Establishing CP circuits in a GIS Network utilizing CP tracing:

Leveraging the power of GIS and cathodic protection tracing tools to identify and compile assets participating in gas corrosion control circuits.





About City Utilities of Springfield's Gas Cathodic Protection (CP) system:

- Approx. 1,088 different CP circuits (Gas Distribution and Transmission combined)
- Approximately 2,783 Test Station points in the combined Gas Distribution/Transmission network
- Operate under Federal DOT as well as Missouri Public Service Commission jurisdiction and guidelines.





Test Station Data prior to GIS:





Bringing Power Home."

Anatomy of a CP circuit







Primary Driver for Spatial Analytics

Assisting in efficient code compliance

(K) External Corrosion Control—Test Stations. (192.469) Each pipeline under cathodic protection required by this section must have sufficient test stations or other contact points for electrical measurement to determine the adequacy of cathodic protection.

§192.491 Corrosion control records.

(a) Each operator shall maintain records or maps to show the location of cathodically protected piping, cathodic protection facilities, galvanic anodes, and neighboring structures bonded to the cathodic protection system. Records or maps showing a stated



(I) External Corrosion Control-Monitoring. (192.465)

1. Each pipeline that is under cathodic protection must be tested at least once each calendar year, but with intervals not exceeding fifteen (15) months, to determine whether the cathodic protection meets the requirements of subsection (9)(H). (192.463)



How do you go from trusting paper cards to trusting your GIS?

- The main challenges for CU:
- Making sure GIS CP isolation points were functioning as such
- Circuits were defined at the test point, and yet, many test points contained test leads from different circuits
- Circuit identification was a number and letter combination that was inconsistent (i.e. se421/se421r)





Three-prong approach

- Leveraging the GIS CP Tracing based on core ArcFM model configuration
- Configure the test stations to be a CP "stop"
- Re-number all "like" test stations with same numeric-only values, posting these values to the test lead(s) whether right or wrong, utilizing tracing to sort it all out











🎒 ArcFM Attribute Edito	r X	
Selection QA/QC		
CP Test Station-sm 348 CP Circuit CP Circuit CPC	all scale	
Test Station ID	<null></null>	II .
CU_ID	31188	llí –
Test Lead Count	4 Wires	
Test Station Position	Below Ground	
Location Description	in back corner/sidewalk in concrete	
Test Station Type	[Standard]	
Date Installed	10/18/1972	
COMMENTS	TL box on N side/4'' VB	
Detail Map Number	NW-E03	
CP Circuit 1	348	
	shi ta	







Test Station Data after GIS clean-up:







ArcFM Attribute Edit	or X
Selection DA/DC	
CP Test Lead ⊕-∰ CP Test Station-lan ⊕-₩ 1 ⊕-₩ 1	ige scale
Test Station ID	<null></null>
CUID	29721
Test Lead Count	2 Wires
Test Station Position	Below Ground
Location Description	10'W/corner post, 5'S/fence
Test Station Type	[Standard]
Date Installed	9/1/1982
COMMENTS	TS is 4" pl box. Green tape on casing wire
Detail Map Number	SW-M09
CP Circuit 1	1
Insulated Indicator	<null></null>
Bonded Indicator	<nul></nul>
REF CELL	<nul></nul>
REFICELL DATE	<nul></nul>
REF CELL WIRE SIZE	<null></null>
REF CELL WIRE COLOR	<null></null>
Active Indicator	Yes
OBJECTID	5782
Creation User	MIGRATION
Date Created	12/10/2006
Date Modified	7/29/2014
Last User	TBOUSE
Work Request ID	<null></null>
Work Location ID	<nul></nul>
Work Function	None
Shape	<shape></shape>
Symbol Rotation	176
CP System Status	Closed





How does it work now?

- CP trace can now be ran from the office or the field on the gas network and accurately display the circuit limits as well as attributes of participating features in seconds (i.e. steel risers vs. anodeless risers).
- CP trace is ran as part of engineering designs that involve steel main in order to maintain valid circuit integrity when changes are proposed to the network.





Gas Cathodic Protection System Tracing

What does CP tracing do for us?

CP circuit performance trending analysis (future)

	Cathodic Protection Systems	□ ×	Cathodic Protection Systems	□ ×	Cathodic Protection Systems	□ ×
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Search	All Systems > System 7 >		All Systems > System 7 >		All Systems > System 7 >	
System 6 1066 ft 167! System 7 2047 ft 3210	Rectifier Amps 425 A Volts 35 Inservice Date 9/25/2006		Anode Material MG Inservice Date 10/27/2009 Description Residential (Stree	eet location)	Test Point Description Residential (Si Inservice Date 6/1/2005	t/Ave Address)
System 8	Description Residential				Test History	
System 9 22603 ft 38					1.5 ²	
Suctom 10					6,0.5 tit 2 -0.5	
System 7					-1.5	
Syster System Sur					2008 201	0
	Rectifier details		Anode details		Test point details and graph	



Cathodic Protection



Future uses?

- Utilize CP tracing to assist in determining connected steel risers vs. isolated steel risers
- Anode replacements
- Maintaining CP circuit integrity in conjunction with field changes



