



PIPETALKER /CODETALKER

ASSET INTELLIGENCE SOLUTION

JANUARY 25, 2021



Abstract

Over the past 50 years the pipeline business has grown to become asset-intensive, highly regulated and technically complex. While technology has provided the efficiencies required to effectively develop and manage the infrastructure, field-based lifecycle management has lagged behind other disciplines. As such, it represents a significant opportunity for process streamlining and cost reductions. To achieve these goals, EchoRFID has successfully developed PipeTalker, a system that will revolutionize how materials are tracked and traced, how construction documentation is retained, and how integrity management will be conducted in the future, all to provide significant value to pipeline owners and operators. Incorporated into the PipeTalker Solution as a separate module is CodeTalker, an inventory management system that can be employed to track warehouse inventory levels, and goods purchases, issues and receipts, and disposals.

PIPETALKER /CODETALKER ASSET INTELLIGENCE SOLUTION

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1. Today's Energy Industry

Since the first North American pipeline was built over 150 years ago, construction companies and pipeline operators have grappled with understanding, cataloging and operating the equipment they work with.

The current system is still largely paper based requiring manual entry in the field and re-entry in the office into centralized systems of record surrounded by technical support platforms.

Users have access to detailed field records and operating records to ensure seamless operations, and GIS teams share content through portals and dashboards to guarantee a universal common operating picture. While greatly improved, there is still one significant gap that is preventing operators from reaching their desired state: Field-Based Lifecycle Management.

2. What is Field Based Lifecycle Management (FBLM) and why is there an issue?

FBLM is a critical form of asset management specifically focused on the material, construction, integrity, and lifecycle management activities performed by the field teams and creating Traceable, Verifiable and Complete (TVC) records as outlined in the PIPES Act.

Traditionally, the focus has been on the construction of the assets and little thought was given to the importance construction records play in operation, equipment maintenance or asset lifecycle management.

Project Managers, inspectors, field leads, and consulting firms continue to rely on paper forms for material tracking, data collection, retention and access with little or no standards and procedures leading to inefficiencies and errors. Where structure does exist, methods of data management are fractured, inconsistent and outdated and do not deliver on TVC.

3. How does PipeTalker solve this problem?

PipeTalker is a secure software solution that connects users to the intelligent digital forms essential to document asset lifecycle, provides access to the records needed to operate a system knowledgeably and employs RFID & GPS to link to/recognize field equipment. Its open architecture provides for critical integration with an operator's existing, key GIS and ERP platforms.

Using PipeTalker FBLM teams easily complete critical TVC tasks. It is a powerful asset management solution that empowers users to document every activity in the construction management, operations and maintenance processes. PipeTalker delivers;

- Content collected and stored in the field forms and project book empower your field teams and ensure content is traceable, verifiable and complete,

- Military-grade security protocols to ensure secure data access,
- Detailed workflow-driven forms configured to achieve full regulatory compliance,
- The ability to capture photos, videos and voice recording so that all work is auditable,
- An open solution that can share and consume content with your legacy systems,
- The ability to enhance safety while reducing costs and improving work management.

4. Why do we use Radio Frequency Identification (RFID) and GPS?

The combination of these technologies provides the best of breed method for capturing critical information and validating its physical location. The term RFID refers to *radio frequency identification* and is used to describe various technologies that use radio waves to automatically identify objects.

RFID is similar to the bar code identification systems but uses an antenna & receiver to transfer information from a tag.

RFID Tags can be Low cost temporary RFID tags (material tag) such as the combination RFID / Barcode shown below, or it can be a more robust permanent tags (construction tag) that contain the material certification information written to the tag's user memory field to ensure that this information is not lost.



Figure 1 Temporary tag with RFID and Barcode



Figure 2: Permanent RFID tag with memory

RFID can be used to quickly capture information as simple as a utility owners name and date of installation to complex instructions on who and how the utility was manufactured. Where RFID manages content, GPS is used to identify the location of a particular activity to ensure the records are defensible and tied to a real-world location.

The GPS Transponder can be used to track each load of pipe as it moves from supplier to customer so that the client knows where the material is and when they can expect to receive it. When combined with the RFID tag information, customers will be able to know precisely where each load is, and what each load contains. The Globalstar Sat-Fi2 Transponder is used when regular cellular communication is unavailable.



Figure 3 Globalstar GPS Transponder



Figure 4 Globalstar SatFi2 Satellite Wi-Fi device

While an operator can deploy the PIPETALKER system with any capable field devices, we have worked closely with Zebra to ensure that we support their RFID devices and RFID capable rugged tablet.



Figure 5: Zebra MC3300R, Zebra L10 tablet, and a typical Android smartphone



The advantages RFID+GPS offer your company are:

- Lower costs and enhance productivity - we automate the collection of accurate and reliable information about the movement and location of assets.
- Improved data quality – location and equipment are identified without human involvement thereby avoiding missed assets, incorrect identification, data transcription errors and other human input errors.
- Capital cost reduction – you have better control of your asset thereby reducing duplication and over purchasing.
- Reduce fulfillment delays – as you know what you have and where it is, you can confidently supply projects without interruptions.
- Improved compliance – reliable, auditable inspection records ensure that regulatory requirements are defensible, satisfies insurers and stakeholders and is the foundation for safety compliance.
- Ensures TVC requirements are met – this system efficiently and reliably creates FBLM records that fill the gaps between purchasing documents and retirement and ensure TVC requirements.

5. How does Pipetalker Fit into Your Business Workflow?

PipeTalker supports material tracking, regulatory compliance, and asset integrity and lifecycle management for all stakeholders. PipeTalker is open and integrates with your enterprise environment, it can share and consume content from a limitless number of platforms ensuring that operational intelligence is widely available and field teams.

To understand how PipeTalker will improve your operations and meet your organizations key performance indicators the following pages depict the end-to-end lifecycle workflow of assets in your organization. After each section we have indicated its use and how it provides value. The numbering will help you connect cost reduction/benefits with specific parts of the workflow.

Supply Chain Management ^{Pipetalker™} 1

-  Transponder
-  Material RFID / Barcode tag
-  Construction RFID / Barcode tag

Manufacturer



1.1 *EchoRFID transponder* on the material shipments augment SCM and material security. **Cost Benefit: Deferred**

1.2 *Tagging assets* at the manufacturing stage would be in the clients interest; the manufacturer / supplier information can easily be integrated with Pipetalker software **Cost Benefit: Deferred**



Coating Plant



1.4 *Gate Readers* automatically read each item on the load and informs managers / field offices of asset status gate readers negate manual interrogation. **Cost Benefit: Immediate**
Workflow Reduction: 95 %

1.5 *Drones* with RFID readers can quickly and accurately complete inventories in laydown areas **Cost Benefit: Immediate**
Workflow Reduction: 90 %

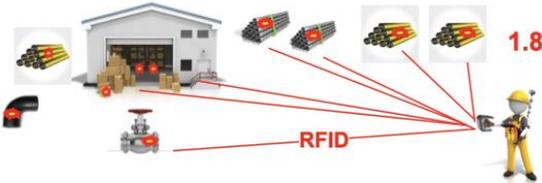
1.6 **Cost Benefit: Deferred**

Manage material from anywhere in real time and know an asset (s) exact location

1.7 **Cost Benefit: Deferred**

Surplus material tagged and returned to storage: records show complete asset pedigree

Warehouse / Project Laydown Yard

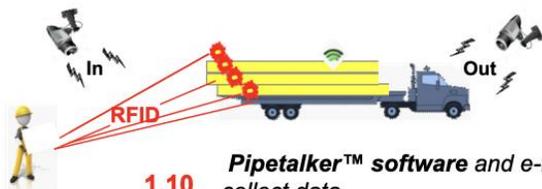


Cost Benefit: Immediate & Deferred
Work flow Reduction: 80%

The RFID tag facilitates a specific asset to be located in seconds. The tag has space for 64 characters and is linked to the material e-form



1.9 Systems integration is quick and complete **Cost Benefit: Immediate & Deferred**



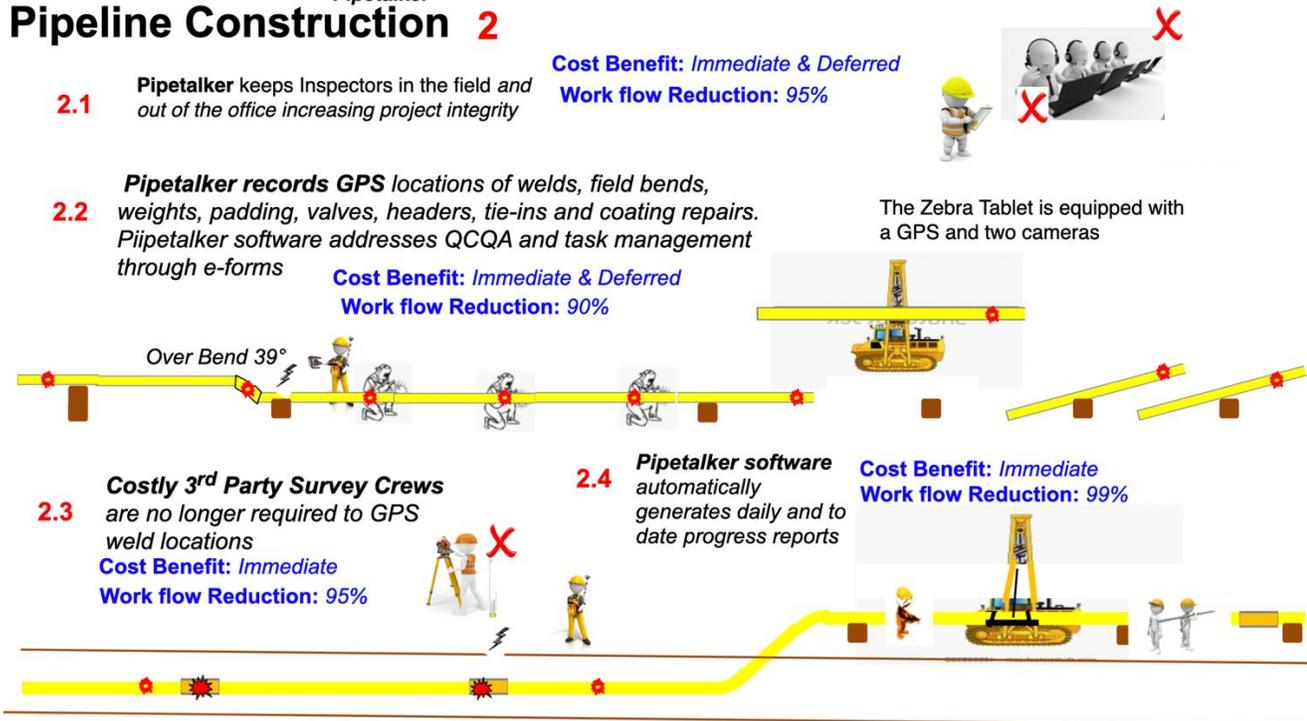
1.10 *Pipetalker™ software* and e-forms use a standardized procedure to collect data **Cost Benefit: Immediate & Deferred**
Work flow Reduction: 80%

Supply Chain Management

- 1.1. The use of Globalstar transponders is inexpensive way to assure the security and location of loads and is an excellent loss prevention tool.
- 1.2. The RFID tag can be used anywhere in the world and on any asset that requires tracking. Attaching the combination RFID/barcode tags at the supplier stage ensures the individual items are identified as to specification, location and ownership; however, this would be a client driven endeavor.
- 1.3. The Gen 2 RFID tag can have information written to it (up to 64 characters) and read by the Zebra, MC330M-R handheld mobile device. The digital e-forms are accessed by the MC330M-R and the completed e-form housed in the digital project book in the cloud.
- 1.4. Gate readers are readers situated at the entrance and exit of a storage yard area. Managers are notified immediately when the material items pass the reader. Gate readers provide reduced workload for employees and assurance as to where items are.
- 1.5. For the larger storage yards readers can be attached to drones for taking quick and accurate inventory
- 1.6. Managers can monitor and control movement of their assets in real time from anywhere in the world. This can lead to errors and oversights and schedule delays being avoided.
- 1.7. Millions of dollars are consistently wasted on pressure containment materials surplus to the project because their specifications cannot be verified. One x 55' long x 20" pipe joint costs roughly \$16,000. One \$3 RFID tag can provide this information.
- 1.8. To read 700 RFID tagged items in a few seconds the reader only needs to be pointed in the general direction of the material whereas the barcode portion must be read by line-of-site, one item at a time. The upside to the barcode is that it can be interrogated by a smart phone. It no longer has to take hours or longer searching for specific items. The PipeTalker system contributes to reducing schedule interruptions and cost overruns.
- 1.9. The developers of PipeTalker understand that clients have spent a considerable amount of time and money developing software in-house so we have designed the system to integrate smoothly with clients' and suppliers' software, including ERP, GIS, and CADD systems.

1.10. Material e-forms use a standardized procedure to enter material data into the e-form via a handheld computer and the e-forms provide a detailed account of the asset's history.

Pipeline Construction ^{Pipetalker™} 2



Pipeline Construction Workflow

- 2.1. Keeping inspectors in the field is essential for complete and accurate chronicling of the project and integrity assurance. Inspectors can be overwhelmed with the amount of work, much of which requires office and support staff for data entry and progress reporting. PipeTalker streamlines this workflow and reduces effort, cost, errors, and timelines.
- 2.2. Electronic data collection is fast, easy to use and provides consistency between pipeline spreads and projects. E-forms are designed for every pipeline and facility task and ask relevant questions with answers chosen from drop down menus. An incredible time and cost saver.
- 2.3. Survey crews are an extremely costly entity to be employed just to GPS weld locations. The cost saving of using the inspector to do this during the lower in procedure alone justifies the utilization of PipeTalker. Employment of survey crews can, and often does, impede the lowering in process and interrupting the schedule. An inspector with GPS capability ensures workflow continuity and no schedule interruptions.
- 2.4. Keeping track of progress of each process (stringing, welding, lower-in, etc.) is essential. It informs project management where the project is in terms of the schedule, allowing changes that may be required for adjustment of the commissioning date, approval for expenditure (AFE) amendments, or material acquisition that can be assessed ahead of time. Accurate and

timely process footages are necessary for contractor progress payments. This generally takes much of the inspector's time when their attention should be focused on field responsibilities.

3 Facility Construction

3.1 *Pipetalker software and e-forms use a standardized procedure to collect data in a consistent manner that yields complete, reliable, and measurable data* **Cost Benefit: Immediate & Deferred**
Work flow Reduction: 99%

3.2 *Management can monitor the project in real time from anywhere* **Cost Benefit: Deferred**

3.3 *Interrogate RFID tags on each pipe, line number and tech cable to access links to the history of the assets ref maintenance, installation, welding, material etc* **Cost Benefit: Deferred**
Work flow Reduction: 99%

3.4 *GPS - welds, valves, vessels, piles, meters etc locations* **Cost Benefit: Immediate**
Work flow Reduction: 90%

3.5 *Interrogate RFID tags on valves to recall the history of the valve ref maintenance, installation, parts list etc*

Cost Benefit: Immediate
Spec Break Work flow Reduction: 90%

3.6 *Record data for Piling / foundations material and installation.* **Cost Benefit: Deferred**



Cut offs can be tagged with reference to original joint tag information

Cost Benefit: Deferred

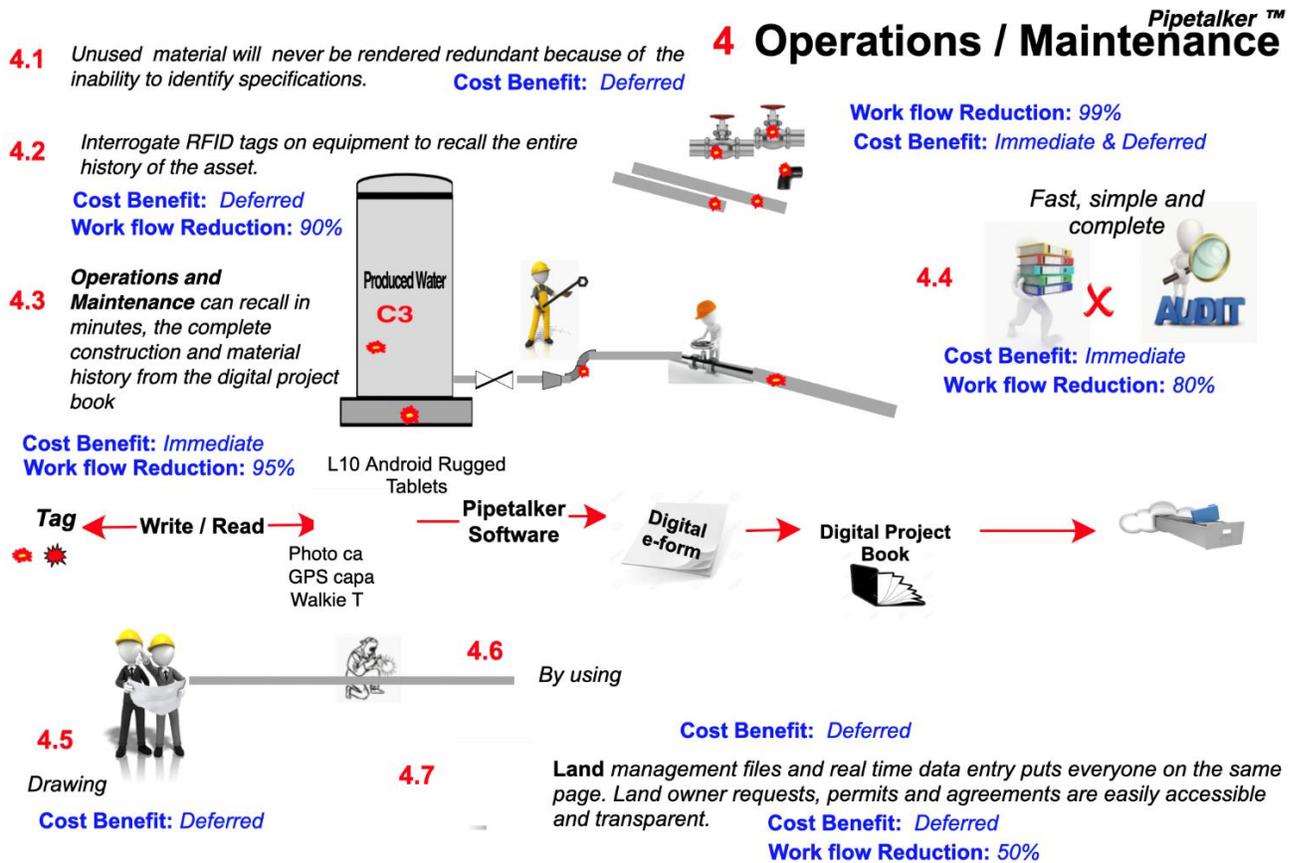
3.7

Photos of u/g facilities attached to e-form **Cost Benefit: Deferred**
Tablet Camera **3.8**

Facility Construction Workflow

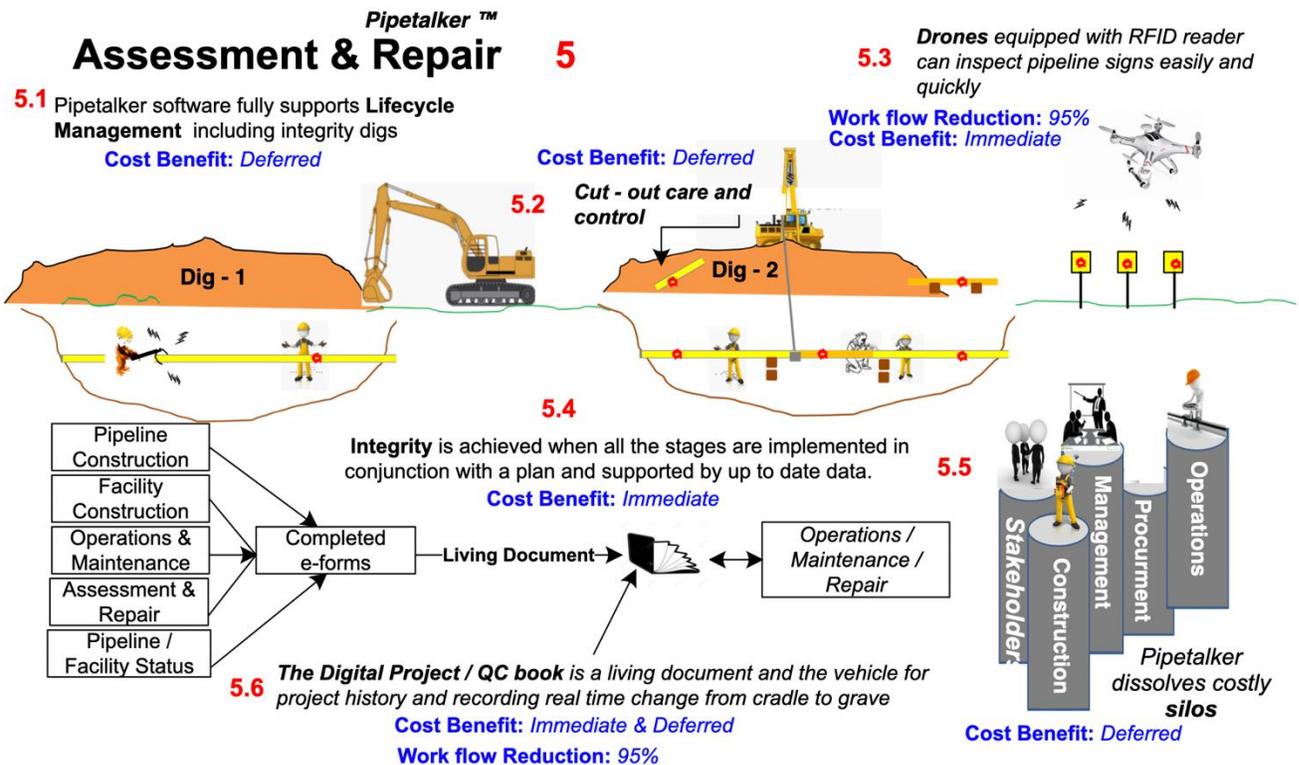
- 3.1. The use of e-forms, for each process for facility, pipeline and material ensures consistent data collection that is complete, reliable, and measurable. Each data entry transaction is date and time stamped, supported by metadata creates a fully auditable, irrefutable record.
- 3.2. Project supervisors and all levels of management regardless of the location including those offshore, can monitor the progress of the project in real time. Project Administration can manage user access and restrict to only certain transaction types, (create, read, update, delete).
- 3.3. RFID tags in a facility setting are extremely useful in identifying individual line numbers and linking them to the construction e-form which has the entire history of that line. Often prints are lost or unattainable holding up process or fail an audit causing the asset to be shut down. Tags can also be incorporated to provide the same function for tech cables. RFID tag identification saves significant time in locating and identifying pipe and cable and enhances safety by making asset attributes transparent.

- 3.4. Tags and GPS combine to mark and identify welds, spec breaks, tank internals, vessels, meters, instrumentation, inlet and outlet headers, valves and ESD valves. This enhances regulatory confidence, safety and allows regulators questions to be answered immediately and accurately.
- 3.5. RFID Tags on a valve can be interrogated as to the valves last inspection date, maintenance completed and a parts list specific to that valve.
- 3.6. Tags can be placed on each pile and linked to the e-form that describes the required information of the pile's characteristics and installation. Extremely useful on piles that support rotating or vibrating equipment.
- 3.7. One of the greatest sources of wasted material and money is the waste of pipe cut-offs. Once a piece has been cut off and the piece moved, it cannot be used unless properly identified. If the pieces are immediately tagged with RFID and the parent joint data copied, the joint cut-offs (pups) can be used or stored
- 3.8. Below grade piping, cable, thrust and anchor blocks can be photographed with the tablets built in camera and linked to the corresponding e-form.



Operations and Maintenance Workflow

- 4.1. Unused material can be safely stored for the next project, future modifications or repair. The items once tagged will never be redundant because the specifications are lost.
- 4.2. Operational equipment that have been tagged by construction, such as vessels, tankage, line heaters, inlet separators, flare knockout (FKO) drums, etc. will no longer be needed to be put out of service because of a lack of information.
- 4.3. Government audits are demanding, costly and time consuming and rarely does a company come out of one vindicated or unscathed. PipeTalker patented digital system has changed the audit experience.
- 4.4. The affirmation of changes and issuances of permits and land entry permissions are instant from land management, and informs field supervisors instantly of land owner requests, land issues and of any change. The PipeTalker system prevents costly mistakes and saves time and minimizes errors.



Assessment and Repair Workflow

- 5.1. PipeTalker is a system that is a tool for the reinforcement of integrity and lifecycle management. The data collected throughout the construction, operation and maintenance phases of the asset assists in the planning, execution and documenting of modifications, repairs and abandonment.
- 5.2. Pipe cut-outs should be cared for properly and readied for shipment so that the failed or affected area is not altered or contaminated during transportation. The better the cut-out is

cared for the more accurate the examination by a metallurgist will be. If the cut-out is from a pipe failure, then it could be used as forensic evidence so care and control will include a chain of custody procedure. Cut-out procedure is listed in the e-form on steps to follow.

- 5.3. Signs are required to be checked once a year for maintenance or replacement which is a costly and time-consuming exercise for those companies that have hundreds of signs. However, by attaching a RFID reader to a drone, the drone can fly the Right-of-Way and in a very short time to identify if and where signs are missing.
- 5.4. Integrity is achieved when the construction phase is completed and documented followed by operations, maintenance and system status entries.
- 5.5. PipeTalker dissolves the silos formed by departments or groups within the organization who choose not to share information or allow for knowledge to be exchanged.

6. Learning More and Taking Next Steps

The PipeTalker system has been custom designed by a team of seasoned oil and gas industry professionals to address a problem that has plagued the industry for years. We have prepared two specific programs to help you learn more about the solution and how your organization could benefit from an implementation.

Building a Business Case

This involves working with our executive team to review your existing solution and processes, identifying efficiencies and savings that could be realized from using EchoRFID's integrated FBLM system and preparing a business case for your management.

Planning a Pilot Implementation

A pilot project is an initial small-scale implementation of PipeTalker that is used to prove the value of the solution, identify and mitigate risks and develop implementation requirements. These engagements are designed and implemented with the help of an EchoRFID system architect and a subject matter expert.

For more information about how EchoRFID can support your company's tracking and tracing needs, please contact contact@echorfid.com.

7. About EchoRFID

EchoRFID is an asset management software organization located in Grand Junction, Colorado. Founded and lead by industry veteran Layne Tucker, the company is focused on implementing his vision of improving employee safety and preventing damage to organizations infrastructure through ground level asset management. His vision is supported by industry experts Ronald J. Baker, Gordon Hockridge and Tom Petty who form the technical nucleus of the organization. This core team is surrounded with implementation and deployment specialists who ensure that Layne’s vision comes to fruition. Combined, the organization has more than 150 years of industry expertise guaranteeing our customer’s success.

