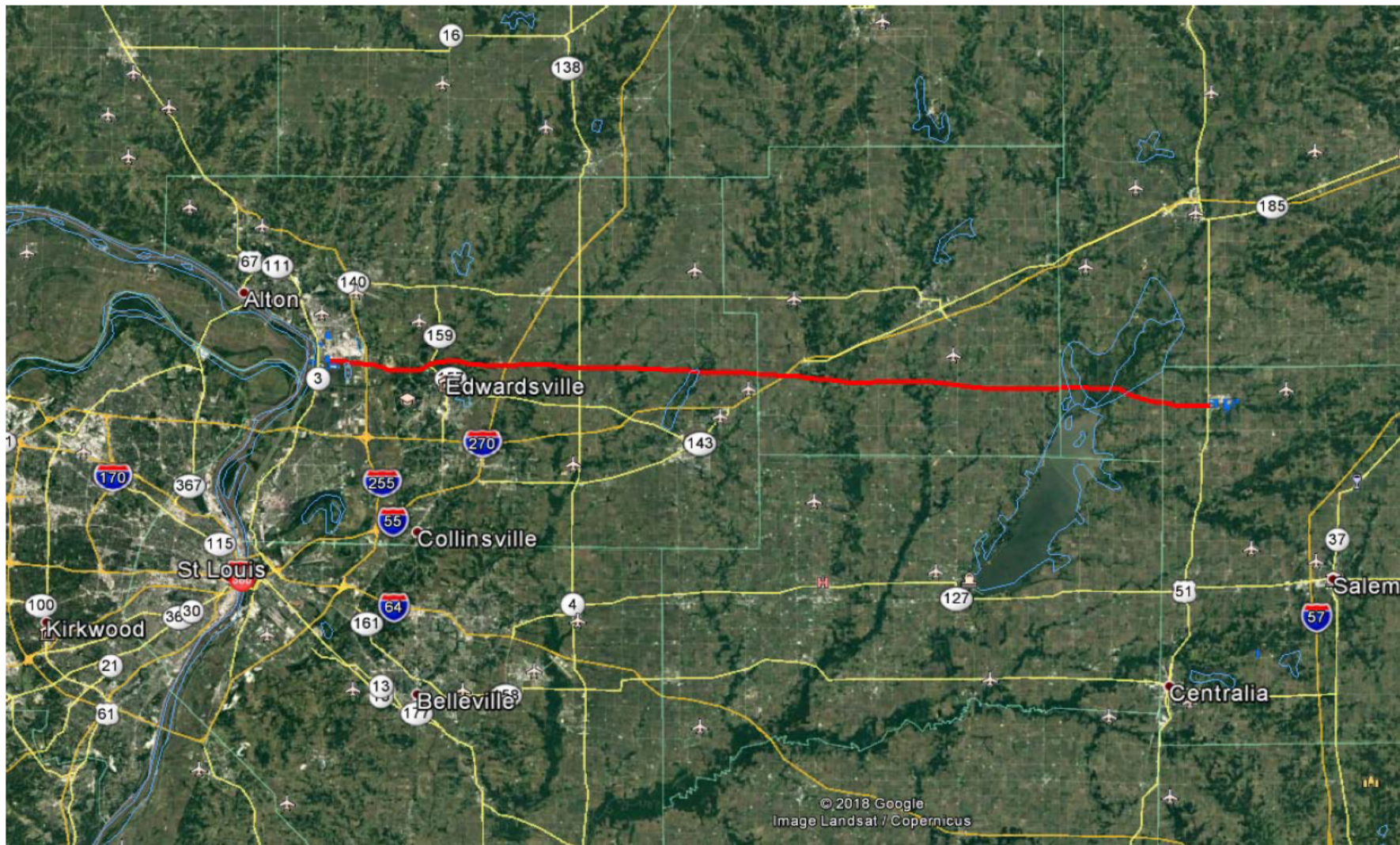


Marathon Pipe Line LLC
Operational Records
Title & Contract Transmittal Form

To be completed electronically					
DOT:	<input type="checkbox"/>	IMP:	<input checked="" type="checkbox"/>	RXI:	<input type="checkbox"/>
				HYD:	<input type="checkbox"/>
				Year:	2019
TapRoot:	Health and Safety:	<input type="checkbox"/>	Process Safety:	<input type="checkbox"/>	Product Quality (Cat 3-4): <input type="checkbox"/>
			Security:	<input type="checkbox"/>	Environment: <input type="checkbox"/>
<p>*System Name: Woodpat 22" Crude</p> <p>*Segment Name: Roxana - Patoka Woodpat 22"</p> <p>*Facility: n/a</p> <p>Record Description: IMP Risk Assessment Report</p>					
Document:	New	<input checked="" type="checkbox"/>	Revision	<input type="checkbox"/>	Year: 2019
					Project ID:
To be completed by hand after printed					
<p>Signatures: (Please print)</p> <p>Originator: _____ Date: _____</p> <p>T&C: _____ Date: _____</p>					
To be completed by T&C					
T&C File Number: _____ (Established by T&C)					



Pipeline Data

Roxana - Patoka Woodpat 22"

Length (miles): **54.7** Diameter (inches): **22**

Assessment Method	Year	Wall Thickness	Miles	SMYS (Pipe Grade)	Miles	Long Seam	Miles
		0.312	34.5	46000	53.7	ERW - LF	51.3
		0.344	18.7	60000	0.5	EFW	1.9
		0.500	0.9	65000	0.3	ERW - HF	0.8
		0.375	0.5	52000	0.2	SMLS	0.6
		0.281	0.1			DSAW	0.2
Future							

External Coating	Miles	Installation Year	Miles	Manufacturer	Miles	HCA	Miles
Coal Tar (Hot Applied)	53.4	1949	53.8	Unknown	1.2	HPA	2.0
FBE	0.7	2004	0.3	Salzgitter Manne	0.1	OPA	12.0
Liquid Epoxy	0.6	2018	0.2	Mannesmann	0.1	ECO	2.9
Hot Applied Wax	0.0	1990	0.1	Hyundai Hysco	0.0	DKW	6.6
Cold Applied Wax Tape	0.0	1991	0.1	Stupp	0.0	CNW	0.0
Bare	0.0	2004	0.1	U.S.Steel	0.0		
		2013	0.0	Hyundai Steel	0.0	All Types	21.9
		2004	0.0				(40%)

The triggering event for this Risk Assessment was an ILI tool run in March of 2017.

Scores Overview

Roxana - Patoka Woodpat 22"

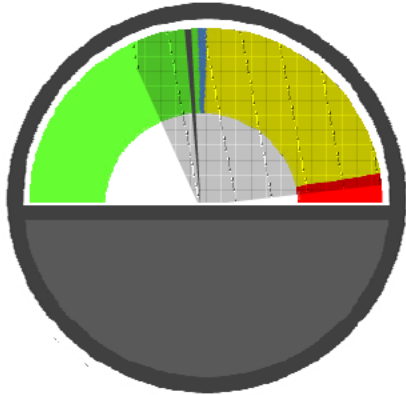
		Roxana - Patoka Woodpat 22"		2019 Marathon Pipeline	
		Avg	Max	Avg	5% Indicator
Threats	EC	2.87	6.46	2.58	4.75
	IC	2.16	4.25	2.21	4.25
	EAC	1.88	3.00	4.44	10.00
	MD	10.00	10.00	2.81	10.00
	EQ	4.75	7.11	5.43	8.28
	CFD	1.57	5.00	2.99	5.00
	IO	3.26	3.70	3.70	6.40
	OF	3.01	4.89	4.40	6.99
	WNF	4.06	8.00	4.23	6.25
	LOF	4.11	4.69	2.47	4.26
	COF	2.40	5.61	3.08	6.47
	ROF	9.90	24.36	7.40	15.05

ABC	Top 5%
ABC	Above Average
ABC	Below Average



Weather/ Natural Forces (WNF)

Roxana - Patoka Woodpat 22"



Average	MPL Average
4.06	4.23
Range	5% Indicator
3.16 - 8.00	6.25

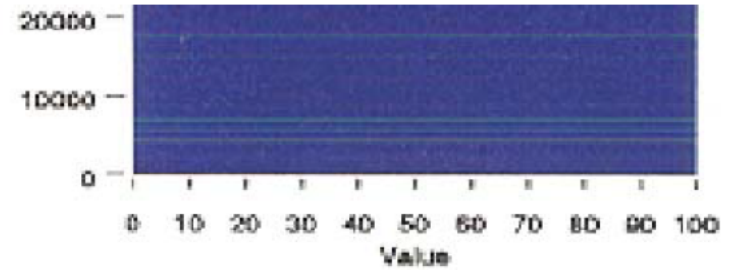
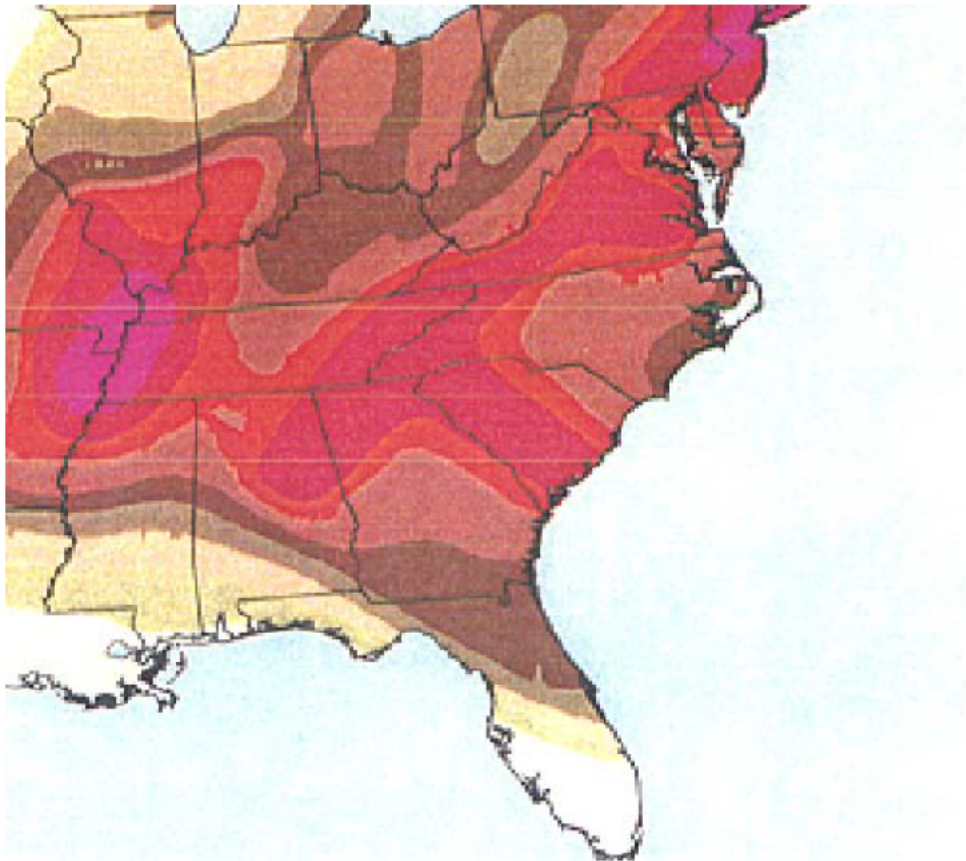
Feet Scoring in Top 5%	32,266 (11%)
Earthquake Rank	Moderate
Hurricane Rank	Low
Flood Hazard Rank	High
Landslide Rank	High
Subsidence	Present
Watercrossings ≥ 100 ft.	6
Max Watercrossing Width	1870 feet
WNF Related Incidents	0

High WNF score for the first 5.5 miles of the line and moderate for the next 2 miles. This location has a medium Earthquake rank and Karst present, also high Flood rank (close to the Mississippi River) and high Landslide rank.

All of the remaining locations with a high (top 5%) WNF score are at waterway crossings. There were four (4) waterways with a high WNF score not in the WWX program. They were reviewed by the Program Leader and determined to not be a concern (details on following pages). There were 6 waterways with high WNF score that are managed by the WWX inspection / repair program.

-Ops asked about the WWX at HWY 143 near Edwardsville - there's submar matting over the creek. We visually inspect them after flooding events. These were installed in 2015 due to the waterway encroaching on our pipe ROW. The matts are considered stable.

There are no other issues which require risk ranking or additional P&MM evaluation.

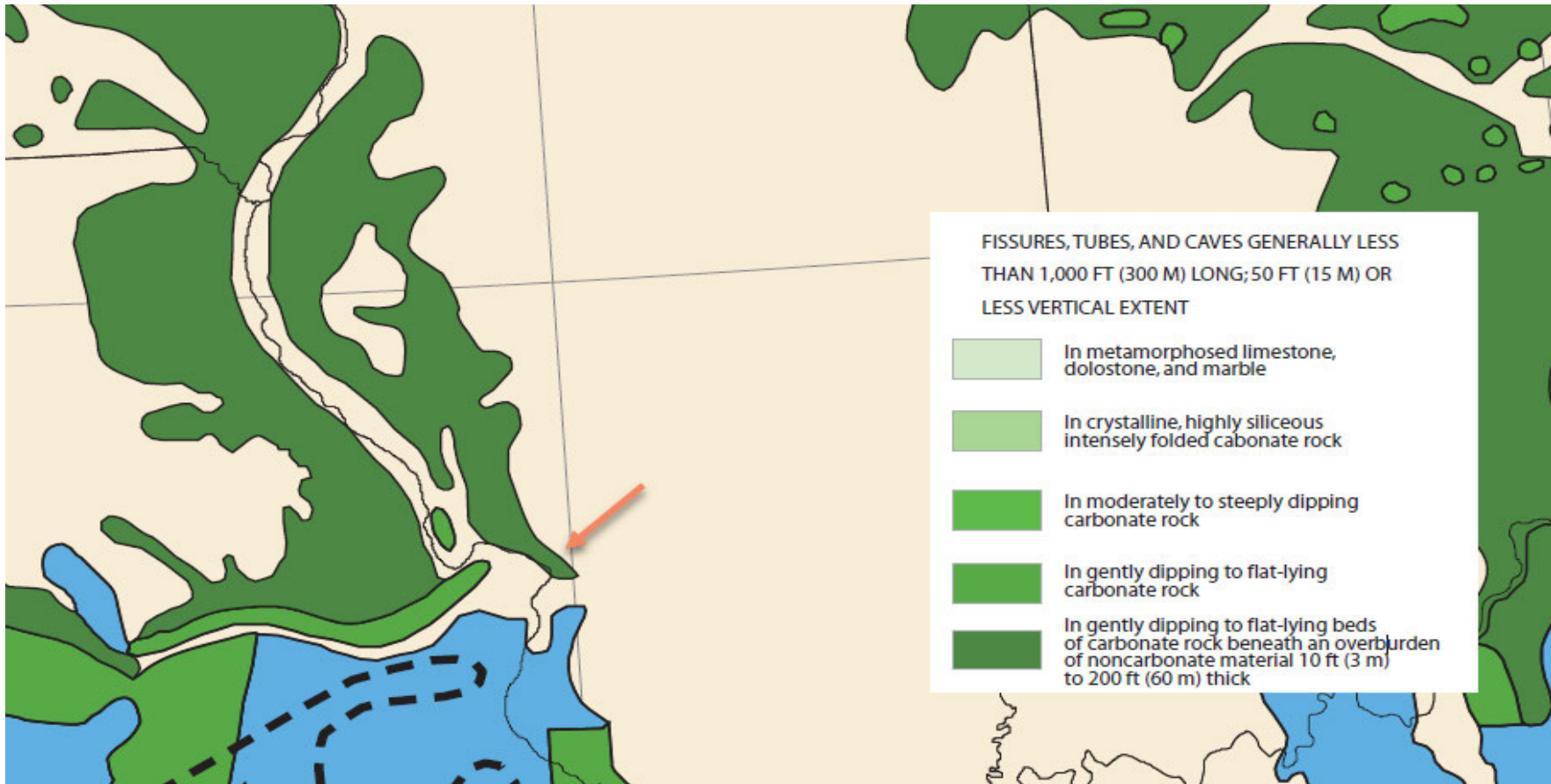


Earthquake Hazard Rank

90 - 100	40 - 50
80 - 90	30 - 40
70 - 80	20 - 30
60 - 70	10 - 20
50 - 60	0 - 10

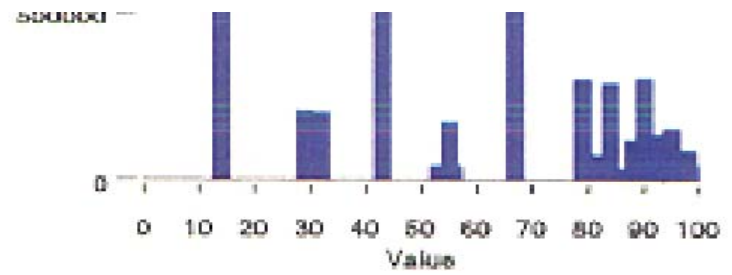
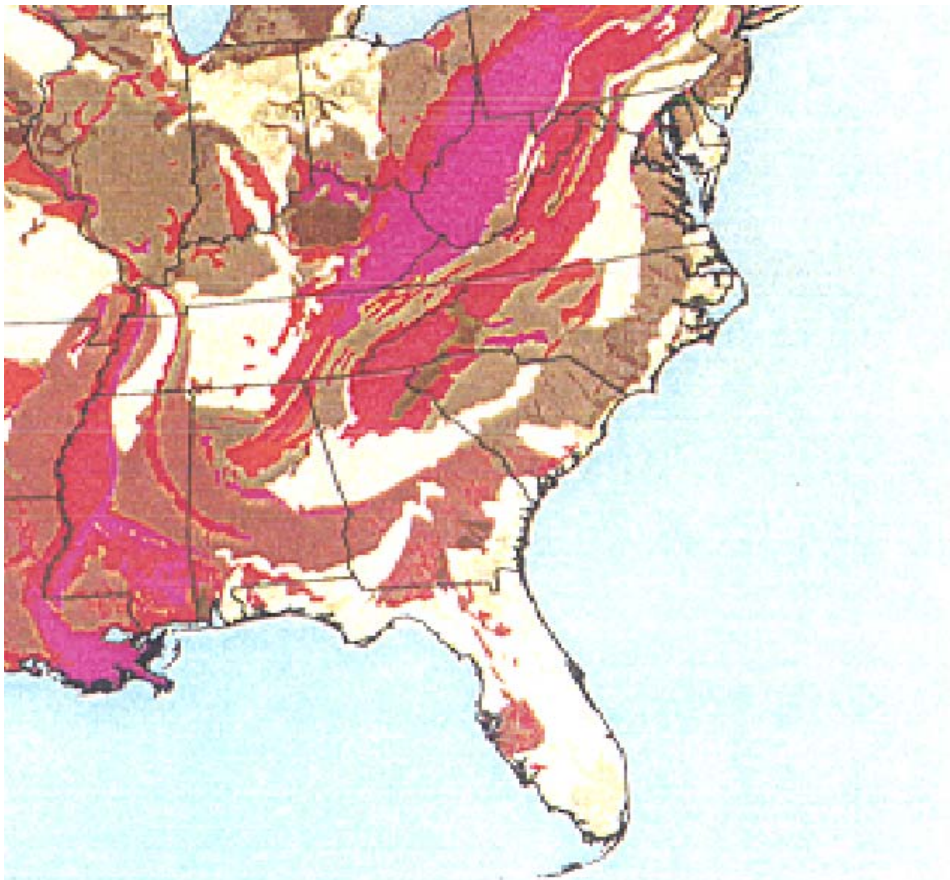
Data source:
NEHRP 1991

FEMA Earthquake hazard map. The part of the line closer to Wood River is in a higher Earthquake rank zone.













Karst USA map. The part of the line very close to Wood River is in a zone indicated to be at risk of caverns.

There are some caves along the river to the North West of Wood River.



Landslide Hazard Rank

	90 - 100		40 - 50
	80 - 90		30 - 40
	70 - 80		20 - 30
	60 - 70		10 - 20
	50 - 60		0 - 10

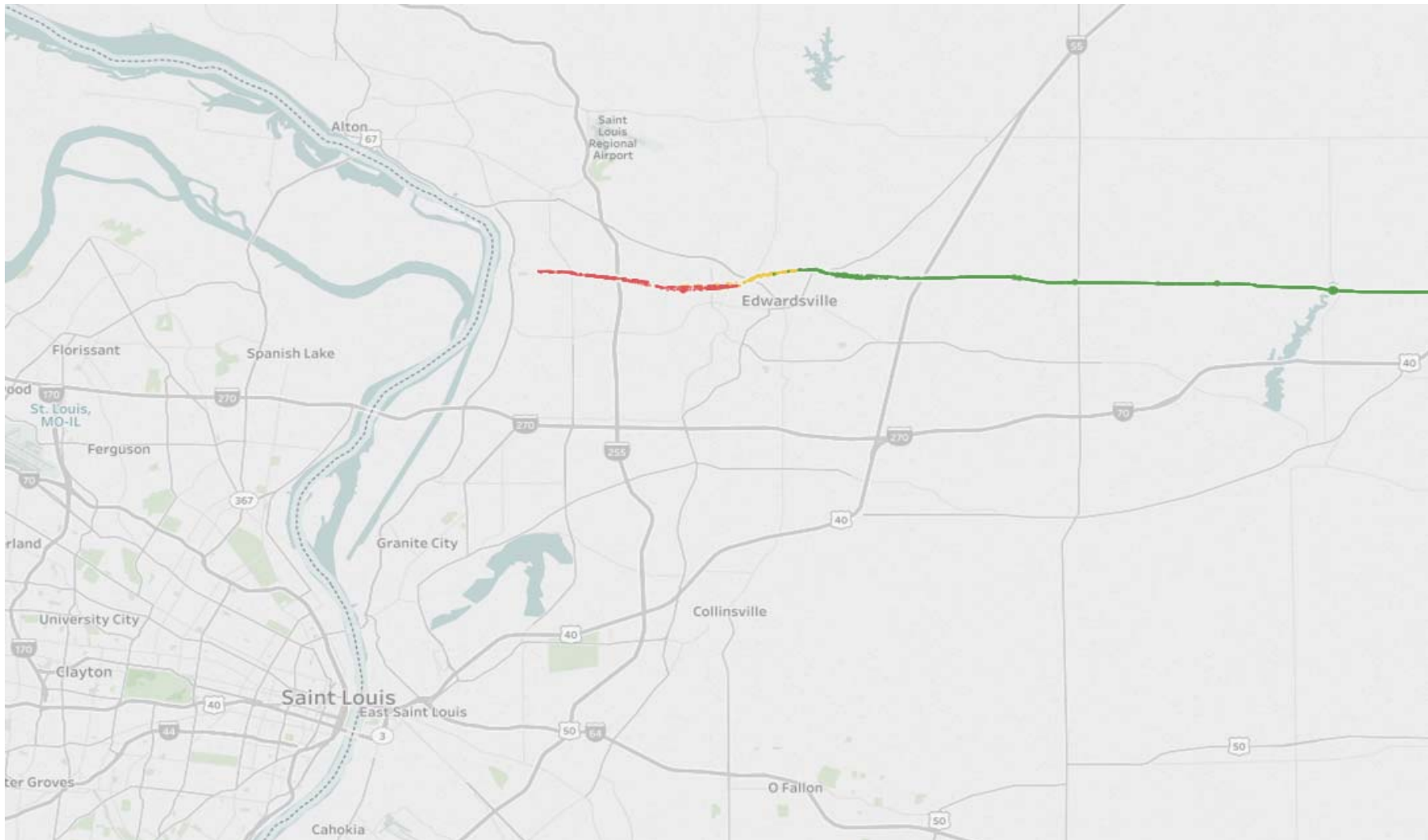
Data source:

Radbruch-Hall and others 1983

Olive and others 1989

Department of Agriculture (STATSGO)

FEMA Landslide hazard map. The part of the line in Wood River is in a higher Landslide rank zone.



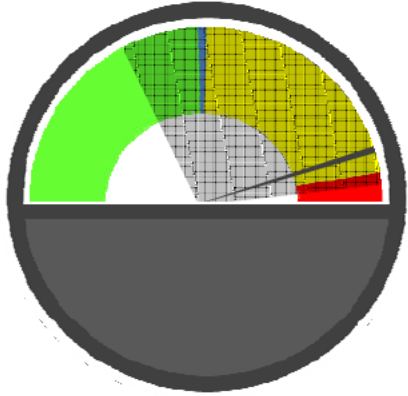
High score of 7.26 and Moderate score of 5.52: This is located at the Wood River end of the line, and goes through Wood River and South Roxana. Medium Earthquake rank and Karst present, also high Flood rank (close to the Mississippi River) and high Landslide rank.



Mats were installed at this waterway encroachment in 2015 as a P&MM.

Likelihood of Failure (LOF)

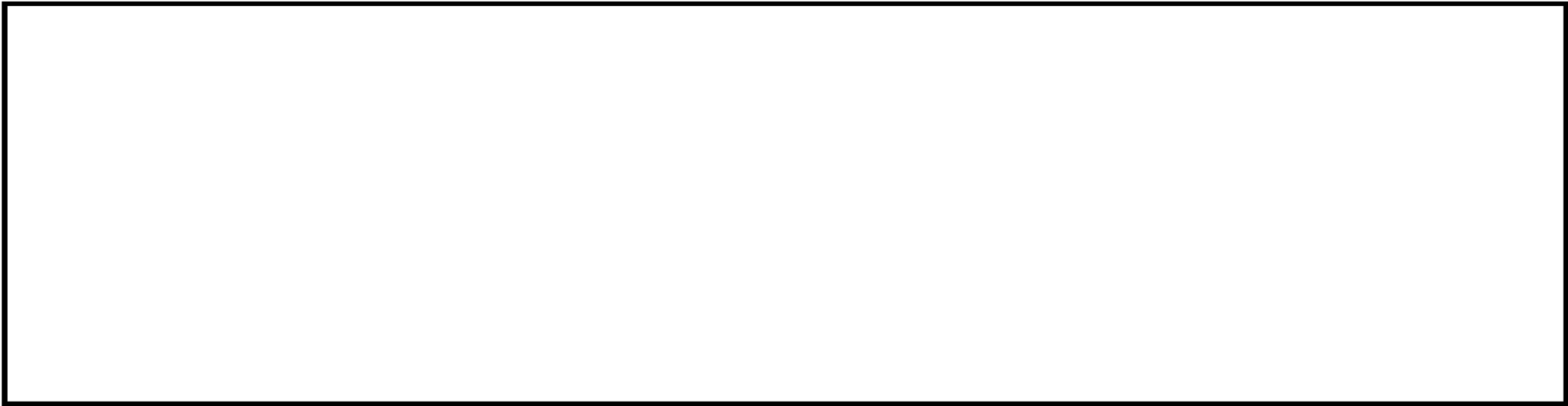
Roxana - Patoka Woodpat 22"



Feet Scoring in Top 5%	23,198 (8%)
Threats Scoring in Top 5%	EC IC MD WFD WNF
Max LOF Score	4.69 (175 feet)

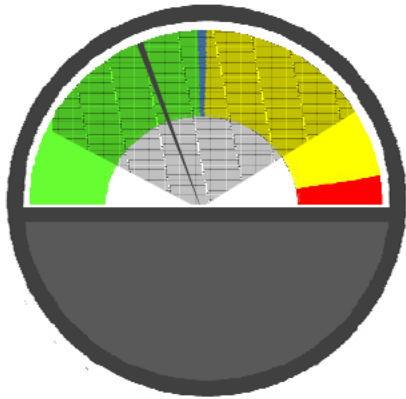
Average	MPL Average
4.11	2.47

Range	5% Indicator
1.80 - 4.69	4.26



Consequence of Failure (COF)

Roxana - Patoka Woodpat 22"



Average	MPL Average
2.40	3.08
Range	5% Indicator
1.00 - 5.61	6.47

Feet Scoring in Top 5%	0 (0%)
HCA Direct Impacts	HPA OPA ECO DKW
HCA Indirect Impacts	HPA OPA ECO DKW CNW
Predominant Land Use	Cultivated Crops
Max Estimated Release Volume	13,631 bbls.
Product Type	Crude
HVL Buffer Zone	N/A
Max COF Score	5.61 (789 feet)

High Population Areas around Roxana and Edwardsville.

ECO impacts in South Roxana, and at Carlyle Lake around the 48 mile mark. The tributaries into Carlyle Lake also have a DKW impact.

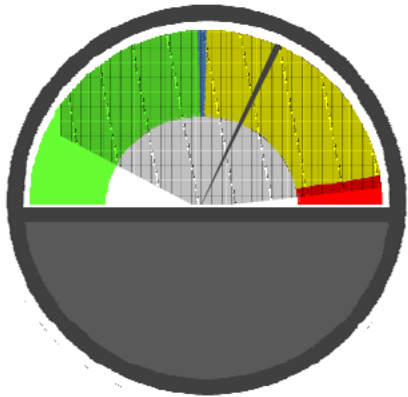
The highest calculated Rupture volume is 13,631 bbls and is [REDACTED]. This location is relatively low in elevation, and results in a larger drain-up volume.

There are no other issues which require risk ranking or additional P&MM evaluation.



Risk of Failure (ROF)

Roxana - Patoka Woodpat 22"



Feet Scoring in Top 5%	41951 (15%)
Max ROF Score	24.36 (9 feet)
Begin Measure	[REDACTED]

Average	MPL Average
9.90	7.40

Range	5% Indicator
2.40 - 24.36	15.05

Location with highest ROF is at [REDACTED] with an ROF score of 24.36. This is near [REDACTED] and is caused mainly by the high COF score where it intersects an HPA in combination with the high WNF score. Everything within the first [REDACTED] as a high ROF due to this HCA impact.

The areas where the pipe crosses near [REDACTED] also have a high ROF score of 16.39. This is due to the high COF score with the ECO and DKW impact and the WNF threat.

There are no other issues which require risk ranking or additional P&MM evaluation.