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Using Spatial Analytics to Inform Capital Replacement Decision Making

*Esri User Conference
June 2016*

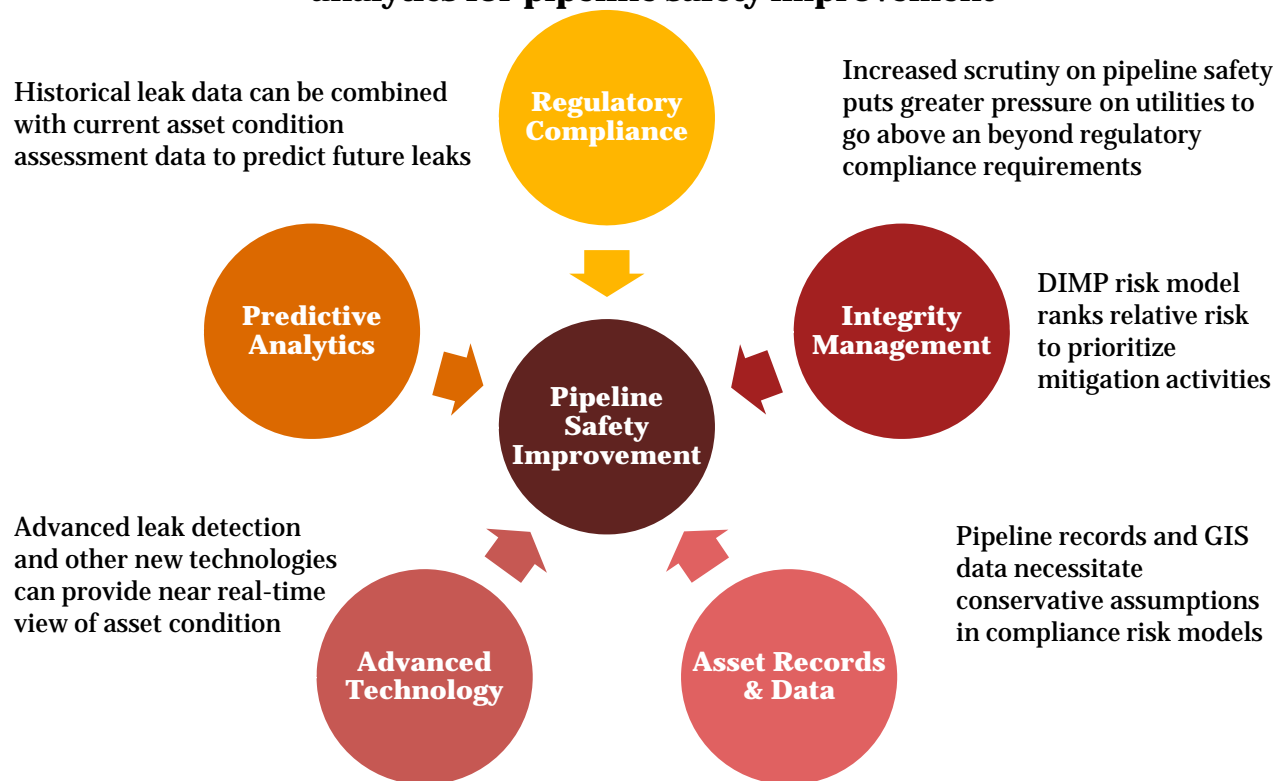
Lindsay Jenkins, PwC
Kate Porter, CenterPoint Energy

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Case Study: Spatial Predictive Analytics

Background

Multiple factors contribute to use of advanced technology and predictive analytics for pipeline safety improvement

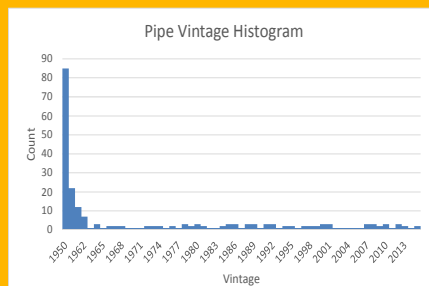


Case Study: Spatial Predictive Analytics

Predictive Modeling Process

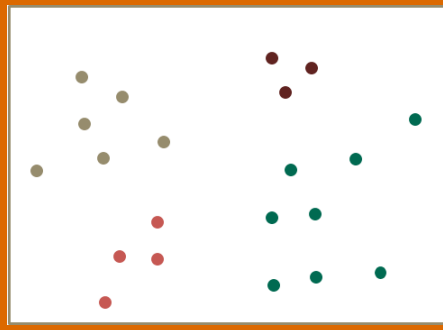
Data Analysis

- Assess data across five categories
- Recommend clustering algorithm and parameters
- Filter data for above / below ground leaks



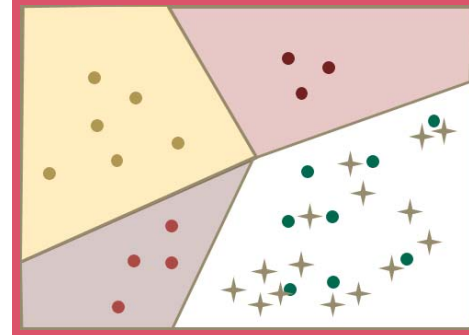
Clustering Analysis

- Deploy clustering algorithm
- Use Thiessen polygons to transform point clouds into cluster polygons



Condition Assessment Integration

- Map condition assessment data
- Assign condition assessment data to clusters

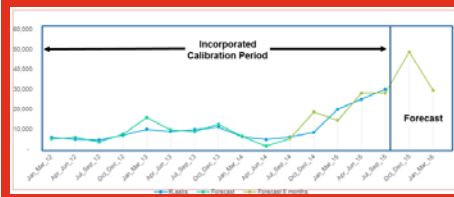


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Predictive Modeling Process (cont.)

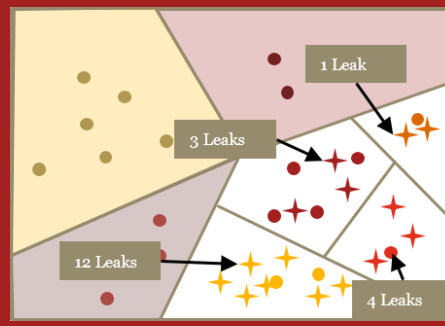
Predictive Modeling

- Create weighted master data set
- Model calibration and validation
- Forecast future leaks



Forecast Distribution

- Bin network
- Distribute to points in bins based on clusters
- Calculate future leak rate per bin



Project Level Predictions

- Calculate future leaks for project segments based on leaks and bin leak rate
- Aggregate forecasts for DIMP projects

PROJECT	Pred. Leaks	Grade
99998	0.22	A
99998	0.77	B
99998	2.43	C

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Results

- Developed a predictive leak model, leak impact model and capital replacement project prioritization decision support dashboard that can be easily automated and integrated with enterprise technology architecture
- Implemented cross-functional asset management process for capital replacement project selection and prioritization decision making and budget planning based on comprehensive data and quantitative metrics

Replacement Project Metrics

Predicted leaks per mile	Risk addressed per \$ capital	Predicted leaks addressed per \$ capital	Avoided expense ratio
<ul style="list-style-type: none">•The concentration of predicted leaks per mile. The higher the metric, the more potential leaks avoided per mile	<ul style="list-style-type: none">•A normalized view of a risk metric which allows for decisions to be made between larger and smaller projects	<ul style="list-style-type: none">•A measure to maximize the number of predicted leaks addressed for capital dollars	<ul style="list-style-type: none">•The estimated expense cost savings per dollar of capital invested for replacement

Questions?

Learn More

Thought Leadership

pwc.com/us/spatial

Lindsay Jenkins, PhD

PwC – Senior Associate

lindsay.m.jenkins@pwc.com

Kate Porter

CenterPoint Energy

kate.porter@centerpointenergy.com

Thank you

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