Leveraging the ESRI Platform for Automating Survey Data Validation & Reporting
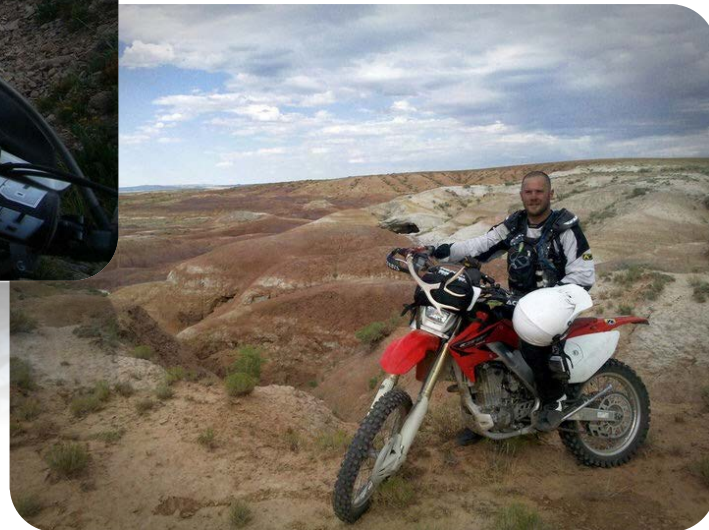
Presented by Justin Calvert

November 6, 2015

RAISING YOUR
RETURN ON
INTEGRITY

Presenter

Justin Calvert

Technical Sales Engineer
New Century Software
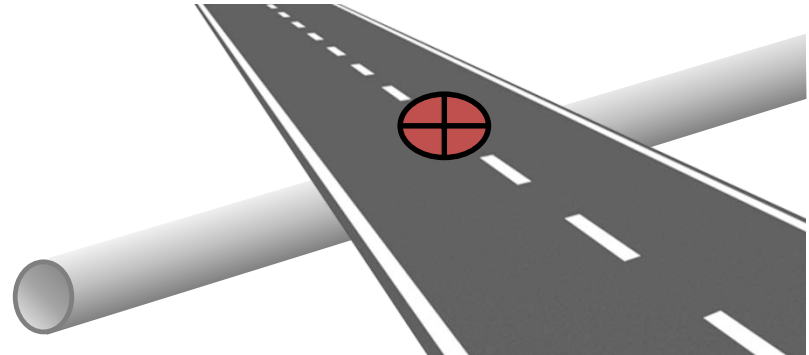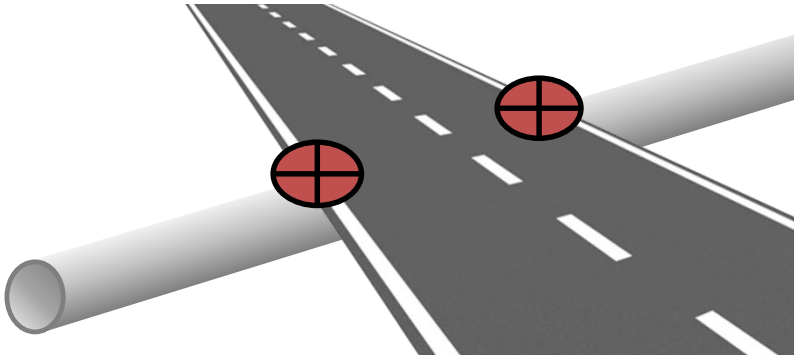
Today's Agenda

- Industry Challenges

- Goals

- Putting the Platform to Use

- Case Study Example

- Benefits & Results

Industry Challenges

- Lack of Industry Standards

- Non-Existant Validation

- Stagnant Data

- Irreparable Errors

- Interoperability

Industry Challenges
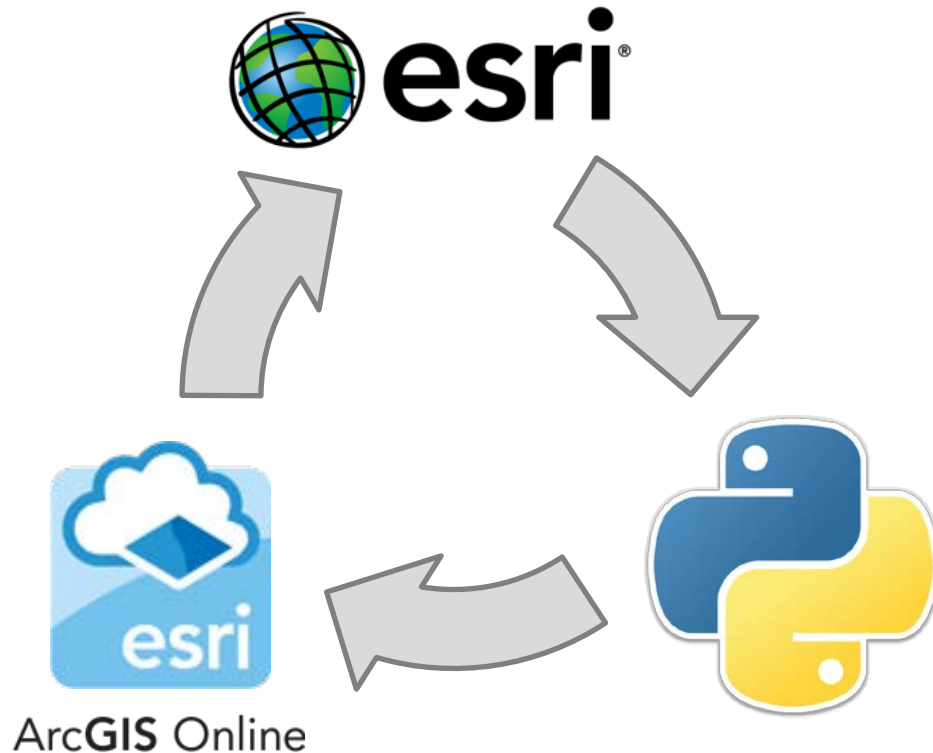
- Lack of Industry Standards

Industry Challenges

Validation Test	Error Type	Comments
Delivery sent as personal geodatabase	WARNING	Delivery was sent as a file geodatabase
A surveyed centerline feature class exists	PASS	
Column headers are correctly named	PASS	
Station column is a numeric field	ERROR	Station field was a text field
All layers were provided in the following projection: NAD83.BLM-14N	PASS	
Point records with null coordinates	PASS	
Point records with null station values	PASS	
Point records with null shot code	WARNING	11 records had a null shot code
Point records with null elevation	WARNING	11 records had a null elevation
Unrecognized shot codes present	PASS	
All point records are within a 15' tolerance of the provided survey centerline	PASS	
Provided survey route is within 15' of the preliminary centerline	PASS	
Provided centerline is a single part line	PASS	
Provided centerline is in the correct direction	PASS	
Provided centerline is M aware and measured	PASS	
Provided centerline contains no duplicate centerline vertices	PASS	
Only 1 centerline shape provided	PASS	
Centerline vertices have no angles above 100^	PASS	
Centerline is not self-intersecting	PASS	
Vertices on preliminary route over 30 degrees with no corresponding vertex on survey line within 50'	PASS	
Points that exist within 5' of each other that are the same feature	PASS	
When a feature denotes a begin or end of feature does the corresponding begin or end exist	ERROR	The PMC code appears to be missing coating end points
The Wld shot code exists	PASS	

Our Objectives

- Automated & Quick.

- Produce Production Ready Data

- Flexible & Efficient

- Transparent

Putting the Platform to Use

ArcGIS

General Workflow

Data received from Surveyor

ArcGIS Processing

"Good" data pushed to Enterprise GIS

Exception Reports sent to Surveyor who resubmits data
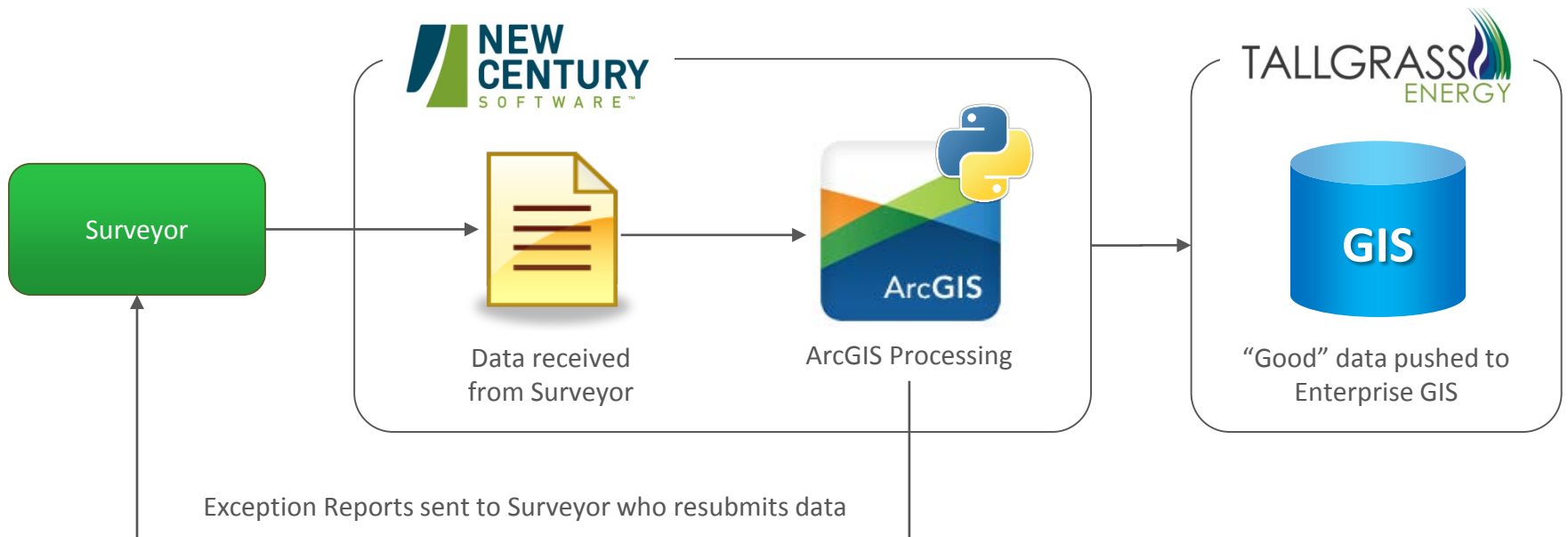
Python
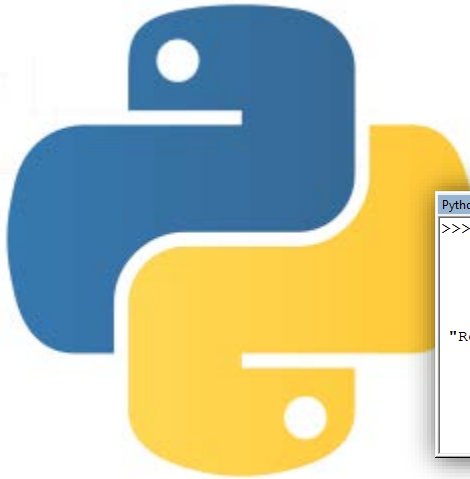
```
Python                                                              □ ×
>>> def MeasurePoints():
        Points = os.path.join(Workspace_PGDB, "Points")
        OutPoints = "in_memory/KMLPoints"
        if arcpy.Exists(Points):
            DebugMsg( "Applying measure to kml points")
            arcpy.LocateFeaturesAlongRoutes_lr(Points, Centerline,"Route_Id","1000 Feet", OutPoints,
"Route_ID POINT Begin_Measure","ALL", "DISTANCE", "ZERO","FIELDS", "#")

        else:
            arcpy.env.workspace = Workspace_PGDB
            arcpy.Rename_management("tmppoints", "KMLPoints")
```
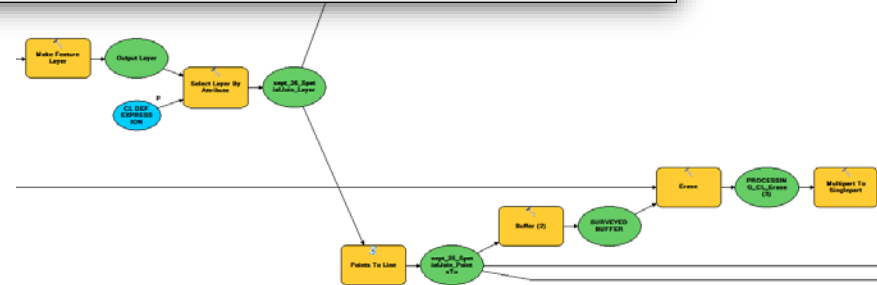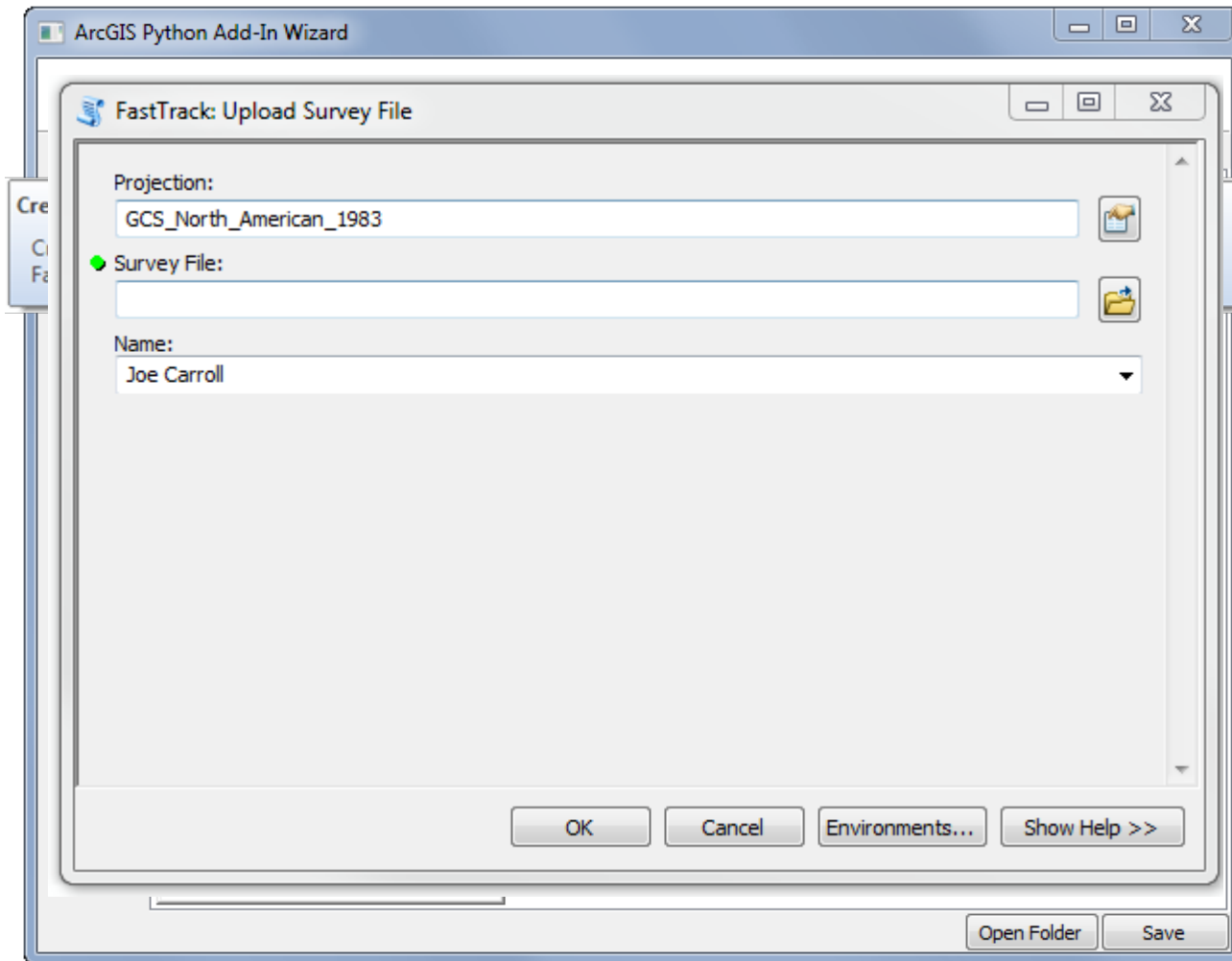
- Spatial and tabular validation

- Flexible

- Maintainable

- Allows GIS experts to maintain and manipulate

- Python allows up to leave the standard packages included with ArcGIS
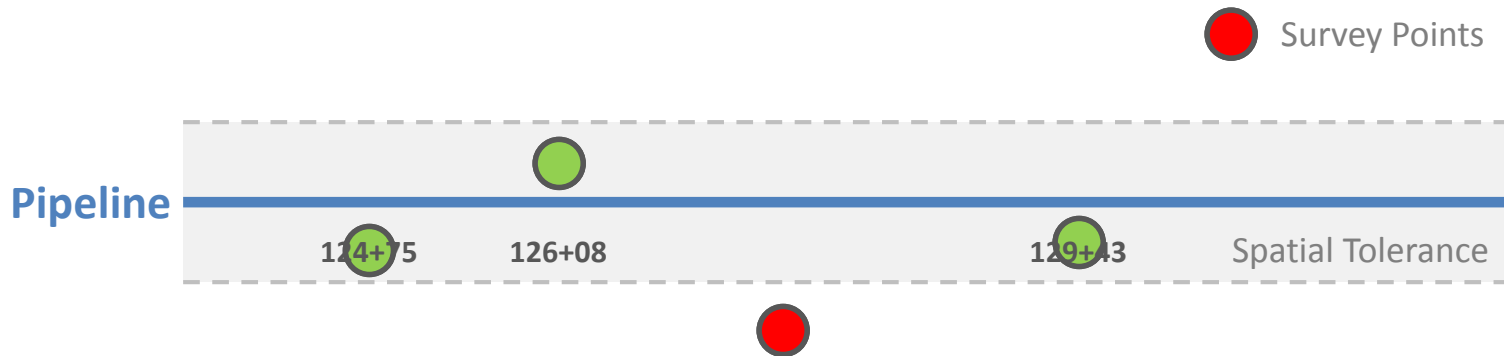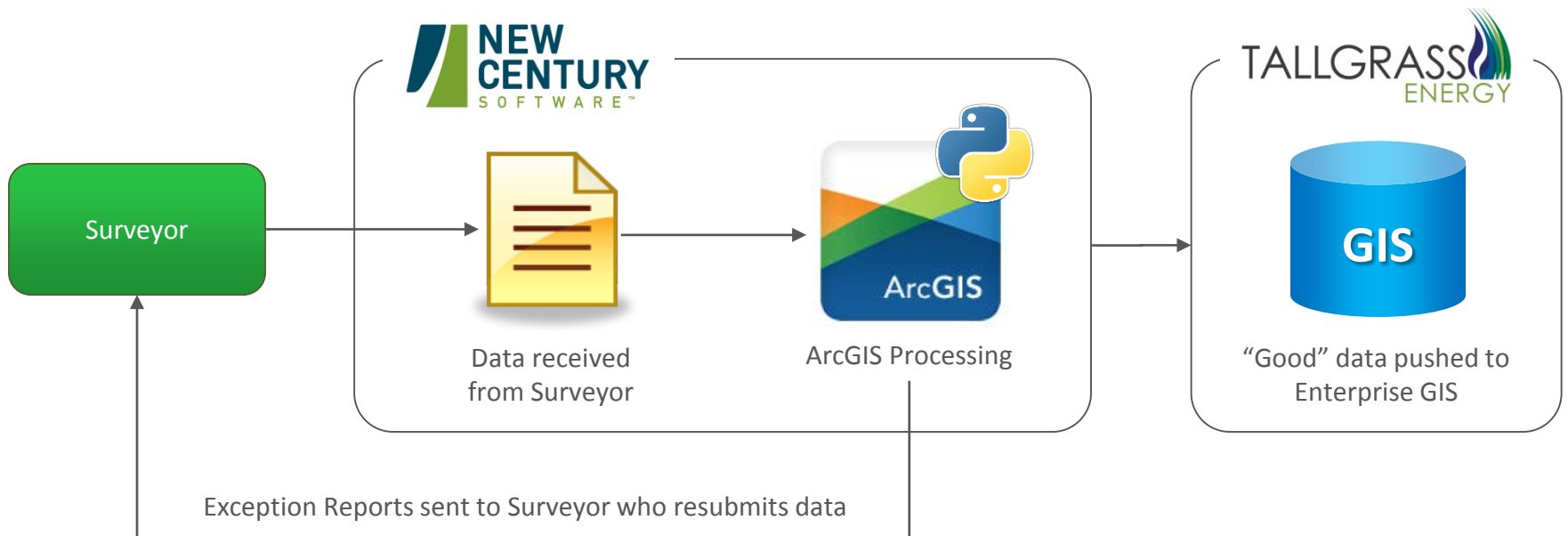
Flexible & Efficient

Automated & Quick

- Tabular Validation

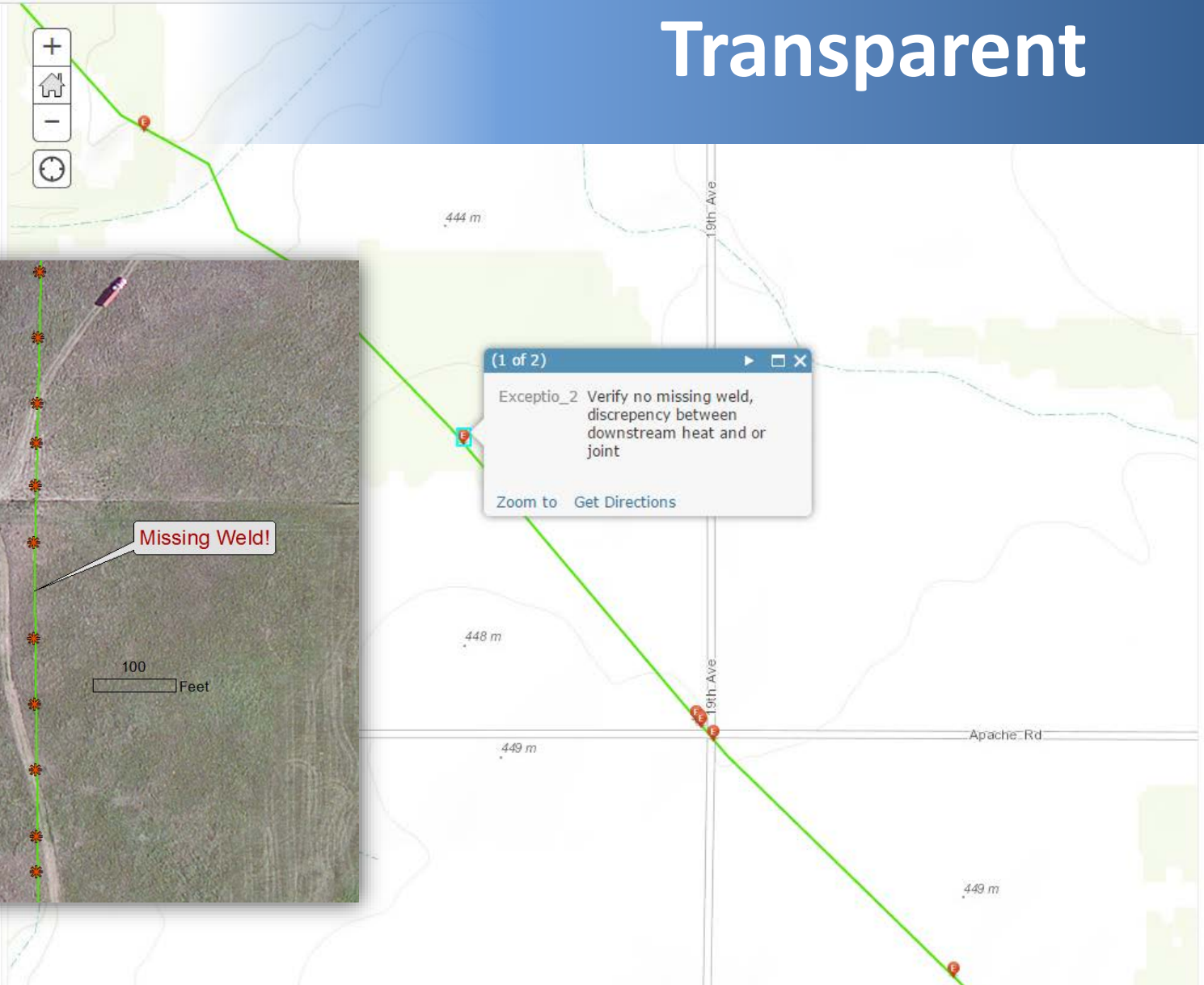| Validation Test	Error Type	Comments
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Automated & Quick

General Workflow

Status Sheet

Error Report

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Case Study

Use Case: Tallgrass Energy
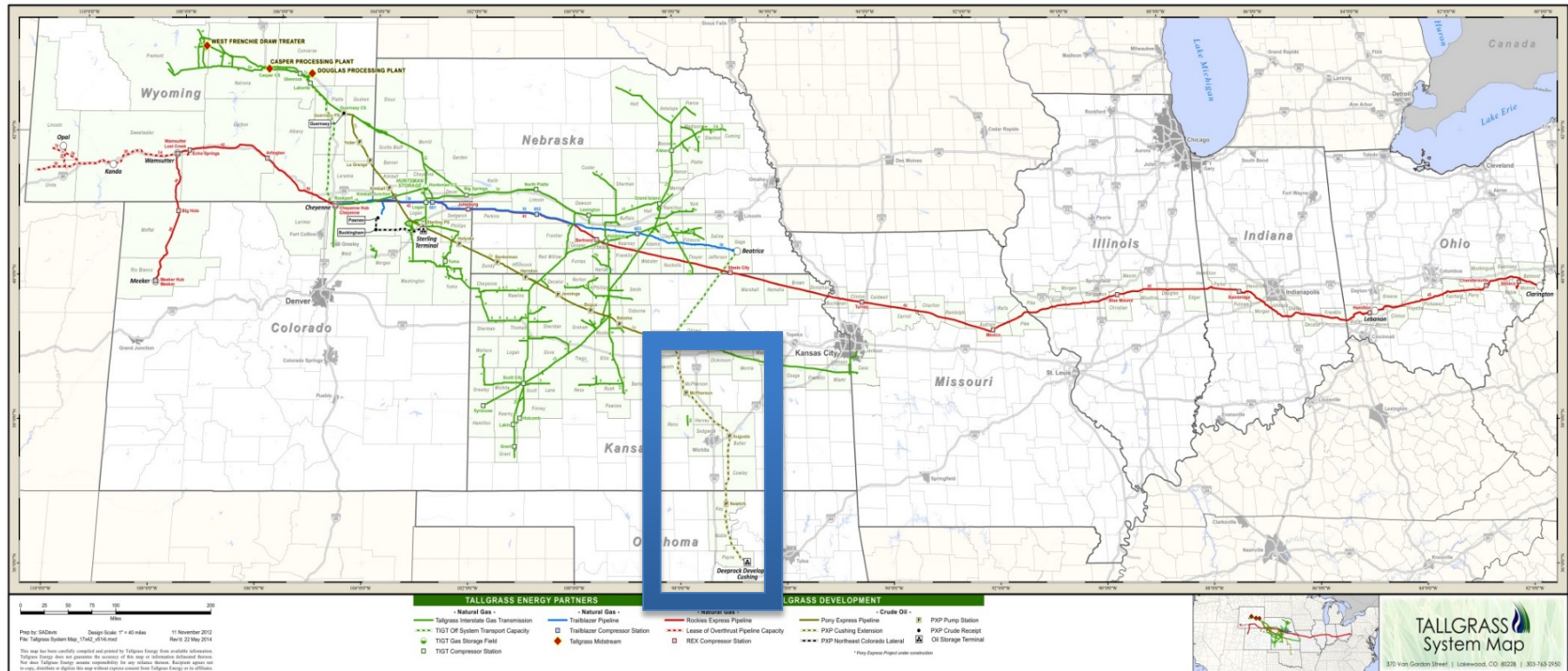
Lessons Learned

- HDD and bore data

- Heat numbers

- Duplicate or non-conforming weld numbers

- Bend or fitting data

- Anomalous survey shots

- Contradictory data elements

ArcGIS Based Solution

- Production Sandbox

- Scripted Validation

- Communicated/Corrected Errors

- Loaded Data

Benefits & Results

- Fast, reproducible process, flexible process

- Usable data

- Spatial and linear reference

Summary

- Survey Data Processing Issues are Common

- Pipeline Location & Asset Data is Foundation

- ArcGIS offers key benefits:

  – Flexible

  – Automated

  – Transparent

  – Efficient

Q/A