



# Complying with PHMSA's Gas Transmission Mega Rule Using a Field Data Collection System

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# TECHNOLOGY OVERVIEW

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# COMPANY OVERVIEW

- Built the technology to enable a streamlined flow from design to the system of record including as-building, locating, and inspections
- Technology developed with industry R&D funding & in collaboration with the US Gas Technology Institute (GTI)
- Over half of the 20 largest energy companies in the US are already clients of the company



# What is TVC?

- Traceable
  - Records can be clearly linked to original documents
  - Careful attention should be given to manual transcription
  - Ex: MTRs, asset material information, purchase requisition
- Verifiable
  - Data can be confirmed by other complimentary source
- Complete
  - Record marked as finalized by signature, date or other marking
  - Incomplete or partial records not adequate for establishing MAOP





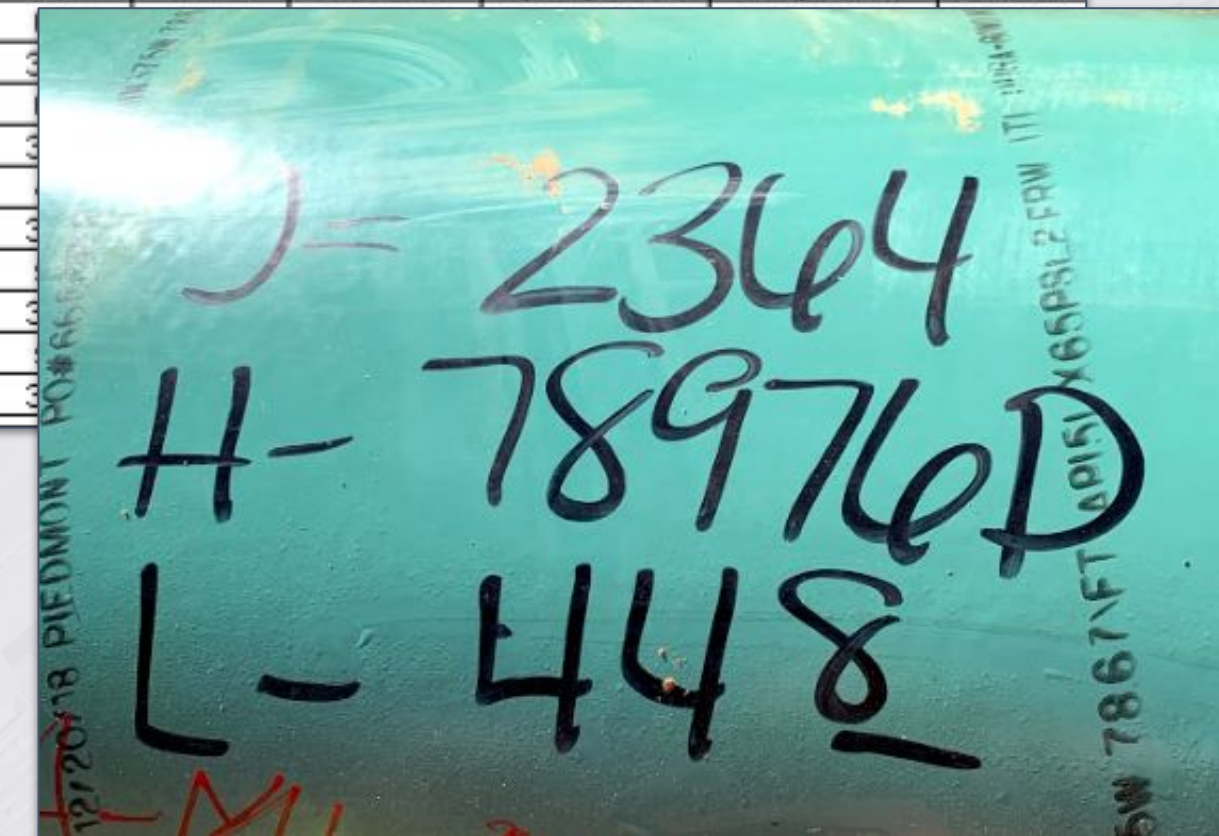
# TVC: Industry Trends

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# CURRENT STATE: MATERIAL TRACEABILITY

- Information written on material with paint pen
- Use of paper inspection forms, spreadsheets, surveyor software
- Information from MTRs must be manually checked in back office
- MTRs kept in a binder or scanned
- Data entry is time consuming and error prone

PIPEBOOK							
Upstream Girth Weld	Joint Length	LSO (deg)	WT (in)	Absolute Distance (feet)	Northing WGS84 UTM (metres)	Easting WGS84 UTM (metres)	Elevation (m)
21550	39.86	345	0.281	85527.41	5,411,479.76	623,503.72	242.09
21560	37.52	82	0.281	85567.27	5,411,470.92	623,512.02	242.06
21570	39.88	322	0.281	85604.79	5,411,462.61	623,519.82	241.90
21580	39.87	52	0.281	85644.67	5,411,453.70	623,528.04	241.87
21590	39.90	345	0.281	85684.53	5,411,444.84	623,536.31	242.11
21600	39.88	75	0.281	85724.43	5,411,436.05	623,544.68	242.19
21610	39.91	375	0.281	85764.31	5,411,427.20	623,552.96	242.35
21620	39.86	60	0.281	85804.22	5,411,418.32	623,561.22	242.68
21630	39.90	330	0.281	85844.09	5,411,409.49	623,569.53	242.92
21640	39.82						
21650	39.90						
21660	37.59						
21670	39.93						
21680	39.91						
21690	39.94						
21700	39.97						
21710	39.89						
21720	39.91						
21730	39.87						



# TECHNOLOGY: MATERIAL TRACEABILITY BARCODING

- Barcoding of materials
- Barcode can contain all of the material asset information that would otherwise be manually entered
- Scan can be done at any time during the job (receiving, stringing, installation, scrapping)
- Increase job efficiency. Scan, check, go.

The image shows three material barcoding labels. Each label contains a QR code, a description of the material, a lot number, and a barcode. The labels are for 'METER MANIFOLD, 4 METER SETTING, STEEL, HP' and 'CAP. 0.50 IN, MI, THREADED, STD. 300 PSIG, BLACK, ASME B16.3'. The lot number for all is 'Lot# TC 222'. The barcodes are '99-220000160' and '090000'.

Overlaid on the labels is a data entry interface with the following fields:

Outside Diameter	40.00	🔒
Wall Thickness	0.375	🔒
Grade	API 5LX-X42	🔒
Seam Type	Seamless	🔒
Coating Type	Bare	>
SMYS	24000	🔒

At the bottom of the interface are two buttons: 'Cancel' and 'Save'.



# CURRENT STATE: MTRs

- Various formats, various styles, varying levels of legibility
- No validation possible without efforts to scan/digitize the documents
- Can get lost or misplaced
- Difficult to read, human error possible in transcription

ONLY HEAT B513062 APPROVED  
PER API 5L

**AMERICAN STEEL PIPE (ASP)**  
A division of American Cast Iron Pipe Co.,  
1501 31st Avenue North, Birmingham, AL 35207  
QUALIFICATION REPORT OF SHIPMENT  
(IN ACCORDANCE WITH ISO 10474/EN 10204 "Type 3.1")

DATE: 16/NOV/2015

CUSTOMER ADDRESS: PIONEER PIPE  
1660 LINCOLN STREET  
SUITE 1950  
DENVER CO 80264

Customer Order Number M 32010182  
ASP Order Number S111698

SPECIAL NOTES

NDT tested using an Ultrasonic test method calibrated ID & OD N-10 NOTCHES.  
Hydrostatic test duration 10 seconds. Max allowable C.E. PCM .25.  
Minimum weld seam anneal temperature 1600 degrees F for all pipe.  
Charpy acceptance criteria Min. Energy 15/Heat. Min. shear area N/A.

LINE	SIZE	WALL	SHIP. NO	DESCRIPTION	SPECIFICATIONS	GRADE
1	20.00	.375	HFW API LINE PIPE	1 - 9	API 5L, PSL 2	X65M

All tests are from the body of the pipe in the transverse direction unless otherwise noted.  
Standard flat tensile gage length 1-1/2" x 2". Pipe body test location: Tensile T180; CVN T90.

HEAT	C	MN	P	S	CB	SI	TI	CU	NI	MO	CR	V	AL	B	N	CA	C.E.	Pipe Coil	
B513062	LINE 1	MFG: Steel Dynamics - Columbus															EDITION REFERENCE 5		
H=	.060	1.230	.019	.001	.046	.240	.002	.110	.040	.010	.080	.037	.028	.0001	.0082	.0022	.144	10/17	
P=	.051	1.217	.019	.003	.053	.239	.002	.107	.037	.012	.073	.037	.033	.0000	.0000	.0017	.134	0006	
P=	.052	1.220	.020	.004	.054	.240	.002	.108	.038	.012	.075	.038	.033	.0000	.0000	.0018	.135	0007	
M=WT	102.5	ksi	PT	89.2	ksi	Yield	72.4	ksi	%EL	32.5	RB	97	Hydro:	2200	Psi	Y/T=	.81	RUN: 34-5	0006
B513064	LINE 1	MFG: Steel Dynamics - Columbus															EDITION REFERENCE 5		
H=	.060	1.230	.019	.001	.042	.240	.001	.110	.040	.010	.070	.037	.037	.0001	.0081	.0018	.144	10/18	
P=	.060	1.204	.021	.004	.049	.239	.001	.111	.040	.014	.070	.037	.042	.0000	.0000	.0015	.143	0001	
P=	.061	1.203	.021	.004	.050	.238	.001	.111	.039	.014	.072	.037	.040	.0000	.0000	.0015	.144	0002	
M=WT	102.4	ksi	PT	91.4	ksi	Yield	73.3	ksi	%EL	33.0	RB	98	Hydro:	2200	Psi	Y/T=	.80	RUN: 34-5	0001

Attachments PAGE 1  
Continued

Issue No.: 7 Form Date: 6/01/2013 QD-AW3F055

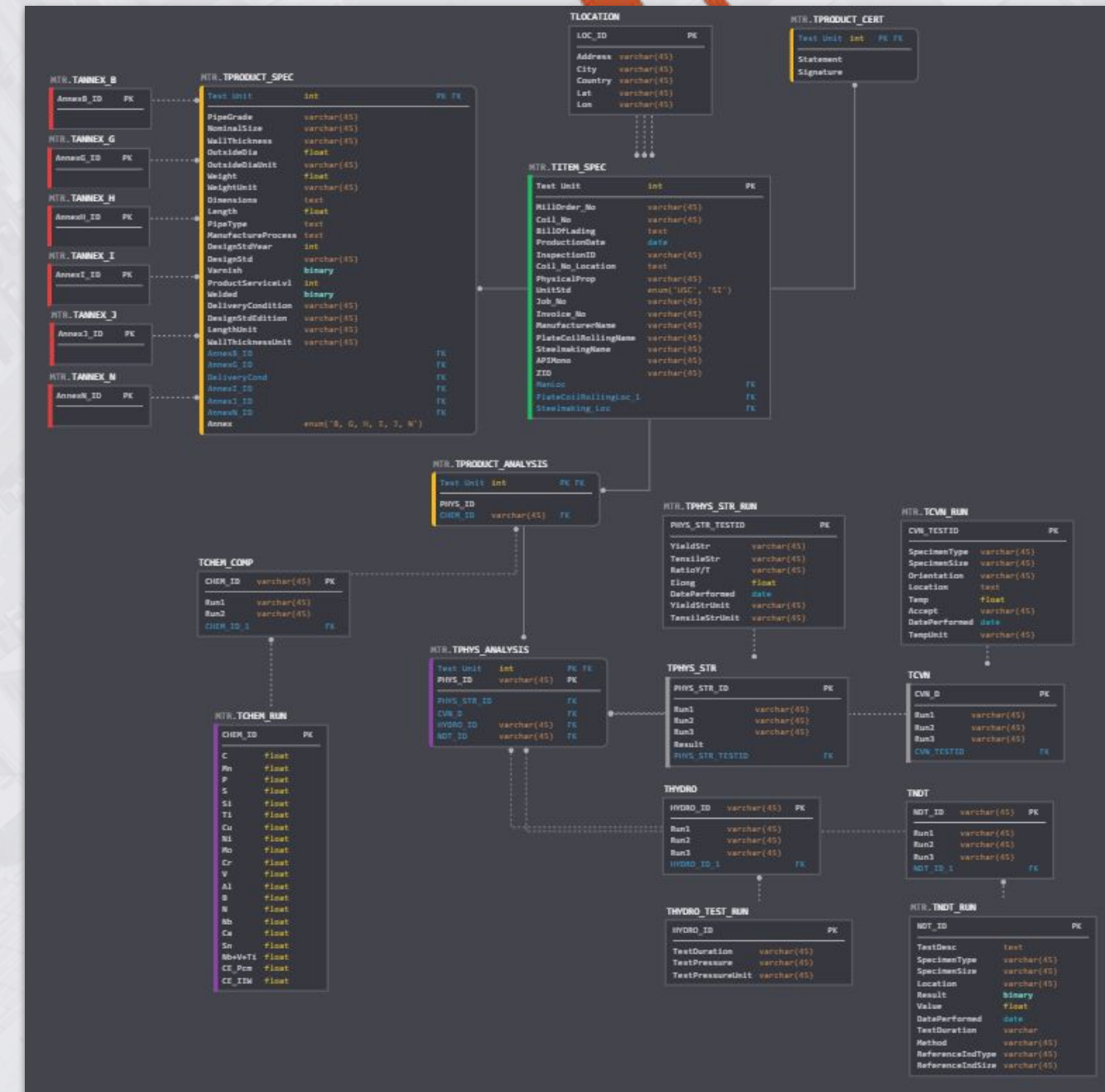


MATERIAL COND: THERMOMECHAN. ROLLED		OD: 12.750 (323.850)		WALL: 0.219 (5.562)							
PRODUCT IDENTIFICATION	TENSILE TEST TYPE/ ORIENTATION	TEST COND.	GAUGE WIDTH IN	YIELD	EXT %	TENSILE	Y/T	ELONG %	HARDNESS	MIN HYDRO	DWELL(SEC)
				PSI	.50	PSI		(IN 2" )	SCALE: HRB	PSI	
F23371	STRIP/T/B	TR	1.500	MIN: 65300		MIN: 77600		MIN:		1910	10
F23371	STRIP/T/W	TR	1.500	MAX: 87000	.50	MAX: 110200	0.89	20.0	MAX: 99.0	1910	10
** END OF DATA THIS SHEET **											



# TECHNOLOGY: DIGITAL MTRs

- API Joint Industry Project to create a digital standard for pipe MTRs
- MTR data is digital, can be validated against during construction
  - Is pipe carbon equiv. level within spec for this type of weld?
- Reduce the need for error prone transcription and time consuming scanning



# Technology Can Simplify TVC

- Ensure data is not lost
- Eliminate manual data entry, sketching, and transcription
- Real-time validations of data completeness
- Integration with “original” data or systems of record (MTRs, ERP, Design, OQ) to promote data quality and traceability
- Real-time validations of materials, people, and procedures
- Connect disparate pieces of data into a cohesive digital job packet
- Streamline and accelerate getting as-built data into the GIS system of record



# PIPELINES: THE LOCUSVIEW WAY



## Visibility

### Real-time project progress

Real-time visibility of all active construction work including project progress tracking.  
Real-time communication between the field and office for troubleshooting, verification, and design changes.



## Compliance

### Accurate and complete TVC data

Data accuracy and material traceability are verified in real-time during construction.  
Material verification and reconciliation is automated and traceable.



## Cost Efficiency

### Reduce back office labor

Reduce labor required to process as-builts and construction records by 70%. Map highly accurate GPS points without surveyors.  
Eliminate manual reviews and data entry and streamline GIS integration.

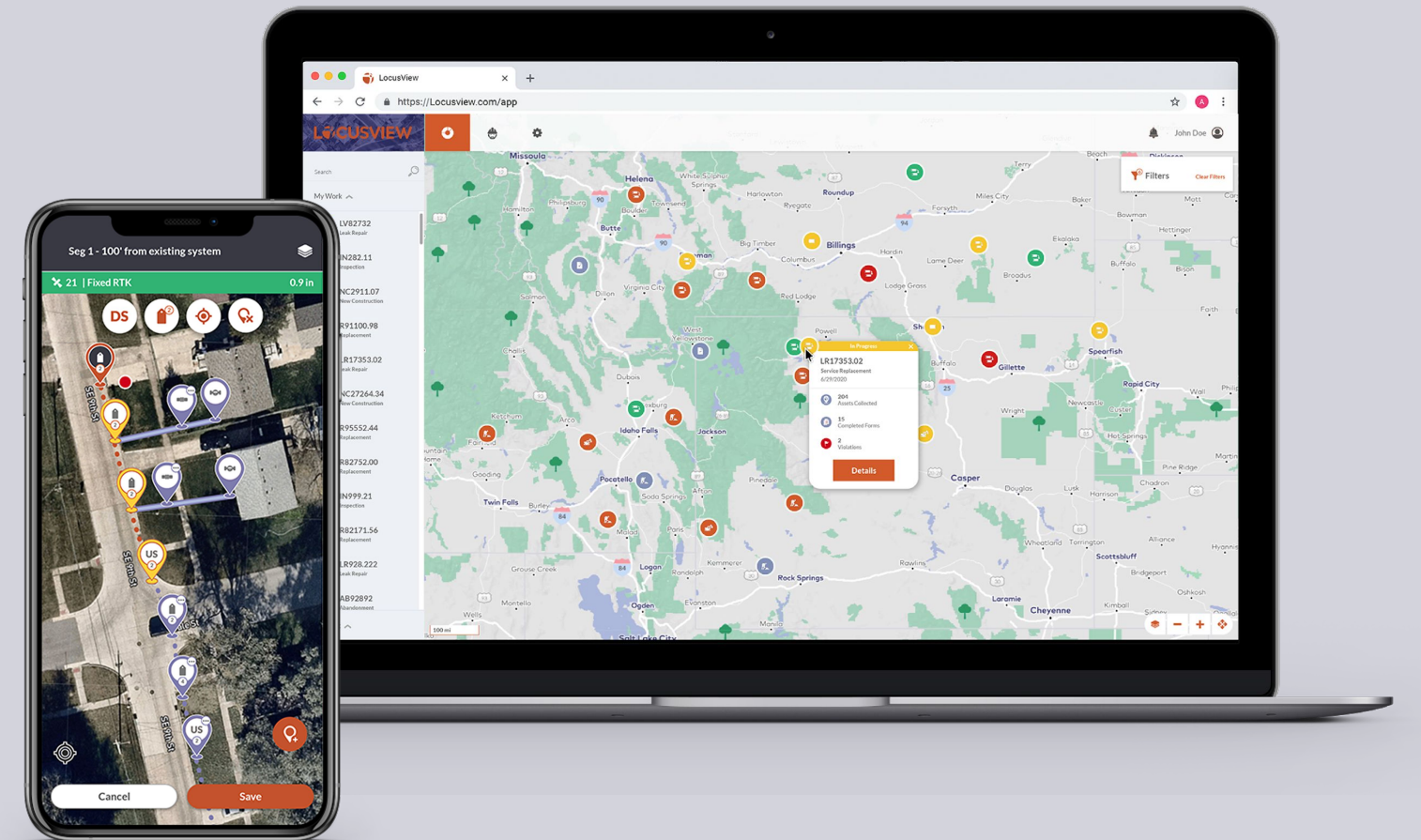


# THE LOCUSVIEW SOLUTION

## HARDWARE



## SOFTWARE



# LOCUSVIEW WORKFLOW

## PRE-FIELD



### ELECTRONIC JOB PACKAGE

- Bill of Materials / Work Order
- Design (CAD or other)
- Existing GIS
- Integrity dig locations

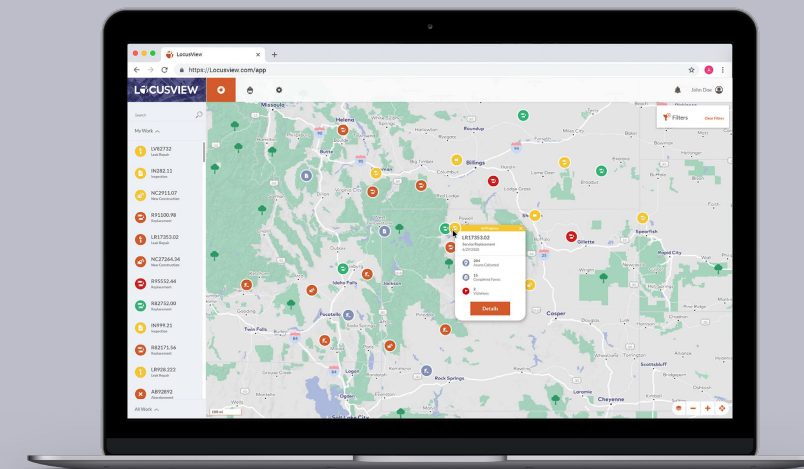
## FIELD



### LOCUSVIEW MOBILE

- As-Building (HA GPS of all assets)
- Material Traceability, Validation & Reconciliation
- Weld Records & Personnel Qualification
- Inspections
- Pressure Test Records
- In-field checklists

## BACK-OFFICE



### LOCUSVIEW WEB

- Real-time Project Status Visibility
- Real-time data validation with automated warnings and violations
- Review & Approve Submitted Projects



### ELECTRONIC CLOSING PACKAGE

- Export to GIS, ERP, Asset Man.
- Create form & As-Built Reports



# PIPELINE FIELD DATA CAPTURE USE CASES



## AS-BUILDING

**ENSURE NEW PIPELINES ARE COMPLIANT AND ACCURATE**

Connect your system of design and system of record seamlessly with electronic as-building. Ensure the correct materials are installed and procedures are followed.



## INSPECTIONS

**ENSURE PROCEDURES ARE FOLLOWED**

Create a record of your on-site inspections including safety, environmental, corrosion, and procedure based inspections. Application will guide the inspector on what to look for.



## LOCATING

**ACCURATELY MAP YOUR EXISTING NETWORK**

Create a highly accurate map of your existing network to correct your system of record. Record any abnormal field conditions that might affect pipeline integrity.



## INTEGRITY MGMT

**COLLECT DATA ON DIGS AND REPAIRS**

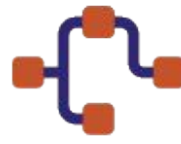
Integrate with your integrity risk models to create and assign digs to users to collect information on existing conditions and remediation steps taken.



# FEATURE HIGHLIGHTS



Material Validation



Procedure Validation



OQ Traceability



Engineering and Project Review



Data Integration and Output

Validate any materials a field crew encounters against a bill of materials.

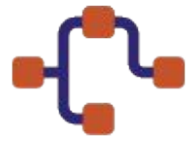
Look up material heat numbers and serial numbers against a database of recorded quality documentation.



# FEATURE HIGHLIGHTS



Material Validation



Procedure Validation



OQ Traceability



Engineering and Project Review



Data Integration and Output

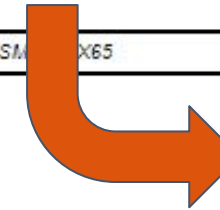
Validations can be configured for your company's specific rules

Other Examples:

- All pipes require a pressure test
- All welds require a VWI and NDT result
- IM Repair wrapped the appropriate amount of times

A	B	C	D	E	F		
Base Metal Grade Group	Pipe O.D.	Welding Process - Filler Metal Combination	Applicable Wall Thickness	Joint Design Group	Welding Procedure Specification		
SMYS ≤ X60	All	SMAW Process - Cellulosic Filler Metal	WT ≤ 0.750"	Branch Weld	<a href="#">10-Sc-BR</a>		
				Groove Weld	<a href="#">10-Sc-G</a>		
				Wide-Gap Groove Weld	<a href="#">10-Sc-WG</a>		
				Long-Seam Weld	<a href="#">10-Sc-LS</a>		
		SMAW Process - Low Hydrogen Filler Metal	0.188" to 1.250"	SMAW Process - Low Hydrogen Filler Metal	0.188" to 1.250"	Branch Weld	<a href="#">12-ScLH-BR</a>
						Groove Weld	<a href="#">12-ScLH-G</a>
						Wide-Gap Groove Weld	<a href="#">12-ScLH-WG</a>
						Long-Seam Weld	<a href="#">12-ScLH-LS</a>
		GMAW Process	WT ≤ 0.375"	GMAW Process	WT ≤ 0.375"	Branch Weld	<a href="#">14-G-BR</a>
						Groove Weld	<a href="#">14-G-G</a>
			WT ≤ 0.750"		WT ≤ 0.750"	Wide-Gap Groove Weld	N/A
						Long-Seam Weld	<a href="#">14-G-LS</a>
SMYS = X65 or X70	All	SMAW Process - Cellulosic Filler Metal	0.188" to 0.750"	Branch Weld	<a href="#">30-Sc-BR</a>		
				Groove Weld	<a href="#">30-Sc-G</a>		
				Wide-Gap Groove Weld	<a href="#">30-Sc-WG</a>		
				Long-Seam Weld	<a href="#">30-Sc-LS</a>		
		SMAW Process - Low Hydrogen Filler Metal	0.188" to 1.250"	SMAW Process - Low Hydrogen Filler Metal	0.188" to 1.250"	Branch Weld	<a href="#">32-ScLH-BR</a>
						Groove Weld	<a href="#">32-ScLH-G</a>
						Wide-Gap Groove Weld	<a href="#">32-ScLH-WG</a>
		SMAW Process - Low Hydrogen Filler Metal	0.188" to 0.750"	SMAW Process - Low Hydrogen Filler Metal	0.188" to 0.750"	Branch Weld	<a href="#">32-ScLH-BR</a>
						Groove Weld	<a href="#">32-ScLH-G</a>
						Long-Seam Weld	<a href="#">32-ScLH-LS</a>

1. Applicable to 1.250" when base metal SMYS ≤ X65



Incorrect Weld Procedure Chosen for wall thickness and grade

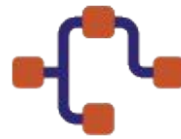




# FEATURE HIGHLIGHTS



Material Validation



Procedure Validation



OQ Traceability



Engineering and Project Review



Data Integration and Output

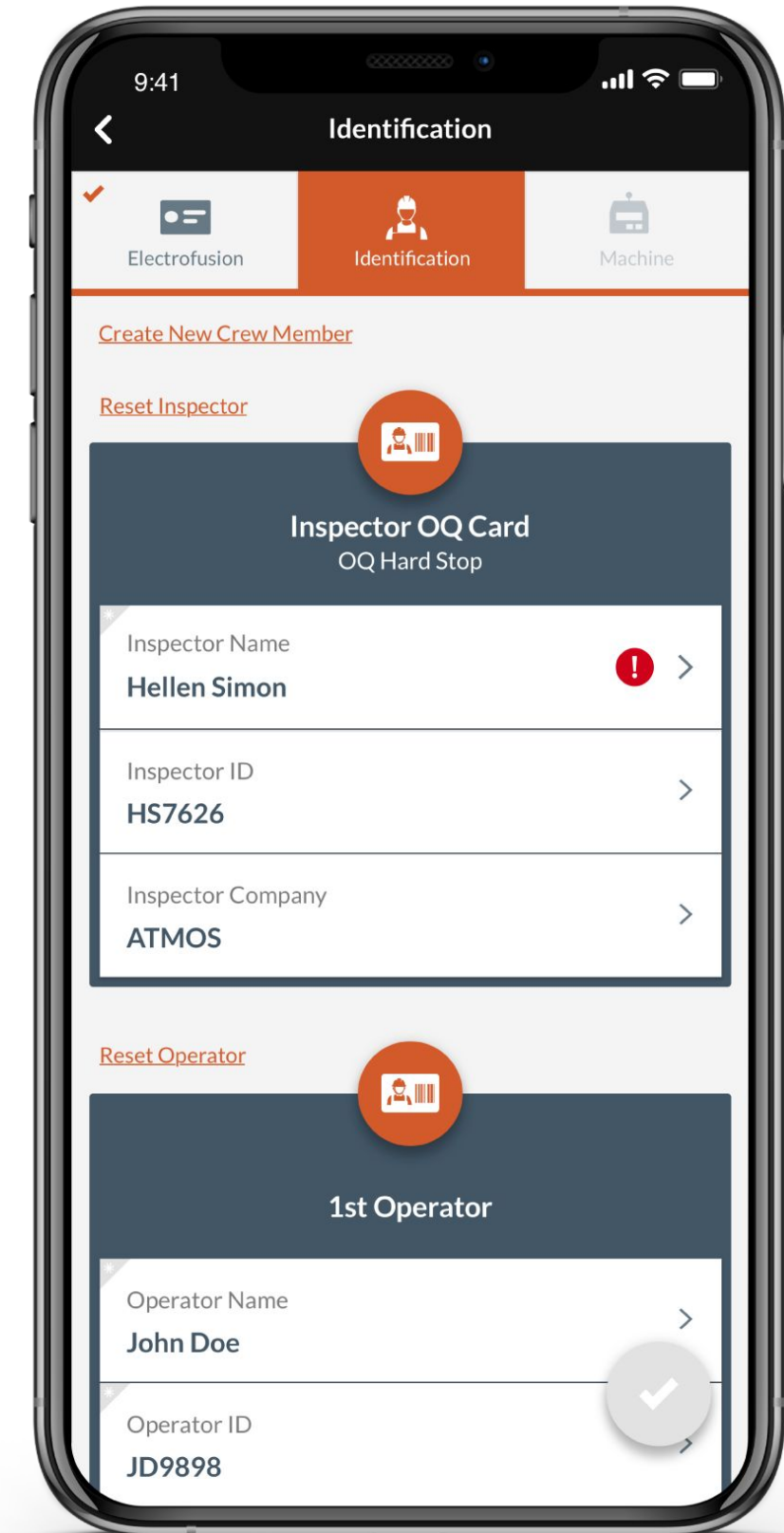


www.locusview.com

Ensure users are qualified to perform certain tasks.

System will raise flags immediately when a user is not qualified.

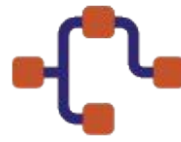
Integrations with ITS and ISN are available.



# FEATURE HIGHLIGHTS



Material Validation



Procedure Validation



OQ Traceability



Engineering and Project Review

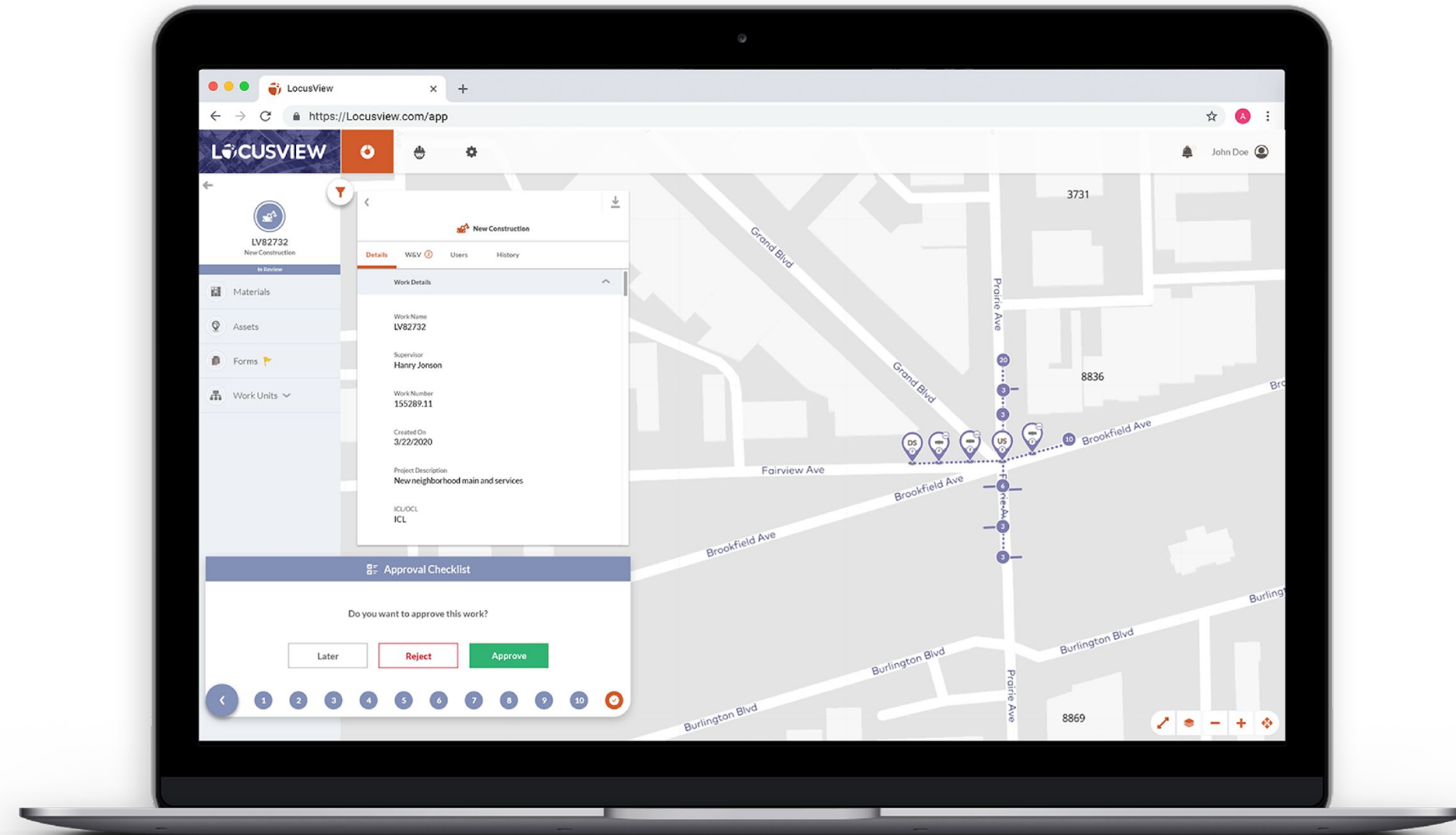


Data Integration and Output

Web reviewer can see data in real-time, including violations flagged by the system.

Engineering Approval of pressure tests, design changes, new materials, etc.

Project managers can view progress of mapping and daily inspection reports



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# FEATURE HIGHLIGHTS

 Material Validation

 Procedure Validation

 OQ Traceability

 Engineering and Project Review

 Data Integration and Output

Project Data can be packaged into exports (GIS, Excel, etc) that fits your company's specific needs.

Job Number  
8173772

Line No.  
36

Class Location  
2 in Hard Road Crossing

HCA  
 Yes  No

Outside Diameter  
40.00

Wall Thickness  
0.375

Grade  
API 5LX-X42

Seam Type  
Seamless

Coating Type  
Bare

SMYS  
24000

Class Loc.
HCA
Job Number
Install Date
Feature Number
Feature Type
Length
Notes / Comments
Mile Point
Field Station
O.D.
W.T.
Seam Type
Specification / Rating
SMYS

# CASE STUDY #1

- Company in the south using LVS for locating existing pipeline network
- 3 year project to map 2,700 miles of pipeline
- Users report and take pictures of abnormal conditions that are visible on web
- LVS technology has resulted in cost-savings, efficiencies, and increased visibility
- Surveyor user-base



# CASE STUDY #2

- Mid-western client
- Fully deployed solution for inspections and as-building simultaneously
- LVS technology digitizes assets that are barcoded in warehouse
- Non-surveyor user base (inspectors) that is capturing high accuracy GPS to create as-builts



# TURN-KEY OFFERING

- Hardware packaged
- Surveyor equipment support
- 24 hour hardware replacement
- Training and deployment services
- Integration and implementation support
- 24/7 bilingual help desk



# THANK YOU

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