



GEOSPATIAL INFORMATION &
TECHNOLOGY ASSOCIATION®

Integrating Data for Pipeline Compliance

Part 2 - Implementation



Background

- **Jeff Alexander, Dominion Resources**
- **IT Technical Lead, Project ICE
(Integrity Compliance and
Effectiveness)**
- **Approximately 5,000 miles of
transmission pipe in scope**



Summary, Part 1 - Concepts

- **Establish a common reference system**
 - **Linear referencing**
 - **Spatial referencing**
 - **The Enterprise key**
- **Establish a repository for all integrity data**
- **Build a data dictionary that describes the sources and transformations of all data**
- **Example - Integrate ILI data using the common reference system**



Problem

- **Needed a new risk analysis tool**
- **Vendors required to integrate asset data and ILI data**
- **All vendors began by converting GIS shape files and historic stationing to c/l measures (i.e. continuous stationing)**
- **Vendors confused by old stationing which was based on original surveys**



Solution

- **Implemented a “smart” stationed centerline in our Smallworld GIS**
- **All measures are recalculated after changes to the c/l (e.g. relocations, swaps, refinements)**
- **Modeled on PODS (www.pods.org)**
- **All line features now have continuous measures**



Problem

- **Risk tool needed data that was stored in the GIS and satellite systems**
- **Example - valve asset data stored in GIS and valve inspection data stored in Inspection system**
- **Descriptive data allowed human to associate data**
- **Needed an automated solution**



Solution

- **Established an enterprise key**
- **Used the GIS system id**
 - **All assets are owned by the GIS**
 - **GIS has c/l measure and asset attributes**
 - **GIS supplies a unique key for each object instance (e.g. valve, CP test point)**
- **Enterprise ID added to each satellite system**
- **Equivalent to PODS event_id**



Problem

- **Needed a way to easily assemble data from multiple sources**
 - **Strategic Asset Management System (GIS)**
 - **Inspection Management System**
 - **Corrosion Management System**
 - **SCADA**
 - **Gas Sampling**
 - **Others**



Solution

- **Built a data repository in Oracle**
- **Publish versus subscribe**
- **Standard SQL and third party reporting tools**
- **Extensive use of database views (e.g. core event, risk analysis export)**



Problem

- **Needed a place to define each integrity data element**
- **Needed a way to track data sources, transformations, and data targets for each data element**



Solution

- **Data architects looked for a vendor package**
- **Custom built a data dictionary in Oracle**



ILI and GIS Problems

- **Spending a lot of time integrating and aligning survey data with GIS asset data**
- **Spending a lot of time generating pipeline maps for vendors**



Solution

- **Create the pipeline trace report ,which exports centerline data to Excel**
- **Include all features on the line, the enterprise id, the c/l measure, the x/y coordinate, and a description**
- **Use our GIS to generate maps as PDF's**
- **Ask vendors to call out features using the enterprise id**

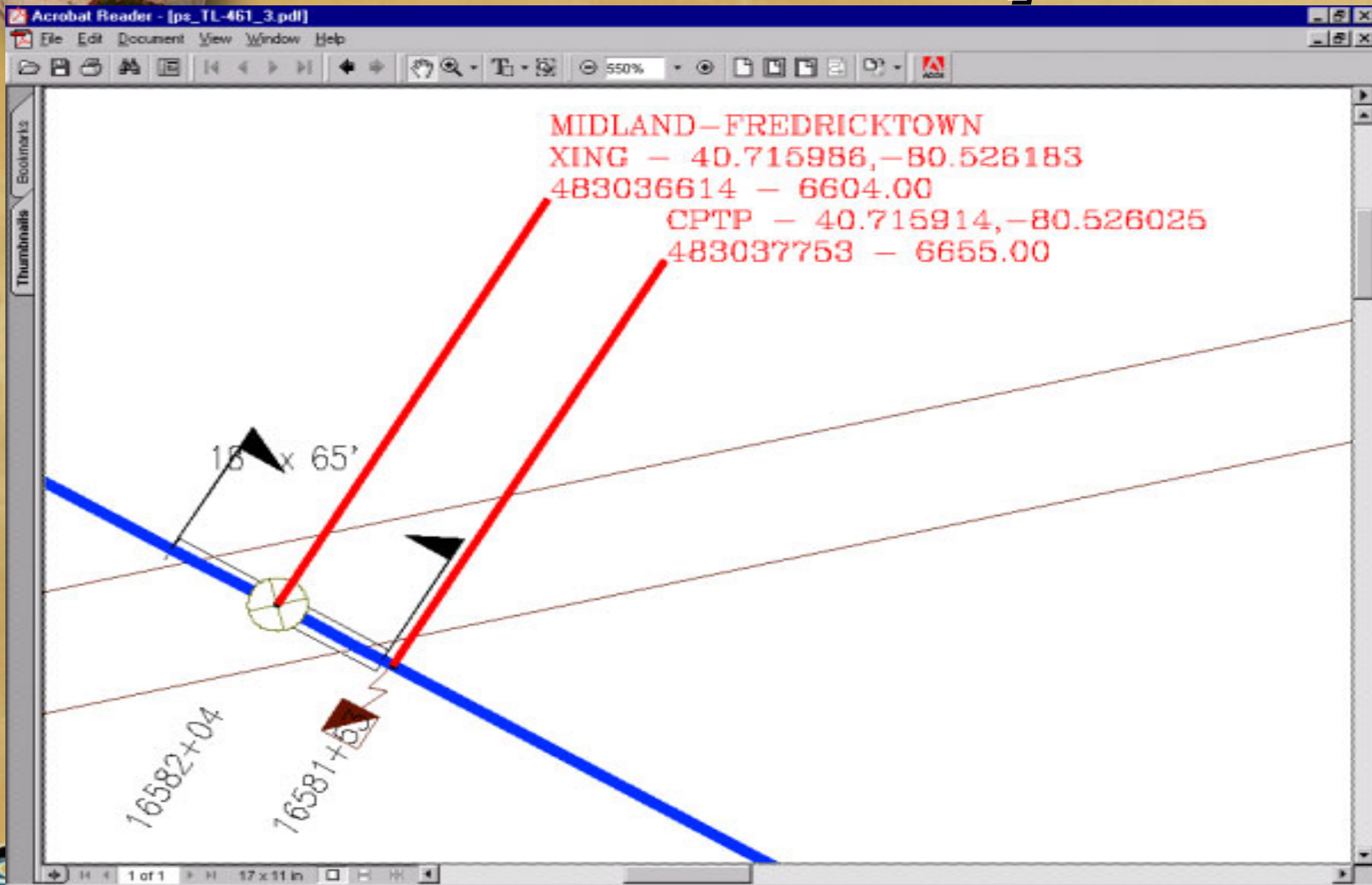


Solution - Excel Trace Rpt

FIT_PT_ID	START	END	FEATURE	HCA	LATITUDE	LONG	DESCRIPTION
483041567	0	6	PSEG	No	40.727016	-80.544776	14 in;0.375;Coal Tar Enamel;Grade B;1987;6 ft
483041556	6		SVEY	No	40.727016	-80.544776	16647+94
483041562	6		TEE	No	40.727016	-80.544776	14X6 in;Tee;Steel
483041542	9		STA VALV	No	40.727008	-80.544766	Vlv#925C;Ball;Port Dia 6;
483037736	6,557	6,650	CSNG	No	Unknown	Unknown	18 in;Vented Yes;UNKNOWN;65 ft
483036614	6,604		ROAD	No	40.715986	-80.526183	MIDLAND RD

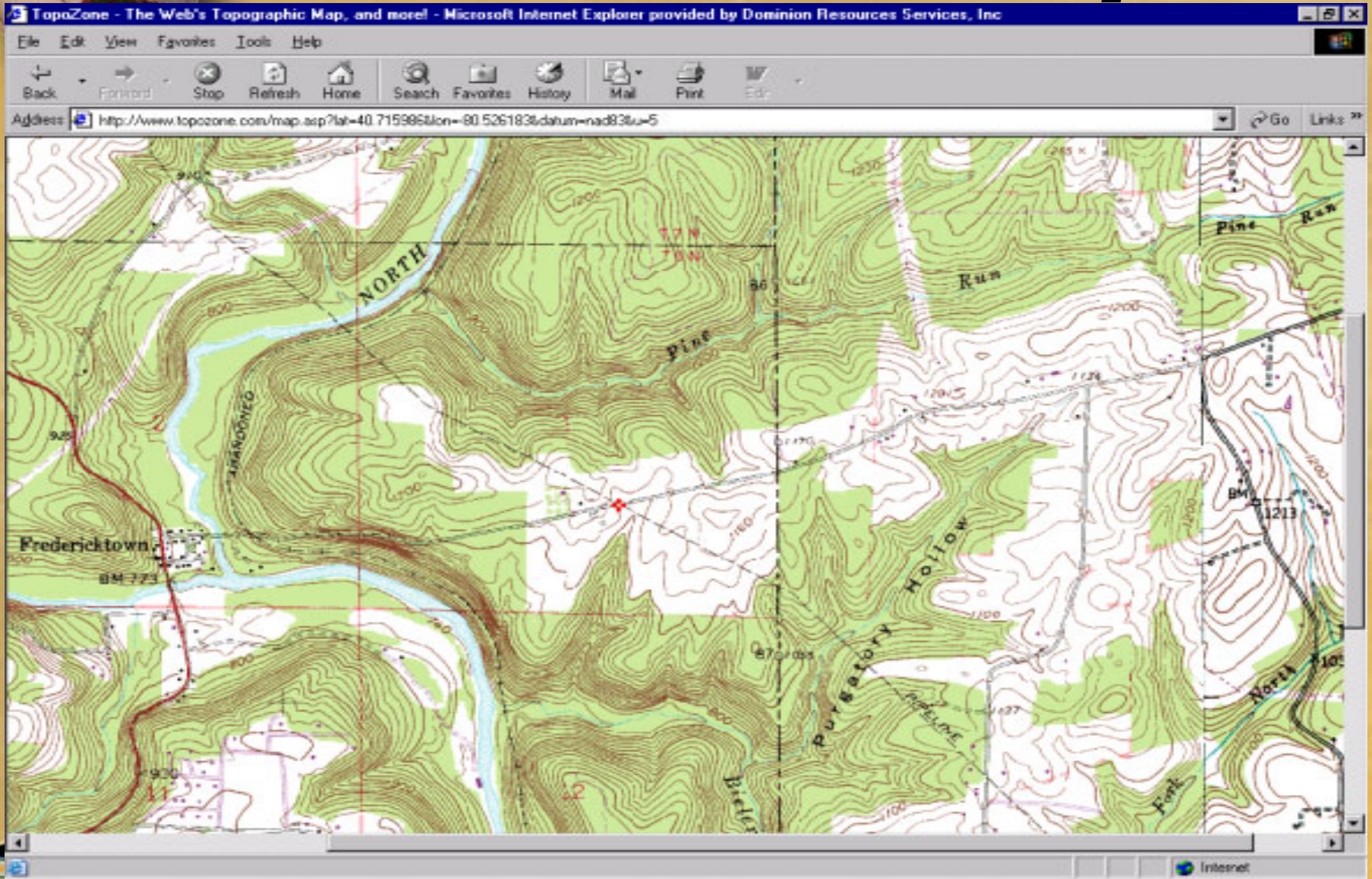


Solution - PDF Maps





Solution - Public Maps





Solution - Public Maps

TopoZone - The Web's Topographic Map, and more! - Microsoft Internet Explorer provided by Dominion Resources Services, Inc

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit

Address <http://www.topozone.com/map.asp?lat=40.715985&lon=-80.526183&datum=nad83&u=5> Go Links

Cursor is 40.7105°N, 80.5060°W (WGS84/NAD83) Internet



Conclusion

- **Linear referencing using the PODS stationed centerline in Smallworld**
- **Enterprise key using the Smallworld system id.**
- **Data repository in Oracle**
- **Data dictionary in Oracle**
- **Survey data integrated using pipeline trace reports, PDF maps, vendor self-help; alignment using enterprise ID**