11 CSLD Troubleshooting

CSLD collects information during each idle time to form a highly accurate leak detection database. Since the database is being constantly updated, leak test results are always current. Periodic leak tests are performed using the best data from up to the previous 28 days, and test results are continuously updated as new data is gathered. Invalid data is discarded and only the best data is used to ensure accurate leak test results and fewer false alarms. Test results are provided automatically every 24 hours at 8:00 a.m.

CSLD Tank Limitations

All applications of CSLD should conform to the following installation guidelines.

MAXIMUM TANK CAPACITY

Single tank - 30,000 gallons

Manifolded tanks - 30,000 gallons per manifolded set (3 tanks maximum per set).

MONTHLY THROUGHPUT GUIDELINES

Table 11-1. Tank Capacity / Monthly Throughput Limitations*

Product	Tank Capacity				
	<10,000	**12,000**	**15,000**	**20,000**	**30,000**
Gasoline	200,000	200,000	200,000	150,000	100,000
Diesel	200,000	200,000	200,000	200,000	200,000

*Total capacity of manifolded tanks establishes the throughput restrictions for that product. Installations exceeding these limitations may not pass monthly tests.

CSLD Block Diagrams

Figure 11-1 illustrates the CSLD decision process in block diagram form and Figure 11-2 diagrams the timing of events during a CSLD test.

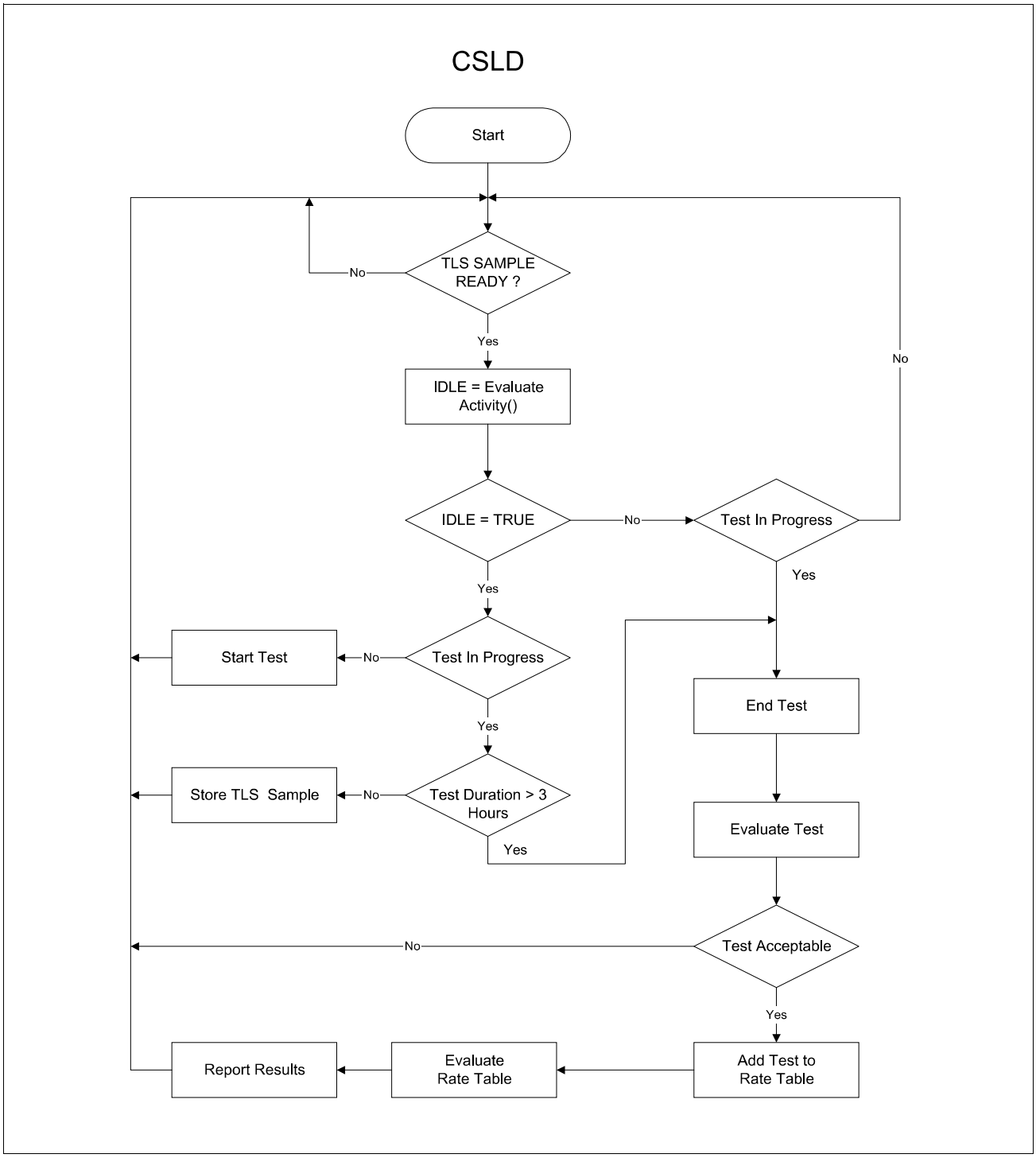

Figure 11-1. CSLD Decision Process Block Diagram

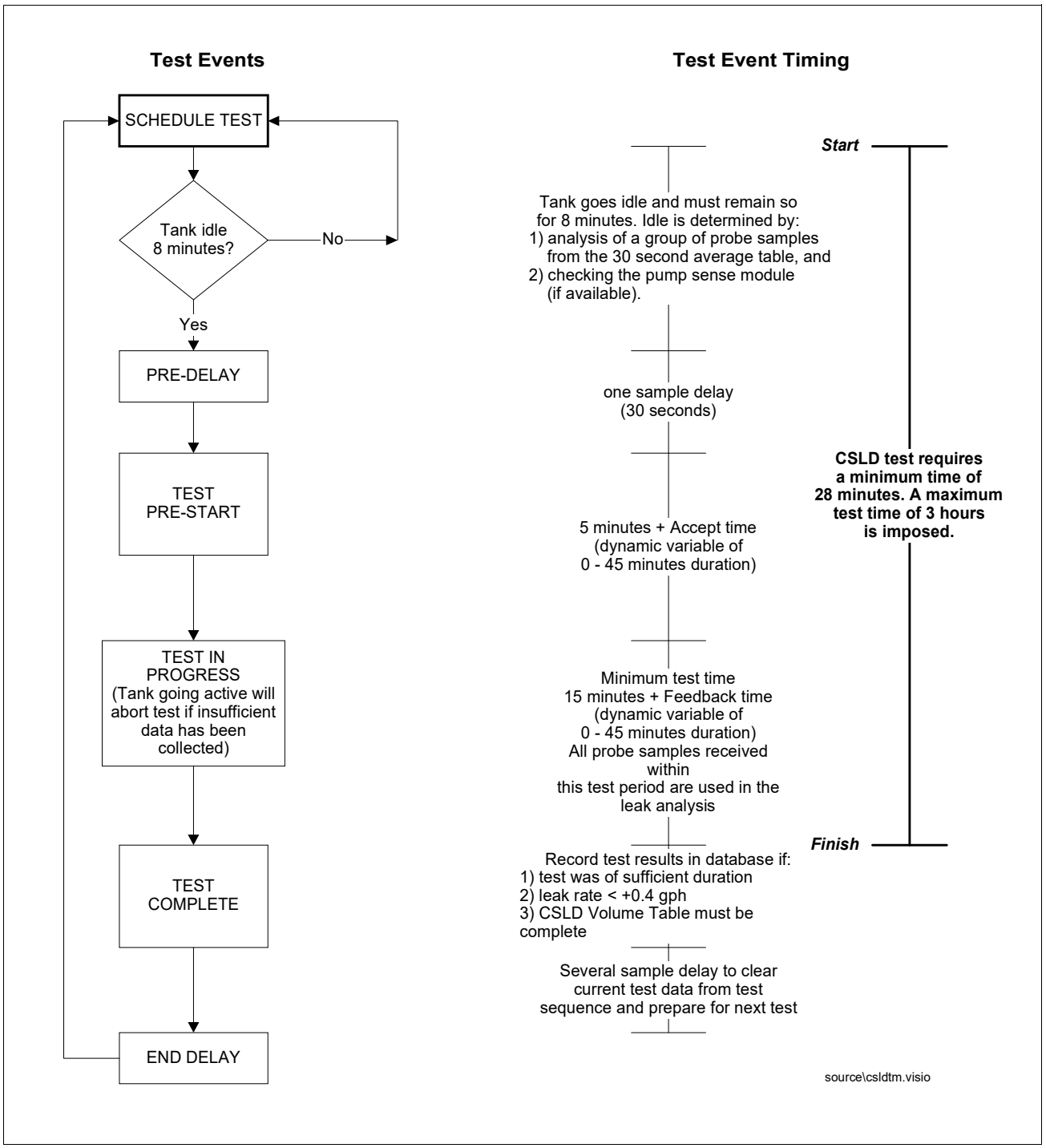

Figure 11-2. CSLD Leak Test Timing Sequence

CSLD Diagnostic Aids

Due to the complexity of CSLD, most information required to troubleshoot the product is accessible only using RS-232 commands via direct or modem connection. If you do not have a computer or data terminal to collect this data you will not be able to resolve CSLD alarms.

In order to troubleshoot CSLD problems you must retrieve the following reports via the RS-232 port or modem:

1. IA5100 - CSLD Rate Table (see Figure 11-3)

   This table contains the last 28 days of leak tests, or a maximum of 80 of the most recent tests.

2. IA5200 - CSLD Rate Test (see Figure 11-4)

   This report contains the CSLD summary of the evaluation of the raw test data collected in the Rate Table.

3. IA5300 - CSLD Volume Table (see Figure 11-5)

   This report contains volume samples collected once every hour. CSLD uses this data to determine the amount of dispensing that has occurred during the last 24 hours.

4. IA5400 - CSLD Moving Average Table (see Figure 11-6)

   This report contains averaged probe data collected every 30 seconds. CSLD uses this data to determine if the tank is idle or active, and to perform the leak test.

```
IA5100
MAR 14, 1996  8:12 AM


CSLD DIAGNOSTICS: RATE TABLE
T 1:SUPER
      TIME ST    LRT AVTMP TPTMP BDTMP  TMRT DSPNS   VOL INTVL    DEL ULLG EVAP

9602202227  0 -0.016  39.2  38.3  36.3  0.02   191  4281 174.5    2.7  168  0.000
9602210128  0  0.016  39.3  38.2  35.9  0.02   169  4281 174.5    5.7  168  0.000
9602210428  0 -0.022  39.4  38.2  35.6  0.03   162  4281  57.5    8.7  168  0.000
9602210636  1  0.106  39.5  38.3  35.8  0.02   213  4207  19.5   10.8  172  0.000
9602210718  1  0.118  39.5  38.4  35.9  0.00   215  4175  19.5   11.5  173  0.000
9602212259  3  0.007  40.2  39.0  37.1  0.02   460  3557 174.5   27.2  204  0.000
```

----- Partial set of entries shown ------

```
TIME      Test start time. (YYMMDDHHMM)

ST        Test qualification status at last evaluation.
          0 Test valid
          1 Test rejected - duration too short.
          2 Test rejected - start time too close to a delivery.
          3 Test rejected - excessive dispensing prior to test.
          4 Test rejected - excessive temperature change during test.
          6 Test rejected - leak rate outlier.

LRT       Leak rate in gph (negative number = a loss, no sign = a gain)

AVTMP     Average fuel temperature

TPTMP     Temperature of top thermistor in the tank.

BDTMP     Temperature of thermistor on the board.

TMRT      Rate of temperature change during the test.

DSPNS     Factor related to the amount of dispensing prior to the test.

VOL       Volume at the start of the test.

INTVL     Test Duration in minutes.

DEL       Time since the last delivery in hours.

ULLG      Amount of surface area of the tank that is not covered by fluid.

EVAP      If the Reid Vapor Pressure table has been entered, the evaporation rate will
          be here.
```

Figure 11-3. CSLD Rate Table Example

```
IA5200
MAR 14, 1996  8:12 AM


CSLD DIAGNOSTICS: RATE TEST

TK        DATE  LRATE INTVL ST  AVLRTE    VOL  C1  C3 FDBK ACPT  THPUT EVAP  RJT
 1  9603140346 -0.031  33.7  1   0.002   3525  74  15 38.3 28.9  31.63 0.000   0
 2  9603140342  0.000  32.2  1   0.004   3184  74  15 38.3 28.9  29.85 0.000   0
 3  9603140151  0.051  26.8  1   0.039   6165  49  16 10.1  8.8  43.67 0.000   0
 4  9603140646 -0.000  53.0  1  -0.003   1762  80  26 45.0 44.8  20.22 0.000   0
```

DATE — The date of the last rate table evaluation (YYDDMMHHMM)

LRATE — Compensated leak rate in gph (negative number = a loss, no sign = a gain)

INTVL — Total test duration, sum of all acceptable tests, in hours.

ST — Status:

0 NO TEST - no evaluation.
1 PASS
2 FAIL
3 NOT USED.
4 INVALID - obsolete.
5 NO DATA:COUNT - not enough tests available to evaluate. There must be at least 2 acceptable tests.
6 NO DATA:INTERVAL - not enough total test time to evaluate (< 6 hours).
7 NO DATA:RANGE - tests did not range over a sufficient time period. test time < 10 hours AND tests date range < 5 DAYS.
8 WARNING INCREASE - excessive positive leak rate.
9 WARNING NEGATIVE_HOLD - 2 day waiting period before reporting a failure.

AVLRTE — Uncompensated Leak Rate, in gph (negative number = a loss, no sign = a gain)

VOL — Average volume of all acceptable tests.

C1 — Total number of tests in the rate table.

C3 — Number of acceptable tests.

FDBK — Feedback control variable, range 0 to 45 minutes.

ACPT — Accept control variable, range 0 to 45 minutes.

THPUT — Estimated monthly throughput in thousands of gallons.

EVAP — If the Reid Vapor Pressure table has been entered, the evaporation rate will be here.

RJT — Of the last 20 tests completed, this is the number of tests rejected due to excessive positive leak rate (>0.4 gph).

Figure 11-4. CSLD Rate Test Example

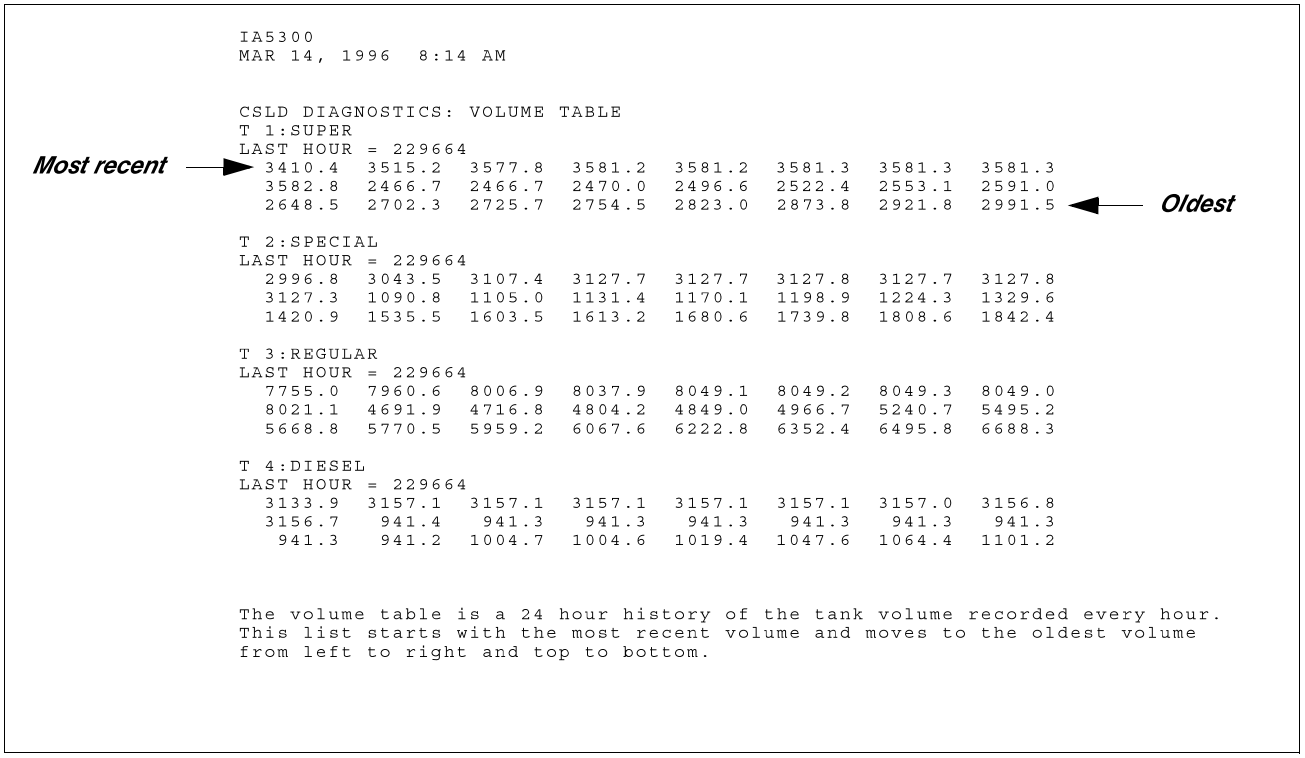

Figure 11-5. CSLD Volume Table Example

SMPLS = Samples
TLCVOL = Temp. compensated volume
HEIGHT = Product height
AVGTEMP = Avg. fuel temperature
TOPTEMP = Temp. of the highest thermistor in the probe
BDTEMP = Temp. of the probe circuit board (in canister)

* following ACTIVE = Pump sense available

```
IA5402
MAR 12, 1996 10:52 AM


CSLD DIAGNOSTICS: MOVING AVERAGE TABLE

T 2:SUPER
        TIME  SMPLS     TCVOL    HEIGHT   AVGTEMP   TOPTEMP    BDTEMP
960312103008     28   2118.16    29.547     45.52     44.01     39.31
960312103038     28   2118.16    29.547     45.52     44.01     39.31
960312103108     28   2118.14    29.547     45.52     44.01     39.31
960312103138     27   2118.16    29.547     45.53     44.02     39.32
960312103208     24   2118.17    29.547     45.53     44.02     39.32
960312103238     28   2118.19    29.547     45.52     44.02     39.32
960312103308     28   2118.13    29.547     45.52     44.02     39.32
960312103338     28   2118.13    29.547     45.52     44.02     39.33
960312103408     28   2118.16    29.547     45.52     44.03     39.33
960312103438     28   2118.13    29.547     45.52     44.03     39.33
960312103508     28   2118.17    29.547     45.52     44.03     39.33
960312103538     27   2118.16    29.547     45.52     44.04     39.34
960312103608     22   2118.21    29.547     45.52     44.04     39.34
960312103638     19   2118.16    29.547     45.52     44.04     39.34
960312103708     28   2118.23    29.548     45.52     44.05     39.34
960312103738     28   2118.19    29.547     45.52     44.05     39.34
960312103808     29   2118.17    29.547     45.52     44.06     39.35
960312103838     21   2118.13    29.547     45.52     44.06     39.35
960312103908     29   2118.21    29.547     45.52     44.06     39.35
960312103938     28   2118.12    29.546     45.53     44.06     39.36
960312104008     28   2118.11    29.546     45.53     44.06     39.36
960312104038     28   2118.21    29.547     45.53     44.06     39.37
960312104108     29   2118.14    29.547     45.53     44.06     39.37
960312104138     27   2118.05    29.546     45.53     44.06     39.38
960312104208     29   2115.86    29.524     45.53     44.06     39.38
960312104238     28   2112.55    29.490     45.53     44.05     39.39
960312104308     28   2109.43    29.459     45.53     44.05     39.39
960312104338     28   2106.14    29.426     45.53     44.05     39.40
960312104408     28   2102.58    29.390     45.53     44.05     39.40
960312104438     27   2099.08    29.354     45.53     44.05     39.40
960312104508     28   2095.64    29.320     45.53     44.05     39.41
960312104538     29   2092.37    29.287     45.53     44.04     39.41
960312104608     22   2091.61    29.279     45.53     44.04     39.41
960312104638     28   2091.66    29.279     45.53     44.04     39.42
960312104708     27   2091.64    29.279     45.53     44.04     39.42
960312104738     28   2091.66    29.280     45.53     44.05     39.43
960312104808     28   2091.65    29.279     45.53     44.05     39.43
960312104838     28   2091.60    29.279     45.53     44.05     39.43
960312104908     28   2091.61    29.279     45.53     44.05     39.44
960312105008     23   2091.60    29.279     45.53     44.04     39.44
960312105038     29   2091.67    29.280     45.53     44.04     39.44
960312105108     29   2091.70    29.280     45.53     44.04     39.45
960312105138     21   2091.63    29.279     45.53     44.04     39.45
960312105208     28   2091.74    29.280     45.53     44.04     39.45
960312105238     29   2091.63    29.279     45.53     44.04     39.45
960312105308     29   2091.64    29.279     45.53     44.04     39.46
MOVING AVERAGE:    2091.64

DISPENSE STATE: ACTIVE *  330.710632
```

Figure 11-6. CSLD Moving Average Table Example

Tank Setup Check Before Troubleshooting

All in-tank setup data must be correct for CSLD to work properly. Setup data, such as manifolded status, pump sense tank assignment, and temperature coefficient of thermal expansion entries, should be verified before attempting troubleshooting procedures.

CSLD Alarms

Each of the three CSLD alarms, CSLD Rate Incr Warn, No CSLD Idle Time, and Periodic Test Fail is discussed below. In addition, there is one CSLD status message, No Results Available, which is also discussed.

ALARM: CSLD RATE INCR WARN

A CSLD Rate Increase Warning indicates fluid is entering the tank during the leak test. This warning indicates a higher than acceptable positive increase in product calculated from the CSLD Rate Table. The threshold amounts are listed below.

Single tank configuration:

PD - 95% = +0.17 gph

PD - 99% = +0.16 gph

Manifolded Tank configuration:

PD - 95% = +0.16 gph

PD - 99% = +0.15 gph

You can also print out the CSLD DIAGNOSTICS from the DIAGNOSTIC Mode to see the actual calculated value (see Figure 6-7).

SOME POSSIBLE Causes of positive rate increases

1. Incorrect temperature coefficient entered during setup. Verify that the temperature coefficient of thermal expansion is set correctly according to the TLS Setup Manual specifications listing for various product grades.
2. Manifold Tank Siphon Bar Leakage

   Rate increases can occur in siphon manifolded tanks due to a leaking siphon system. Since the siphon piping is normally full of fuel this can become a source of rate increases. If the siphon does not hold, product will drain back slowly into the tanks during idle periods. The fuel from the siphon piping will increase the volume in the tank which will cause a CSLD rate increase warning. Test and repair the siphon system per the manufacturer's recommendations.
3. Leaks In Submersible Pumps
   - Around the packer O-ring.
   - At the threads of the two-inch pipe coming from the turbine motor.
   - The gasket between the turbine motor and mounting flange.
   - At any seal which would allow the column of fuel being held in the pump by the check valve to leak back slowly into the tank.
4. Manifolded tanks are programmed incorrectly in In-Tank setup.

   Tanks in a manifolded set must be programmed as a set, and you must select **CSLD** as the Leak Test Frequency for each of the tanks.
5. Defective Line Check Valves

   Fluid from the line piping leaking back into the tank through a defective Line Check Valve may cause a rate increase. Verify that the line piping holds pressure after pumping stops.
6. Thermal Expansion In The Lines

   When the product temperature in the tank is lower than the ground temperature, product in the line will expand after dispensing. After pumping ceases the line check valve or pump check valve will maintain pressure in the line. As the ground warms the product in the line expands. This expansion causes a corresponding pressure increase in the line therefore the pressure relief valve opens. The relief valve, relieves this increased pressure by allowing fuel to flow back into the tank. The flow from the line back into the tank can be a source of rate increase warnings. Typically thermal expansion's impact on CSLD is short lived. However, in extreme cases thermal expansion can be a source of CSLD rate increase warnings. If thermal expansion is suspected as the source of CSLD rate increase warnings you should inspect the site layout to determine if it is susceptible to extreme thermal expansion due to site specific conditions (i.e. shallow line depth combined with extreme temperatures, etc.).

7. Stage II Vapor Recovery System Related Problems
   - Condensed vapors and liquid drawn into the vapor recovery system can leak back into the tank causing increases.
   - Check with the manufacturer of the vapor recovery system about possible solutions such as the addition of a vapor pot to collect these condensed vapors.
   - Have the Stage II vapor recovery system inspected and tested.
   - Verify that liquid product in the vapor lines cannot drain directly back into the tank. A liquid trap can be installed. The product that collects in the trap can be siphoned back to the tank via the pump siphon system. This will prevent the introduction of liquid into the tank during idle periods.
8. Water Leaking into the Tank
   - Water can leak into the tank and cause rate increase warnings.
   - Check the water level in the tank.
   - Monitor the tank for increasing water levels.
   - Check the alarm history for prior water level alarms.
9. Air eliminator tube missing from Red Jacket pump
   - Install air eliminator tube.
10. Clogged FE Petro siphon jet assembly
   - Clean assembly.

ALARM: NO CSLD IDLE TIME

The system has not detected an idle period in the last 24 hours. All tanks must have at the very least some short idle periods each day. CSLD needs to find an idle time to clear this alarm. This alarm will automatically clear when the system detects that at least one idle period has occurred (this does not require that a CSLD record get stored in the rate table).

Frequent or continuous NO CSLD IDLE TIME messages are an indication of a problem. Possible reasons for this message:

1. Very large leaks may look like a product dispense. If this occurs the system will post a NO CSLD IDLE TIME alarm since it appears that product is being continually dispensed from the tank. Stop all activities and run a Static Leak Test.
2. Very high activity. Tank capacity or throughput specifications are exceeding CSLD specifications.
3. Line leak detection is running the product pump during normally idle periods.Veeder-Root line leak equipment is designed to coordinate line testing and CSLD to prevent this disturbance however in some cases conflicts may arise.
4. The site may be having problems determining an idle period due to site specific equipment disturbing the tank level (e.g. vapor recovery equipment).
5. The pump is running continuously. Check for a defective product dispenser or pump relay that is keeping the pump turned On.
6. A defective probe will sometimes make the tank level appear as though it is changing continuously when it is actually stable. This can be determined by examining the CSLD Moving Average Table (IA5400 Command). This table displays the tank data at 30 second intervals. Increases and decreases of typically around 1 or 2 gallons when the tank is idle are indications that the probe may be the problem. Also verify the amount of samples the TLS is receiving from the probe -there should be at least 7 and as many as 31.
7. Noisy probe wiring. Check connections.
8. Air eliminator tube missing from Red Jacket pump

- Install air eliminator tube.

9. Clogged FE Petro siphon jet assembly
   - Clean assembly.

ALARM: PERIODIC TEST FAIL

This message is posted when CSLD data indicates a high probability that a tank is leaking. The threshold for this determination is shown below,

Single Tanks:

PD - 95% = +0.17 gph

PD - 99% = +0.16 gph

Manifolded Tanks:

PD - 95% = +0.16 gph

PD - 99% = +0.15 gph

Review the rate table leak rates (LRATE). If the rates are not consistent (-0.83, +0.06,-0.90, -0.62, etc.) most likely the tank is not leaking.

Possible reasons for this message:

1. Tank is leaking.
2. CSLD is not recognizing the start of a busy period soon enough. These conditions are caused by small and/or slow dispenses, as in the case of operation with blenders. The solution would be to install a Pump Sense Module.
3. An external device is periodically turning On the pump power. This usually results in large negative leak rates. A Pump Sense Module will solve this problem.
4. Coefficient of expansion programmed incorrectly.
5. Tank is manifolded but programmed incorrectly.
6. Excessive compensation. Check in the IA500 report for excessive compensation by comparing the compensated value (LRATE) to the uncompensated value (AVLRTE). The most likely cause of excessive compensation is bad probe temperature readings.
7. Stuck floats. Install a collar on the probe shaft to prevent floats from entering riser.
8. Floats damaged or installed incorrectly.
9. A stuck relay is causing the pump to run continuously. This causes the fluid to heat up around the pump producing temperature compensation errors.
10. Excessive evaporation due to an air leak into the tank may be the cause of a periodic leak test failure. Check vapor recovery system, pressure vent cap, all tank sump areas and riser caps, delivery sump plunger valve, etc.

STATUS MESSAGE: NO RESULTS AVAILABLE

This message may print when the CSLD Test Results are printed or accessed via the RS-232 command. This message indicates that CSLD has not collected sufficient test data to determine whether or not the tank is leaking, and is normal until 7 -10 days AFTER a CSLD startup. The program must be allowed to build a suitable database to calculate reliable results. At highly active sites some tanks may provide results before others. The busier tanks will take longer to produce the initial results.

Possible reasons for this message:

1. Not enough time after startup to generate results.
2. Console is being shut Off on a regular basis.
3. Tank too busy.
4. Defective probe.
5. Noisy probe wiring.
6. Not enough idle time (see message above).
7. Tests are being rejected because the test results indicate a rate increase >+0.4 gph.

Static Leak Test

If after troubleshooting the Periodic Test Fail Alarm an equipment problem has not been identified, perform a static leak test. Be sure that the product pump cannot come on during the test and that the level in the tank is within the normal operating range (i.e., the results of the static test may not be meaningful if the tank is nearly empty). If the static test verifies the CSLD result follow the procedures as established by the site owner. If the static test passes, contact Technical Support for assistance.

When to Manually Clear the CSLD Rate Table

You should manually clear the CSLD Rate Table if data, known to be inaccurate, had been stored in the table and the source of the inaccurate data was subsequently removed (e.g., after making tank plumbing repairs).

The CSLD Rate Table can be cleared in the DIAG MODE at the console front panel or via the RS-232 command shown below.

IMPORTANT! DO NOT CLEAR THE CSLD RATE TABLE UNLESS IT IS ABSOLUTELY NECESSARY. DATA CLEARED FROM THIS TABLE CAN NOT BE RECOVERED!

```
Function Code:      054
Function Type:      Delete CSLD Rate Table
Command Format:
Display:            <SOH>S054TT149
Computer:           <SOH>s054TT149
```

NOTE:

1. TT - Tank number (command valid for single tank only).
2. 149 - Verification code.

Typical Response Message Display:

```
<SOH>
S05402149
JAN 1, 1997 8:03 AM
T2:PRODUCT 2       CSLD RECORDS DELETED
<ETX>
```

typical Response Message Computer:

```
      <SOH>s054TTYYMMDDHHMM&&CCCC<EXT>
```

NOTE:

```
      1.       YYMMDDHHmm   -  Current time of day
      2.                TT   -  Tank number
```

```
3.              &&   - Data termination flag
4.            CCCC   - Message checksum.
```

Contacting Tech Support

If the CSLD problem cannot be resolved, retrieve the following data via the RS-232 port or SiteFax modem and contact Technical Support:

1. <Ctrl-A> `IA5100` CSLD RATE TABLE
2. <Ctrl-A> `IA5200` CSLD RATE TEST
3. <Ctrl-A> `IA5300` CSLD VOLUME TABLE
4. <Ctrl-A> `IA5400` CSLD MOVING AVERAGE TABLE
5. <Ctrl-A> `I10100` SYSTEM STATUS REPORT
6. <Ctrl-A> `I10200` SYSTEM CONFIGURATION REPORT
7. <Ctrl-A> `I11100` PRIORITY ALARM HISTORY
8. <Ctrl-A> `I11200` NON-PRIORITY ALARM HISTORY
9. <Ctrl-A> `I20100` INVENTORY REPORT
10. <Ctrl-A> `I20200` DELIVERY REPORT
11. <Ctrl-A> `I20600` TANK ALARM HISTORY REPORT
12. <Ctrl-A> `I25100` CSLD RESULTS
13. <Ctrl-A> `I60900` SET TANK THERMAL EXPANSION COEFFICIENT
14. <Ctrl-A> `I61200` SET TANK MANIFOLDED PARTNERS
15. <Ctrl-A> `I61400` COMMAND CLIMATE FACTOR

Is tank assigned to a pump sense input or assigned to a line leak device?

If assigned to a pump sense collect the following reports:

1. <Ctrl-A> `I77100` PUMP SENSE CONFIGURATION REPORT
2. <Ctrl-A> `I77200` PUMP SENSOR TANK ASSIGNMENT REPORT
3. <Ctrl-A> `I77300` PUMP SENSOR DISPENSE MODE REPORT
4. <Ctrl-A> `IB7100` PUMP SENSOR DIAGNOSTIC REPORT

OR - if assigned to PLLD collect the following report:

1. <Ctrl-A> I78000 PRESSURE LINE LEAK GENERAL SETUP INQUIRY

OR - if assigned to WPLLD collect the following report:

1. <Ctrl-A> I7A000 WPLLD LINE LEAK GENERAL SETUP

OR - if assigned to VLLD collect the following reports:

1. <Ctrl-A> I75200 SET VOLUMETRIC LINE LEAK TANK NUMBER
2. <Ctrl-A> I75D00 SET VOLUMETRIC LINE LEAK DISPENSE MODE

Actual CSLD Test Problems Analyzed

CSLD PROBLEM 1 - TANK 1 CSLD FAIL

Report I25101 confirmed the failure. Reports IA5201, and IA5100 were then collected for analysis.

```
I25101
CSLD TEST RESULTS
TANK        PRODUCT     RESULT
1           SUPER       PER: JUL 26, 1996 FAIL
```

DIAGNOSTICS

```
JUL 26, 1996 10:44 AM
IA5101
CSLD DIAGNOSTICS: RATE TABLE
T1: SUPER
```

TIME	ST	LRT	AVTMP	TPTMP	BDTMP	TMRT	DISPNS	VOL	INTVL	DEL	ULLG	EVAP
9606280418	1	0.105	66.1	75.3	84.8	-0.05	750	2837	35.5	51.9	263	0.000
9606290312	3	0.059	69.3	76.4	86.3	-0.09	488	3542	127.5	5.0	227	0.000
9606281743	1	0.095	68.8	77.0	86.8	-0.08	731	2802	36.0	19.5	265	0.000
9606300041	3	-0.212	74.0	78.6	87.7	-0.15	432	4432	49.5	5.5	179	0.000
9606300246	1	0.098	73.8	78.7	87.8	-0.13	441	4381	33.0	7.6	182	0.000
9606300353	3	0.097	73.6	78.8	87.8	-0.12	438	4366	52.5	8.7	183	0.000
9606300519	1	0.079	73.5	78.8	87.8	-0.11	434	4352	36.0	10.1	184	0.000
9606300657	3	0.055	73.4	78.9	87.8	-0.11	4180	4316	53.5	11.8	186	0.000
9607010127	3	0.070	72.4	79.9	89.5	-0.10	633	3464	39.5	30.3	231	0.000
9607010240	3	0.047	72.3	79.9	89.6	-0.10	600	3458	44.0	31.5	231	0.000
9607020111	1	0.050	71.4	79.5	90.2	-0.05	490	4492	32.0	16.5	176	0.000
9607020303	1	0.067	71.3	79.6	90.2	-0.05	474	4467	26.0	18.4	178	0.000
9607021054	1	0.092	70.7	80.2	89.7	-0.05	519	4196	25.5	26.2	193	0.000
9607021900	1	0.105	70.9	80.5	89.8	-0.07	568	3837	35.0	34.3	212	0.000
9607030105	3	0.069	71.0	80.7	89.8	-0.08	616	3580	41.5	40.4	225	0.000
9607030222	3	0.002	70.9	80.7	89.7	-0.06	532	3571	113.0	41.7	226	0.000
9607040407	1	-0.175	69.5	78.0	88.6	0.08	377	4297	34.0	0.9	187	0.000
9607041719	3	0.092	69.7	79.8	88.0	-0.05	679	3574	42.0	14.1	226	0.000
9607042049	3	0.052	69.8	79.8	88.3	-0.02	674	3448	43.5	17.6	232	0.000
9607042330	3	0.010	69.8	79.8	88.3	-0.04	566	3423	113.5	20.3	233	0.000

9607050208	3	0.042	69.7	79.8	88.3	-0.05	558	3403	39.5	23.0	234	0.000	
9607050323	3	0.002	69.7	79.7	88.2	-0.03	484	3398	99.5	24.2	235	0.000	
9607052355	3	0.062	72.6	79.8	88.6	-0.06	534	4442	78.5	11.8	179	0.000	
9607060152	3	0.040	72.5	79.9	88.7	-0.05	492	4416	146.0	13.8	180	0.000	
9607061838	3	0.095	72.0	80.8	89.1	-0.07	560	3832	37.0	30.5	212	0.000	
9607062238	1	-0.195	72.2	72.6	89.0	0.09	121	5631	28.5	0.0	97	0.000	
9607070235	1	0.022	72.5	74.8	89.4	0.01	208	5511	35.0	4.0	108	0.000	
9607070414	3	-0.454	72.6	75.3	89.4	0.00	209	5502	42.5	5.6	108	0.000	
9607080224	3	-0.004	72.5	80.9	90.7	-0.05	614	4585	104.0	27.8	171	0.000	
9607080756	3	0.042	72.5	81.2	90.5	-0.05	650	4427	41.5	33.3	180	0.000	
9607080923	0	-0.257	71.9	72.0	87.0	0.07	17	6027	147.0	34.8	0	0.000	***Start of bad data***
9607081224	0	-0.341	72.1	73.1	88.5	0.07	14	6026	146.5	3.0	0	0.000	
9607081524	0	-0.557	72.4	74.0	89.0	0.12	13	6025	146.5	6.0	0	0.000	
9607081825	0	-0.356	72.7	75.1	89.4	0.07	10	6024	146.0	9.0	0	0.000	
9607082126	0	-0.306	72.9	76.1	89.7	0.06	7	6023	145.5	12.0	0	0.000	
9607090027	0	-0.296	73.1	76.7	89.8	0.05	6	6022	145.0	15.0	0	0.000	
9607090329	0	-0.359	73.2	77.3	89.7	0.09	5	6021	144.0	18.0	0	0.000	
9607090630	0	-0.429	73.6	78.4	89.4	0.09	4	6020	143.0	21.0	0	0.000	
9607090931	6	-0.737	73.9	79.5	89.2	0.16	5	6018	142.5	24.0	0	0.000	
9607091233	0	-0.448	74.3	80.4	89.0	0.10	6	6017	141.5	27.0	0	0.000	
9607091534	0	-0.187	74.5	80.8	88.9	0.05	5	6016	141.0	30.0	0	0.000	
9607091835	0	-0.393	74.7	81.1	88.8	0.08	5	6015	140.0	33.1	0	0.000	
9607092137	0	-0.080	75.1	81.5	88.7	0.02	5	6013	139.0	36.1	0	0.000	
9607100038	0	-0.034	75.1	81.5	88.5	-0.00	4	6013	138.5	39.1	0	0.000	
9607100339	0	-0.223	75.1	81.4	88.2	0.02	4	6013	137.5	42.1	0	0.000	
9607100640	0	0.054	75.2	81.5	87.8	0.00	3	6013	137.0	45.1	0	0.000	
9607100942	0	-0.178	75.2	81.5	87.4	0.05	2	6013	136.0	48.1	0	0.000	
9607101243	0	-0.555	75.5	81.5	87.2	0.13	3	6012	135.5	51.1	0	0.000	
9607101544	0	-0.093	75.9	81.6	87.2	0.04	3	6010	135.0	54.1	0	0.000	
9607101845	0	-0.018	76.0	81.4	87.4	0.02	3	6010	134.5	57.1	0	0.000	
9607102146	0	-0.248	76.1	81.4	87.5	0.04	3	6009	134.0	60.1	0	0.000	
9607110047	6	0.270	76.1	81.3	87.5	-0.06	2	6009	133.5	63.2	0	0.000	
9607110348	0	-0.115	76.0	81.2	87.4	0.04	2	6009	133.0	66.2	0	0.000	***End of bad data***
9607110649	0	0.113	76.1	81.1	87.1	-0.04	2	6009	44.5	69.2	0	0.000	
9607120336	3	-0.149	71.5	80.3	87.4	-0.05	1440	3214	75.5	15.9	244	0.000	
9607130348	3	-0.211	70.8	79.3	86.5	-0.02	587	3965	99.0	4.8	205	0.000	
9607132344	3	0.054	70.9	79.9	87.5	-0.05	638	3110	51.5	24.7	249	0.000	
9607140246	2	0.133	70.1	75.1	86.5	0.04	182	5030	128.5	0.1	144	0.000	
9607150252	3	0.054	70.7	79.4	86.0	-0.03	638	4088	45.0	24.2	199	0.000	
9607170151	1	0.019	72.8	79.6	86.3	-0.07	795	3756	29.0	36.7	216	0.000	
9607170329	3	0.061	72.8	86.4	87.5	-0.07	732	3736	40.5	38.3	217	0.000	
9607170752	1	0.055	72.8	79.8	86.5	-0.07	697	3593	18.5	42.7	224	0.000	
9607172000	1	0.059	72.5	80.2	86.1	-0.05	614	3045	30.5	54.8	252	0.000	
9607180638	1	0.029	72.8	80.4	84.7	-0.04	607	2665	18.0	65.5	271	0.000	
9607190226	1	0.073	72.4	79.5	84.2	-0.02	700	3614	28.0	14.0	223	0.000	
9607200059	3	0.024	73.1	79.5	84.8	-0.09	980	2230	38.0	36.6	294	0.000	
9607200246	3	0.006	73.0	79.5	84.7	-0.08	882	2203	93.0	38.4	295	0.000	
9607210433	3	0.033	71.6	78.6	84.6	-0.01	510	4222	48.0	17.4	191	0.000	
9607210613	1	0.027	71.6	78.6	84.5	-0.02	493	4218	32.0	19.1	191	0.000	
9607220129	1	0.074	72.4	78.9	83.3	-0.08	637	3403	16.0	38.3	234	0.000	
9607220323	3	-0.011	72.3	78.9	83.1	-0.04	563	3380	54.5	40.2	235	0.000	
9607220828	1	0.107	72.4	78.8	82.6	-0.07	604	3219	16.0	45.3	243	0.000	
9607232310	1	0.045	72.7	78.4	83.9	-0.06	644	3525	21.0	32.6	228	0.000	
9607240105	1	0.066	72.7	78.4	84.0	-0.06	620	3471	21.5	34.5	230	0.000	
9607250248	1	0.094	72.0	78.5	85.1	-0.05	654	3301	20.5	18.4	239	0.000	
9607250641	1	0.003	72.1	78.6	84.9	-0.04	620	3219	17.5	22.3	243	0.000	

```
9607260126  3  0.009   72.3  78.9   85.3   -0.07     793    2153   78.5  41.0     298  0.000
9607260336  3 -0.024   72.2  78.9   85.2   -0.06     732    2145   63.0  43.2     298  0.000
IA5201
CSLD DIAGNOSTICS: RATE TEST
TK       DATE    LRATE  INTVL  ST   AVLRTE  VOL   C1  C3   FDBK   ACPT   THPUT   DFMUL   RJT
1  9607260947   -0.308   49.8   2   -0.259  6016   79  22   43.9   43.4    5.24   -0.40    0
```

ANALYSIS OF RATE TABLE (IA51)

LRT

Looking in the leak rate column (LRT) the test results start off looking reasonable, if anything they tend to be positive. Leak rates suddenly change on the 8th and are consistently negative. There is another transition on the 13th where the leak rates return to the pattern observed prior to the 8th - slightly positive.

ST

the status table indicates that the tests between the 8th and 13th are the only ones contributing to the overall leak rate. This is indicated by a status code of 0. The reason CSLD is favoring these tests will be explained below.

DATE

The DATE field indicated that tests are being performed on a regular basis, several tests a day.

CSLD will complete a test after 3 hours and start a new test if the tank remains idle. The tests between the 8th and the 13th are being performed continuously, one test every 3 hours. This is inconsistent with the tests outside this date range.

INTVL

This is the length of a test in minutes. With the exception of the period between the 8th and 13th, test lengths are much less than 140 minutes. this indicates the site is a 24-hour site because tests are halted by dispensing, not the 3-hour CSLD limit. Test intervals are less than 3 hours because CSLD eliminates the first part of a test. The amount of time eliminated varies with the feedback variables.

Together, the interval and date information indicates that the tank was IDLE during the 8th and 13th period.

In reference to all the test in the rate table, these tests also have the longest interval time, one of the reasons CSLD is favoring these tests. All the tests with status code 1 were rejected due to short intervals.

DSPNS

The dispense factor is an indication of the amount of dispensing that occurred during the last 24 hours. It is not as simple as the amount of gallons dispensed during the last 24 hours because the hourly volumes are weighted in such a way that the most recent dispensing value contributes more to the dispense factor than dispensing volume that has occurred 23 hours ago. But it can be used as a relative indication of tank activity. The dispense factor for the above data set shows a typical value of 600. But the dispense factor during the 8th and 13th period drops rapidly to single digit values. This is another indication that there was no dispensing during this period.

CSLD prefers tests with low dispense factors, another reason why CSLD is favoring these tests. All the tests rejected with error code 3 were rejected because of high dispense factors.

VOL

The volume parameter indicates the volume at the start of the test. The volume during the trouble period started at 6027 and slowly dropped to 6009 gallons. Note that none of the volumes exceeded 6027.

EVAP

If the Reid Vapor Pressure table has been entered, the evaporation rate is displayed here.

DEL

The time since last delivery is in hour units. There was no indication of a delivery during the problem period. All tests rejected with error code 2 started within 2 hours of a delivery.

ULLG

The ullage factor is the surface area of the walls of the tank that is NOT covered in fluid. It is used for leak rate compensation. This parameter normally provides little diagnostic value, but it actually solves the problem. An ullage factor of zero indicates the tank is completely full, i.e., fluid height is equal to or greater than the tank's diameter.

ANALYSIS OF RATE TEST (IA52)

The average leak rate (AVLRTE) is -0.259. The average leak rate is uncompensated so excessive compensation is not an issue. This leak rate is not excessively high so blender/pump sense issues are probably not involved.

The tank label is SUPER so most likely it is not manifolded.

The DATE is recent so results are up to date.

The maximum number of tests is 80 and because C1 = 79 there are more than enough tests.

SOLUTION

The float was stuck in the riser. A collar was installed on the probe to prevent recurrences of this problem.

CSLD PROBLEM 2 - MANIFOLDED TANKS 1 AND 2 ARE FAILING

Reports I201, I51, IA52, and I752 were collected for analysis.

DIAGNOSTICS

I20100

STATION HEADER INFO

MAY 21, 2000 10:29 AM

TANK	PRODUCT	VOLUME	TLC VOLUME	ULLAGE	HEIGHT	WATER	TEMP
1	REGULAR	2311	2303	3705	39.21	0.0	65.2
2	REGULAR SECONDARY	3276	3266	4746	41.07	1.6	64.1
3	MIDGRADE	4378	4365	5774	42.81	0.0	64.4
4	PREMIUM	2547	2548	7605	28.68	1.3	59.7

IA5200

JUN 11, 2000 12:00 PM

CSLD DIAGNOSTICS: RATE TEST

TK	DATE	LRATE	INTVL	ST	AVLRTE	VOL	C1	C3	FDBK	ACPT	THPUT	EVAP	RJT
1	9608220320	-0.834	28.4	2	-0.809	7909	58	30	20.3	21.7	32.37	0.000	0
2	9608220320	-0.834	28.4	2	-0.809	7909	58	30	20.3	21.7	29.56	0.000	0
3	9608220445	-0.008	25.8	1	0.005	4400	67	18	30.	21.7	21.23	0.000	0
4	9608220402	0.005	22.3	1	0.005	1893	80	13	45.0	44.8	24.45	0.000	0

I75200

JUN 11, 2000 10:30 AM

LINE LEAK TANK ASSIGNMENT

LINE	LABEL	TAN
1	PREMIUM	4
2	MIDGRADE	3
3	REGULAR	1

Line 1 should be labelled Regular and assigned to tank 1
Correct as is
Line 3 should be labelled Premium and assigned to tank 4

I510

AUG 22, 1996 11:58 AM

CSLD DIAGNOSTICS: RATE TABLE

T1: REGULAR

Large and inconsistent negative leak rates.

TIME	ST	LRT	AVTMP	TPTMP	BDTMP	TMRT	DISPNS	VOL	INTVL	DEL	ULLG	EVAP
9607250359	1	-0.802	72.3	73.7	76.0	-0.09	594	5214	20.0	36.3	602	0.000
9607260145	3	-0.186	73.5	74.3	76.2	-0.15	451	9019	25.0	0.6	443	0.000
9607260309	0	-0.661	73.3	74.3	76.2	-0.12	438	9005	28.5	2.0	444	0.000
9607270309	0	-0.666	72.4	73.5	76.2	-0.04	602	11409	29.5	3.4	331	0.000
9607270411	0	-0.409	72.4	73.6	76.2	-0.04	552	11407	55.5	4.4	331	0.000
9607280030	0	-1.027	72.2	73.9	76.2	-0.05	503	9725	39.5	24.8	413	0.000
9607280318	0	-1.064	72.1	73.9	76.2	-0.05	448	9688	74.5	27.6	414	0.000
9607280511	0	-0.634	72.1	73.8	76.2	-0.04	410	9671	57.0	29.5	415	0.000
9607290118	1	-0.544	71.9	73.9	76.3	-0.07	478	8065	25.0	49.6	483	0.000
9607290408	0	-0.932	71.8	73.8	76.3	-0.05	434	8032	33.0	52.4	485	0.000
9607300100	0	-1.121	71.7	73.6	76.2	-0.07	601	5827	84.5	73.3	577	0.000
9607300258	0	-0.873	71.5	73.6	76.2	-0.07	551	5815	119.0	75.3	577	0.000
9607310325	2	-0.621	70.3	72.7	76.0	0.02	468	10592	29.5	1.8	373	0.000
9607310427	0	-0.388	70.4	72.8	76.0	0.01	431	10589	43.0	2.8	373	0.000
9608010046	6	-0.081	70.3	71.8	75.6	0.00	509	11824	138.5	2.1	309	0.000
9608010451	1	-0.521	70.3	72.4	75.5	0.00	481	11804	22.5	6.2	310	0.000
9608020130	3	-0.839	70.6	73.1	75.4	-0.04	689	9208	107.5	26.9	436	0.000
9608020349	0	-0.597	70.5	73.1	75.3	-0.04	663	9202	48.5	29.2	436	0.000
9608020510	1	-1.061	70.5	73.1	75.3	-0.03	639	9191	17.0	30.5	437	0.000
9608030035	1	-0.775	70.8	72.9	75.1	-0.06	783	6543	15.0	49.9	546	0.000
9608030351	3	-0.951	70.7	72.9	75.1	-0.06	680	6448	68.0	53.2	551	0.000
9608040234	3	-0.839	72.8	73.7	75.1	-0.08	988	8570	55.5	12.4	463	0.000
9608040425	1	-0.046	72.7	73.9	75.1	-0.05	944	8567	16.0	14.3	462	0.000
9608040649	1	-0.144	72.6	73.7	75.1	-0.07	842	8514	21.0	16.6	465	0.000
9608050051	0	-0.228	72.3	73.4	75.2	-0.07	531	6661	81.5	34.7	541	0.000
9608050309	1	0.030	72.2	73.6	75.2	-0.09	509	6659	20.0	37.0	541	0.000
9608060123	0	-0.344	71.9	73.3	75.3	-0.10	617	4366	107.5	59.2	639	0.000
9608070046	3	-0.942	77.8	77.3	76.4	-0.20	684	9861	48.0	7.2	404	0.000
9608070312	1	-0.955	77.4	77.0	76.5	-0.17	647	9823	26.0	9.6	406	0.000
9608080356	0	-0.960	75.5	75.9	76.9	-0.10	654	7168	76.5	34.4	520	0.000
9608090121	0	-1.035	74.6	75.4	77.2	-0.11	614	4957	47.0	55.6	613	0.000
9608090315	1	-1.435	74.5	75.4	77.2	-0.10	599	4930	22.5	57.7	614	0.000
9608090410	0	-1.226	74.4	75.4	77.3	-0.09	577	4923	31.0	58.6	614	0.000
9608100145	1	-0.738	73.3	75.0	77.4	-0.06	713	7261	24.0	19.6	517	0.000
9608110220	1	0.132	72.5	74.0	77.4	0.00	420	11645	22.0	1.4	317	0.000
9608110445	0	-0.218	72.6	74.7	77.5	-0.01	372	11634	53.0	3.8	318	0.000
9608110616	0	-0.628	72.6	74.7	77.5	-0.01	362	11624	42.5	5.3	319	0.000
9608120303	2	-0.779	72.7	73.3	77.3	-0.02	302	12240	31.5	0.7	282	0.000
9608120409	2	-0.574	72.7	73.5	77.3	-0.03	293	12233	43.5	1.8	283	0.000
9608130138	0	-0.874	72.8	74.8	77.2	-0.04	580	10045	88.0	23.3	398	0.000
9608130342	1	-0.777	72.7	74.9	77.2	-0.04	560	10035	21.5	25.4	398	0.000
9608130520	1	-1.054	72.7	74.9	77.2	-0.04	547	10016	21.5	27.0	399	0.000
9608140210	0	-1.442	72.7	74.9	77.1	-0.05	565	8025	36.5	47.8	486	0.000
9608140328	0	-1.245	72.6	74.9	77.1	-0.05	523	8010	47.0	49.1	486	0.000
9608150117	3	-0.758	72.6	74.7	77.0	-0.08	690	5501	100.5	70.9	590	0.000
9608160325	2	-0.843	72.1	74.1	76.9	0.00	415	10443	53.0	1.7	380	0.000
9608160455	0	-0.594	72.1	74.3	77.0	0.00	398	10438	30.5	3.2	380	0.000
9608170055	0	-0.427	72.2	74.7	77.0	-0.06	630	8255	29.5	23.3	475	0.000
9608170403	0	-0.704	72.2	74.7	77.0	-0.04	551	8193	112.0	26.4	478	0.000
9608180200	0	-1.037	72.2	74.6	76.9	-0.06	504	6338	78.5	48.3	555	0.000

```
9608180357  0 -0.853   72.1  74.6  76.9  -0.05     486   6329   46.5   50.3    555  0.000
9608180523  0 -1.071   72.0  74.6  76.9  -0.05     452   6316   72.0   51.7    556  0.000
9608190359  2 -1.182   72.0  74.1  76.8   0.00     358   9680   62.0    1.7    414  0.000
9608200135  1 -0.385   72.2  74.6  76.8  -0.05     618   7471   22.5   23.3    508  0.000
9608220158  0 -1.139   71.6  74.5  76.7  -0.09     564   3210   41.5   71.6    694  0.000
9608220320  0 -1.284   71.5  74.5  76.7  -0.08     520   3194   40.0   73.0    695  0.000


CSLD DIAGNOSTICS: RATE TABLE
T2: REGULAR SECONDARY
      TIME  ST   LRT    AVTMP   TPTMP   BDTMP   TMRT   DISPNS    VOL    INTVL    DEL    ULLG    EVAP
RATE TABLE EMPTY
```

The secondary tank in manifolded sets <u>will</u> have empty rate tables!

Analysis of Rate Table (IA51)

Rate table shows large negative rates and the rates are inconsistent. This is an indication that CSLD is not detecting dispensing soon enough. If the leak test had stopped after dispensing began, the result would have been a negative rate.

The solution for this type of problem is pump sensing. BUT this site has pump sensing with line leak devices. The problem in this example was that the pump wiring to the line leak devices was correct, but the line leak tank assignments were incorrect.

Solution

Reassign Tanks 4 and 1 to their installed line leak devices (in this example, Line 1 [Reg] to Tank 1, Line 2 is correctly assigned to Tank 3, but Line 3 [Premium] should be assigned to Tank 4).

CSLD PROBLEM 3 - INCREASE RATE WARNING FOR MANIFOLDED TANKS 2 AND 3

Reports IA52 and IA53 were collected for analysis.

Diagnostics

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IA5200
MAR 12, 1996  1:54 PM


CSLD DIAGNOSTICS: RATE TEST

TK        DATE  LRATE INTVL ST  AVLRTE    VOL  C1  C3 FDBK ACPT THPUT DFMUL RJT
 1  9603121226 -0.033  28.6  1  -0.009   3877  80  20 45.0 44.8  1.42 -0.08   0
 2  9603120523  0.138  36.8  1   0.165   8647  53  31 14.6 15.0  3.26  0.16   5
 3  9603120523  0.138  36.8  1   0.165   8647  53  31 14.6 15.0  3.26  0.16   5


CSLD DIAGNOSTICS: RATE TABLE
T 2:REGULAR
      TIME ST    LRT AVTMP TPTMP BDTMP  TMRT DSPNS   VOL INTVL    DEL ULLG  EVAP

9602130541  1  0.181  42.2  41.7  40.1 -0.01   265 10628  20.5   23.9  304 0.000
9602140033  3  0.320  42.1  41.6  40.3 -0.00   457  9331  59.5   42.7  366 0.000
9602140318  1  0.285  42.1  41.6  40.4 -0.00   420  9304  21.5   45.5  366 0.000
9602140406  0  0.178  42.1  41.6  40.4 -0.00   386  9292 100.0   46.3  366 0.000
9602150326  0  0.144  42.1  41.6  40.9 -0.00   382  7994  76.0   69.6  415 0.000
9602160140  0  0.354  42.0  41.6  41.2  0.00   440  6451  86.5   91.8  469 0.000
```

Indicates number of tests rejected because leak rates > +0.4 gph.

Large positive rates.

```
9602160333  0  0.281  42.0  41.6  41.2  0.00   422  6446  30.0   93.7  469 0.000
9602160506  1  0.260  42.0  41.7  41.2  0.00   404  6434   9.0   95.3  469 0.000
9602160541  0  0.084  42.0  41.7  41.2  0.00   388  6428  44.5   95.9  469 0.000
9602170444  0  0.353  42.1  41.5  41.4  0.00   416  4840  77.0  118.9  526 0.000
9602190128  0  0.307  42.8  42.6  41.8 -0.01   287 11416 101.0   33.9  267 0.000
9602190335  0  0.072  42.8  42.6  41.8 -0.01   259 11411 123.0   36.0  267 0.000
9602200211  0  0.046  42.7  42.4  41.9 -0.00   357 10165 125.0   58.6  328 0.000
9602210256  0  0.169  42.7  42.3  41.9 -0.00   366  8726 132.0   83.3  383 0.000
9602210534  0  0.260  42.7  42.3  41.8 -0.00   351  8721  53.0   86.0  383 0.000
9602220139  3  0.153  42.6  42.2  41.9 -0.00   499  7285  63.0  106.1  444 0.000
9602220308  3  0.180  42.6  42.2  41.9 -0.00   479  7280  43.5  107.6  444 0.000

CSLD DIAGNOSTICS: RATE TABLE
T 3:REGULAR
      TIME ST    LRT AVTMP TPTMP BDTMP  TMRT DSPNS   VOL INTVL    DEL ULLG THPT

RATE TABLE EMPTY


IA5300
IA5300
MAR 12, 1996  1:54 PM
```

T2 is not tracking T3 which indicates siphon is broken.

```
CSLD DIAGNOSTICS: VOLUME TABLE
T 2:REGULAR
LAST HOUR = 229621
3768.9  3844.8  3893.5  3938.7  3979.9  4002.5  4002.5  4003.3
4003.4  4003.4  4003.3  4003.5  4003.1  4003.0  4003.5  4001.6
4003.8  4024.6  4061.8  4109.2  4162.8  4253.6  4344.8  4346.6

T 3:REGULAR
LAST HOUR = 229621
3473.6  3457.0  3487.6  3511.8  3537.1  3573.3  3609.7  3644.7
3649.7  3653.7  3655.9  3664.3  3670.7  3688.0  3746.6  3756.3
3796.1  3831.2  3850.6  3914.6  3941.3  3923.1  3908.1  3999.2
```

Volume is not moving.

Volume is moving.

Analysis

The hourly volume table shows that the manifolded tanks are not always tracking. Compare the periods underlined in the volume table below (Tank 2 volume only moved 1.3 gals while Tank 3 volume moves 222.8 gals). This large difference indicates that the siphon is breaking. Fluid leaking into the tank from the siphon is causing the increase rate warning.

Solution

Repair siphon.

CSLD PROBLEM 4 - NO CSLD IDLE TIME

Report IA5402 was collected for analysis during an idle period (no dispensing/deliveries).

Diagnostics

IA5402

JUN 24, 1996 2:30 PM

CSLD DIAGNOSTICS: MOVING AVERAGE TABLE

Excessive differences may indicate a defective probe.

T 2: MIDGRADE

TIME	SMPLS	TLCVOL	HEIGHT	AVGTEMP	TOPTEMP	BDTEMP
960624140631	31	6521.67	53.299	78.76	81.10	86.64
960624140701	31	6521.77	53.298	78.72	80.99	86.54
960624140731	31	6521.85	53.297	78.67	80.88	86.44
960624140801	31	6522.22	53.298	78.61	80.75	86.34
960624140831	31	6522.67	53.298	78.53	80.62	86.23
960624140901	31	6523.02	53.298	78.46	80.49	86.11
960624140931	31	6523.44	53.299	78.38	80.35	85.94
960624141001	31	6523.48	53.297	78.30	80.17	85.81
960624141031	31	6523.90	53.297	78.22	80.04	85.67
960624141101	31	6524.77	53.301	78.15	79.93	85.84
960624141131	31	6524.58	53.298	78.11	79.84	85.41
960624141201	31	6525.14	53.301	78.09	79.77	85.28
960624141231	31	6524.94	53.299	78.08	79.71	85.15
960624141301	31	6524.97	53.299	78.06	79.66	85.03
960624141331	30	6525.22	53.300	78.04	79.62	84.91
960624141401	32	6525.17	53.299	78.02	79.57	84.79
960624141431	30	6525.26	53.299	77.98	79.51	84.68
960624141501	32	6525.63	53.299	77.93	79.24	84.52
960624141531	31	6526.39	53.302	77.68	79.33	84.40
960624141601	31	6526.71	53.303	77.80	79.26	84.29
960624141631	31	6526.88	53.302	77.74	79.20	84.17
960624141701	31	6527.34	53.304	77.72	79.17	84.07
960624141731	31	6527.60	53.306	77.73	79.17	83.97
960624141801	31	6527.49	53.308	77.81	79.27	83.89
960624141831	30	6527.37	53.311	77.93	79.43	83.85
960624141901	32	6526.21	53.307	78.05	79.62	83.82
960624141931	31	6526.36	53.311	78.16	79.78	83.81
960624142001	31	6525.02	53.305	78.23	79.94	83.81
960624142031	31	6525.20	53.307	78.26	80.00	83.81
960624142101	31	6524.84	53.304	78.25	80.01	83.80
960624142131	30	6523.02	53.304	78.25	80.00	83.80
960624142201	32	6526.39	53.314	78.23	80.04	83.79
960624142231	31	6526.65	53.319	78.35	80.19	83.81
960624142301	31	6525.05	53.315	78.57	80.45	83.86
960624142331	30	6523.43	53.319	78.84	80.78	83.94
960624142401	29	6521.88	53.310	79.11	81.12	84.05
960624142431	31	6519.58	53.303	79.34	81.44	84.17
960624142501	31	6519.59	53.308	79.53	81.69	84.35
960624142531	30	6518.62	53.304	79.60	81.84	84.47
960624142601	32	6518.72	53.305	79.59	81.90	84.58
960624142631	30	6519.02	53.305	79.53	81.89	84.67
960624142701	31	6519.54	53.305	79.43	81.78	84.73
960624142731	31	6520.18	53.307	79.35	81.70	84.78
960624142801	31	6520.59	53.308	79.31	81.66	84.83
960624142831	31	6519.95	53.305	79.33	81.68	84.88
960624142901	30	6519.45	53.304	79.41	81.79	84.95

MOVING AVERAGE: 6523.52

DISPENSE STATE: ACTIVE * 177.531143

Analysis

The moving average table shows erratic probe readings. Fluid is rising and falling by several gallons.

Solution

Replace probe.

CSLD PROBLEM 5 - TANK 1 IS FAILING

Reports I251, I201, IA52, IA51, and I609 were collected for analysis.

Diagnostics

```
I25100
JUN 26, 1996 2:37
STATION
HEADER
INFO
PHONE

CSLD TEST RESULTS
TANK   PRODUCT            RESULT
1      UNLEADED           PER: JUN 24, 1996 FAIL
2      UNLEADED PLUS      PER: JUN 26, 1996 PASS
3      SUPER UNLEADED     PER: JUN 26, 1996 PASS
4      KEROSENE           PER: JUN 26, 1996 PASS
5      DIESEL             PER: JUN 26, 1996 PASS


I20100
STATION HEADER INFO
JUN 26, 1996 2:36 PM
TANK   PRODUCT         VOLUME  TLC VOLUME   ULLAGE   HEIGHT   WATER    TEMP
1      UNLEADED          8627         8617     3000   63.42    0.0    76.9
2      UNLEADED PLUS     9286         9278     2341   67.92    0.0    72.2
3      SUPER UNLEADED    8315         8309     3312   61.38    0.0    70.6
4      KEROSENE          5399         5395      598   60.21    0.0    70.9
5      DIESEL            2989         2987     2940   46.27    0.0    70.1

IA5200
JUN 26, 1996 2:37 PM
CSLD DIAGNOSTICS: RATE TEST
TK       DATE    LRATE  INTVL  ST   AVLRTE  VOL   C1  C3  FDBK  ACPT  THPUT    EVAP  RJT
1  9606240446  -0.270   10.3   2  -0.217   6406  21  20  0.0   0.0    44.32  0.000   1
```

2	9606260806	-0.159	25.1	1	-0.140	8959	67	16	30.4	32.6	77.32	0.000	0
3	9606260928	-0.039	31.3	1	-0.026	9277	80	18	45.0	44.8	87.45	0.000	0
4	9606261351	0.020	102.1	1	0.031	5404	63	41	25.9	24.3	43.32	0.000	0
5	9606261122	-0.010	41.4	1	0.001	3495	80	21	45.0	44.8	27.45	0.000	0

IA5100

CSLD DIAGNOSTICS: RATE TABLE (excerpt)

Inconsistent rates - not temperature compensating correctly.

T1: UNLEADED

TIME	ST	LRT	AVTMP	TPTMP	BDTMP	TMRT	DISPNS	VOL	INTVL	DEL	ULLG	EVAP
9605270507	0	-0.140	65.9	70.0	73.7	0.00	1271	8521	31.5	24.7	322	0.000
9605290214	0	-0.343	66.0	70.1	72.9	-0.10	1945	4983	17.0	38.9	471	0.000
9605290334	0	-0.172	65.9	70.0	72.8	-0.09	1820	4937	44.0	40.3	473	0.000
9605290444	0	-0.135	65.8	70.0	72.6	-0.11	1770	4911	40.5	41.4	474	0.000
9606020430	0	0.050	70.6	72.2	76.0	-0.07	1660	7254	20.0	16.1	378	0.000
9606020510	0	-0.301	70.5	72.2	76.1	-0.12	1591	7247	31.5	16.8	378	0.000
9606020637	0	-0.193	70.4	72.1	75.8	-0.10	1539	7215	18.0	18.3	380	0.000
9606030317	0	-0.408	69.2	71.8	73.1	-0.13	1584	4802	16.5	38.9	479	0.000
9606030346	0	-0.336	69.1	71.8	73.1	-0.14	1517	4799	21.5	39.4	479	0.000
9606030441	0	-0.249	69.0	71.7	73.1	-0.09	1474	4779	27.5	40.3	480	0.000
9606100451	0	-0.114	68.0	71.2	72.5	-0.12	1411	4303	28.5	41.1	500	0.000
9606110421	0	-0.136	67.8	70.6	72.8	-0.05	1956	7132	28.5	22.5	383	0.000
9606110505	0	-0.049	67.8	70.6	72.9	-0.05	1907	7105	23.0	23.2	384	0.000
9606120357	0	0.148	68.8	70.8	72.7	-0.05	1253	6644	17.0	4.7	403	0.000
9606120601	0	0.133	68.7	70.6	72.2	-0.06	1247	6535	18.5	6.7	408	0.000
9606130439	0	-0.293	73.0	73.4	75.2	-0.14	745	8532	44.0	5.8	321	0.000
9606130608	0	0.324	72.9	73.3	74.8	-0.12	763	8464	16.0	7.3	324	0.000
9606170258	0	-0.254	73.1	75.4	80.0	-0.12	1511	4677	21.5	38.7	484	0.000
9606170334	0	-0.424	73.0	75.5	80.2	-0.16	1373	4672	112.0	39.3	484	0.000
9606180420	6	-1.046	78.9	79.2	82.8	-0.26	1222	6206	49.0	10.3	421	0.000
9606240446	0	-0.350	75.2	79.0	84.5	-0.20	1659	3399	41.0	33.0	539	0.000

IA5100

CSLD DIAGNOSTICS: RATE TABLE (excerpt)

T2: UNLEADED PLUS

TIME	ST	LRT	AVTMP	TPTMP	BDTMP	TMRT	DISPNS	VOL	INTVL	DEL	ULLG	EVAP
9606100818	1	-0.134	67.2	69.2	71.5	-0.04	116	10194	21.5	2.3	231	0.000
9606110159	3	-0.081	67.4	70.1	72.3	-0.02	492	9489	69.5	19.9	273	0.000
9606110346	3	-0.081	67.3	70.2	72.3	-0.01	460	9479	90.0	21.7	274	0.000
9606120140	3	-0.075	67.5	70.3	71.8	-0.03	484	8763	70.0	43.6	310	0.000
9606120329	3	-0.083	67.5	70.4	71.9	-0.02	445	8759	75.0	45.4	310	0.000
9606120614	3	-0.044	67.4	70.5	71.8	-0.02	395	8747	57.5	48.1	311	0.000
9606130250	0	-0.103	68.9	70.6	73.6	-0.04	245	9650	146.5	3.8	264	0.000
9606140214	3	-0.111	68.6	71.2	75.3	-0.02	404	8974	145.5	27.1	300	0.000
9606140515	0	-0.117	68.5	71.4	75.8	-0.02	369	8974	66.5	30.1	300	0.000
9606150445	1	-0.051	68.5	71.6	76.7	-0.03	543	8049	27.5	53.6	343	0.000
9606150557	3	-0.108	68.5	71.8	76.7	-0.02	506	8035	120.0	54.8	344	0.000
9606160322	3	-0.251	70.7	73.0	78.6	-0.04	415	9276	113.5	14.8	284	0.000
9606160601	3	-0.233	70.5	73.1	79.0	-0.04	399	9271	52.0	17.4	285	0.000
9606170504	1	-0.142	70.2	73.4	78.9	-0.04	326	8731	29.0	40.4	312	0.000
9606180317	3	-0.131	70.0	73.8	79.6	-0.02	395	8055	76.0	62.6	343	0.000
9606190158	3	-0.146	69.9	73.9	78.7	-0.03	434	7315	138.5	85.3	375	0.000
9606190524	3	-0.136	69.8	74.1	79.4	-0.03	398	7310	52.5	88.7	375	0.000
9606191045	1	-0.062	69.7	74.1	77.5	-0.05	354	7207	28.0	94.1	380	0.000

```
9606200101  3 -0.183   70.4   74.1   79.3   -0.07     412    7715   48.5   12.6     358  0.000
9606200241  3 -0.187   70.3   74.2   79.5   -0.05     382    7711   53.5   14.3     358  0.000
9606200429  0 -0.175   70.3   74.3   79.6   -0.04     354    7708   70.5   16.0     358  0.000
```

Wrong values.

```
I60900
JUN 26, 1996 2:39 PM
TANK     PRODUCT LABEL
1        UNLEADED              0.000070
2        UNLEADED PLUS         0.000070
3        SUPER UNLEADED        0.000070
4        KEROSENE              0.000050
5        DIESEL                0.000045
6                              0.000000
7                              0.000000
8                              0.000000
```

Analysis of Rate Table (IA5100)

The test results show that tank 2 is also close to failing. Examining the leak rates for both tanks shows negative rates. the TMRT parameter is showing a negative temperature rate. This means that the fuel is contracting during the test.

ANALYSIS OF THERMAL EXPANSION COEFFICIENT REPORT (I60900)

Checking the thermal temperature coefficient of expansion value for the tanks reveals that these values were programmed incorrectly (1 extra zero was entered for each value e.g., 0.000070 instead of 0.00070). CSLD was not able to correct for temperature change when computing the leak rate.

Solution

Correctly reprogram the coefficient of thermal expansion for each tank.

CSLD PROBLEM 6 - CSLD PERIODIC FAILURE TANK 1

Diagnostics

Identical names suggest tanks are manifolded.

When tank levels are close tanks may be manifolded.

```
200
Station Header 1
Station Header 2
Station Header 3
Station Header 4

JUN 17, 1998  8:31 AM

TANK  PRODUCT              GALLONS   INCHES    WATER   DEG F    ULLAGE

  1   UNLEADED SOUTH          5288    48.27      0.8    63.4      4528
  2   UNLEADED NORTH          5332    48.59      0.0    63.8      4484
  3   POWER PREMIUM           7168    62.35      0.0    66.4      2648
  4   POWER PLUS              6150    54.60      0.0    65.2      3666
```

```
I25100
JUN 17, 1998  8:32 AM

Station Header 1
Station Header 2
Station Header 3
Station Header 4

CSLD TEST RESULTS
TANK PRODUCT                RESULT
  1  UNLEADED SOUTH         PER: JUN 17, 1998 FAIL
  2  UNLEADED NORTH         PER: JUN 17, 1998 PASS
  3  POWER PREMIUM          PER: JUN 17, 1998 PASS
  4  POWER PLUS             PER: JUN 17, 1998 PASS
```

Tanks programmed as manifolded would have a common result.

```
IA5200
JUN 17, 1998  8:32 AM


CSLD DIAGNOSTICS: RATE TEST

TK        DATE  LRATE INTVL ST  AVLRTE    VOL  C1  C3 FDBK ACPT THPUT DFMUL RJT
 1  9806170430 -0.492  14.7  2  -0.504   6123  26  20  0.0  0.0  7.13  0.61   0
 2  9806170254  0.025  14.8  1   0.015   6238  22  19  0.0  0.0  6.89  0.67   9
 3  9806170557  0.033  22.3  1   0.025   6289  75  19 39.4 29.8  4.01  0.14   0
 4  9806170527  0.033  26.6  1   0.018   6010  44  21  4.5  4.2  6.74  0.08   1
```

Positive tests rejected, these occurred when T1 was filing this tank.

```
I61200
JUN 17, 1998  8:33 AM

TANK MANIFOLDED PARTNERS

TANK   PRODUCT LABEL          MANIFOLDED TANKS
 1     UNLEADED SOUTH            NONE
 2     UNLEADED NORTH            NONE
 3     POWER PREMIUM             NONE
 4     POWER PLUS                NONE
```

Tanks not programmed as manifolded.

IA5100
JUN 17, 1998 8:32 AM

Inconsistent large leak rates. T1 is filling T2 while test is running.

CSLD DIAGNOSTICS: RATE TABLE
T 1:UNLEADED SOUTH

TIME	ST	LRT	AVTMP	TPTMP	BDTMP	TMRT	DSPNS	VOL	INTVL	DEL	ULLG	THPT
9806060245	3	-0.307	63.0	66.4	69.8	-0.08	1562	4297	57.5	31.7	419	6.7
9806060527	0	-0.452	62.9	66.3	69.5	0.12	1457	4263	16.0	34.4	420	6.4
9806070032	2	0.073	60.5	64.8	69.5	0.03	649	6411	34.5	1.1	325	7.4
9806070211	0	-0.185	60.5	65.0	69.4	0.02	601	6379	111.5	2.8	327	7.0
9806070414	0	-0.459	60.5	65.2	69.3	0.11	601	6378	24.0	4.8	327	7.0
9806080228	2	0.081	59.9	60.2	69.7	0.07	225	8870	54.5	0.7	190	6.9
9806100232	3	-0.978	60.8	64.4	69.9	0.04	1680	3968	17.5	48.7	434	7.2
9806100303	3	-1.977	60.8	64.4	69.9	-0.05	1612	3966	28.5	49.2	434	7.2
9806110337	0	-0.706	63.0	64.9	70.2	-0.03	916	6092	27.0	13.2	339	7.1

CSLD DIAGNOSTICS: RATE TABLE
T 2:UNLEADED NORTH

TIME	ST	LRT	AVTMP	TPTMP	BDTMP	TMRT	DSPNS	VOL	INTVL	DEL	ULLG	THPT
9806060147	6	-0.747	63.4	67.8	71.8	-0.02	1620	4335	47.5	30.7	417	7.0
9806060245	0	-0.008	63.4	67.7	71.7	-0.02	1555	4333	58.0	31.7	417	6.7
9806060527	0	-0.420	63.3	67.4	71.2	-0.01	1452	4299	16.5	34.4	419	6.4
9806070032	2	-0.061	60.9	66.0	71.3	0.07	647	6442	35.5	0.7	324	6.9
9806070211	0	0.109	61.0	66.1	71.2	0.04	599	6406	112.0	2.4	325	6.6
9806070414	0	0.021	61.1	66.1	71.1	-0.00	599	6403	25.0	4.4	326	6.5
9806080248	2	0.046	62.1	62.6	71.2	0.01	187	8886	35.5	0.6	188	6.4
9806080434	0	-0.303	62.1	63.1	71.2	-0.02	202	8854	29.5	2.4	191	6.3
9806090040	0	-0.323	62.0	66.1	71.4	-0.01	1470	6594	23.0	22.5	317	6.7
9806090425	0	-0.427	62.0	66.2	71.2	-0.02	1329	6571	20.5	26.2	318	6.5

IA5400
JUN 17, 1998 8:33 AM

This tank is filling T2.

CSLD DIAGNOSTICS: MOVING AVERAGE TABLE

T 1:UNLEADED SOUTH

TIME	SMPLS	TLCVOL	HEIGHT	AVGTEMP	TOPTEMP	BDTEMP
980617081037	23	5322.01	48.612	63.50	66.17	71.45
980617081107	23	5321.05	48.605	63.51	66.18	71.45
980617081137	22	5320.19	48.599	63.51	66.19	71.45
980617081207	23	5319.40	48.593	63.51	66.19	71.45
980617081237	23	5318.47	48.587	63.51	66.18	71.45
980617081307	24	5317.38	48.579	63.52	66.18	71.45
980617081337	25	5316.16	48.570	63.51	66.19	71.45
980617081407	16	5315.18	48.562	63.51	66.19	71.45

980617081437	20	5313.85	48.552	63.50	66.19	71.45
980617081507	16	5312.97	48.546	63.50	66.19	71.45
980617081537	15	5311.84	48.538	63.50	66.18	71.44
980617081607	10	5310.87	48.531	63.50	66.17	71.44
980617081637	15	5309.86	48.523	63.51	66.15	71.44
980617081707	23	5308.98	48.517	63.51	66.15	71.44
980617081737	24	5307.90	48.509	63.51	66.15	71.44
980617081807	23	5306.60	48.500	63.51	66.16	71.44
980617081837	24	5305.09	48.489	63.51	66.17	71.44
980617081907	22	5303.46	48.477	63.51	66.19	71.44
980617081937	19	5301.98	48.466	63.51	66.19	71.44
980617082007	13	5300.33	48.454	63.51	66.19	71.44
980617082037	19	5298.60	48.441	63.50	66.19	71.43
980617082107	23	5297.30	48.431	63.50	66.20	71.44
980617082137	23	5295.99	48.422	63.51	66.21	71.44
980617082207	22	5294.84	48.414	63.51	66.20	71.44
980617082237	24	5293.70	48.406	63.52	66.19	71.44
980617082307	13	5292.71	48.399	63.53	66.19	71.44
980617082337	23	5291.84	48.392	63.53	66.19	71.44
980617082407	22	5291.12	48.387	63.53	66.19	71.44
980617082437	23	5290.39	48.381	63.52	66.18	71.44
980617082507	24	5289.71	48.376	63.53	66.18	71.44
980617082537	22	5288.92	48.370	63.52	66.20	71.44
980617082607	12	5287.66	48.361	63.52	66.19	71.44
980617082637	24	5286.69	48.354	63.52	66.19	71.44
980617082707	23	5285.51	48.346	63.52	66.19	71.44
980617082737	24	5284.08	48.335	63.52	66.19	71.43
980617082807	23	5282.60	48.324	63.52	66.19	71.43
980617082837	24	5281.25	48.314	63.51	66.20	71.43
980617082907	13	5280.05	48.305	63.51	66.20	71.43
980617082937	13	5278.94	48.297	63.51	66.20	71.43
980617083007	23	5277.81	48.289	63.50	66.21	71.43
980617083037	23	5276.85	48.282	63.51	66.21	71.43
980617083107	24	5275.94	48.275	63.51	66.21	71.43
980617083137	23	5275.23	48.270	63.52	66.21	71.43
980617083207	21	5274.56	48.266	63.54	66.20	71.43
980617083237	15	5273.92	48.262	63.55	66.20	71.43
980617083307	23	5273.35	48.258	63.55	66.20	71.43

MOVING AVERAGE: 5284.02

T2's volume increases as T1 fills it.

DISPENSE STATE: ACTIVE * 762.432312
T 2:UNLEADED NORTH

TIME	SMPLS	TLCVOL	HEIGHT	AVGTEMP	TOPTEMP	BDTEMP
980617081037	24	5358.36	48.889	63.88	67.13	72.66
980617081107	23	5359.32	48.896	63.89	67.15	72.66
980617081137	22	5360.10	48.901	63.88	67.15	72.66
980617081207	23	5357.81	48.885	63.88	67.15	72.67
980617081237	23	5353.93	48.856	63.87	67.16	72.67
980617081307	24	5350.46	48.830	63.87	67.17	72.67
980617081337	23	5349.34	48.822	63.87	67.17	72.67
980617081407	16	5347.34	48.808	63.87	67.15	72.67
980617081437	20	5348.24	48.814	63.88	67.15	72.67
980617081507	16	5349.11	48.821	63.89	67.15	72.67
980617081537	15	5348.68	48.818	63.88	67.14	72.67
980617081607	10	5347.10	48.806	63.88	67.13	72.67
980617081637	15	5347.82	48.811	63.88	67.12	72.67

```
980617081707     23   5345.59    48.795     63.87     67.13     72.67
980617081737     24   5340.45    48.757     63.86     67.14     72.67
980617081807     23   5332.53    48.699     63.85     67.14     72.67
980617081837     23   5327.48    48.662     63.85     67.13     72.67
980617081907     22   5323.96    48.636     63.85     67.13     72.67
980617081937     18   5321.93    48.621     63.85     67.13     72.67
980617082007     14   5323.43    48.632     63.85     67.12     72.67
980617082037     19   5325.39    48.647     63.86     67.13     72.66
980617082107     23   5326.68    48.656     63.86     67.14     72.66
980617082137     22   5327.94    48.666     63.87     67.14     72.67
980617082207     23   5329.04    48.674     63.87     67.14     72.67
980617082237     24   5330.24    48.682     63.86     67.14     72.68
980617082307     12   5331.09    48.688     63.86     67.13     72.68
980617082337     24   5332.11    48.696     63.86     67.12     72.68
980617082407     22   5332.77    48.701     63.86     67.12     72.68
980617082507     23   5329.52    48.677     63.85     67.15     72.68
980617082537     22   5324.32    48.639     63.85     67.16     72.68
980617082607     12   5321.19    48.616     63.86     67.16     72.68
980617082637     24   5319.28    48.602     63.87     67.16     72.68
980617082707     23   5315.00    48.571     63.86     67.16     72.68
980617082737     24   5309.65    48.531     63.86     67.15     72.68
980617082807     23   5309.97    48.534     63.87     67.15     72.68
980617082837     23   5311.16    48.543     63.87     67.14     72.69
980617082907     13   5311.96    48.549     63.87     67.14     72.69
980617082937     12   5313.25    48.558     63.87     67.14     72.68
980617083007     24   5314.42    48.567     63.87     67.13     72.68
980617083037     23   5315.37    48.574     63.87     67.14     72.68
980617083107     24   5316.16    48.579     63.87     67.14     72.69
980617083137     22   5316.99    48.585     63.86     67.14     72.69
980617083207     21   5317.58    48.590     63.86     67.14     72.69
980617083237     15   5316.19    48.580     63.87     67.14     72.69
980617083307     23   5312.81    48.555     63.86     67.13     72.69
980617083337     20   5311.06    48.542     63.86     67.13     72.69
MOVING AVERAGE:   5311.55

DISPENSE STATE: ACTIVE    957.217224
```

Analysis

Tanks 1 and 2 are siphon manifolded, but they are incorrectly programmed in the console as single tanks.

Solution

Reprogram tanks 1 and 2 as manifolded and delete the rate table.

CSLD PROBLEM 7 - NO CSLD RESULTS

Diagnostics

```
I20100
MAY 14, 1998 11:44 AM

Station id 1
Station id 2
Station id 3
Station id 4

IN-TANK INVENTORY

TANK PRODUCT              VOLUME TLC VOLUME   ULLAGE   HEIGHT    WATER     TEMP
  1  REGULAR UNLEADED       6912          0     3115    62.50     0.00    73.39
  2  PLUS UNLEADED          1845          0     8182    22.99     0.00    74.96
  3  PREMIUM UNLEADED       3761          0     6266    38.52     0.00    73.95


IA5200
MAY 14, 1998 11:45 AM

CSLD DIAGNOSTICS: RATE TEST

TK      DATE  LRATE INTVL ST  AVLRTE    VOL  C1  C3 FDBK ACPT THPUT DFMUL RJT
1 7001010000  0.000   0.0  5   0.000      0   0   0  0.0  0.0  0.00  0.80   0
2 7001010000  0.000   0.0  5   0.000      0   0   0  0.0  0.0  0.00  0.80   0
3 7001010000  0.000   0.0  5   0.000      0   0   0  0.0  0.0  0.00  0.80   0


IA5300
MAY 14, 1998 11:45 AM


CSLD DIAGNOSTICS: VOLUME TABLE
T 1:REGULAR UNLEADED
LAST HOUR = 248651
  6876.8  6949.6  6985.7  7110.7  7191.0  7282.3  7354.8     0.0
     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0

T 2:PLUS UNLEADED
LAST HOUR = 248651
  1825.8  1846.9  1868.8  1900.3  1936.7  1936.7  1947.3     0.0
     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0

T 3:PREMIUM UNLEADED
```

No tests.

Table not full.

```
LAST HOUR = 248651
  3737.9  3773.5  3797.8  3817.8  3883.3  3904.5  3904.7     0.0
     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
```

Analysis

The volume table IA53 gets cleared when a gap in time between probe samples is detected. The site operators were turning the console's power Off every evening. This caused a gap between probe readings which cleared the volume table. CSLD does not perform any tests until the volume table is full (24 hours).

Solution

Keep power turned On to the console.

CSLD PROBLEM 8 - CSLD FAILURE TANK 1

Diagnostics

```
I25100
JUN 11, 1998 12:45 PM

Site Id 1
Site Id 2
Site Id 3
Site Id 4

CSLD TEST RESULTS
TANK PRODUCT                RESULT
  1  REGULAR                PER: JUN 11, 1998 FAIL
  2  PLUS                   PER: JUN 11, 1998 PASS
  3  PREMIUM                PER: JUN 11, 1998 PASS


200
Site Id 1
Site Id 2
Site Id 3
Site Id 4

JUN 11, 1998 12:45 PM

TANK  PRODUCT               GALLONS  INCHES   WATER  DEG F   ULLAGE

  1   REGULAR                  6439   57.38     1.0   52.3     3289
  2   PLUS                     6362   56.81     0.0   68.1     3366
  3   PREMIUM                  7916   69.05     0.0   67.3     1812
```

IA5200
JUN 11, 1998 12:45 PM

Comparing compensated LRATE to uncompensated AVLRATE shows excessive compensation.

CSLD DIAGNOSTICS: RATE TEST

TK	DATE	LRATE	INTVL	ST	AVLRTE	VOL	C1	C3	FDBK	ACPT	THPUT	DFMUL	RJT
1	9806110308	-0.309	13.0	2	0.040	6676	56	22	18.0	12.3	8.22	0.40	0
2	9806110404	-0.011	25.0	1	0.025	7865	80	16	45.0	44.0	2.28	0.02	0
3	9806110021	-0.011	26.6	1	0.012	7087	80	16	45.0	44.2	2.01	-0.00	0

I60900
JUN 11, 1998 12:46 PM

TANK THERMAL COEFFICIENT

OK

TANK	PRODUCT LABEL	
1	REGULAR	0.000700
2	PLUS	0.000700
3	PREMIUM	0.000700
4		0.000000

IA5101
JUN 11, 1998 12:46 PM

Abnormal temperatures.

Large jump in temp following delivery.

CSLD DIAGNOSTICS: RATE TABLE
T 1:REGULAR

TIME	ST	LRT	AVTMP	TPTMP	BDTMP	TMRT	DSPNS	VOL	INTVL	DEL	ULLG	THPT
9805230026	3	0.050	69.2	14.7	71.3	-0.02	2052	2976	24.5	34.7	452	8.2
9805230102	3	0.011	69.2	14.7	71.3	-0.03	1991	2972	30.0	35.3	452	8.0
9805230148	3	0.016	69.1	14.7	71.2	-0.02	1915	2964	38.5	36.0	452	7.9
9805230239	3	0.006	69.1	14.7	71.2	-0.02	1841	2953	69.5	36.9	453	7.6
9805230441	3	0.021	69.0	14.7	71.2	-0.02	1729	2910	29.5	38.9	455	7.4
9805230557	3	0.017	69.0	14.7	71.2	-0.00	1687	2856	29.5	40.2	457	7.3
9805240018	0	-0.018	55.4	14.7	72.0	-0.03	561	7499	33.5	4.6	255	8.1
9805240144	0	-0.041	55.3	14.7	72.0	-0.03	565	7470	23.5	6.0	256	7.9
9805240224	1	-0.069	55.2	14.7	71.9	-0.04	565	7454	19.0	6.6	257	7.9
9805240303	0	0.057	55.1	14.7	71.9	-0.05	584	7426	45.0	7.3	259	7.8
9805240454	0	-0.138	54.9	14.7	71.8	-0.00	594	7366	21.5	9.1	262	7.7
9805240552	0	-0.084	54.8	14.7	71.8	-0.01	593	7337	40.0	10.1	263	7.5
9805250213	3	-0.048	51.2	14.7	72.0	-0.03	1599	5019	32.5	30.5	366	7.8
9805250340	0	-0.026	51.3	14.7	71.9	-0.04	1481	4988	24.0	31.9	367	7.8

```
9805250526  1  0.178  51.8  14.7  71.7 -0.08  1468  4911  18.0   33.7  370  7.7
9805250617  0  0.343  70.5  14.7  71.5 -0.13  1424  4821  26.0   34.5  371  7.7
9805250655  1  0.296  70.4  14.7  71.4 -0.12  1446  4812  18.5   35.2  372  7.6
9805260040  1  0.183  55.6  14.7  71.8 -0.08   650  7598  17.5    5.2  250  7.9
9805260118  1  0.124  55.5  14.7  71.7 -0.07   629  7580  16.5    5.8  251  7.9
9805260227  6  0.242  55.3  14.7  71.6 -0.08   604  7540  98.5    7.0  253  7.7
9805260417  0  0.277  55.1  14.7  71                                    253  7.7
9805270015  0  0.051  46.7  14.7  71                                    338  7.6
9805270109  0  0.053  46.7  14.7  71.1 -0.05  1174  5704  65.0   29.7  338  7.5
9805270303  0  0.019  46.8  14.7  70.9 -0.05  1164  5656  34.0   31.6  340  7.5
9806020056  2 -0.004  55.7  14.7  70.5 -0.00   375  8102  28.0    1.4  222  7.9
9806020136  0  0.045  55.7  14.7  70.6 -0.00   370  8090  46.0    2.1  223  7.9
9806020234  0  0.050  55.6  14.7  70.5 -0.01   359  8086  63.5    3.1  223  7.9
9806020442  0  0.022  55.6  14.7  70.5 -0.00   351  8061  43.0    5.2  225  7.8
9806030030  3  0.026  46.5  14.7  71.0 -0.01  1487  5697 108.5   25.0  338  7.9
9806030231  1  0.028  46.6  14.7  71.0 -0.02  1487  5688  18.5   27.0  339  7.9
9806030308  0  0.014  46.7  14.7  70.9 -0.02  1454  5660  44.5   27.6  340  7.9
9806040208  3  0.039  67.7  14.7  70.3 -0.05  2093  2291  23.5   50.7  485  8.1
9806040317  3  0.016  67.7  14.7  70.1 -0.05  2012  2267  37.5   51.8  486  8.1
9806040426  3  0.014  67.7  14.7  70.0 -0.04  1856  2245  61.5   52.9  487  8.0
9806050031  0 -0.008  42.0  14.7  70.9 -0.05  1002  6740  34.5    9.5  294  8.2
9806050118  0  0.015  42.1  14.7  70.8 -0.05  1002  6726  24.0   10.3  295  8.2
9806050154  0  0.007  42.1  14.7  70.8 -0.04   983  6719  21.0   10.9  295  8.1
```

Big swing in temperature even though there has been no delivery.

```
Template for A12 command

IA1200
JUN 11, 1998 12:47 PM
TANK  1  REGULAR                MAG    NUMBER OF SAMPLES =    20
WATER     HEIGHT0   HEIGHT1   HEIGHT2   HEIGHT3   HEIGHT4   HEIGHT5   HEIGHT6
HEIGHT7   HEIGHT8   HEIGHT9   TMP REF   TMP5      TMP4      TMP3      TMP2
TMP1      TMP0      TMP REF


Probe Standard Average Buffers

IA1200
JUN 11, 1998 12:47 PM
TANK  1  REGULAR                MAG    NUMBER OF SAMPLES =    20
 1477.000 19845.199 19845.150 19844.699 19845.350 19845.150 19847.199 19847.301
19847.051 19847.400 19847.350 42377.398 17287.949 42375.449 17287.301 42375.898
17286.199 19271.199 42375.051
TANK  2  PLUS                   MAG    NUMBER OF SAMPLES =    20
 1371.150 19443.000 19443.000 19443.000 19443.000 19442.850 19443.000 19443.000
19443.000 19442.949 19443.000 42508.199 17503.051 18755.250 19174.350 19427.551
19583.150 20000.600 42506.000
TANK  3  PREMIUM                MAG    NUMBER OF SAMPLES =    20
 1383.000 23473.699 23473.500 23473.699 23473.699 23473.500 23485.051 23484.699
23484.850 23485.150 23484.949 41917.949 17255.750 18685.750 19646.900 19714.150
19804.750 19917.900 41901.301
```

Bad probe thermistor values.

Analysis

From the IA52 command compare LRATE (-0.309) with AVLRTE (0.040). This shows that there is excessive compensation. The most likely cause for excessive compensation is a false probe temperature reading. Examining the IA12 command shows that there are two erroneous thermistor values.

Solution

Replace probe and delete rate table.

CSLD PROBLEM 9 - TANK 1 FAIL

Diagnostics

```
200
Site ID
Site ID
Site ID
Site ID

MAY 18, 2000  8:23

TANK  PRODUCT               GALLONS   INCHES    WATER   DEG F    ULLAGE

  1   UNLEADED                 4740    44.69      0.0    61.2      4896
  2   PLUS                     5740    63.65      0.0    61.9      1952
  3   PREMIUM                  2712    62.65      0.0    62.0      1010


CSLD TEST RESULTS
TANK PRODUCT                RESULT
  1  UNLEADED               PER: MAY 18, 2000 FAIL
  2  PLUS                   PER: MAY 18, 2000 PASS
  3  PREMIUM                PER: MAY 18, 2000 PASS


__       76687IA5200_
IA5200
MAY 18, 2000  8:23


CSLD DIAGNOSTICS: RATE TEST

TK        DATE   LRATE INTVL ST  AVLRTE    VOL  C1  C3 FDBK ACPT THPUT  EVAP RJT
 1  0005180427 -0.282  37.0  2   0.017   6709  70  17 33.8 33.8 127.1 0.000   0
 2  0005180735 -0.025  32.5  1   0.026   5558  80  19 45.0 44.8  17.6 0.000   0
 3  0005180531 -0.061  32.3  1  -0.000   2589  80  17 45.0 44.8   8.6 0.000   0



IA5101
MAY 18, 2000  8:25


CSLD DIAGNOSTICS: RATE TABLE
```

Comparing compensated LRATE to uncompensated AVLRTE shows excessive compensation.

T 1:UNLEADED

TIME	ST	LRT	AVTMP	TPTMP	BDTMP	TMRT	DSPNS	VOL	INTVL	DEL	ULLG	EVAP
0004200431	0	-0.085	53.3	52.0	56.5	0.00	2	9682	50.0	48.5	0	0.000
0004202332	3	0.068	55.2	55.5	57.2	-0.03	3073	4904	129.5	14.8	372	0.000
0004210148	3	-0.044	55.1	55.4	57.2	-0.03	2712	4904	174.5	17.8	372	0.000
0004210448	3	-0.174	55.0	55.4	57.1	-0.02	2601	4904	54.0	20.8	372	0.000
0004222339	0	-0.023	52.3	54.1	55.8	0.02	1585	6548	129.5	8.7	301	0.000
0004230155	0	0.012	52.4	53.5	55.6	0.01	1398	6548	174.5	11.7	301	0.000
0004230456	0	0.027	52.4	52.6	55.4	0.01	1234	6548	168.5	14.8	301	0.000
0004232246	3	0.038	53.2	53.0	55.8	-0.00	2597	2936	129.5	31.8	459	0.000
0004240105	3	0.005	53.2	53.1	55.8	-0.00	2292	2936	171.0	34.8	459	0.000
0004240407	3	-0.011	53.2	53.2	55.7	0.00	2109	2936	57.0	37.9	459	0.000
0004242334	0	0.052	56.6	56.0	56.5	-0.06	1649	5721	129.5	6.6	337	0.000
0004250156	0	-0.002	56.4	56.0	56.4	-0.05	1455	5721	168.0	9.6	337	0.000
0004250458	1	-0.047	56.3	56.0	56.2	-0.04	1395	5721	18.5	12.6	337	0.000
0004252306	2	-0.024	55.8	55.9	56.8	-0.02	382	8435	129.5	1.0	199	0.000
0004260131	0	-0.016	55.8	55.9	56.8	-0.01	337	8435	165.5	4.0	199	0.000
0004260432	0	0.050	55.7	55.8	56.8	-0.01	323	8435	50.5	7.0	199	0.000
0004262332	3	-0.036	55.8	56.0	57.5	-0.03	2846	4236	129.5	25.4	401	0.000
0004270158	3	0.024	55.8	55.9	57.5	-0.02	2511	4236	164.0	28.4	401	0.000
0004270459	1	-0.414	55.7	55.9	57.5	-0.02	2409	4236	27.0	31.5	401	0.000
0004272326	3	0.036	58.4	57.6	58.5	-0.08	2029	4975	129.5	6.3	369	0.000
0004280154	3	-0.039	58.2	57.6	58.4	-0.06	1790	4975	162.5	9.3	369	0.000
0004282311	0	0.061	59.1	57.1	59.4	-0.06	1659	6434	129.5	6.4	305	0.000
0004290140	0	-0.002	58.9	57.1	59.4	-0.06	1464	6434	161.0	9.4	305	0.000
0004290441	0	0.021	58.8	57.0	59.4	-0.05	1345	6434	98.0	12.4	305	0.000
0004292345	3	0.074	58.3	56.0	60.1	-0.10	3384	1251	129.5	31.0	551	0.000
0004300216	3	0.028	58.0	58.0	60.1	-0.09	2986	1251	159.0	34.0	551	0.000
0004300518	3	0.007	57.8	57.9	60.1	-0.07	2618	1251	110.5	37.0	551	0.000
0004302242	3	0.050	56.8	57.5	61.1	-0.02	2587	3949	129.5	12.9	413	0.000
0005010116	3	-0.022	56.7	57.9	61.1	-0.02	2283	3950	156.5	15.9	413	0.000
0005010417	3	-0.099	56.7	57.8	61.1	-0.02	2190	3950	39.0	18.9	413	0.000
0005012322	3	0.000	58.1	58.9	61.7	-0.03	2100	5699	129.5	12.1	338	0.000
0005020159	3	0.027	58.0	58.8	61.7	-0.03	1853	5699	153.5	15.1	338	0.000
0005022346	3	0.047	58.0	58.8	62.1	-0.08	2882	1445	129.5	36.5	539	0.000
0005030225	3	-0.014	57.8	58.9	62.0	-0.06	2652	1445	49.0	39.5	539	0.000
0005032325	3	0.061	57.2	57.9	62.8	-0.03	2922	4110	129.5	19.0	406	0.000
0005040206	3	0.034	57.2	58.3	62.9	-0				22.0	406	0.000
0005042339	3	0.032	63.4	-107.4	64.6	-0				7.8	301	0.000
0005050222	3	0.007	63.1	-105.1	64.7	-0.10	1791	6496	147.5	10.8	301	0.000
0005052345	3	0.053	61.8	61.2	65.9	-0.14	3175	1823	129.5	31.8	516	0.000
0005060230	3	0.007	61.4	60.5	65.9	-0.12	2801	1823	145.5	34.8	516	0.000
0005060531	3	-0.025	61.1	60.2	65.9	-0.11	2571	1823	51.5	37.9	516	0.000
0005062349	3	0.006	61.1	51.2	67.2	-0.06	3140	3581	129.5	14.1	429	0.000
0005070236	3	0.012	60.9	51.4	67.2	-0.06	2771	3581	143.5	17.1	429	0.000
0005070537	3	-0.040	60.7	51.0	67.3	-0.04	2547	3581	124.0	20.1	429	0.000
0005072237	0	-0.023	66.8	-107.5	68.8	-0.16	792	7014	129.5	2.5	275	0.000
0005080126	0	0.020	66.4	-107.4	69.0	-0.13	699	7014	141.5	5.5	276	0.000
0005080427	1	0.129	66.0	-107.3	69.1	-0.11	670	7014	30.5	8.5	276	0.000
0005082328	3	0.097	64.5	-107.3	70.3	-0.16	2854	2747	129.5	27.3	467	0.000
0005090218	3	0.051	64.1	-107.3	70.3	-0.14	2518	2747	140.5	30.3	467	0.000
0005092322	3	0.003	64.6	-83.9	71.2	-0.07	1982	5745	129.5	9.1	334	0.000
0005100213	0	0.036	64.4	41.9	71.2	-0.06	1749	5744	139.5	12.1	334	0.000
0005102331	3	0.039	63.7	30.1	71.2	-0.13	2855	1559	129.5	33.3	531	0.000
0005110222	3	0.036	63.4	35.6	71.0	-0.10	2520	1559	139.0	36.3	531	0.000

Intermittent bad values.

```
0005112319  3  0.048  62.5 -107.1 70.7 -0.04  2878  4154 129.5   15.0  404 0.000
0005120210  3  0.009  62.3 -72.8  70.7 -0.04  2540  4154 139.0   18.0  404 0.000
0005130136  2  0.030  69.8 -107.2 71.1 -0.24   824  6333 138.5    0.2  307 0.000
0005130437  0  0.077  69.1 -107.3 71.3 -0.17   723  6333 114.5    3.2  307 0.000
0005132347  3  0.028  67.1 -107.0 71.6 -0.22  3350  1342 129.5   22.2  545 0.000
0005140237  3  0.008  66.5 -107.2 71.4 -0.17  2956  1342 140.5   25.2  545 0.000
0005140537  3  0.038  66.0 -106.0 71.2 -0.16  2720  1342  66.5   28.3  545 0.000
0005142248  3 -0.013  60.1 -79.5  70.7  0.00  2724  5396 140.5   14.9  438 0.000
0005150138  3  0.007  60.1 -72.9  70.6 -0.00  2724  5396 140.5   17.9  438 0.000
0005150438  3 -0.051  60.1 -72.7  70.4 -0.00  2507  3396  45.0   20.9  438 0.000
0005152328  0  0.054  64.5 -94.8  70.4 -0.07  1260  5499 129.5    5.7  345 0.000
0005160218  0  0.013  64.3 -107.2 70.3 -0.06  1112  5499 140.5    8.7  345 0.000
0005162319  3  0.052  64.1 -106.1 69.7 -0.14  2548  1734 129.5   29.5  521 0.000
0005170209  3  0.020  63.7 -98.6  69.6 -0.12  2444  1734  32.0   32.5  521 0.000
0005170352  2  0.007  60.2  60.5  69.1  0.08   615  9215  68.0    0.2  131 0.000
0005172312  3  0.034  61.5  35.6  68.9 -0.02  2757  5141 129.5   19.3  361 0.000
0005180202  3 -0.010  61.5 -91.1  68.8 -0.02  2433  5141 140.5   22.3  361 0.000
```

Intermittent bad values.

```
__I_I_  76687IA1000_
IA1000
MAY 18, 2000  8:27
TANK  1  UNLEADED              MAG    NUMBER OF SAMPLES =  9445
 1334.000 15481.000 15480.000 15480.000 15480.000 15482.000 15483.000 15485.000
15489.000 15494.000 15497.000 45689.000 20931.000 23464.000 23409.000 23962.000
24250.000 24810.000 45691.000
TANK  2  PLUS                  MAG    NUMBER OF SAMPLES =   523
 1309.000 22143.000 22143.000 22143.000 22143.000 22143.000 22145.000 22144.000
22145.000 22145.000 22146.000 45504.000 21342.000 22545.000 23465.000 24019.000
24086.000 24730.000 45503.000
TANK  3  PREMIUM               MAG    NUMBER OF SAMPLES =   462
 1312.000 21871.000 21871.000 21871.000 21871.000 21871.000 21871.000 21871.000
21872.000 21871.000 21871.000 44889.000 21445.000 22442.000 22975.000 23510.000
23695.000 24592.000 44892.000
```

Yet probe's temperature readings look good at this time!

Analysis

From the IA52 command compare LRATE (-0.282) with AVLRTE (0.017). This shows that there is excessive compensation. The most likely cause for excessive compensation is a false probe temperature reading. Examining the IA52 command did not show erroneous thermistor values. However, examining the IA51 command showed that the board temperature value was intermittently bad.

Solution

Replace probe and delete rate table.

CSLD PROBLEM 10 - TANK 8 FAILING

Diagnostics

```
I61200
MAY  7, 1999 10:10 AM

TANK MANIFOLDED PARTNERS

TANK   PRODUCT LABEL          MANIFOLDED TANKS
```

```
 1     DIESEL 1                    2, 3, 4, 5
 2     DIESEL 2                    1, 3, 4, 5
 3     DIESEL 3                    1, 2, 4, 5
 4     DIESEL 4                    1, 2, 3, 5
 5     DIESEL 5                    1, 2, 3, 4
 6     AUTO DIESEL                 NONE
 7     SUPER                       NONE
 8     REGULAR 1                    9
 9     REGULAR 2                    8
 10                                NONE
 11                                NONE
 12                                NONE
```

Manifolded set.

```
IA5200
MAY  7, 1999 10:11 AM

CSLD DIAGNOSTICS: RATE TEST

TK        DATE  LRATE INTVL ST  AVLRTE    VOL  C1  C3 FDBK ACPT THPUT DFMUL RJT
 6  9905070326 -0.013  41.1  1   0.000   7740  80  22 45.0 44.8  0.86 -0.36   0
 7  9905070456  0.003  22.2  1   0.014   4823  58  23 20.3 16.9  0.87  0.18   1
 8  9905070428  0.246   6.8  8   0.241   8708  11  10  0.0  0.0  2.86  0.79  12
```

Positive rejects.

Positives

```
T 8:REGULAR 1
      TIME ST    LRT AVTMP TPTMP BDTMP  TMRT DSPNS   VOL INTVL    DEL ULLG THPT

9904120309  0  0.395  64.3  67.8  71.5 -0.02   980  8808  36.0   36.8  909  3.0
9904130447  0  0.213  64.8  68.5  72.3 -0.01   849  5892  23.0   62.7 1038  3.0
9904280337  0  0.226  67.1  68.9  70.0 -0.02   608  6015  63.5   75.2 1028  3.1
9904280451  0  0.244  67.1  68.9  70.1 -0.03   578  6013  36.5   76.4 1028  3.1
9904300319  0  0.198  64.8  68.5  72.3  0.05  1102 10406  26.5   15.5  835  3.1
9905030233  0  0.130  65.9  69.9  74.2  0.01  1124 12183  22.0   17.1  762  3.1
9905030302  6 -0.032  65.9  69.9  74.2  0.01   983 12183 117.5   17.8  762  3.1
9905040303  0  0.324  66.8  70.7  74.7 -0.00   902  9501  29.5   41.7  877  2.8
9905040453  0  0.178  66.8  70.6  74.6 -0.01   856  9453  46.5   43.3  879  2.8
9905050339  0  0.186  67.4  71.0  74.8 -0.00   697 11738  90.0    10.  785  2.8
9905070428  0  0.370  68.2  71.8  75.1 -0.02   719  7068  37.0   59.0  983  2.9
```

```
I61100
MAY  7, 1999 10:13 AM

LEAK TEST METHOD
- - - - - -  - - - - - -
TEST CSLD    : TANK 8
Pd = 95%
CLIMATE FACTOR:MODERATE


TEST ON DATE : TANK 9
JAN  1, 1996
```

```
START TIME : DISABLED
TEST RATE  :0.20 GAL/HR
DURATION   : 2  HOURS


S61109
MAY  7, 1999 10:15 AM

LEAK TEST METHOD
- - - - - -  - - - - - -
TEST CSLD    : TANK 9
Pd = 95%
CLIMATE FACTOR:MODERATE


IA5108
MAY  7, 1999 10:16 AM


CSLD DIAGNOSTICS: RATE TABLE


S05408
MAY  7, 1999 10:16 AM

T 8:REGULAR 1           CSLD RECORDS DELETED
T 9:REGULAR 2           CSLD RECORDS DELETED
```

Analysis

Tanks 8 and 9 were manifolded and programmed as manifolded. However, the leak test frequency selected for Tank 9 was not CSLD. The CSLD program was only using Tank 8's volume to perform the test. When Tank 9 was filling, Tank 8's LRATE was positive.

Solution

Set Tank 9's Leak Test Frequency to CSLD and delete rate table.

CSLD PROBLEM 11 - PERIODIC TEST FAIL TANK 2

Diagnostics

```
200
Site ID
Site ID
Site ID
NOV 16, 1999  1:06 PM

TANK  PRODUCT               GALLONS   INCHES    WATER   DEG F    ULLAGE

  1   REGULAR                  8543    61.99      0.0    77.4      3139
  2   PLUS                     3705    32.53      0.0    85.2      7977
  3   SUPREME                  6024    46.50      0.0    80.4      5658

__       76687IA5100_
IA5100
NOV 16, 1999  1:06 PM

CSLD DIAGNOSTICS: RATE TABLE
T 2:PLUS
      TIME ST    LRT AVTMP TPTMP BDTMP  TMRT DSPNS   VOL INTVL    DEL ULLG THPT

9910181409  3 -1.252  98.7  97.2  98.9  0.36   734   601  50.0   26.5  717  2.4
9910181537  6 -0.824  99.2  97.2  98.9  0.39   582   599 142.0   28.0  717  2.4
9910190355  1 -0.464  91.4  96.5  98.9  0.28   432  2783  14.0    9.1  572  2.4
9910192324  3 -0.132  96.6  96.9  98.9 -0.21   898  1474  52.5   28.6  646  2.4
9910200241  3 -0.152  96.0  96.6  98.9 -0.13   753  1445 143.5   31.9  648  2.4

CSLD DIAGNOSTICS: RATE TABLE
T 3:SUPREME
      TIME ST    LRT AVTMP TPTMP BDTMP  TMRT DSPNS   VOL INTVL    DEL ULLG THPT

9910190459  0 -0.166  85.9  88.1  88.8  0.02  1074  5434  52.5   10.2  456  6.9
9910200011  0 -0.131  85.7  88.0  88.9  0.03   925  5970  34.5    4.3  434  6.9
9910200121  0 -0.134  85.8  88.0  88.9  0.03   862  5958  47.0    5.4  434  6.9
9910200243  0 -0.102  85.8  88.1  88.9  0.03   797  5955 126.0    6.8  434  6.9

CSLD DIAGNOSTICS: RATE TABLE
T 1:REGULAR
      TIME ST    LRT AVTMP TPTMP BDTMP  TMRT DSPNS   VOL INTVL    DEL ULLG THPT

9910200045  0 -0.049  84.9  86.2  88.6  0.04   856  8970  47.0    4.6  301 10.7
9910200212  0 -0.022  85.0  86.3  88.6  0.02   755  8969 109.5    6.1  301 10.7
9910200451  0  0.115  85.1  86.5  88.6  0.00   753  8940  26.0    8.7  302 10.7
9910210348  3 -0.096  86.3  87.0  88.7  0.02  1455  8414  31.0   12.2  327 10.7
9910210459  0 -0.011  86.3  87.0  88.7  0.02  1394  8410  32.5   13.4  328 10.7
9910220344  0 -0.087  84.4  85.7  88.5  0.05   661  9773  43.5    6.4  257 10.7
```

High 90s inconsistent with other tanks.

Mid 80s

Analysis

It can be seen that the temperatures in Tank 2 are abnormally higher than in the other tanks. This problem was traced to a stuck relay. The pump was running continuously and heating up the fuel.

Solution

Replace the stuck relay for pump in Tank 2.

CSLD PROBLEM 12 - PERIODIC TEST FAIL ON TANK 1

Diagnostics

```
IA5400
NOV 20, 1998  7:31 AM

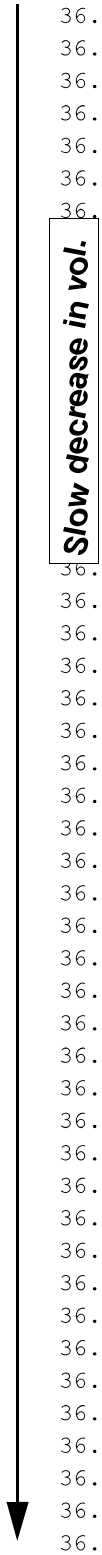
CSLD DIAGNOSTICS: MOVING AVERAGE TABLE

T 1:PREM
        TIME  SMPLS     TLCVOL    HEIGHT   AVGTEMP   TOPTEMP    BDTEMP
981120072142     30   3456.82    36.518     61.85     60.91     57.32
981120072212     31   3456.80    36.518     61.85     60.90     57.32
981120072242     30   3456.80    36.518     61.85     60.90     57.33
981120072312     30   3456.76    36.518     61.85     60.90     57.33
981120072342     30   3456.78    36.518     61.85     60.90     57.34
981120072412     31   3456.79    36.518     61.85     60.90     57.34
981120072442     30   3456.80    36.518     61.85     60.90     57.34
981120072512     30   3455.51    36.512     61.85     60.90     57.34
981120072542     31   3451.16    36.489     61.85     60.90     57.35
981120072612     30   3446.74    36.466     61.85     60.90     57.35
981120072642     31   3441.81    36.441     61.85     60.90     57.35
981120072712     30   3437.17    36.417     61.85     60.90     57.35
981120072742     30   3435.84    36.410     61.85     60.90     57.34
981120072812     31   3435.37    36.408     61.85     60.90     57.34
981120072842     30   3435.12    36.406     61.85     60.89     57.34
981120072912     31   3434.87    36.405     61.85     60.89     57.33
981120072942     30   3434.70    36.404     61.85     60.89     57.33
981120073012     30   3434.65    36.404     61.85     60.89     57.32
981120073042     31   3434.54    36.403     61.85     60.88     57.32
981120073112     30   3434.45    36.403     61.85     60.88     57.32
981120073142     31   3434.39    36.403     61.85     60.87     57.31
981120073212     29   3434.29    36.402     61.85     60.87     57.31
981120073242     30   3434.18    36.402     61.85     60.86     57.30
981120073312     30   3434.04    36.401     61.85     60.86     57.30
981120073342     30   3433.96    36.400     61.85     60.85     57.30
981120073412     31   3433.91    36.400     61.85     60.85     57.30
981120073442     30   3433.88    36.400     61.85     60.85     57.30
981120073512     31   3433.84    36.400     61.85     60.84     57.30
981120073542     30   3433.85    36.400     61.85     60.84     57.31
981120073642     31   3433.81    36.400     61.85     60.83     57.31
981120073712     30   3433.82    36.400     61.85     60.83     57.32
```

Dispensing

Slow decrease in vol.

981120073742	31	3433.77	36.399	61.85	60.83	57.32
981120073812	30	3433.69	36.399	61.85	60.83	57.32
981120073842	31	3433.63	36.399	61.85	60.82	57.33
981120073912	30	3433.62	36.399	61.85	60.82	57.33
981120073942	31	3433.56	36.398	61.85	60.83	57.33
981120074012	30	3433.63	36.399	61.85	60.83	57.33
981120074042	30	3433.58	36.398	61.85	60.83	57.33
981120074112	30	3433.60	36.399	61.85	60.83	57.33
981120074142	30	3433.60	36.399	61.85	60.84	57.33
981120074212	31	3433.57	36.398	61.85	60.84	57.33
981120074242	30	3433.55	36.398	61.85	60.84	57.33
981120074312	31	3433.54	36.398	61.85	60.85	57.33
981120074342	30	3433.50	36.398	61.85	60.85	57.34
981120074412	31	3433.43	36.398	61.85	60.85	57.34
981120074442	30	3433.48	36.398	61.85	60.86	57.34
981120074512	31	3433.47	36.398	61.85	60.86	57.34
981120074542	30	3433.44	36.398	61.85	60.86	57.34
981120074612	30	3433.46	36.398	61.85	60.87	57.35
981120074642	31	3433.49	36.398	61.85	60.87	57.35
981120074712	30	3433.50	36.398	61.85	60.87	57.35
981120074742	30	3433.46	36.398	61.85	60.88	57.35
981120074812	31	3433.47	36.398	61.85	60.88	57.35
981120074842	30	3433.41	36.398	61.85	60.88	57.36
981120074912	30	3433.44	36.398	61.85	60.88	57.36
981120074942	31	3433.41	36.398	61.85	60.88	57.36
981120075012	30	3433.36	36.397	61.85	60.88	57.36
981120075042	30	3433.35	36.397	61.85	60.88	57.37
981120075112	30	3433.41	36.398	61.85	60.88	57.37
981120075142	29	3433.41	36.398	61.85	60.88	57.37
981120075212	29	3433.39	36.397	61.85	60.88	57.37
981120075242	32	3433.37	36.397	61.85	60.88	57.38
981120075312	30	3433.41	36.398	61.85	60.88	57.38
981120075342	30	3433.39	36.397	61.85	60.88	57.38
981120075412	31	3433.40	36.398	61.85	60.88	57.38
981120075442	30	3433.37	36.397	61.85	60.88	57.38
981120075512	30	3433.34	36.397	61.85	60.89	57.38
981120075542	31	3433.35	36.397	61.85	60.88	57.39
981120075612	31	3433.38	36.397	61.85	60.88	57.39
981120075642	30	3433.31	36.397	61.85	60.88	57.39
981120075712	30	3433.31	36.397	61.85	60.88	57.40
981120075742	30	3433.29	36.397	61.85	60.88	57.40
981120075812	31	3433.29	36.397	61.85	60.88	57.40
981120075842	30	3433.30	36.397	61.85	60.88	57.41
981120075912	30	3433.27	36.397	61.85	60.88	57.41
981120075942	30	3433.28	36.397	61.85	60.88	57.41
981120080012	30	3433.30	36.397	61.85	60.88	57.41
981120080042	30	3433.26	36.397	61.85	60.88	57.42
981120080112	31	3433.23	36.397	61.85	60.88	57.42
981120080142	30	3433.13	36.396	61.85	60.89	57.42
981120080212	31	3433.14	36.396	61.85	60.89	57.42
981120080242	30	3433.12	36.396	61.85	60.89	57.42



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981120080312     30   3433.05    36.396     61.85     60.89     57.42
981120080342     31   3433.04    36.396     61.85     60.89     57.42
981120080412     30   3433.10    36.396     61.85     60.89     57.41
981120080442     31   3433.07    36.396     61.85     60.89     57.41
981120080512     30   3433.08    36.396     61.85     60.90     57.40
981120080542     30   3433.08    36.396     61.85     60.90     57.40
981120080612     30   3433.06    36.396     61.85     60.90     57.40
981120080642     31   3433.04    36.396     61.85     60.90     57.39
981120080712     31   3433.06    36.396     61.85     60.90     57.39
981120080742     30   3432.99    36.395     61.85     60.90     57.39
981120080812     30   3432.99    36.395     61.85     60.90     57.39
981120080842     31   3433.00    36.395     61.85     60.90     57.40
981120080912     30   3433.03    36.396     61.85     60.90     57.40
981120080942     31   3433.02    36.396     61.85     60.89     57.40
981120081012     30   3433.04    36.396     61.85     60.89     57.40
MOVING AVERAGE:   3433.07

DISPENSE STATE: IDLE      0.097659
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Analysis

Examining the IA54 table showed that following a dispense the level continued dropping for a long period of time. Inspecting the probe revealed that the floats had been installed upside down.

Solution

Reinstall floats correctly and delete rate table.