4449	9162	4713	90.244	92.936	95.477	5.233
	Hoffmans Coneauto File 3	1	07/18/99	20:56	07/18/99	21:11	6179	10068	3889	92.365	92.430	92.533	0.168
	Hoffmans Coneauto File 3	1	07/19/99	15:51	07/19/99	16:23	2324	6000	3676	90.584	94.974	97.749	7.165
	Hoffmans Coneauto File 3	1	07/20/99	11:46	07/20/99	12:28	2562	9734	7172	92.788	92.551	92.466	-0.322
	Hoffmans Coneauto File 3	1	07/20/99	20:12	07/20/99	20:39	5797	11225	5428	91.917	91.640	91.344	-0.573
	Hoffmans Coneauto File 3	1	07/21/99	20:42	07/21/99	21:22	3975	9735	5760	90.644	91.097	91.410	0.766
	Hoffmans Coneauto File 3	1	07/22/99	9:53	07/22/99	10:05	7009	9977	2968	90.802	90.807	90.819	0.017
	Hoffmans Coneauto File 3	1	07/22/99	23:27	07/23/99	0:17	2962	9588	6626	89.947	91.001	91.472	1.525
	Hoffmans Coneauto File 3	1	07/23/99	10:51	07/23/99	11:10	6244	10208	3964	90.657	92.139	94.473	3.816
	Hoffmans Coneauto File 3	1	07/24/99	0:25	07/24/99	1:15	3332	9100	5768	90.895	92.857	93.990	3.095
	Hoffmans Coneauto File 3	1	07/24/99	12:22	07/24/99	12:43	5142	9962	4820	91.995	93.816	95.759	3.764
	Hoffmans Coneauto File 3	1	07/25/99	9:21	07/25/99	9:53	5067	10906	5839	91.924	88.720	85.940	-5.984
	Hoffmans Coneauto File 3	1	07/25/99	21:45	07/25/99	22:37	6423	9296	2873	89.076	89.668	90.992	1.916
	Hoffmans Coneauto File 3	1	07/26/99	14:16	07/26/99	14:27	4561	7710	3149	89.557	91.391	94.047	4.490
	Hoffmans Coneauto File 3	1	07/26/99	20:20	07/26/99	21:14	3275	9846	6571	90.730	93.391	94.717	3.987
	Hoffmans Coneauto File 3	1	07/27/99	18:39	07/27/99	19:18	2069	9101	7032	91.203	92.537	92.929	1.726
	Hoffmans Coneauto File 3	1	07/28/99	12:41	07/28/99	13:14	4815	8542	3727	91.465	92.214	93.182	1.717
	Hoffmans Coneauto File 3	1	07/29/99	1:27	07/29/99	2:34	4132	10114	5982	91.192	88.751	87.065	-4.127
	Hoffmans Coneauto File 3	1	07/29/99	15:09	07/29/99	15:28	5343	8168	2825	88.988	88.203	86.718	-2.270
	Hoffmans Coneauto File 3	1	07/30/99	13:14	07/30/99	13:38	5573	9462	3889	89.545	89.961	90.557	1.012
	Hoffmans Coneauto File 3	1	07/30/99	21:53	07/30/99	22:50	5778	8588	2810	89.721	89.012	87.554	-2.167
	Hoffmans Coneauto File 3	1	07/31/99	12:20	07/31/99	12:45	5230	9077	3847	89.072	89.305	89.622	0.550
	Hoffmans Coneauto File 3	1	08/01/99	0:16	08/01/99	1:09	4422	8317	3895	88.993	88.843	88.673	-0.320
	Hoffmans Coneauto File 3	1	08/01/99	11:59	08/01/99	12:20	5206	8783	3577	88.873	89.692	90.884	2.011
	Hoffmans Coneauto File 3	1	08/01/99	23:01	08/02/99	0:08	3456	7327	3871	89.193	88.422	87.734	-1.459
	Hoffmans Coneauto File 3	1	08/02/99	9:45	08/02/99	10:01	5223	9090	3867	88.584	90.153	92.272	3.688
45,46,47,48	Caroll Towson File 2	1	08/27/99	1:55	08/27/99	3:05	1451	6722	5271	79.476	78.828	78.650	-0.826
	Caroll Towson File 2	1	08/28/99	4:15	08/28/99	5:27	3169	7180	4011	79.372	77.770	76.504	-2.868
	Caroll Towson File 2	1	08/28/99	23:34	08/29/99	0:40	4464	8935	4471	78.528	77.520	76.514	-2.014
	Caroll Towson File 2	1	08/30/99	0:38	08/30/99	1:28	5721	10150	4429	78.515	77.368	75.886	-2.629
	Caroll Towson File 2	1	09/01/99	0:01	09/01/99	1:23	2854	7834	4980	78.970	77.800	77.129	-1.841
	Caroll Towson File 2	1	09/02/99	0:57	09/02/99	1:59	4130	9552	5422	78.504	77.964	77.553	-0.951
	Caroll Towson File 2	1	09/03/99	1:20	09/03/99	1:48	5357	9538	4181	78.715	79.096	79.584	0.869
	Caroll Towson File 2	1	09/04/99	1:47	09/04/99	2:47	5905	10338	4433	79.506	78.090	76.204	-3.302
	Caroll Towson File 2	1	09/05/99	23:53	09/06/99	0:52	3358	7740	4382	79.422	78.048	76.995	-2.427
	Caroll Towson File 2	1	09/07/99	2:15	09/07/99	4:25	4054	8193	4139	78.756	78.187	77.630	-1.126
	Caroll Towson File 2	1	09/08/99	2:02	09/08/99	2:46	4334	9269	4935	78.733	77.782	76.947	-1.786
	Caroll Towson File 2	1	09/09/99	0:30	09/09/99	1:08	5044	7450	2406	78.650	78.233	77.359	-1.291
	Caroll Towson File 2	1	09/10/99	3:04	09/10/99	4:02	3021	8422	5401	78.893	75.885	74.203	-4.690
	Caroll Towson File 2	1	09/10/99	22:09	09/10/99	22:55	4931	9001	4070	77.222	76.181	74.920	-2.302
	Caroll Towson File 2	1	09/13/99	0:34	09/13/99	1:56	2178	6580	4402	78.019	76.835	76.249	-1.770

Table A4. Delivery Records for Data Used in the Evaluation

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2		5	6	13	14	10	12	11	8	9		
Test No's Included in File	**Site and Tank ID**	**Tank No.**	**Date of Start**	**Time of Start (military)**	**Date of End**	**Time of End (military)**	**Start Volume (gal)**	**End Volume (gal)**	**Delivered Volume (gal)**	**Start Temp. (deg F)**	**End Temp. (deg F)**	**Delivery Temp. (deg F)**	**Temp. Difference (deg F)**
	Caroll Towson File 2	1	09/14/99	0:28	09/14/99	1:40	3386	8302	4916	77.726	76.184	75.122	-2.604
	Caroll Towson File 2	1	09/15/99	1:38	09/15/99	2:47	4615	10079	5464	77.198	75.766	74.557	-2.641
49,50,51,52	Caroll Towson File 2	3	08/27/99	1:56	08/27/99	2:45	2418	4499	2081	79.675	79.589	79.489	-0.186
53,54,55,56	Caroll Towson File 2	3	08/28/99	4:17	08/28/99	4:56	2692	6022	3330	79.341	80.324	81.119	1.778
57	Caroll Towson File 2	3	08/28/99	23:37	08/29/99	0:31	4514	7428	2914	80.229	80.209	80.178	-0.051
	Caroll Towson File 2	3	08/30/99	0:41	08/30/99	0:55	5946	8954	3008	80.263	78.615	75.357	-4.906
	Caroll Towson File 2	3	09/01/99	0:02	09/01/99	0:50	3158	5603	2445	79.455	79.669	79.945	0.490
	Caroll Towson File 2	3	09/02/99	0:57	09/02/99	1:50	4245	6317	2072	79.546	79.838	80.436	0.890
	Caroll Towson File 2	3	09/03/99	1:26	09/03/99	2:25	4081	6565	2484	79.756	80.915	82.819	3.063
	Caroll Towson File 2	3	09/04/99	1:49	09/04/99	2:19	4726	7715	2989	80.451	79.104	76.974	-3.477
	Caroll Towson File 2	3	09/05/99	23:56	09/06/99	0:23	4415	7394	2979	79.663	79.529	79.330	-0.333
	Caroll Towson File 2	3	09/07/99	2:17	09/07/99	3:15	2892	5362	2470	79.817	80.570	81.452	1.635
	Caroll Towson File 2	3	09/08/99	2:04	09/08/99	3:05	3633	6105	2472	80.033	80.254	80.579	0.546
	Caroll Towson File 2	3	09/09/99	0:38	09/09/99	1:26	4581	6575	1994	80.077	79.804	79.177	-0.900
	Caroll Towson File 2	3	09/10/99	3:04	09/10/99	3:39	4589	6569	1980	79.888	77.404	71.647	-8.241
	Caroll Towson File 2	3	09/10/99	22:10	09/10/99	22:41	4848	7271	2423	78.328	76.943	74.172	-4.156
	Caroll Towson File 2	3	09/13/99	0:35	09/13/99	1:06	3959	6926	2967	78.264	78.157	78.014	-0.250
	Caroll Towson File 2	3	09/14/99	0:29	09/14/99	1:44	2525	4992	2467	78.677	77.463	76.220	-2.457
	Caroll Towson File 2	3	09/15/99	1:45	09/15/99	2:31	3323	5307	1984	77.821	76.703	74.830	-2.991
58	Caroll Towson File 3	1	09/22/99	22:53	09/22/99	23:41	2372	7210	4838	75.842	74.941	74.499	-1.343
	Caroll Towson File 3	1	09/24/99	1:48	09/24/99	2:57	2858	7880	5022	75.627	74.145	73.302	-2.325
	Caroll Towson File 3	1	09/24/99	23:52	09/25/99	1:42	3056	7355	4299	75.213	74.031	73.191	-2.022
	Caroll Towson File 3	1	09/26/99	3:40	09/26/99	4:42	3229	5673	2444	75.030	73.566	71.632	-3.398
	Caroll Towson File 3	1	09/27/99	1:57	09/27/99	3:13	2568	7497	4929	74.676	73.159	72.369	-2.307
	Caroll Towson File 3	1	09/28/99	3:10	09/28/99	4:38	3345	7749	4404	74.439	74.031	73.721	-0.718
	Caroll Towson File 3	1	09/29/99	0:59	09/29/99	2:30	3575	8487	4912	74.864	74.659	74.510	-0.354
	Caroll Towson File 3	1	09/30/99	2:14	09/30/99	3:41	4160	9113	4953	75.208	73.594	72.238	-2.970
	Caroll Towson File 3	1	10/01/99	0:40	10/01/99	1:28	5902	10071	4169	74.420	72.407	69.557	-4.863
	Caroll Towson File 3	1	10/02/99	0:46	10/02/99	2:11	4355	9259	4904	73.731	71.443	69.411	-4.320
	Caroll Towson File 3	1	10/04/99	2:04	10/04/99	3:17	1607	7032	5425	73.589	71.636	71.057	-2.532
	Caroll Towson File 3	1	10/05/99	1:58	10/05/99	4:24	2941	7362	4421	72.854	72.030	71.482	-1.372
59,60,61	Caroll Towson File 1	1	08/06/99	2:53	08/06/99	4:22	2400	7810	5410	77.203	76.772	76.581	-0.622
	Caroll Towson File 1	1	08/07/99	3:17	08/07/99	4:49	3627	8560	4933	77.693	76.873	76.270	-1.423
	Caroll Towson File 1	1	08/08/99	2:37	08/08/99	3:33	5269	9401	4132	77.633	78.754	80.183	2.550
	Caroll Towson File 1	1	08/08/99	23:00	08/08/99	23:49	6300	10731	4431	79.088	79.787	80.781	1.693
	Caroll Towson File 1	1	08/10/99	1:24	08/10/99	1:48	7005	10943	3938	80.027	79.594	78.824	-1.203
	Caroll Towson File 1	1	08/12/99	0:49	08/12/99	2:08	3499	6461	2962	80.148	79.734	79.245	-0.903
62,63,64,65	Caroll Timon File 2	1	08/30/99	5:59	08/30/99	7:13	2708	9006	6298	82.630	77.117	74.747	-7.883
	Caroll Timon File 2	1	08/31/99	15:54	08/31/99	21:12	1044	4646	3602	82.560	81.956	81.781	-0.779

Table A4. Delivery Records for Data Used in the Evaluation

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2		5	6	13	14	10	12	11	8	9		
Test No's Included in File	**Site and Tank ID**	**Tank No.**	**Date of Start**	**Time of Start (military)**	**Date of End**	**Time of End (military)**	**Start Volume (gal)**	**End Volume (gal)**	**Delivered Volume (gal)**	**Start Temp. (deg F)**	**End Temp. (deg F)**	**Delivery Temp. (deg F)**	**Temp. Difference (deg F)**
	Caroll Timon File 2	1	09/01/99	19:42	09/01/99	21:10	1648	7935	6287	83.442	78.978	77.808	-5.634
	Caroll Timon File 2	1	09/02/99	14:45	09/02/99	15:35	5409	9149	3740	80.722	80.211	79.472	-1.250
	Caroll Timon File 2	1	09/04/99	0:59	09/04/99	1:34	2451	8906	6455	82.417	77.499	75.632	-6.785
	Caroll Timon File 2	1	09/05/99	14:33	09/05/99	22:16	991	5118	4127	82.210	82.020	81.974	-0.236
	Caroll Timon File 2	1	09/06/99	11:44	09/06/99	12:28	3269	8442	5173	82.435	81.081	80.225	-2.210
	Caroll Timon File 2	1	09/07/99	13:55	09/07/99	15:20	3043	8054	5011	82.790	81.894	81.350	-1.440
	Caroll Timon File 2	1	09/09/99	6:26	09/09/99	8:33	2562	8398	5836	82.975	78.847	77.035	-5.940
	Caroll Timon File 2	1	09/10/99	7:52	09/10/99	8:26	3352	8699	5347	81.176	78.391	76.645	-4.531
	Caroll Timon File 2	1	09/11/99	9:23	09/11/99	11:44	3130	7855	4725	80.896	79.711	78.926	-1.970
	Caroll Timon File 2	1	09/12/99	12:50	09/12/99	15:17	2458	7967	5509	82.046	80.552	79.885	-2.161
	Caroll Timon File 2	1	09/13/99	13:41	09/13/99	14:47	2974	8874	5900	82.295	80.595	79.738	-2.557
	Caroll Timon File 2	1	09/14/99	14:28	09/14/99	14:50	4550	8707	4157	82.025	79.545	76.831	-5.194
	Caroll Timon File 2	1	09/16/99	5:51	09/16/99	7:16	3112	8361	5249	81.401	78.517	76.807	-4.594
	Caroll Timon File 2	1	09/17/99	11:26	09/17/99	13:43	1823	7405	5582	81.281	79.321	78.681	-2.600
	Caroll Timon File 2	1	09/18/99	12:58	09/18/99	22:23	2369	4716	2347	81.154	80.903	80.650	-0.504
	Caroll Timon File 2	1	09/19/99	14:23	09/19/99	15:29	1907	6767	4860	81.746	79.384	78.457	-3.289
	Caroll Timon File 2	1	09/20/99	15:26	09/20/99	16:34	1593	7645	6052	81.521	79.168	78.549	-2.972
66,67,68,69	Caroll Timon File 1	1	07/29/99	7:08	07/29/99	7:49	4092	9390	5298	81.709	79.100	77.085	-4.624
70,71	Caroll Timon File 1	1	07/30/99	12:01	07/30/99	15:24	2289	6352	4063	81.549	80.344	79.665	-1.884
	Caroll Timon File 1	1	07/31/99	14:28	07/31/99	18:19	2625	6752	4127	81.627	79.932	78.854	-2.773
	Caroll Timon File 1	1	08/01/99	16:51	08/01/99	17:46	2160	7081	4921	81.679	77.537	75.719	-5.960
	Caroll Timon File 1	1	08/02/99	14:30	08/02/99	16:04	3187	8095	4908	79.901	78.754	78.009	-1.892
	Caroll Timon File 1	1	08/03/99	17:26	08/03/99	22:18	1962	5805	3843	81.018	78.754	77.598	-3.420
	Caroll Timon File 1	1	08/04/99	11:23	08/04/99	12:02	4102	9294	5192	79.467	78.657	78.017	-1.450
	Caroll Timon File 1	1	08/05/99	12:59	08/05/99	14:25	3055	7780	4725	80.480	79.522	78.903	-1.577
	Caroll Timon File 1	1	08/06/99	16:00	08/06/99	21:40	1560	6748	5188	81.522	80.494	80.185	-1.337
	Caroll Timon File 1	1	08/08/99	4:36	08/08/99	5:58	2896	8287	5391	81.280	78.369	76.805	-4.475
	Caroll Timon File 1	1	08/09/99	4:57	08/09/99	5:43	3023	8435	5412	80.487	78.010	76.626	-3.861
	Caroll Timon File 1	1	08/10/99	7:08	08/10/99	8:28	2455	8425	5970	80.410	76.828	75.355	-5.055
	Caroll Timon File 1	1	08/11/99	9:05	08/11/99	12:20	2909	7261	4352	79.595	79.572	79.557	-0.038
	Caroll Timon File 1	1	08/12/99	12:12	08/12/99	22:16	2069	4082	2013	81.312	83.268	85.278	3.966
	Caroll Timon File 1	1	08/13/99	8:26	08/13/99	9:21	3843	9027	5184	82.679	80.437	78.775	-3.904
	Caroll Timon File 1	1	08/14/99	15:07	08/14/99	18:39	2425	6697	4272	82.444	82.966	83.262	0.818
	Caroll Timon File 1	1	08/15/99	20:53	08/15/99	22:47	1686	6861	5175	84.150	81.711	80.916	-3.234
	Caroll Timon File 1	1	08/17/99	0:32	08/17/99	2:06	1619	7658	6039	83.368	82.526	82.300	-1.068
72,73,74	Mascott Clack File 1	2	10/25/99	12:19	10/25/99	13:13	2822	5968	3146	73.077	66.499	60.598	-12.479
	Mascott Clack File 1	2	10/31/99	14:27	10/31/99	15:25	2168	5680	3512	71.721	65.648	61.899	-9.822
	Mascott Clack File 1	2	11/03/99	14:39	11/03/99	15:10	3849	5244	1395	70.411	67.827	60.697	-9.714
	Mascott Clack File 1	2	11/09/99	13:14	11/09/99	14:25	1192	4139	2947	70.238	64.826	62.637	-7.601
75	InterstatePumpTank Stretch File 2	6	10/14/99	12:40	10/14/99	13:08	8966	16420	7454	70.052	67.275	63.935	-6.117

Table A4. Delivery Records for Data Used in the Evaluation

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2		5	6	13	14	10	12	11	8	9		
Test No's Included in File	**Site and Tank ID**	**Tank No.**	**Date of Start**	**Time of Start (military)**	**Date of End**	**Time of End (military)**	**Start Volume (gal)**	**End Volume (gal)**	**Delivered Volume (gal)**	**Start Temp. (deg F)**	**End Temp. (deg F)**	**Delivery Temp. (deg F)**	**Temp. Difference (deg F)**
	InterstatePumpTank Stretch File 2	6	10/14/99	17:46	10/14/99	18:16	11934	18804	6870	67.984	67.129	65.644	-2.340
	InterstatePumpTank Stretch File 2	6	10/15/99	18:13	10/15/99	19:07	9107	16355	7248	69.464	67.825	65.766	-3.698
	InterstatePumpTank Stretch File 2	6	10/16/99	11:02	10/16/99	12:06	10762	17965	7203	69.013	65.737	60.842	-8.171
	InterstatePumpTank Stretch File 2	6	10/16/99	15:36	10/16/99	16:40	16105	19371	3266	66.304	65.818	63.421	-2.883
	InterstatePumpTank Stretch File 2	6	10/17/99	14:51	10/17/99	15:26	14121	17672	3551	67.604	67.850	68.828	1.224
	InterstatePumpTank Stretch File 2	6	10/19/99	17:07	10/19/99	17:39	8021	15398	7377	69.427	66.589	63.503	-5.924
	InterstatePumpTank Stretch File 2	6	10/21/99	12:11	10/21/99	12:38	7417	14931	7514	68.279	65.454	62.665	-5.614
	InterstatePumpTank Stretch File 2	6	10/21/99	21:21	10/21/99	22:04	10079	17552	7473	66.724	63.921	60.141	-6.583
	InterstatePumpTank Stretch File 2	6	10/22/99	14:10	10/22/99	15:04	11949	19204	7255	65.910	65.176	63.967	-1.943
	InterstatePumpTank Stretch File 2	6	10/23/99	10:23	10/23/99	10:52	11617	15775	4158	66.848	65.744	62.660	-4.188
	InterstatePumpTank Stretch File 2	6	10/23/99	21:52	10/23/99	22:36	10465	17766	7301	66.872	63.425	58.484	-8.388
	InterstatePumpTank Stretch File 2	6	10/24/99	9:33	10/24/99	10:13	16590	21402	4812	64.293	62.031	54.232	-10.061
	InterstatePumpTank Stretch File 2	6	10/26/99	17:19	10/26/99	17:34	8733	15881	7148	65.787	61.053	55.269	-10.518
	InterstatePumpTank Stretch File 2	6	10/27/99	8:29	10/27/99	9:01	11013	18131	7118	62.983	59.393	53.839	-9.144
	InterstatePumpTank Stretch File 2	6	10/27/99	19:54	10/27/99	20:32	11227	18316	7089	61.778	60.307	57.977	-3.801
	InterstatePumpTank Stretch File 2	6	10/28/99	8:53	10/28/99	9:21	14485	21618	7133	61.823	60.954	59.189	-2.634
	InterstatePumpTank Stretch File 2	6	10/28/99	19:58	10/28/99	20:41	17101	20566	3465	61.868	61.229	58.075	-3.793
	InterstatePumpTank Stretch File 2	6	10/29/99	19:51	10/29/99	20:13	11025	18420	7395	63.264	62.205	60.626	-2.638
	InterstatePumpTank Stretch File 2	6	10/30/99	16:59	10/30/99	17:33	11620	19341	7721	63.617	63.145	62.435	-1.182
	InterstatePumpTank Stretch File 2	6	10/31/99	15:04	10/31/99	15:33	16337	21272	4935	63.638	63.985	65.134	1.496
	InterstatePumpTank Stretch File 2	6	11/02/99	7:16	11/02/99	7:46	16442	18223	1781	64.282	64.023	61.632	-2.650
	InterstatePumpTank Stretch File 2	6	11/02/99	16:28	11/02/99	17:02	13018	16306	3288	64.546	64.039	62.032	-2.514
	InterstatePumpTank Stretch File 2	6	11/03/99	9:39	11/03/99	10:22	10101	17494	7393	64.666	62.165	58.748	-5.918
	InterstatePumpTank Stretch File 2	6	11/04/99	11:57	11/04/99	12:41	9323	16597	7274	63.736	60.354	56.019	-7.717
76,77,78,79	SouthEastPetro Charlott File 1	3	10/13/99	11:37	10/13/99	12:58	2682	9130	6448	79.171	80.543	81.114	1.943
80	SouthEastPetro Charlott File 1	3	10/17/99	20:57	10/17/99	22:16	3817	10164	6347	80.181	83.928	86.181	6.000
	SouthEastPetro Charlott File 1	3	10/24/99	17:14	10/24/99	18:54	2025	8202	6177	81.897	86.543	88.066	6.169
	SouthEastPetro Charlott File 1	3	10/29/99	2:48	10/29/99	4:19	2241	7994	5753	84.017	80.264	78.802	-5.215
	SouthEastPetro Charlott File 1	3	11/03/99	0:12	11/03/99	1:45	2669	9412	6743	81.611	84.682	85.898	4.287
	SouthEastPetro Charlott File 1	3	11/06/99	7:12	11/06/99	8:09	4809	11718	6909	83.902	84.909	85.610	1.708
	SouthEastPetro Charlott File 1	3	11/12/99	13:29	11/12/99	15:02	3394	10630	7236	84.455	84.638	84.724	0.269
81,82,83,84	Brunswick File 1	2	06/19/99	12:14	06/19/99	12:38	2720	3681	961	65.799	67.135	70.916	5.117
85	Brunswick File 1	2	06/21/99	6:50	06/21/99	6:59	2497	4288	1791	66.305	66.886	67.696	1.391
	Brunswick File 1	2	06/22/99	18:24	06/22/99	19:09	2883	4633	1750	66.927	69.289	73.180	6.253
	Brunswick File 1												
86,87,88,89	Indy File 1	1		no deliveries									
90,91,92,93	PlainsPump 208 File 1	2	10/13/99	10:03	10/13/99	10:30	2629	3958	1329	92.396	91.370	89.340	-3.056
94	PlainsPump 208 File 1	2	10/18/99	14:50	10/18/99	16:01	1323	3719	2396	92.145	91.433	91.040	-1.105
	PlainsPump 208 File 1	2	10/21/99	7:20	10/21/99	8:00	1797	3224	1427	91.763	89.655	87.000	-4.763

Table A4. Delivery Records for Data Used in the Evaluation

CITLDS Name INCON Tank Sentinel ATG with SCALD 2.0
Version Model TS-750, TS-1000, TS-1001, TS-2001 with Probe TSP-LL2

1	2		5	6	13	14	10	12	11	8	9		
Test No's Included in File	**Site and Tank ID**	**Tank No.**	**Date of Start**	**Time of Start (military)**	**Date of End**	**Time of End (military)**	**Start Volume (gal)**	**End Volume (gal)**	**Delivered Volume (gal)**	**Start Temp. (deg F)**	**End Temp. (deg F)**	**Delivery Temp. (deg F)**	**Temp. Difference (deg F)**
	PlainsPump 208 File 1	2	10/22/99	16:43	10/22/99	17:31	2248	4576	2328	90.751	90.332	89.927	-0.824
	PlainsPump 208 File 1	2	10/26/99	10:50	10/26/99	11:45	2862	5364	2502	90.748	88.697	86.351	-4.397
	PlainsPump 208 File 1	2	11/01/99	14:14	11/01/99	14:56	2080	4544	2464	89.310	85.391	82.083	-7.227
	PlainsPump 208 File 1	2	11/03/99	8:16	11/03/99	8:51	3664	4680	1016	87.031	85.416	79.592	-7.439
	PlainsPump 208 File 1	2	11/07/99	17:38	11/07/99	18:21	2454	4913	2459	86.966	84.385	81.809	-5.157
	PlainsPump 208 File 1	2	11/14/99	16:49	11/14/99	17:48	1869	2965	1096	86.555	84.217	80.230	-6.325
	PlainsPump 208 File 1	2	11/15/99	15:05	11/15/99	15:41	2606	3788	1182	85.051	83.460	79.952	-5.099
	PlainsPump 208 File 1	2	11/17/99	15:54	11/17/99	16:29	2500	3704	1204	85.319	84.183	81.824	-3.495
	PlainsPump 208 File 1	2	11/18/99	10:23	11/18/99	10:47	3430	4389	959	84.701	81.640	70.692	-14.009
	PlainsPump 208 File 1	2	11/19/99	10:49	11/19/99	11:17	3766	4804	1038	82.769	80.617	72.809	-9.960
	PlainsPump 208 File 1	2	11/20/99	22:30	11/20/99	23:04	4217	5233	1016	82.038	80.933	76.347	-5.691
	PlainsPump 208 File 1	2	11/23/99	17:21	11/23/99	17:49	3808	4923	1115	82.998	82.220	79.563	-3.435
95,96,97,98	PlainsPump 323 File 1	2	10/04/99	16:46	10/04/99	17:00	3345	5691	2346	84.249	84.782	85.542	1.293
	PlainsPump 323 File 1	2	10/08/99	10:55	10/08/99	11:04	4951	6162	1211	84.290	82.845	76.937	-7.353
98,99,100	PlainsPump 323 File 1	3	10/8/1999	10:45	10/8/1999	11:00	2087	4138	2051	83.197	80.769	78.298	-4.899
2	InterstatePumpTank Stretch File 1	6	9/19/1999	12:51	9/19/1999	13:16	12369	18939	6570	75.745	75.249	74.315	-1.430
	InterstatePumpTank Stretch File 1	6	9/19/1999	19:54	9/19/1999	20:36	14827	21875	7048	75.511	75.028	74.012	-1.499
	InterstatePumpTank Stretch File 1	6	9/23/1999	14:57	9/23/1999	15:25	7462	14139	6677	76.186	75.374	74.467	-1.719
	InterstatePumpTank Stretch File 1	6	9/24/1999	15:24	9/24/1999	16:02	10937	17285	6348	75.829	75.148	73.975	-1.854
	InterstatePumpTank Stretch File 1	6	9/25/1999	12:33	9/25/1999	13:13	9295	16521	7226	75.844	73.201	69.801	-6.043
	InterstatePumpTank Stretch File 1	6	9/25/1999	17:04	9/25/1999	17:33	14890	21774	6884	73.495	72.109	69.111	-4.384
	InterstatePumpTank Stretch File 1	6	9/26/1999	12:14	9/26/1999	12:45	15100	20283	5183	73.652	72.158	67.805	-5.847
	InterstatePumpTank Stretch File 1	6	9/27/1999	12:41	9/27/1999	13:18	16225	20828	4603	73.345	72.646	70.182	-3.163
	InterstatePumpTank Stretch File 1	6	9/29/1999	11:44	9/29/1999	12:20	13350	18801	5451	73.711	71.149	64.874	-8.837
	InterstatePumpTank Stretch File 1	6	9/29/1999	16:51	9/29/1999	17:13	15383	20143	4760	71.749	70.862	67.995	-3.754
	InterstatePumpTank Stretch File 1	6	9/30/1999	21:20	9/30/1999	22:17	7449	14829	7380	73.024	68.568	64.070	-8.954
	InterstatePumpTank Stretch File 1	6	10/1/1999	13:10	10/1/1999	13:52	8984	16413	7429	70.835	69.179	67.176	-3.659
	InterstatePumpTank Stretch File 1	6	10/2/1999	14:43	10/2/1999	15:24	6677	13618	6941	71.738	69.816	67.967	-3.771
	InterstatePumpTank Stretch File 1	6	10/3/1999	12:30	10/3/1999	13:10	13425	20601	7176	70.844	69.821	67.907	-2.937
	InterstatePumpTank Stretch File 1	6	10/3/1999	18:51	10/3/1999	19:07	17254	22224	4970	70.225	69.589	67.381	-2.844
	InterstatePumpTank Stretch File 1	6	10/4/1999	7:57	10/4/1999	8:26	20245	22646	2401	70.08	69.205	61.827	-8.253

Description
Continuous In-Tank Leak Detection System

This section describes briefly the important aspects of the continuous leak detection system (CITLDS). It is not intended to provide a thorough description of the principles behind the system or how the equipment and software work.

CITLDS Name and Version

INCON Tank Sentinel with SCALD 2.0

Model TS-750, TS-1000, TS-1001, TS-2000, and TS-2001, with Probe TSP-LL2

Product

> Product type

For what products can this CITLDS be used? (check all applicable)

[X] gasoline

[X] diesel

[X] aviation fuel

[X] fuel oil #4

[ ] fuel oil #6

[X] solvents

[X] waste oil

[X] other (list) Solvents compatible with sensors and with known coefficients of expansion and densities. Contact manufacturer for specific applications.

What product level is required to conduct a test?

[ ] greater than 90% full

[ ] greater than 50% full

[X] other (specify) The system tests continuously at whatever product level. Testing was done between 14% and 93.5% full.

Does the CITLDS measure inflow of water as well as loss of product (gallon per hour)?

[X] yes

[ ] no

Does the CITLDS detect the presence of water in the bottom of the tank?

[X] yes

[ ] no

Level Measurement

What technique is used to measure changes in product volume?

[ ] directly measure the volume of product change

[ ] changes in head pressure

[ ] changes in buoyancy of a probe

[ ] mechanical level measure (e.g., ruler, dipstick)

[ ] changes in capacitance

[ ] ultrasonic

[X] change in level of float (specify principle, e.g., capacitance, magnetostrictive, load cell, etc.)

[ ] other (describe briefly)

Temperature Measurement

If product temperature is measured during a test, how many temperature sensors are used?

[ ] single sensor, without circulation

[ ] single sensor, with circulation

[ ] 2-4 sensors

[X] 5 or more sensors

[ ] temperature-averaging probe

If product temperature is measured during a test, what type of temperature sensor is used?

[X] resistance temperature detector (RTD)

[ ] bimetallic strip

[ ] quartz crystal

[ ] thermistor

[ ] other (describe briefly)

If product temperature is not measured during a test, why not?

[ ] the factor measured for change in level/volume is independent of temperature (e.g., mass)

[ ] the factor measured for change in level/volume self-compensates for changes in temperature

[ ] other (explain briefly)

Data Acquisition

What data does the CITLDS collect and analyze for its test? (check all that apply)

[X] product level

[X] product temperature

[X] time

[X] product deliveries

[ ] dispensing records

[ ] other (specify)

Procedure Information

> Waiting times

What is the minimum waiting period between adding a large volume of product (i.e., a delivery) and the

beginning of a test (e.g., filling from 50% to 90-95% capacity)?

[X] no waiting period

[ ] less than 3 hours

[ ] 3-6 hours

[ ] 7-12 hours

[ ] more than 12 hours

[ ] variable, depending on tank size, amount added, operator discretion, etc.

> Test duration

What is the typical time required for the CITLDS to acquire enough data for a valid test?
__0.07__ days.

What factors influence the time required for the CITLDS to acquire and analyze enough data for a valid test?

Frequency of deliveries, amount of dispensing activity, temperature change.

What is the sampling frequency for the level and temperature measurements?

[X] more than once per second

[ ] at least once per minute

[ ] every 1-15 minutes

[ ] every 16-30 minutes

[ ] every 31-60 minutes

[ ] less than once per hour

[ ] variable (explain)

> Identifying and correcting for interfering factors

How does the CITLDS determine the presence and level of the ground water above the bottom of the tank?

[X] observation well near tank

[ ] information from USGS, etc.

[X] information from personnel on-site

[X] presence of water in the tank

[ ] other (describe briefly)

[ ] level of ground water above bottom of the tank not determined

How does the CITLDS correct for the interference due to the presence of ground water above the bottom of the tank?

[X] system tests for water incursion

[ ] different product levels tested and leak rates compared

[ ] other (describe briefly)

[ ] no action

How does the CITLDS determine when tank deformation has stopped following delivery of product?

[ ] wait a specified period of time before beginning test

[X] watch the data trends and begin test when decrease in product level has stopped

[ ] other (describe briefly)

Are the temperature and level sensors calibrated before each test?

[ ] yes

[X] no

If not, how frequently are the sensors calibrated?

[ ] weekly

[ ] monthly

[ ] yearly or less frequently

[X] Never

How does the CITLDS compensate for the effects of product evaporation on product level following dispensing of product from the tank?

[ ] wait a specified period of time after dispensing before beginning test

[ ] watch the data trends and begin test when decrease in product level has stopped

[X] other (describe briefly) Special algorithm that uses ullage space and temperature.

[ ] no compensation

- **Interpreting test results**

How are level changes converted to volume changes (i.e., how is height-to-volume conversion factor determined)?

[ ] actual level changes observed when known volume is added or removed (e.g., liquid, metal bar)

[X] theoretical ratio calculated from tank geometry

[X] interpolation from tank manufacturer's chart

[ ] other (describe briefly)

[ ] not applicable; volume measured directly

How is the coefficient of thermal expansion (Ce) of the product determined?

[ ] actual sample taken for each test and Ce determined from specific gravity

[X] by vendor of product

[X] average value for type of product

[ ] other (describe briefly)

How is the leak rate (gallons per hour) calculated?

[ ] average of subsets of all data collected

[ ] difference between first and last data collected

[ ] from data from last _____hours of test period

[X] from data determined to be valid by statistical analysis

[ ] other (describe briefly)

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

[X] yes

[ ] no Explain

What threshold value for product volume change (gallons per hour) is used to declare that a tank is leaking?

[ ] 0.05 gallon per hour

[X] 0.10 gallon per hour

[ ] 0.15 gallon per hour

[ ] other (list)

Under what conditions are test results considered inconclusive?

[X] too much variability in the data (standard deviation beyond a given value)

[ ] unexplained product volume increase

☐ other (describe briefly)

Exceptions

Are there any conditions under which a test should not be conducted?

☐ water in the excavation zone

☐ large difference between ground temperature and delivered product temperature

☐ extremely high or low ambient temperature

☐ invalid for some products (specify)

☒ other (describe briefly) None

What are acceptable deviations from the standard testing protocol?

☒ none

☐ lengthen the duration of test

☐ other (describe briefly)

What elements of the test procedure are determined by personnel on-site?

☐ product level when test is conducted

☒ when to conduct test

☐ waiting period between filling tank and beginning test

☐ length of test

☐ determination that tank deformation has subsided

☐ determination of "outlier" data that may be discarded

☒ other (describe briefly) Once the CITLDS is set to test, no other elements are determined on site.

☐ none

Attachment B

Graphs for INCON SCALD 2.0

Test No. 100 and Test No. 9

Comments on Graphs

Plains Pump Test # 100

Test Time – Start Time 10/5/99 00:05, End Time 10/05/99 01:47
Monthly Throughput - 5952 gal/mo
Tank Size – 8,023 gal
Product – Diesel

1. This station shuts down from 8PM to 8AM. Most tests will be conducted during the closed period. This graph shows the type of activity at the station from October 4 through October 7. One delivery occurred during that time period.

2. This graph shows the activity on the day of the test.

3. This graph provides detail during Test # 100. There was no activity during the test. A regression of the data gives an in-leak of 0.004 gal/h. The reported zero leak rate was an in-leak of 0.007 gal/h.

Palmetto Amoco Tank 3 and 5 manifold, Test #9

Test Time – Start Time 07/08/99 01:30, End Time 07/10/99 03:09
Monthly Throughput – 206,254 gal/mo
Tank Size – 12,160 gal and 20,731 gal manifold
Product – Diesel

4. This graph shows the general activity of the tank from July 7 to July 11, 1999. Four deliveries occurred during this time period. The time periods for Tests 8 and 9 are shown.

5. This graph shows only the time period of the leak. Several quiet periods are available during the time period of the test.

Chart 1. Plains Pump Test #100
Activity from Oct 4 to Oct 7

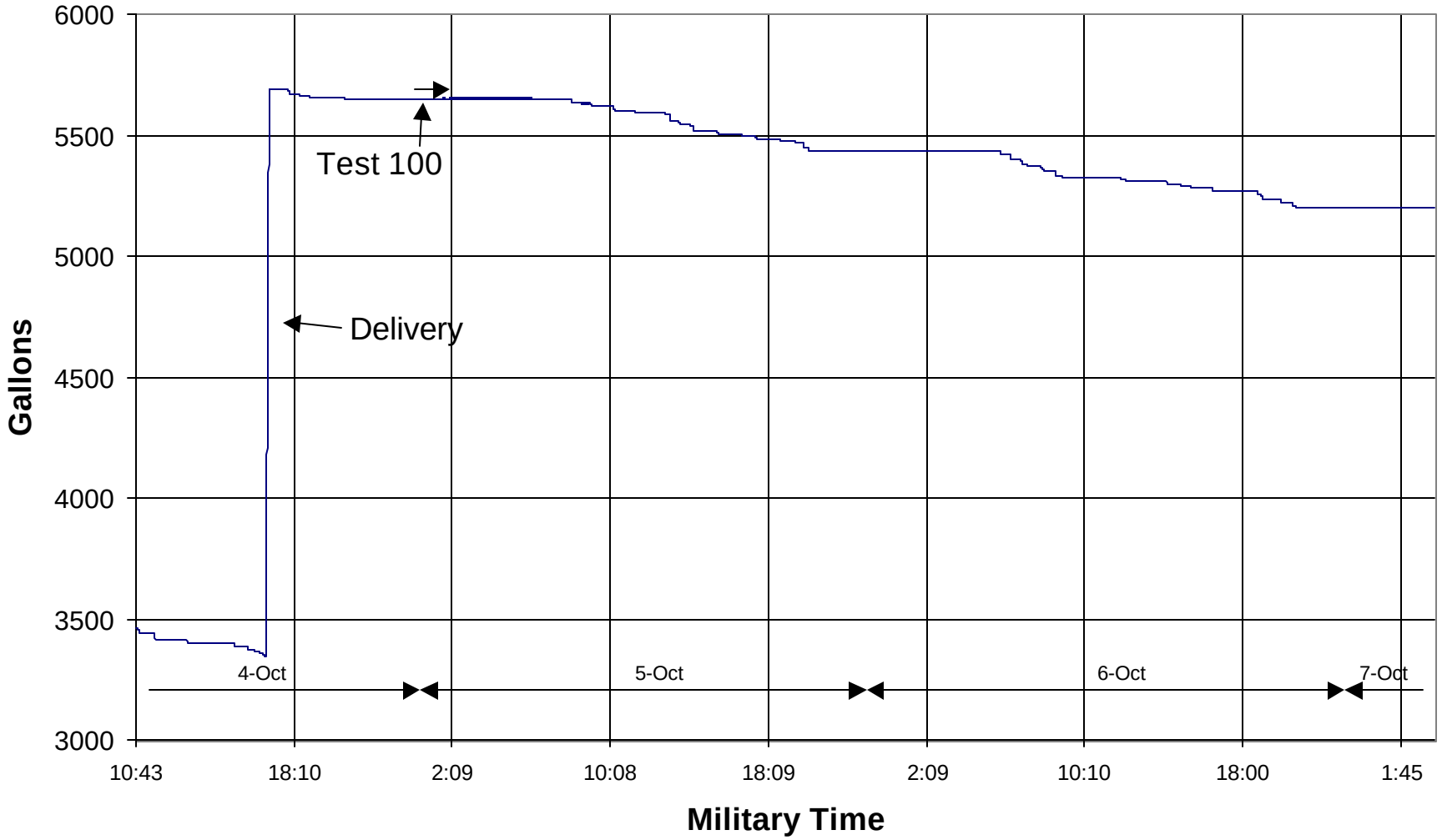


Chart 2. Plains Pump Test # 100
October 5, 1999

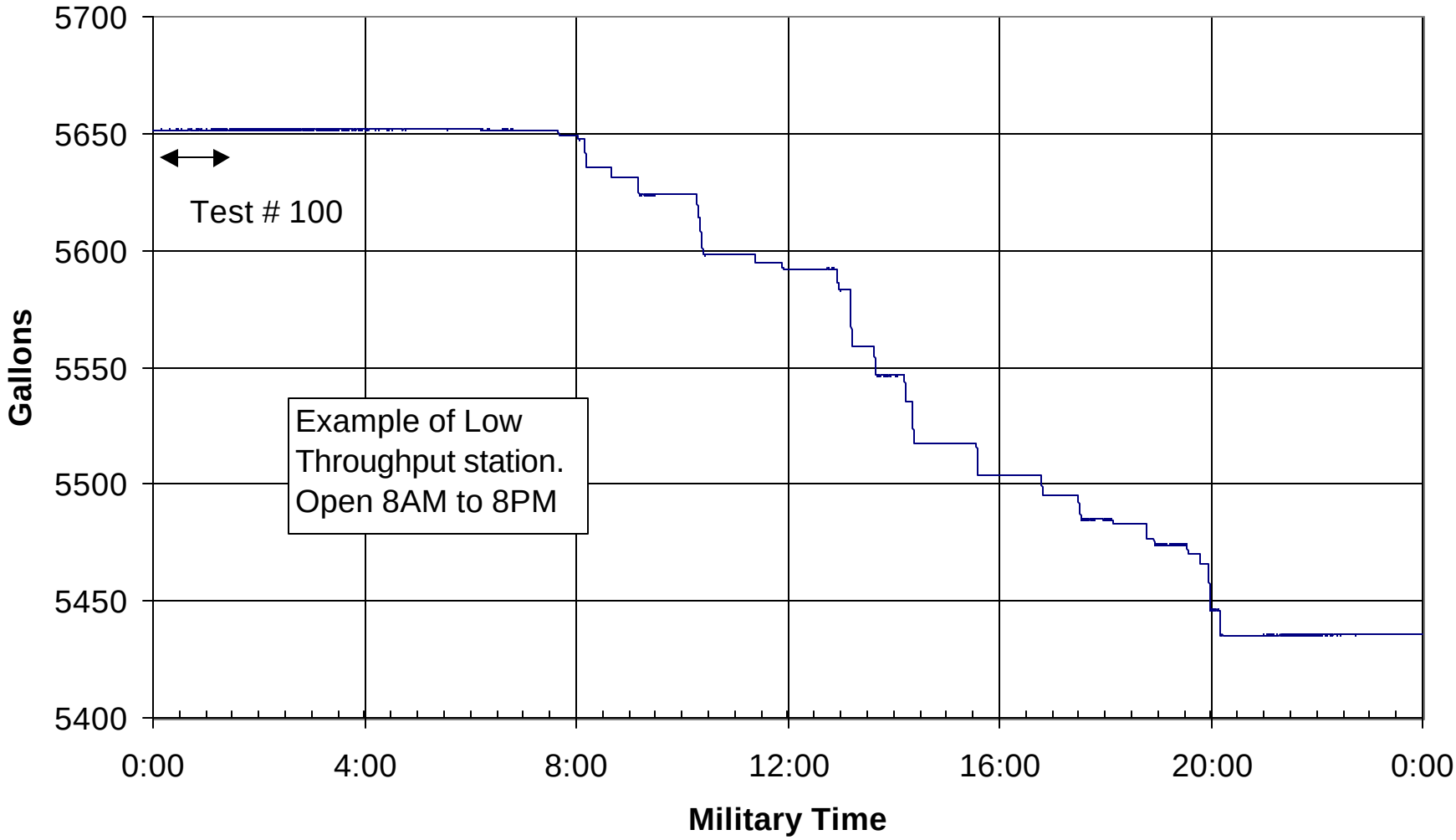


Chart 3. Plains Pump Test #100
October 5, 1999

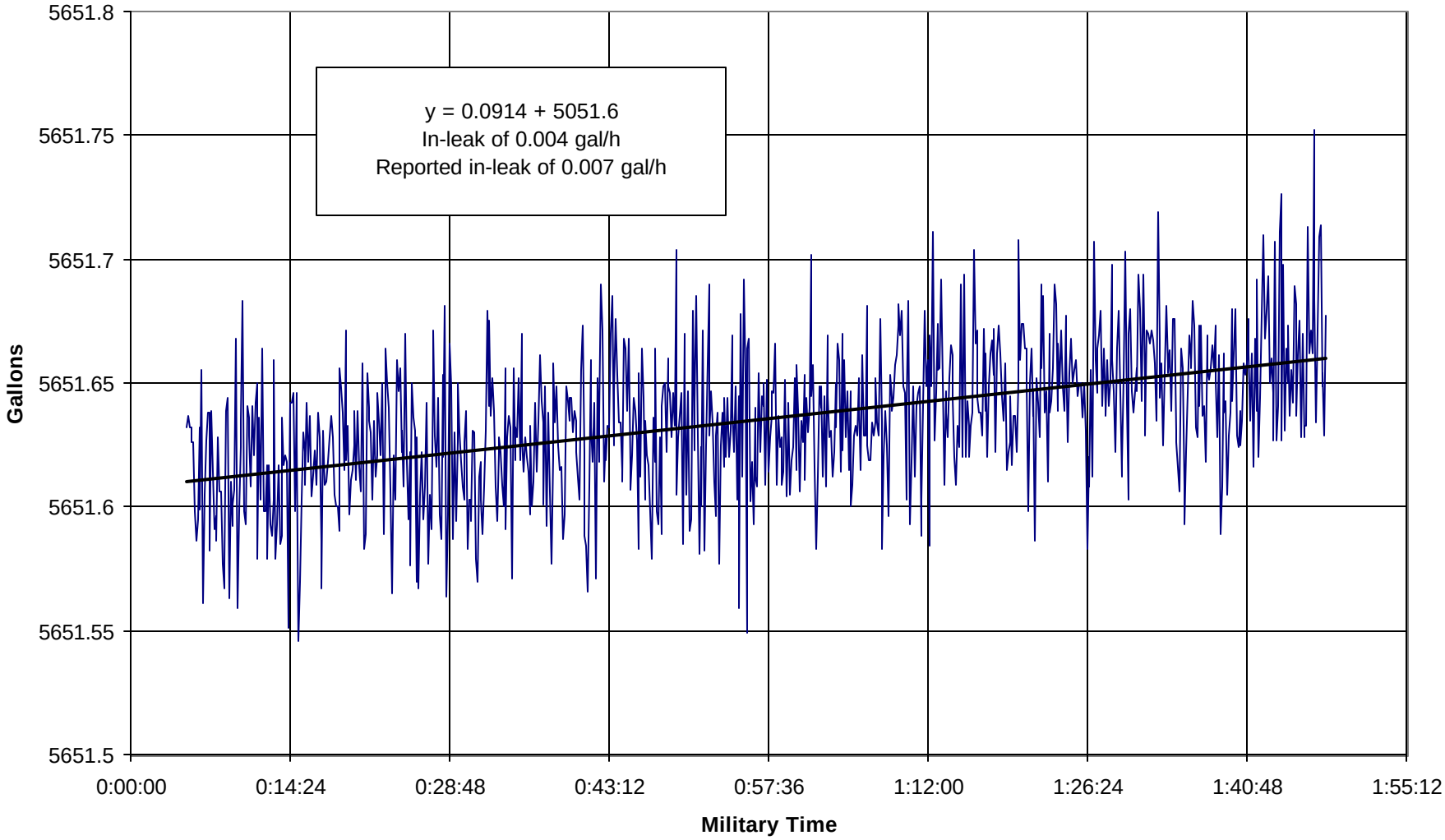


Chart 4. Palmetto Amoco Tank 3
Tests 8 and 9 - July 7 -11

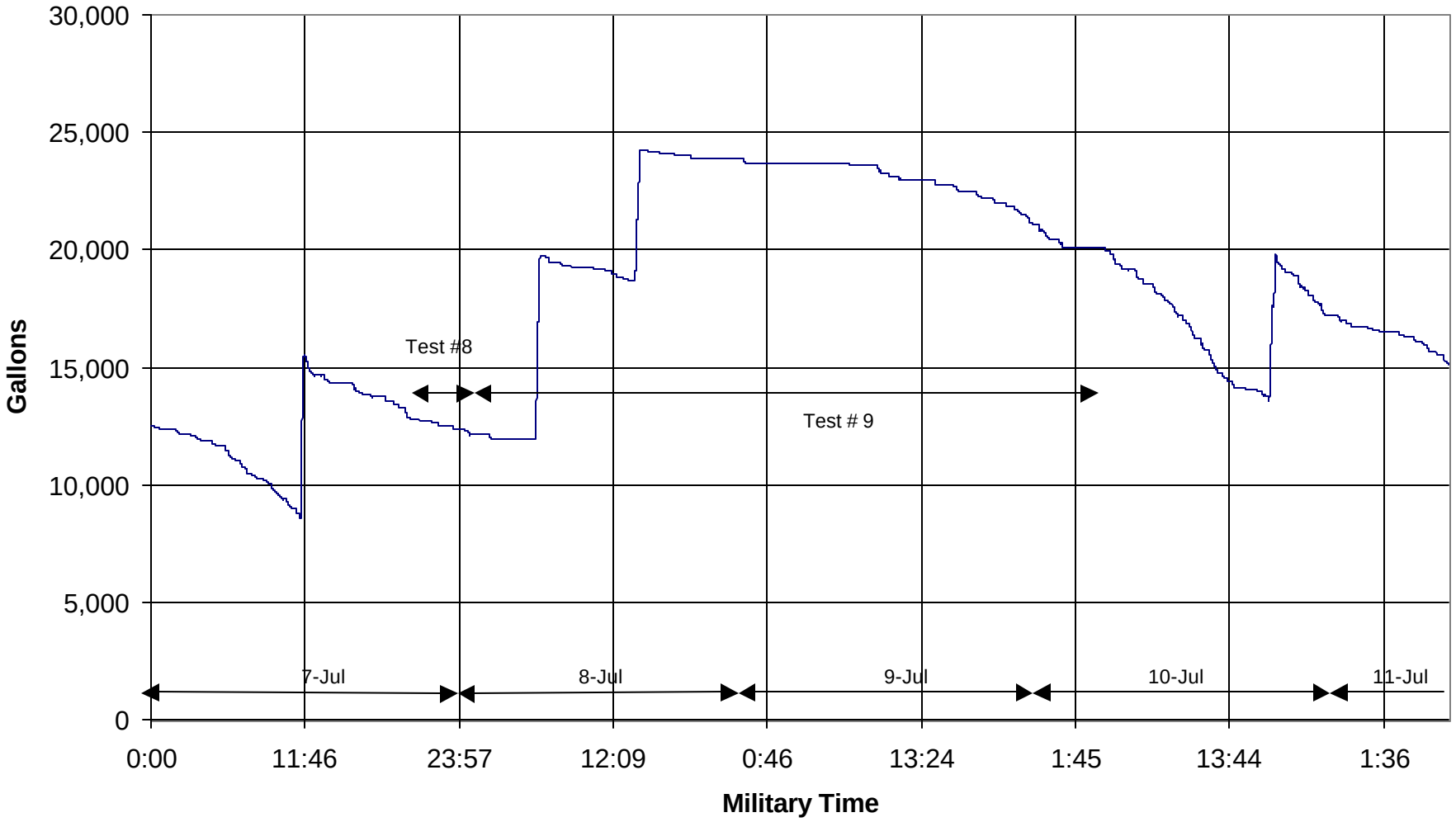
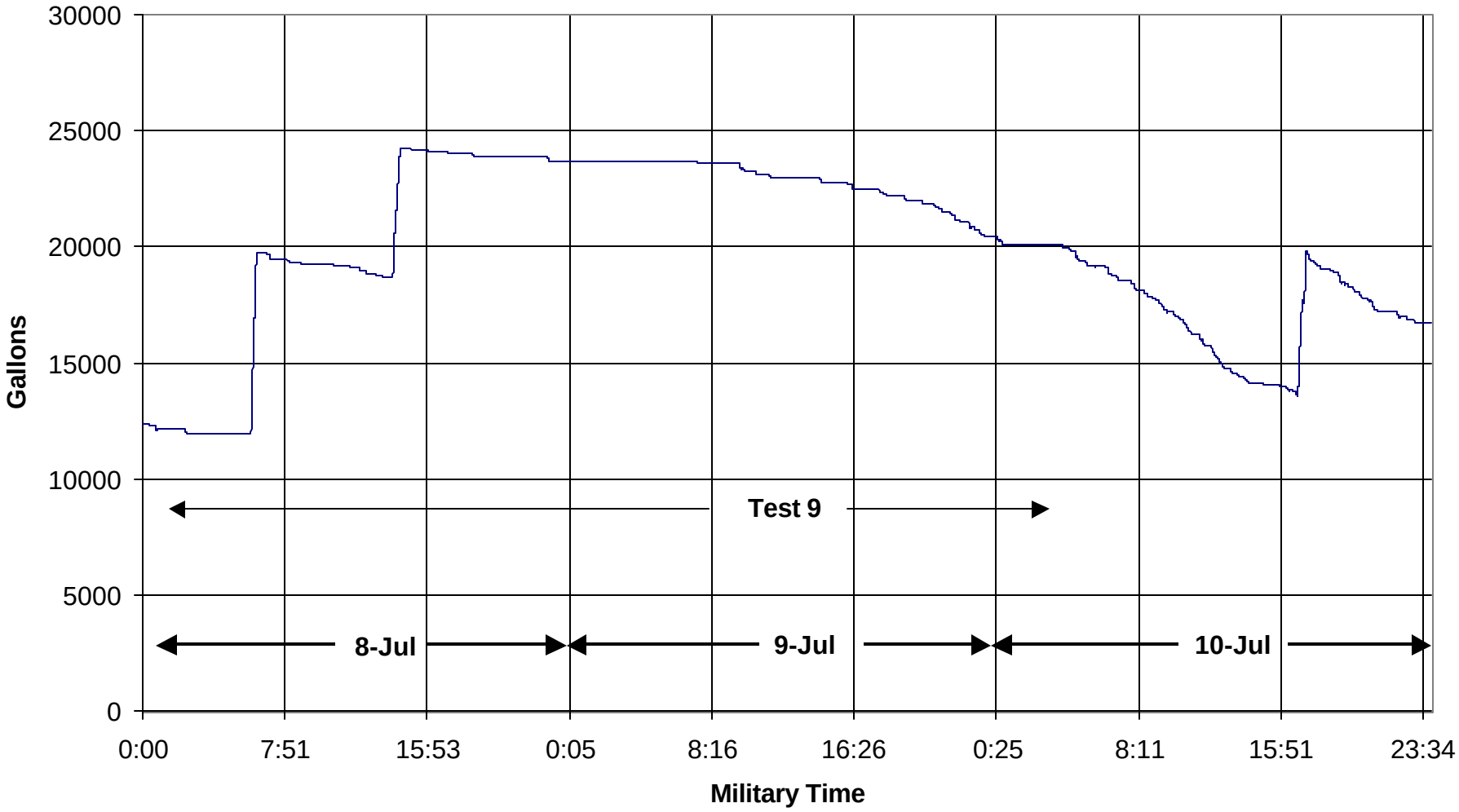


Chart 5. Palmetto Amoco Tank 3
Test 9 Zero Leak



Attachment C

Explanation for Data Gaps

Data Gaps

Out of the 100 test records contained in the evaluation database in Table A1, over 90% of the tests are sequential, with one test ending and the next test starting within minutes of one another. The tests that are not sequential are the result of data logging methods used by the vendor as explained below.

Separate Data Log Files

In order to gather data from the ATG in the field, the vendor employed a PC running a ProComm script. The ProComm script is used to receive and store data test data received over a serial connection between the ATG and the PC. When the ATG is manually put into "data logging" mode and the ProComm script started on the PC, the data records are stored sequentially in chronological order in a single file on the hard drive of the PC.

If the power at the site is interrupted, the ATG will go thru a power up sequence, restart the leak-testing algorithm and run normally. The ATG does not automatically go into data logging mode. Data logging mode needs to be started manually at the site. The co-ordination of monitoring the site and verifying that data logging was running could sometimes cause days or weeks between data logging sessions.

When the PC starts up after a power interruption, the ProComm script automatically starts, but instead of using the previous data log file, a new one is opened. Once a technician was dispatched to the site to manually restart data logging, the newly opened file begins receiving data records once again. The net result of this configuration is that multiple files are created while logging data at the site.

This affects the following tests, whereby within a single tank, a time gap follows the end of one test and the start of the next: 8, 13, 31, 43, 45, 58, and 62.