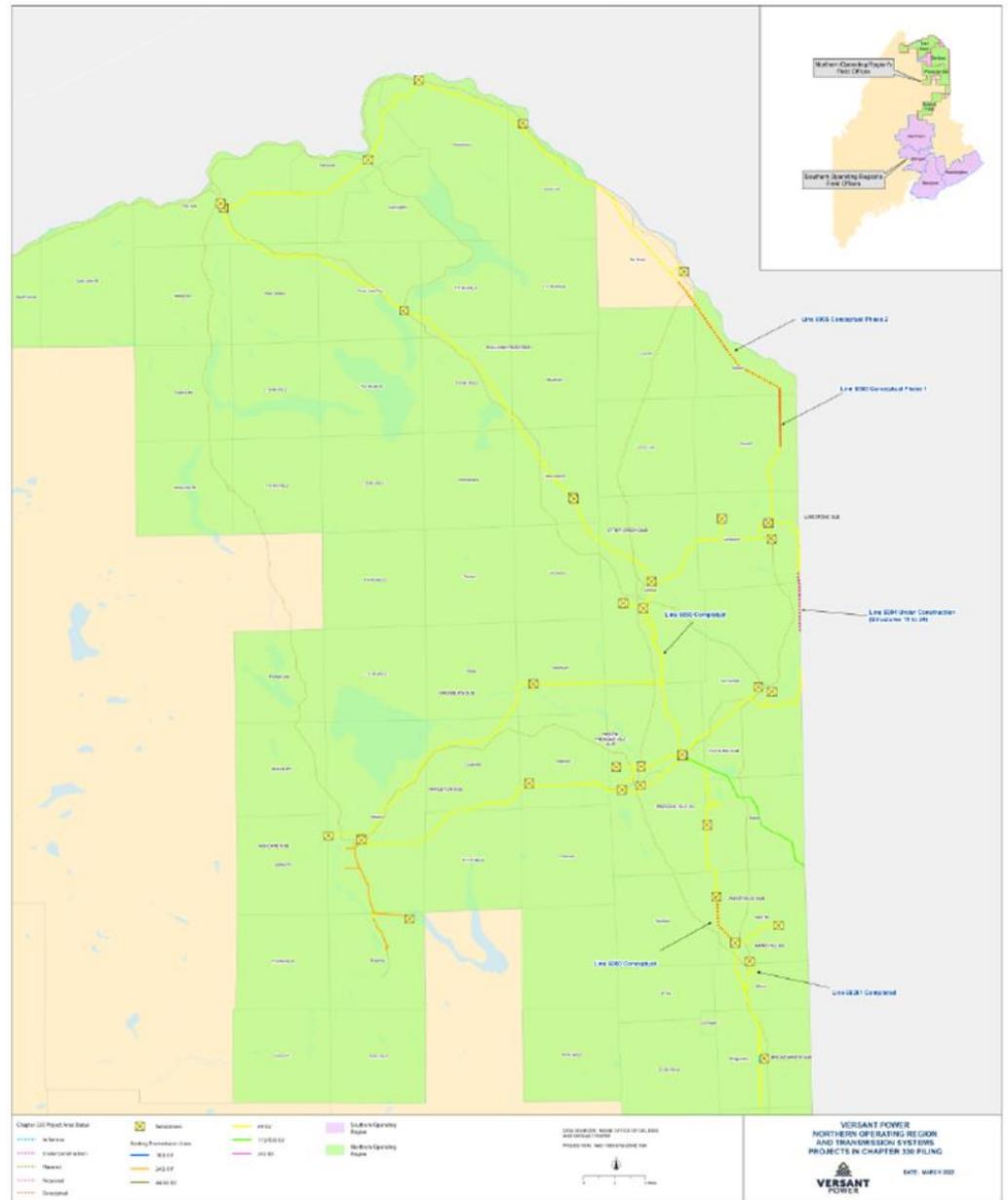




June 21, 2023

2023 PAG Meeting

Northern Maine Transmission System Chapter 330 Work Plan Map



Transmission Planning Collaboration

- Adjusted based on customer feedback
- Intent: spread out remaining required MPD rebuild plan over 15-20 years (total rebuild program will span nearly 30 years)
- Final plan subject to enhanced inspection findings (visual, drone, resistograph, climbing, ultrasonic, thermal, etc...)
- Line and targeted line segment rebuilds will be necessary but targeted structure maintenance will be performed when it makes sense to delay complete line rebuilds

Chapter 330 Plans & Adjustments

Summary of Past and Present Chapter 330 Reports

Year	2020 Report			2021 Report			2022 Report			2023 Report		
	Project	Miles	Cost Range (\$M)									
2020	6903 Pole 57 - 126	3.8	2.85 - 3.8									
	1176 Str 42 - Border	7.2	5.5 - 6.0									
2021	6930 Dow to Maysville	3.0	2.0 - 2.4	6930 Dow to Maysville	2.5	1.2 - 1.3						
	1176 Str 3 to 41	4.8	3.1 - 3.8	1176 Str 42 - Border	7.2	6.0 - 6.5						
				1176 Str 3 to 41	4.8	3.3 - 3.8						
2022	69053 Van Buren Tap	1.2	0.8 - 1.2	69053 Van Buren Tap	1.2	0.8 - 1.2	69201 Mars Hill Tap	1.0	1.3 - 1.4			
	69201 Mars Hill Tap	1.6	2.0 - 2.6	69201 Mars Hill Tap	1.6	2.2 - 2.6	6930 Dow to Maysville	0.5	0.2 - 0.3			
2023	69032 Loring Tap	1.6	0.9 - 1.1	69032 Loring Tap	1.6	0.9 - 1.1	6904 Str 11 to 34	3.5	1.8 - 2.0	6904 Str 11 to 34	3.5	1.8 - 2.0
	6905 Phase 1	4.0	2.2 - 2.6	6915 Flos to NPI	3.0	1.5 - 2.0	69032 Loring Tap	1.6	1.0 - 1.2			
2024	6915 Flos to NPI	3.0	1.5 - 2.0	6950 Westfield to MHSS	3.4	3.0 - 3.5	6915 Flos to NPI	2.5	2.0 - 2.5	Line 63	0.4	0.6 - 0.8
	6950 Westfield to MHSS	3.4	3.0 - 3.5									
2025				6905 Phase 1	4.0	2.2 - 2.6	6950 Westfield to MHSS	3.4	3.0 - 3.5	6950 Westfield to MHSS	3.4	3.0 - 3.5
2026							6905 Phase 1	4.0	2.6 - 3.0	6905 Phase 1	4.0	2.6 - 3.0
2027										6905 Phase 2	4.0	2.8 - 3.2
Total		33.6	23.8 - 29.0		29.3	21.1 - 24.6		16.5	11.9 - 13.9		15.3	10.8 - 12.5
Avg/Yr		6.7	4.8 - 5.8		5.9	4.2 - 4.9		3.3	2.4 - 2.8		3.1	2.2 - 2.5

Designates Project Under Construction at time annual Chapter 330 Report filed (April 1)

Designates project in BHD Operating Region



2022 Project Work Completed

- Line 6930 Dow to Maysville Siding Roads
- Line 6904 Transmission Rebuild per Inspection
- Line 6920 Transmission Rebuild per Inspection
- Line 69201 Move ROW to Roadside
- Line 69053 Transmission Rebuild per Inspection

** Yellow shading denotes Chapter 330 Project

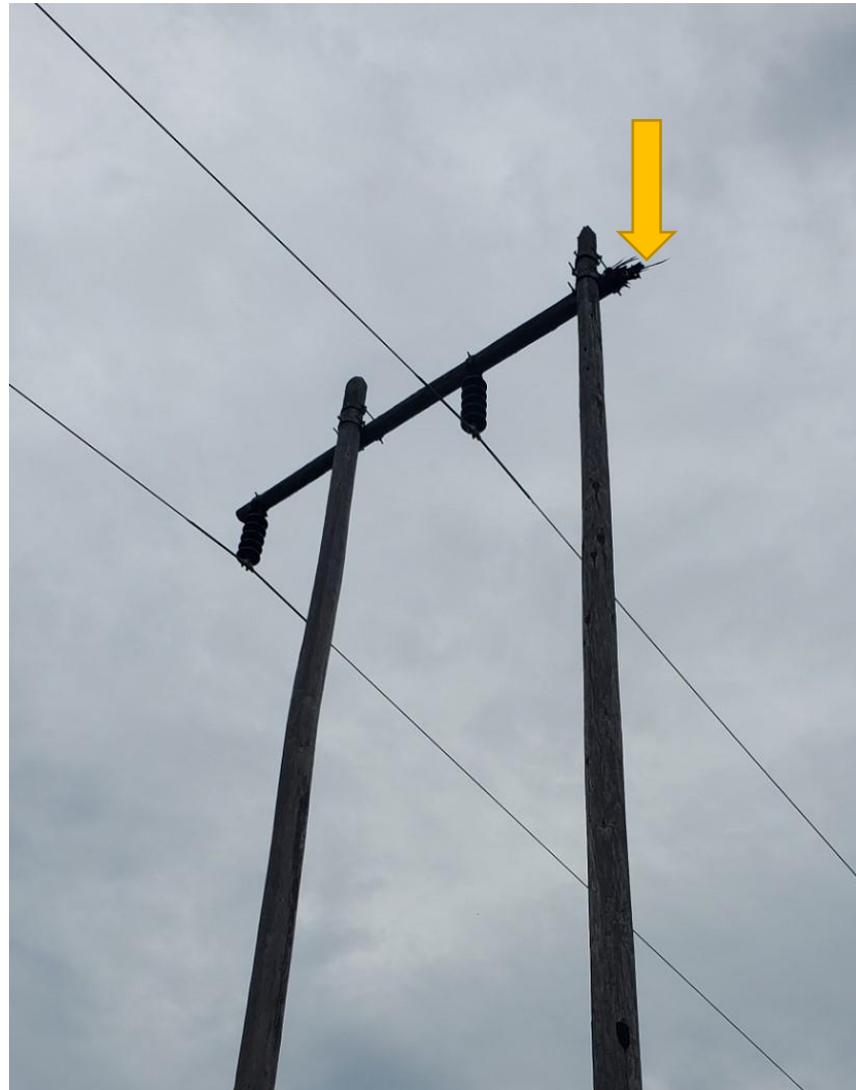
Emerging Issues

System Condition

- **Line 6905 – Line connects Madawaska Substation to Limestone Substation serving Grand Isle and Van Buren communities via tap lines. Originally built in 1964, wood poles and wood pole crossarms continue to age and are becoming weaker with more rejects occurring as a result. Phased rebuild of this line planned to begin in 2025.**
- **Line 6920 – Line connects Mars Hill Switching Station to Mullen Substation serving communities of Bridgewater and Monticello via tap lines. Originally built in 1964 through 1967 period, wood poles and wood pole crossarms continue to age and become weaker with more rejects expected to occur in coming years. Eventually, a complete rebuild of various sections will make more economic sense than spot targeted maintenance work. Also, lack of overhead lightning protection places many structures at risk of strikes, which can adversely impact crossarms, poles and insulators.**

Line 6905 Condition

Wood pole
crossarm
failure due to
internal decay
or possible
lightning strike



Line 6905 Condition continued...

**Drooping
crossarm
under
weigh of
conductors
likely
caused by
internal
decay**



Line 6905 Condition continued...

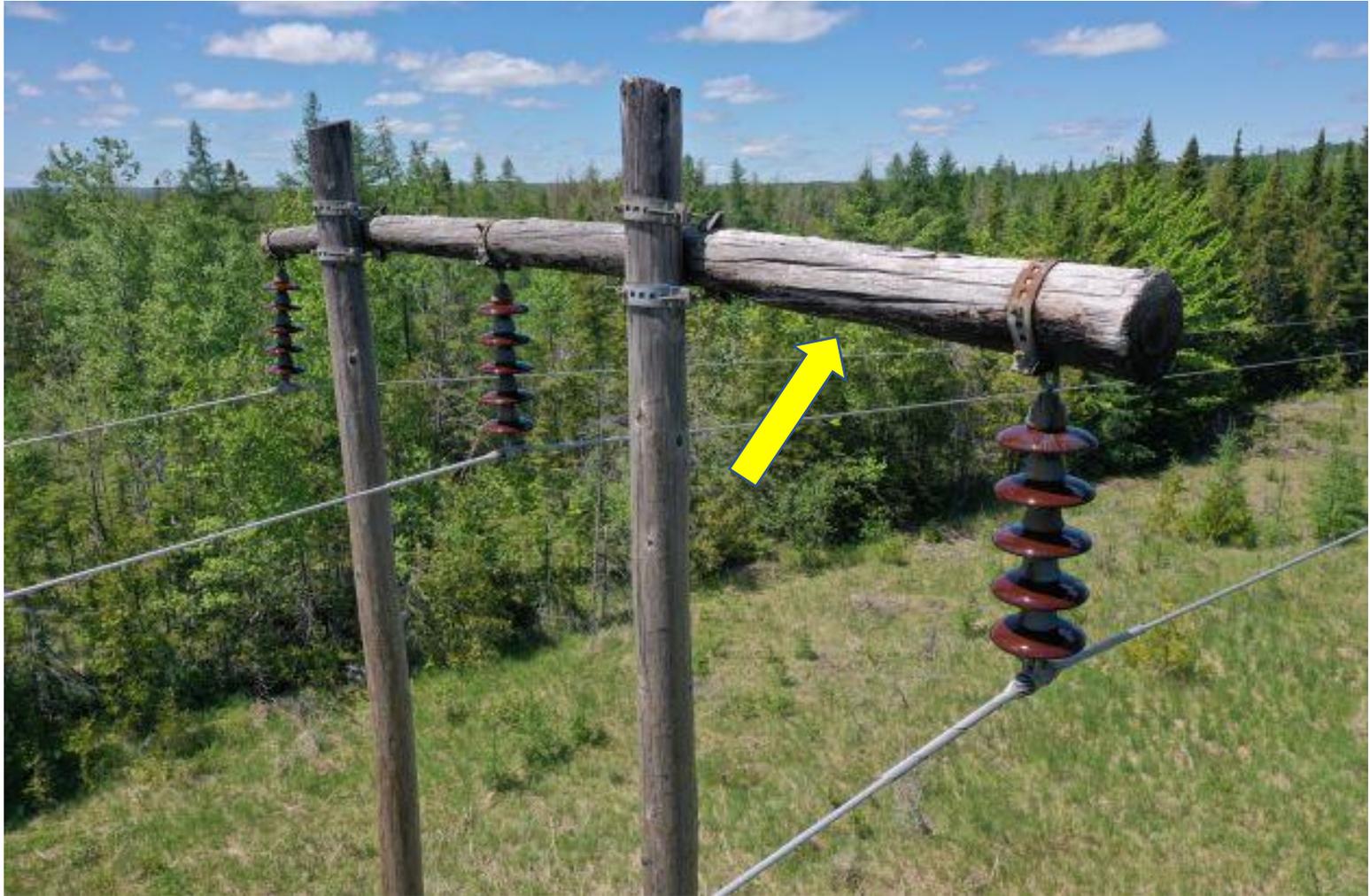
Company inspectors are finding that wood stub poles placed alongside original wood poles with decay are themselves reaching end of life leading to structure replacement



Line 6920 Condition



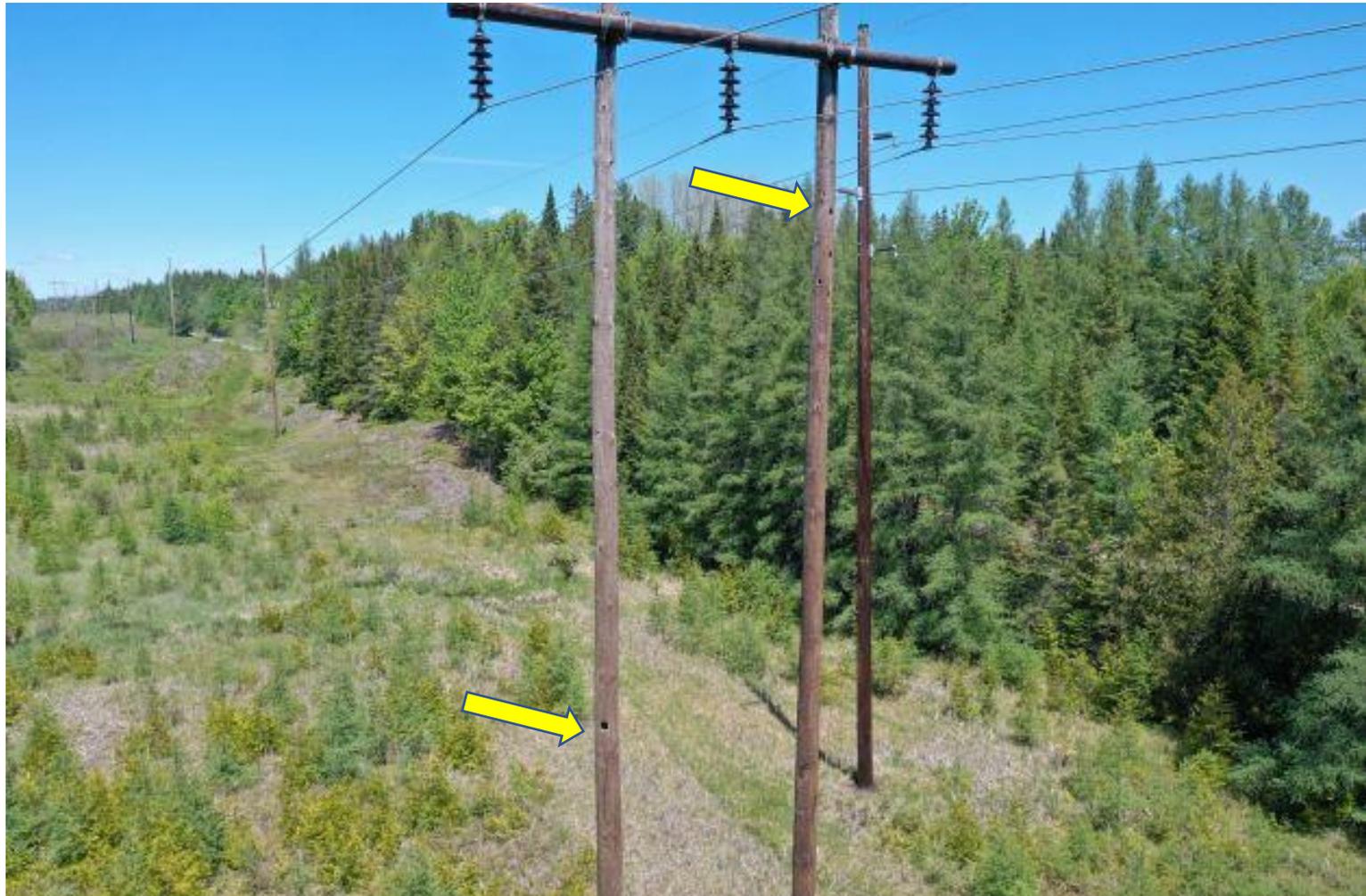
Line 6920 Condition continued...



Line 6920 Condition continued...



Line 6920 Condition continued...



Enhanced Inspection Methods - Drones



Overhead images provided by drones are providing asset managers with a new and different way of assessing asset condition

Example of a Closeup Drone Inspection Photo



Enhanced Inspection Methods continued...Wood Pole Strength Assessment using Resistograph



Using a long thin needle the electric power consumption of the resistograph drilling device is measured and recorded. The resistance data gathered provides a high linear correlation between the measured values and the density of the penetrated wood.



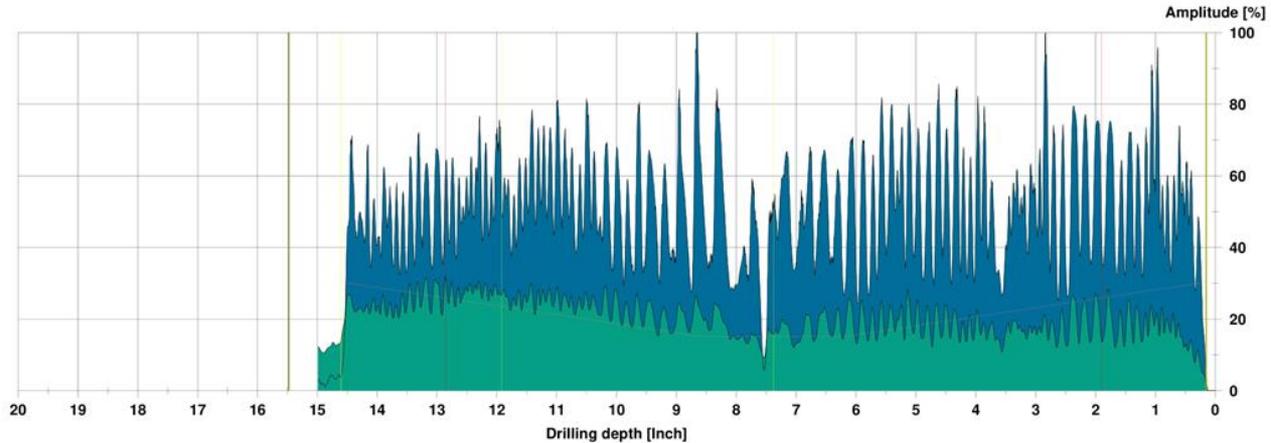
Resistograph Plot - Wood Pole in good condition

Measuring / object data

Measurement no.:	47	Speed	: 3000 r/min	Diameter:	13,25 in
ID number	: 20694	Needle state:	---	Level	:
Drilling depth	: 14,99 in	Tilt	: -30°	Direction:	
Date	: 01/15/2019	Offset	: 56 / 289	Species	:
Time	: 11:33:03	Avg. curve	: off / off	Location	:
Feed	: 10 in/min			Name	:

WoodInspector

Program	: Pole - EMERA 1.00	Sum decay	: 0,0% 0,0% 0,0%
Pole type	:	Heart rot	: 0,0% 0,0% 0,0%
Measurement	: Below soil level	Shell rot	: No No
Defect pattern	: No decay	Remaining wall	: 50,0% 50,0% 50,0%
Result (auto)	: PASS	Strength	: 100,0% 100,0% 100,0%



Assessment

Comment

20694M047 (PASS).rgp

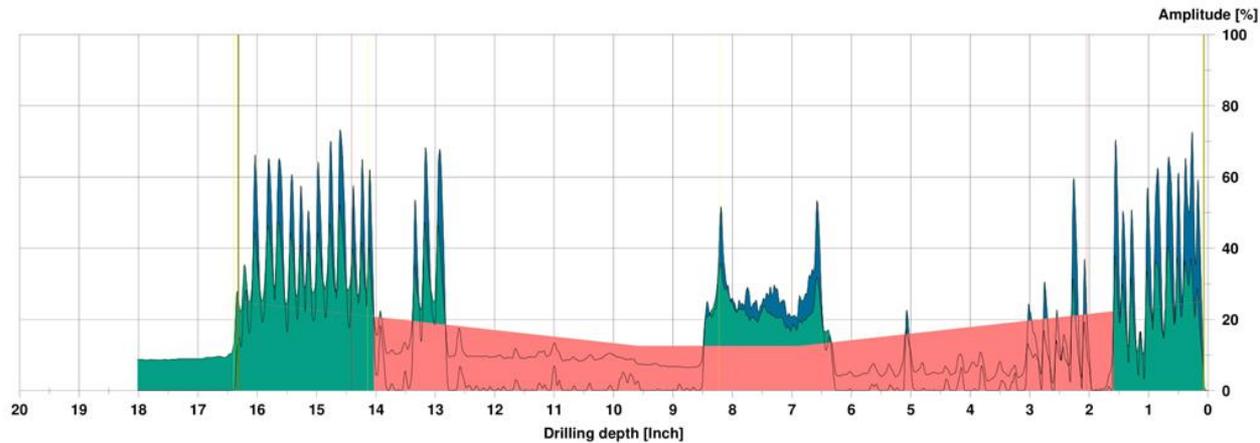
Rejected Wood Pole – Heart Rot

Measuring / object data

Measurement no.:	13	Speed :	3000 r/min	Diameter:	16,25 in
ID number :	20781	Needle state:	---	Level :	
Drilling depth :	18,01 in	Tilt :	-1°	Direction:	
Date :	10/23/2018	Offset :	93 / 388	Species :	
Time :	09:24:24	Avg. curve :	off / off	Location :	
Feed :	40 in/min			Name :	

WoodInspector

Program :	Pole - EMERA 1.00	Sum decay :	40,7%	35,6%	76,3%
Pole type :		Heart rot :	40,7%	35,6%	76,3%
Measurement :	Auto diameter	Shell rot :	No	No	
Defect pattern:	Heart rot	Remaining wall:	9,3%	14,4%	11,8%
Result (auto) :	REJECT	Strength :	56,1%	74,3%	65,2%



Assessment

Comment

20781M013 (REJECT).rgp

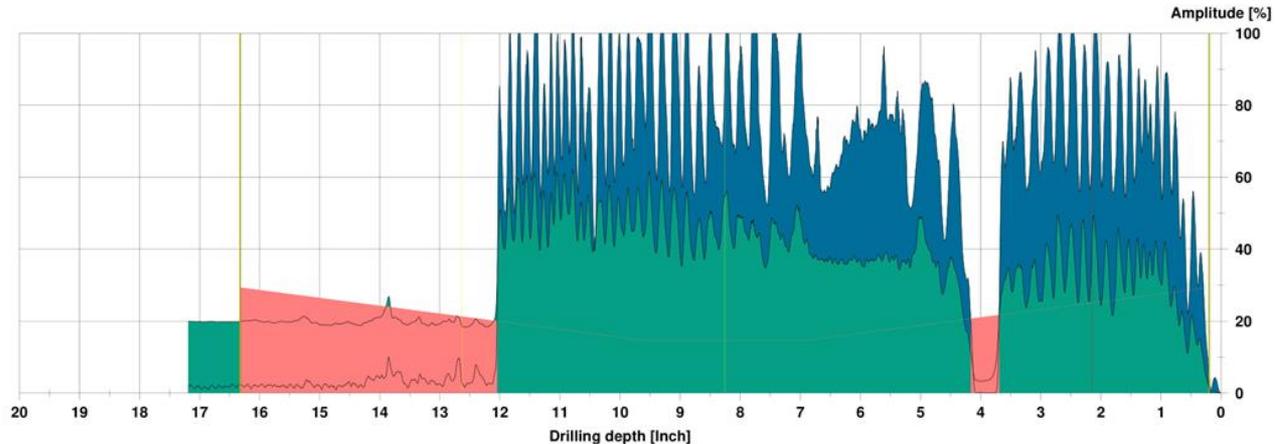
Rejected Wood Pole – Heart Rot & Shell Rot

Measuring / object data

Measurement no.:	46	Speed :	3000 r/min	Diameter:	14,00 in
ID number :	20705	Needle state:	---	Level :	
Drilling depth :	17,19 in	Tilt :	-30°	Direction:	
Date :	01/17/2019	Offset :	111 / 415	Species :	
Time :	10:57:14	Avg. curve :	off / off	Location:	
Feed :	40 in/min			Name :	

Woodinspector

Program :	Pole - EMERA 1.00	Sum decay :	2,9% 0,0% 2,9%
Pole type :		Heart rot :	2,9% 0,0% 2,9%
Measurement :	Below soil level	Shell rot :	No Yes
Defect pattern:	Heart+shell rot	Remaining wall:	21,7% ---
Result (auto) :	REJECT	Strength :	89,7% ---

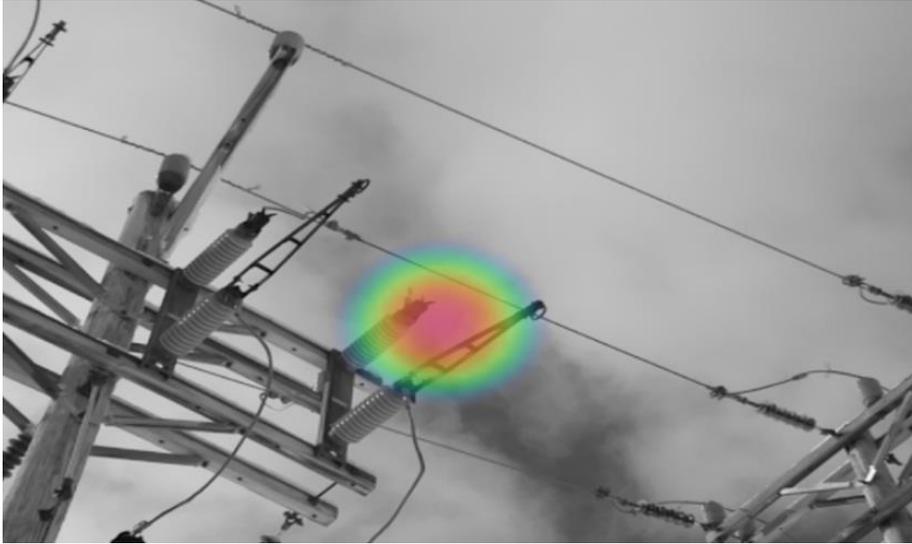


Assessment

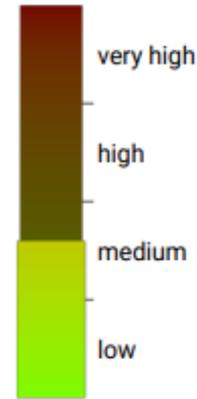
Comment

20705M046 (REJECT).rgp

Handheld Acoustic Condition Assessment



Severity



Description

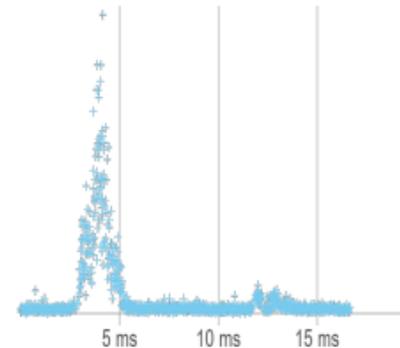
This is classified as corona, i.e., partial discharge into air. In most cases, corona is harmless.

Recommendation

Typically no action required unless power loss, audible noise, electromagnetic interference, or deterioration of nearby polymer insulators is a problem.

Partial discharge type PRPD

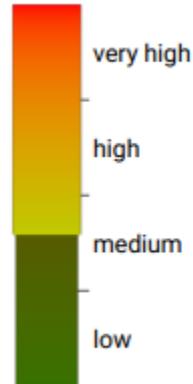
- negative corona
- positive and negative corona
- floating discharge
- surface or internal discharge



Handheld Acoustic Condition Assessment



Severity



Description

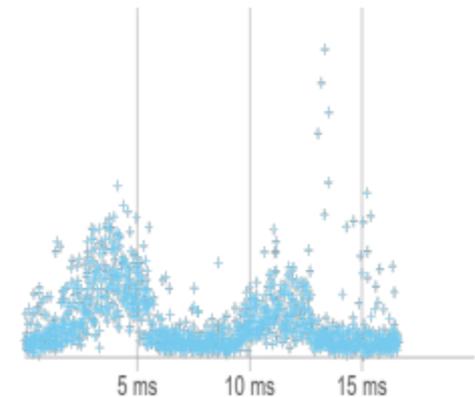
This is classified as a surface or internal discharge. The discharge appears to be strong and might rapidly escalate to complete insulation breakdown.

Recommendation

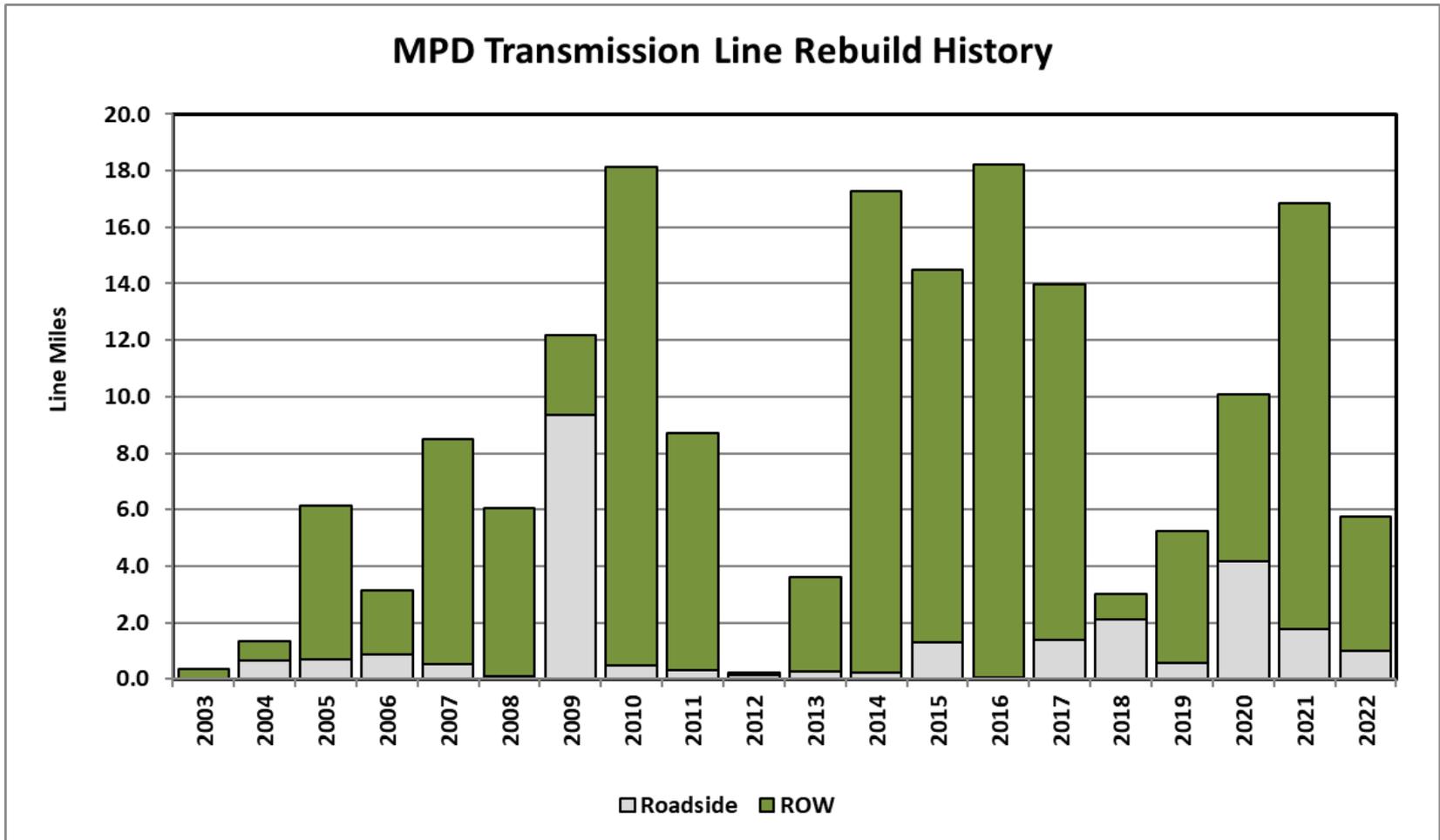
Immediate action. Visual inspection. Cleaning of polluted surfaces. Repair or replacement of the components.

Partial discharge type PRPD

- negative corona
- positive and negative corona
- floating discharge
- surface or internal discharge

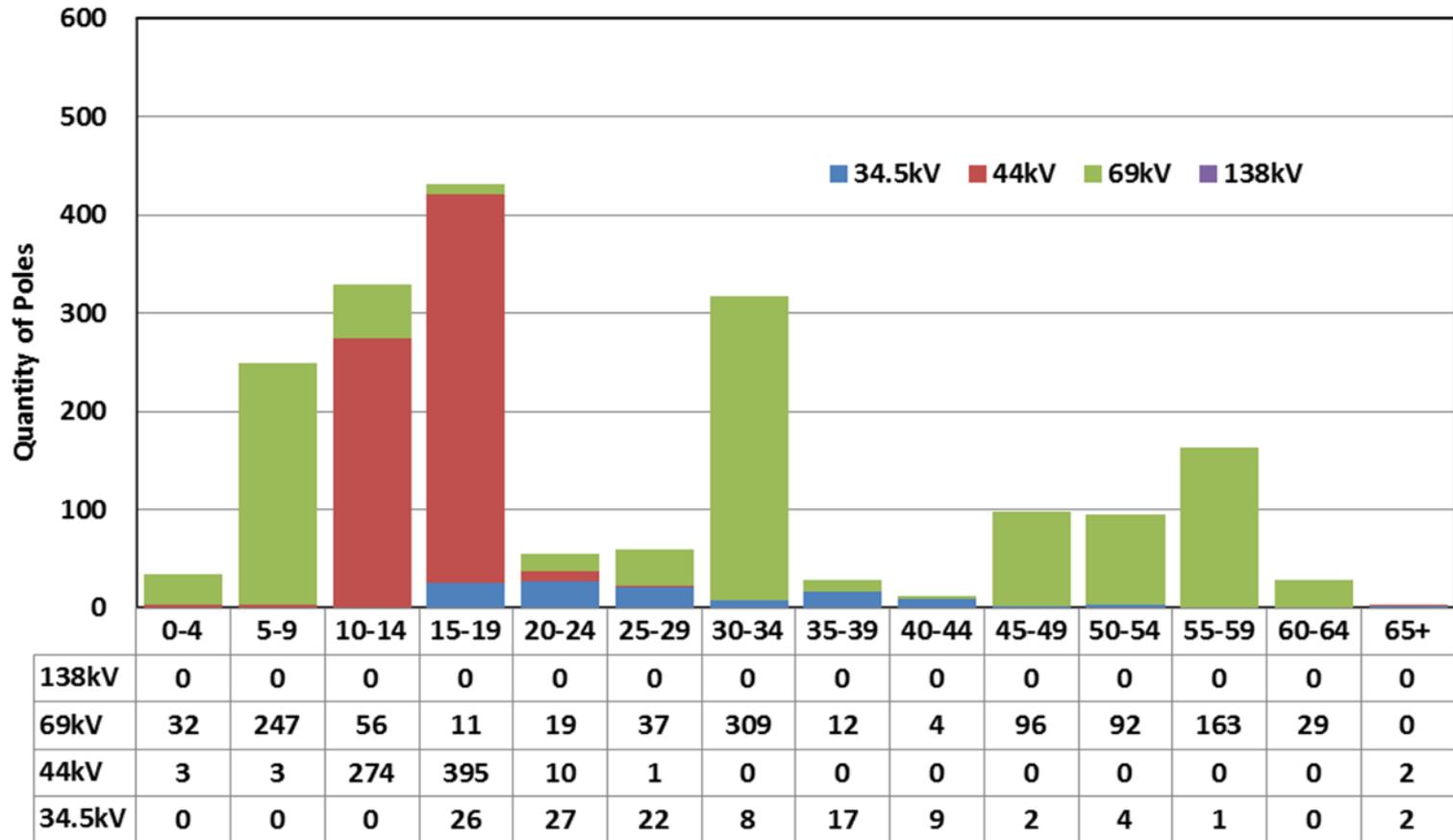


20-Year MPS Transmission Line Rebuild History

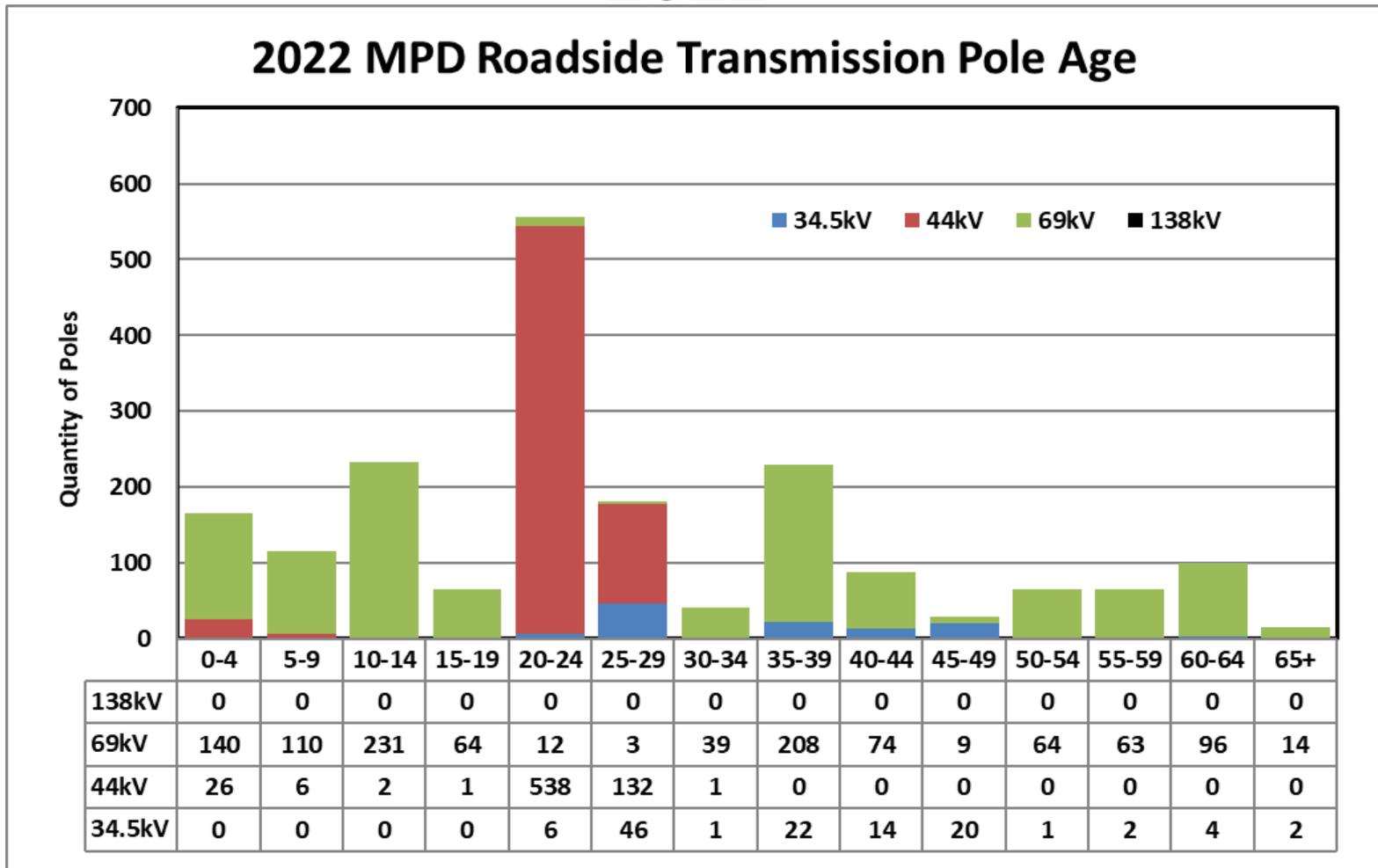


MPD Roadside Transmission Line Pole Age - 2016

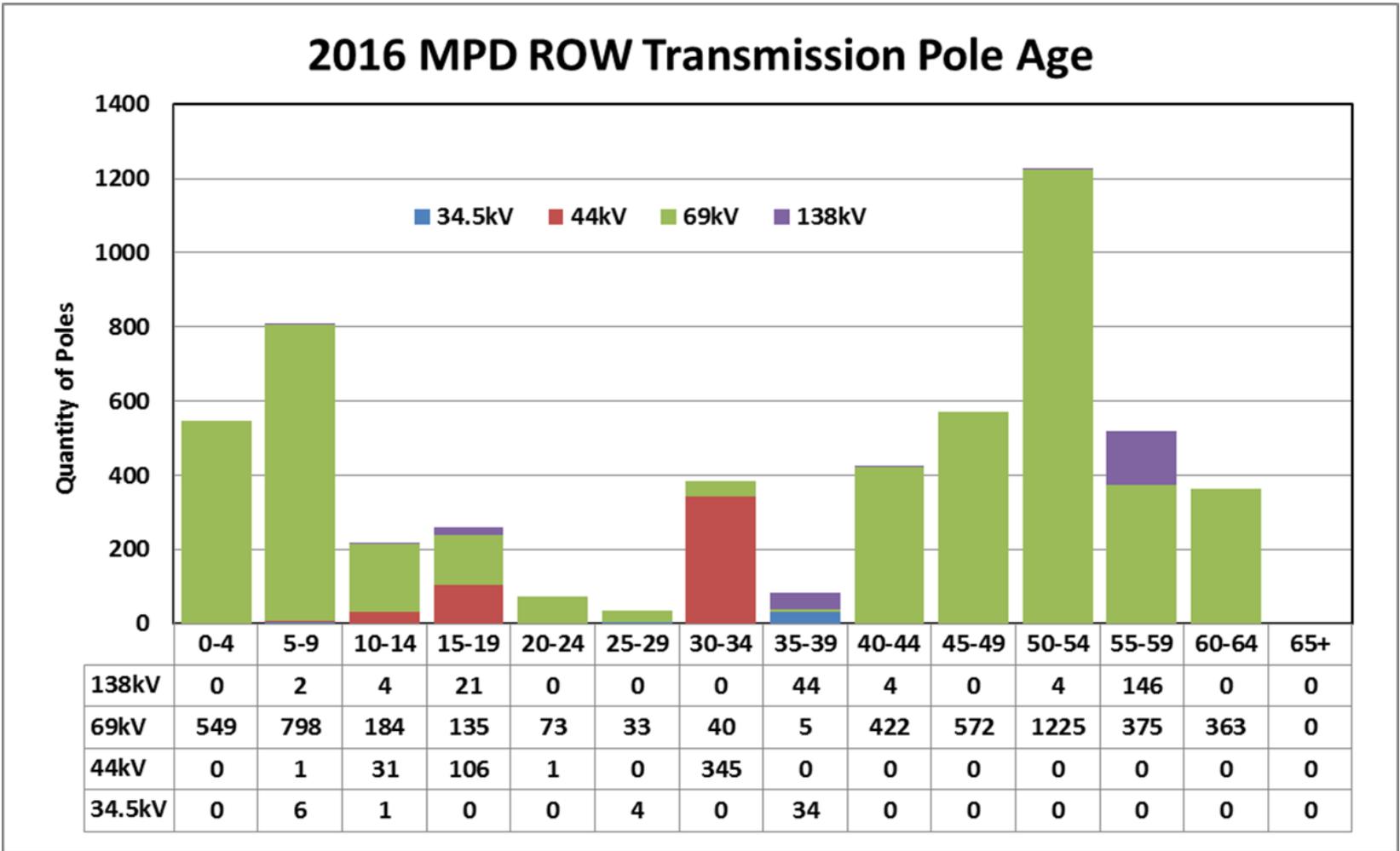
2016 MPD Roadside Transmission Pole Age



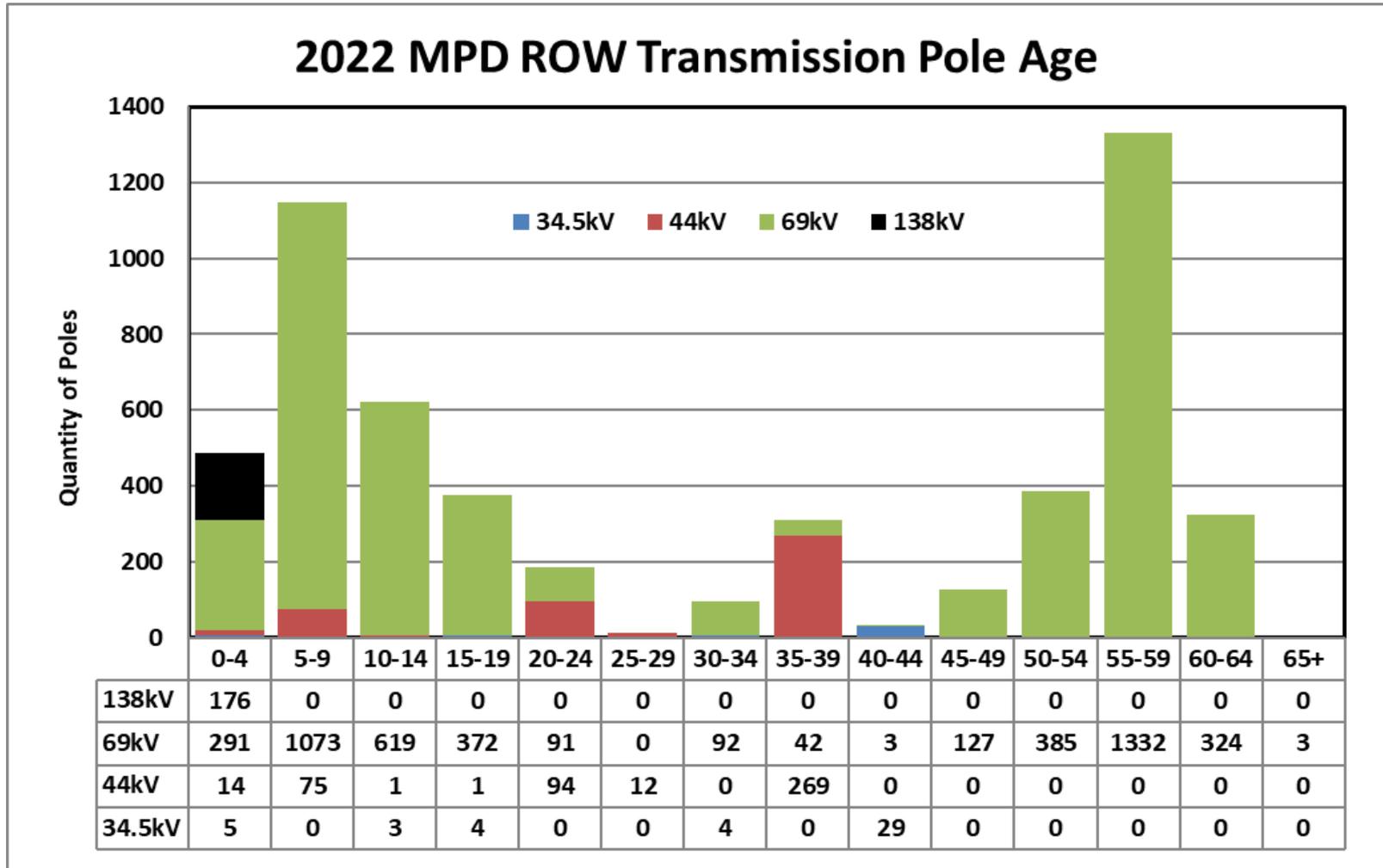
MPD Roadside Transmission Line Pole Age – 2022



MPD ROW Transmission Line Pole Age - 2016



MPD ROW Transmission Line Pole Age - 2022



Chapter 330 Summary

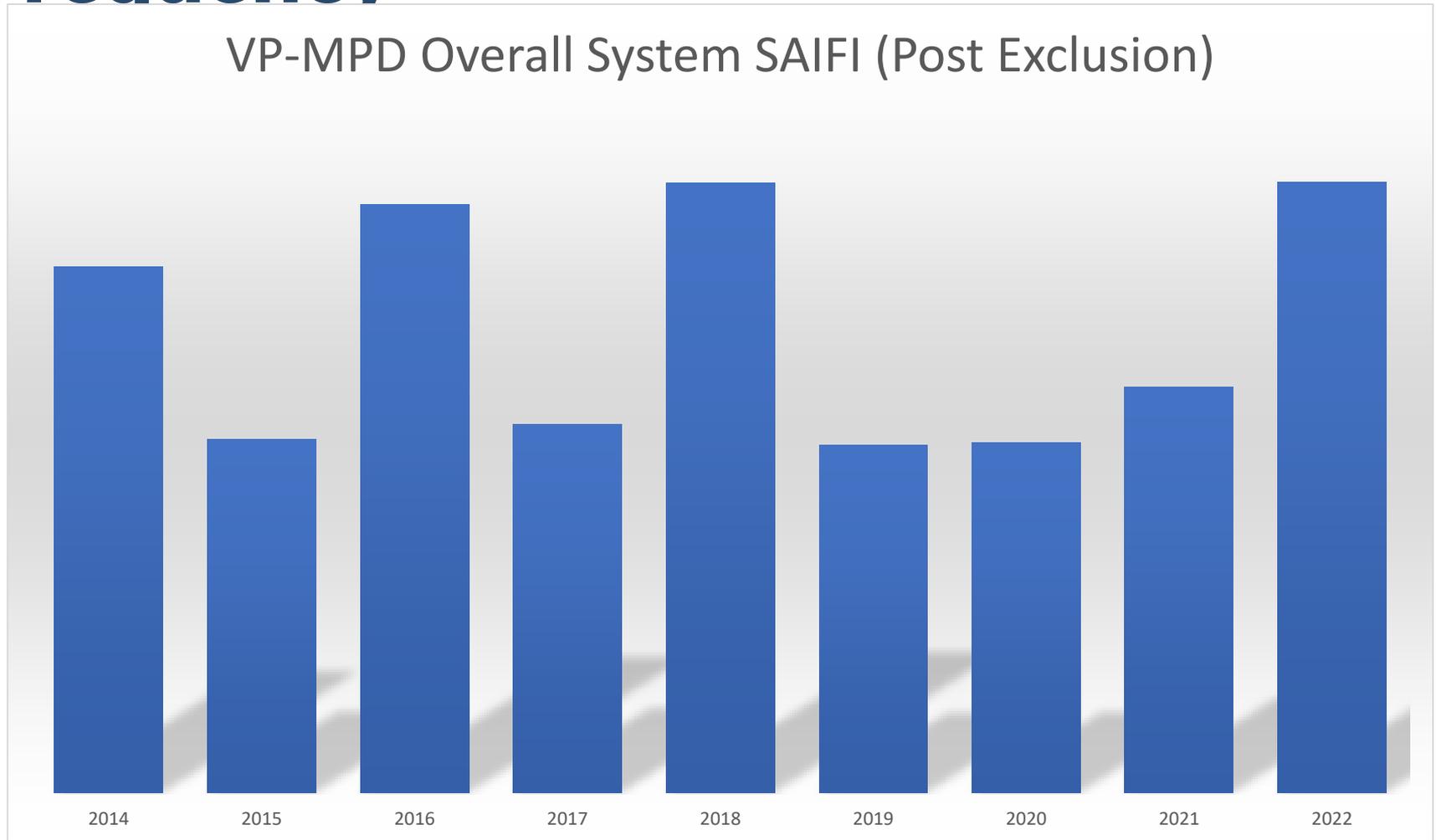
	2019	2020	2021	2022	2023
Plan miles	30	33	29	17	15
Average Miles per year	6.1	6.7	5.9	3.3	3.0
Average Cost per year (\$ M)	\$4.2	\$5.3	\$4.6	\$2.6	\$2.4

Still forecasting fewer miles:

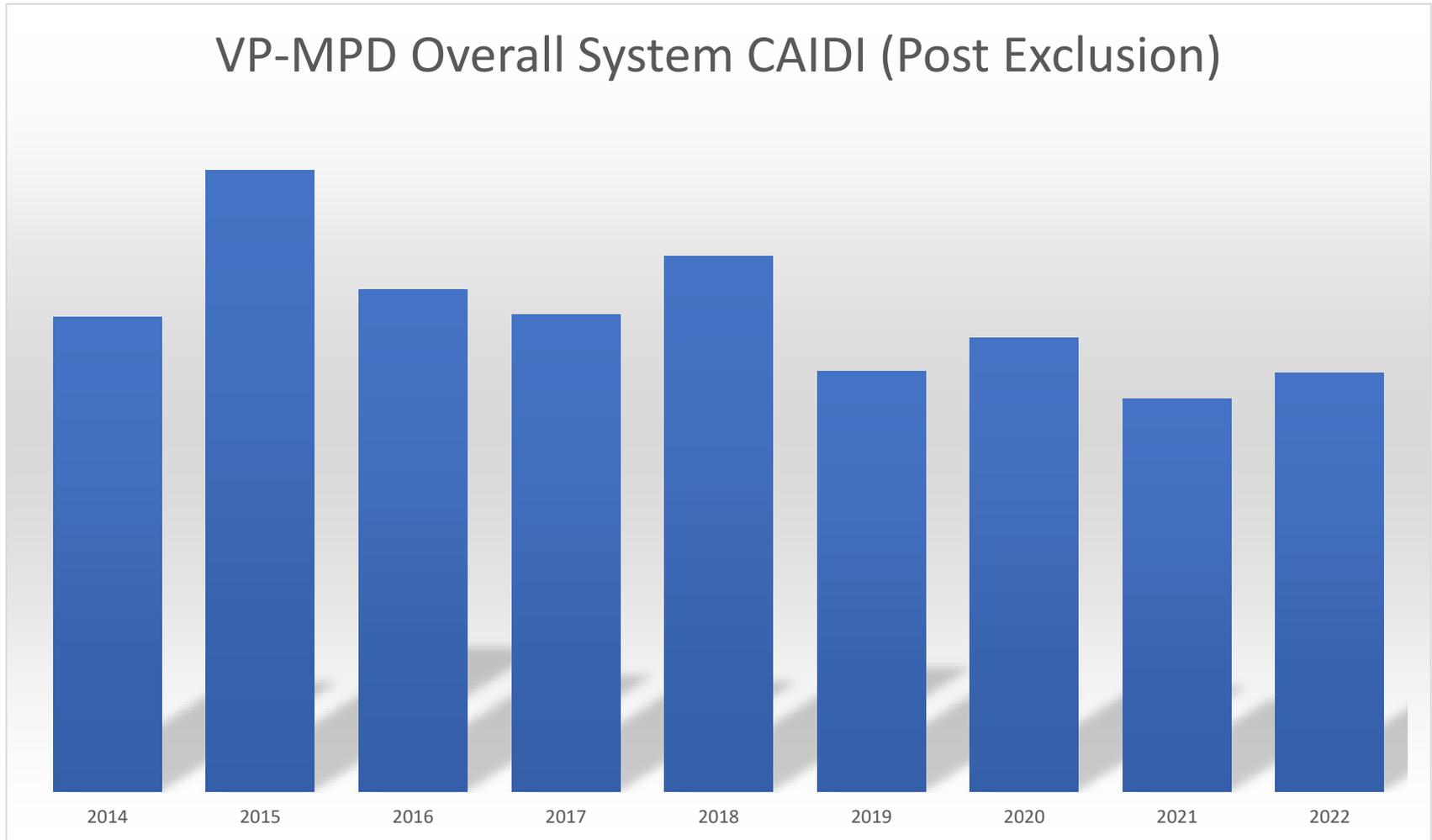
- Large project, Line 1176, is complete
- Currently, no large projects in the 5 year plan – drives averages down (miles & cost)
- Smaller projects planned

Reliability Performance

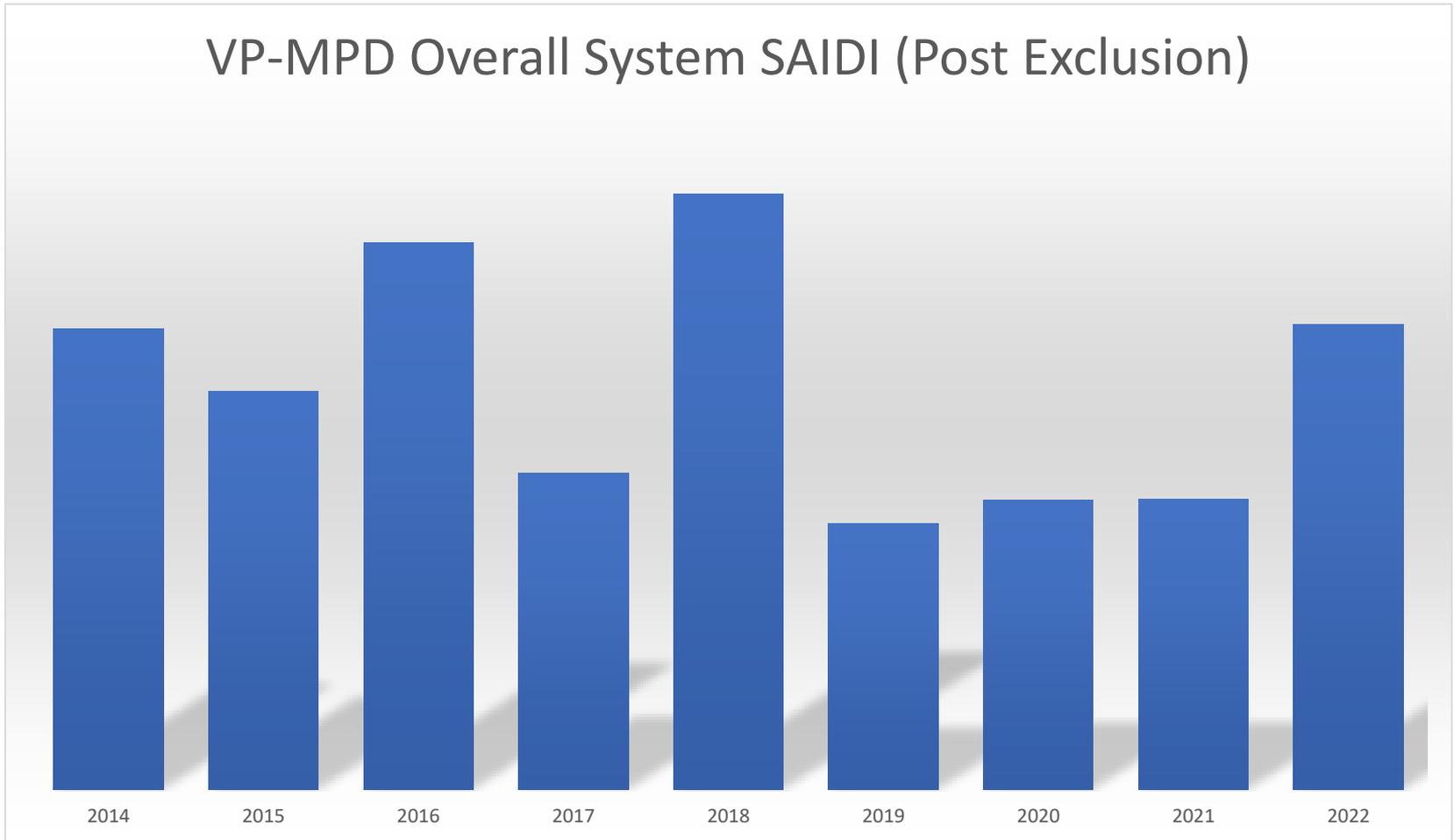
MPD Reliability Performance - Frequency



MPD Reliability Performance - Duration



MPD Overall Reliability Performance



Integrated Grid Plan Update

Integrated Grid Planning Update

- **MPUC is focusing on 3 tasks this summer with working groups: forecasting, solution evaluation criteria, and data sharing**
- **MPUC chosen facilitator is EPE**
- **Information is on their website (also in Docket 2022-00322)**
- **Versant-led process will begin once the MPUC issues their order later this year or next year; Versant will then have 18 months to perform the IGP**
- **Versant believes IGP is key to making optimal decisions to meet Maine's goals in an efficient and least cost manner**
- **When the Versant process begins, Versant will work through the PAG**