1400 East Paseo Pavon • Tucson, AZ 85718 • Phone 520.207.4878 • FAX: 520.990.8965 •
www.LeakDetect.net

Pipeline Hydrostatic Diagnostic (PHD) Evaluation

For:
Client
Richman Railroad
Diesel Fuel Pipelines
Platform Delivery System

Test Section
PL 1247

At:
Richman Yard
Located in Richman, PA

Date: Friday, March 26, 2010

Submitted by:
Leak Detection Technologies, LLC

Prepared for:
Richman Railroad

LEAK DETECTION TECHNOLOGIES LLC

1400 East Paseo Pavon • Tucson, AZ 85718 • Phone 520.207.4878 • FAX: 520.990.8965 • www.LeakDetect.net

LEAK DETECTION TECHNOLOGIES LLC

1400 East Paseo Pavon • Tucson, AZ 85718 • Phone 520.207.4878 • FAX: 520.990.8965 •
www.LeakDetect.net

1. Introduction

1.1. Purpose of Report

Leak Detection Technologies (LDT) **P**ipeline **H**ydrostatic **D**iagnostic (PHD) evaluation is a sensitive and in depth test method for owners and engineers of pipelines that are interested in having a broader understanding of the condition of their pipeline. By evaluating a broad spectrum of indicators LDT is able to deliver an evaluation of the pipeline's health. The following report can assist engineers in future decisions about pipeline repairs or replacement, preventive maintenance, frequency and type of ongoing testing to the system.

By utilizing PHD indicators pipeline managers will confidently spend their maintenance dollars more efficiently, and will have greater knowledge to manage risk. Knowing this information saves money by directing funds where needed and by minimizing catastrophic pipeline events in which complete systems are required to be out of service for long periods of time.

2. PHD Evaluation Indicators

2.1. Historical Data Evaluation

The PHD testing method collects a large quantity of data for each test section. The data collected is similar to a fingerprint in that it records the characteristics unique to each pipeline. Historical data is very consistent between test events when no changes have occurred to the pipeline.

Comparison differences in the historical data in most cases are due to modifications to the pipeline. Changes observed in comparing historical data to current test data of a pipeline, where no modifications have occurred, generates an indication of concern

Historical Data Evaluation

Rating:

NA (No Previous Data Was Available)

2.2. Simulated Leak Calibration

System calibrations are completed by making a number of simulated leaks. These leaks are created by removing a given amount of fluid from the test section. The leak simulation allows for several evaluations to be performed.

Pipeline Confirmation:

Confirming the properties of test segment is critical to accurately evaluate the data. It is important to have piping and instrumentation diagrams before arriving onsite. By evaluating the pipelines' properties LDT can predict the pressure changes during a leak simulation. Leak simulation discrepancies that fall outside of the PHD test parameters require further investigation by LDT technicians. In most discrepancy cases the pipeline length was not correctly reported or a valve was left closed or opened effectively increasing or decreasing the size of the test section. Whenever the pipeline falls outside the parameters of the leak simulation test, testing is stopped and the pipeline is thoroughly inspected to determine the cause.

Quantitative air measurements:

Air can be trapped in the pipeline masking a real leak. It is important to know how much air is in the pipeline in order to addressed and record a true signature of the pipeline.

Simulated Leak Calibration

Rating:

Excellent

2.3. Theoretical Pressure Comparison Test

Pipelines can be made from a variety of different materials and are made to suit a variety of different purposes. For each purpose a pipeline is built to a specification or standard. These specifications are used by LDT to determine how a pipeline will react to pressure. When the pipeline specification is known, theoretical pressure properties can be calculated. The theoretical to actual pressure response is generated creating a comparison.

Theoretical Pressure Comparison Test

Rating:

Excellent

2.4. Rate Change Comparison

The PHD testing method tests pipelines at a variety of different pressure regiments. The data from the different pressure regiments are evaluated in comparison to each other. This evaluation allows LDT to determine a rate change comparison scale for the tested section.

Rate Change Comparison

Rating:

Fair

2.5. Unaccountable Allowance

In most testing scenarios test sections are blocked in by valves that cannot be tested for leakage. Pressurizing large test section where valves can allow for bypass can account for fluid loss.

Unaccountable Allowance

Rating:

Poor

3. Conclusions

3.1. Scoring

3.1.1. The PHD method evaluates a final pipeline heath score. All five separate indicators are rated by a method and each indicator is weighted according to the PHD formula.

SCORING:	
100 to 75	**Excellent**
50 to 74	**Fair**
Less than 49	**Poor**

3.1.2. Pipeline sections where historical data is not available (NA) is not scored and therefore the report contains 20% less diagnostic information.

3.2. Rating

3.2.1. **The pipeline health report is rated in three categories <u>Poor</u> <u>Fair</u> <u>Excellent.</u>** The health report can be influence by factors that may need to be addressed in order to improve the health of the pipeline. These factors are reviewed in the recommendation below but can include

3.2.2. Valves blocking in the test section need to be internally tight. Leaking valves can allow small amounts of fluid to bypass the valve into a non-tested section of piping. Unaccountable bypassing through a valve that cannot be proven tight can account for a poor pipeline health

score. The PHD evaluation will determine which valve/s need repair. (see recommendations for the test section).

3.2.3. Accumulators that are within the test section that cannot be isolated with a valve will affect the pipeline health score.

4. Results of Evaluation

4.1.1. PHD testing was conducted using diesel fuel as the test medium for distribution pipelines to loading racks for truck and rail needs of the Richman Railroad, Platform Delivery System at the Richman Yard located in Richman, Pennsylvania

4.2. Stress and Integrity Testing:

4.2.1. The PHD test method was also utilized to conduct the integrity testing; as set forth by Richman Railroad. This criteria states that a pipeline test section shall be tested for a duration of one hour and shall fail the test criteria if the pipeline has a pressure decay greater than 1psi during the test period.

Results of Stress Testing: PASS

(The rate of change during the test duration did not exceed a pressure decay of 1psi.)

4.3. Results of PHD Testing

4.3.1. Historical Data Evaluation

Results: **NA**

4.3.2. Simulated Leak Calibration

Results: **Excellent**

4.3.3. Theoretical Pressure Comparison Test

Results: **Excellent**

4.3.4. Rate Change Comparison

Results: **Fair**

4.3.5. Unaccountable Allowance

Results: **Poor**

5. Final Results:

PHD Pipeline Health Report:

Score	Rating
46	**Poor**

SCORING:

100 to 75	**Excellent**
50 to 74	**Fair**
Less than 49	**Poor**

6. Recommendations

6.1. LDT recommend that the 7 manholes in which the secondary containments terminate be inspected for product or residue especially in the areas at the secondary termination points. The inspector should keep a separate written report of each manhole. Backup the inspection with photos if possible.

6.2. Furthermore, valves isolating the pipeline at the far end of the pipeline section should be checked for bypass and be repaired as required.

6.3. Recommended Test Regimen

6.3.1. It is recommended that LDT returns to the site with the ability to perform a PHD test and if the Unaccountable Allowance is unchanged a tracer gas leak location test be performed the same day. The retest should be conducted as soon as the inspection and repairs can be made.

7. Assurance

7.1. This report is the property of Leak Detection Technologies (LDT), is confidential, and intended solely for the use of the client listed on page one.

7.2. No modifications can be made to the report without the written approval of LDT.

7.3. This report is accurate at the time of the evaluation. Events after the evaluations are the responsibility of the client and not LDT.

7.4. LDT will assist its client/s in resolving any and all third party disputes on behalf of the client.

8. PHD Certification

8.1. This is a statement to confirm that the component/s listed above, at the time of testing, have been tested utilizing the PHD Evaluation Method. The PHD Evaluation Method is one of the most comprehensive test procedure offered to the petroleum industry for preventative leak detection.

8.2. I declare under penalty of perjury the information contained in this report is true and correct to the best of my knowledge.

03-26-2010
Date

David Rabb

LEAK DETECTION TECHNOLOGIES LLC

1400 East Paseo Pavon • Tucson, AZ 85718 • Phone 520.207.4878 • FAX: 520.990.8965 •
www.LeakDetect.net

Addendum A

Third Party Certification