

ITCT: Target Appendix A Projects: Baseline Reliability Projects/Other-Reliability.

ITCT-15917 Fermi 345 kV SVC and ITCT-15923 SVC for Import at Fermi

ITCT-15917 Fermi 345 kV SVC

Project Description:

Install a -100/+600 MVAR SVC near the Fermi 345kV switchyard. The SVC will be installed as two -50/+300 MVAR SVC's at a new switchyard (sharing some common station equipment) outside Fermi property, tentatively named Leroux. Two 345kV circuits (vacant sides of the Fermi-Brownstown #2 and Fermi-Brownstown length TBD based on station siting, but approximately 2 miles in total) will be installed on the #3 345kV structures from the new station into the existing Fermi switchyard.

System Need:

The 2018 Fermi 2 Nuclear Plant NPOA Transmission study demonstrated an inability of the system to adhere to ITC's transient voltage recovery criteria for all tested contingencies. In addition, voltages lower than the bus specific criteria at the Fermi 345kV bus (<0.984 pu) were identified in an ongoing MISO attachment Y study. This project is being proposed by ITC as a mitigation for that constraint.

Estimated Cost:

\$60.0 M

Expected ISD:

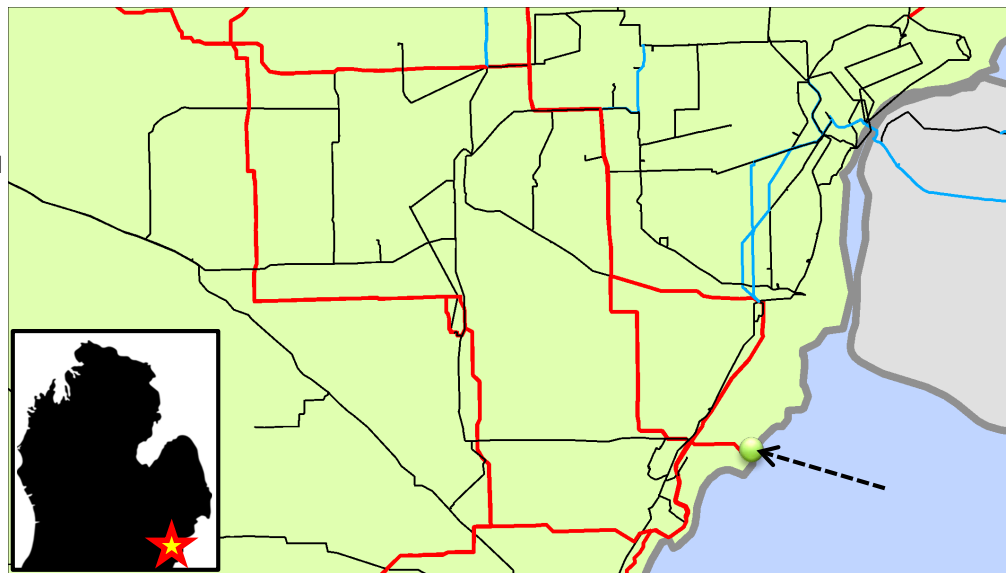
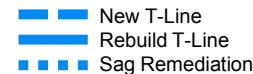
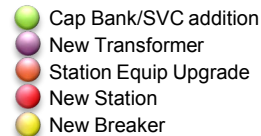
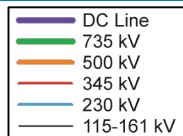
6/31/2023

Project Type:

Baseline Reliability Project

Target Appendix:

A in MTEP19



ITCT: Target Appendix A Projects: Baseline Reliability Projects/Other-Reliability. ITCT-15917 Fermi 345 kV SVC and ITCT-15923 SVC for Import at Fermi

ITCT-15923 SVC for Import at Fermi

Project Description:

Increase the total SVC capability of the Fermi 345kV SVC project (MTEP #15917) by 300 MVAR (for a total of +900 MVAR) for import capability into the LP of Michigan. Each SVC at Fermi would be a -50/+450 MVAR range SVC. The additional 300 MVAR would be all Mechanically Switched Capacitor Banks, controlled by the SVC controls.

System Need:

Import capability into the LP of Michigan.

Estimated Cost:

\$2.0 M

Expected ISD:

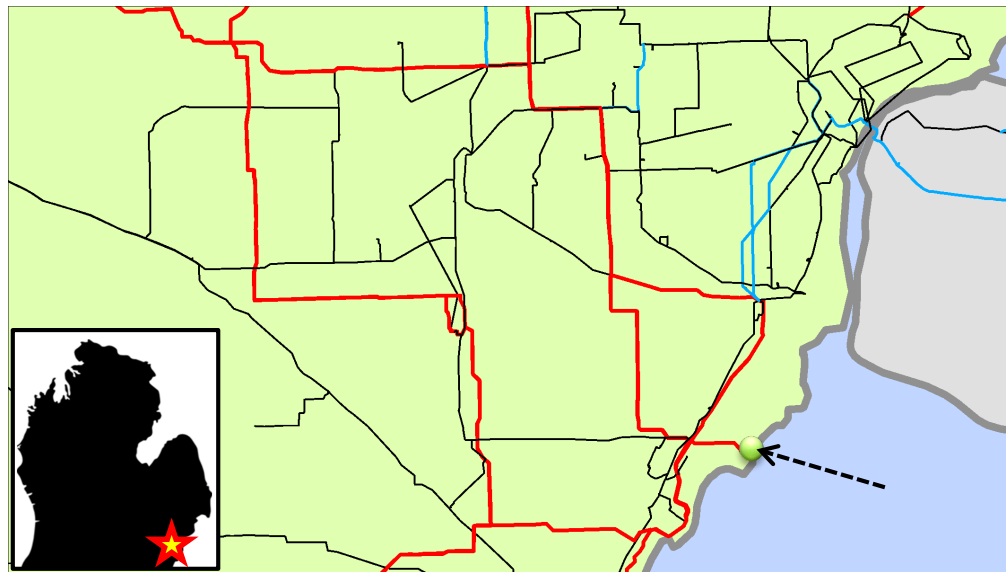
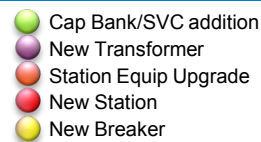
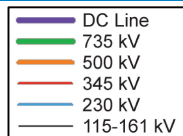
6/31/2023

Project Type:

Other - Reliability

Target Appendix:

A in MTEP19



ITCT-15917 Fermi 345 kV

MISO's Project Justification: Analysis Summary (Steady-State)

Monitored Facility						worst voltage violation in %										
Bus #	Bus Name	Base kV	Base Case or G-1 Volt. Limit	N-1 Volt. Limit (%)	G-1 or N-1 Volt. Dev. Limit (%)	N-1				N-1-1				No of Cases		
						P11		P2		P7		P3			P6	
						Volt	Volt. Dev.	Volt	Volt. Dev.	Volt	Volt. Dev.	Volt	Volt. Dev.		Volt	Volt. Dev.
264621	19ENFPP	345		98.4	3	99	3.254	98.97	3.279	98.6	3.65	95.51			11	

Analysis Summary:

- MISO identified multiple open issues (voltage drop below voltage limit and/or voltage deviation limit stipulated in the current Fermi 2 Nuclear Power Plant Interface Requirement (“NPIR”) in single initiating events and double contingency events seen in multiple summer and shoulder cases
- The proposed SVC project can mitigate the identified steady-state voltage violations
- MISO may need to conduct transient stability analysis to confirm the effectiveness of the proposed SVC project to mitigate the voltage recovery issues identified in MISO’s SSR study and in ITCT’s 2018 NPOA study.
- A recommendation TBD

ITCT-15923 SVC for Import at Fermi

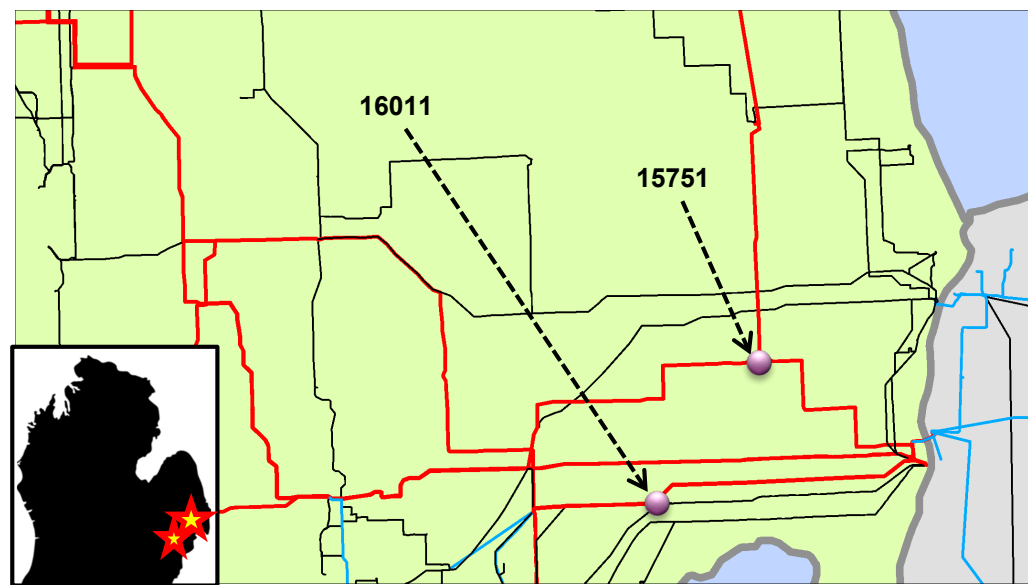
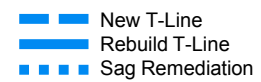
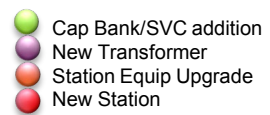
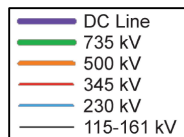
MISO's Project Justification: Analysis Summary (Steady-State)

ITCT Target Appendix A Projects: Baseline Reliability Projects.

ITCT-15751 Fitz 345/120 kV Transformer #2

ITCT-16011 Lenox 2nd 345/120 kV Transformer

MTEP ID	Project Name	Description	Expected ISD	Cost
15751	Fitz 345/120 kV Transformer #2	Install a second 345/120 kV transformer at Fitz.	12/31/2022	\$7.3M
16011	Lenox 2nd 345/120 kV Transformer	Install a second 345/120 kV transformer at Lenox	12/31/2022	\$8.4M



ITCT-15751 Fitz 345/120 kV Transformer #2

MISO's Project Justification: Analysis Summary

Monitored Facility	Rating (MVA)	Before Detroit Cable Project and Caniff Station Equipment Upgrade									After Detroit Cable Project and Caniff Station Equipment Upgrade									
		Worst Loading (%)									Worst Loading (%)									
		N-1			N-1-1			Count of OL Cases	N-1			N-1-1			Count of OL Cases					
P0	P1	P11	P2	P7	P20	P3	P6		P0	P1	P11	P2	P7	P20		P3	P6			
264746 19FITZ 345 265228 19FITZ 120 1	739									103.4	3								103.5	3

Analysis Summary:

- MISO identified 5 open issues in double contingency events seen in 3 cases. No system adjustment found.
- ITCT's proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. The scope of Romeo project is not yet finalized; please refer to ITCT's presentation about it.
- MISO recommends moving this project to Appendix A if Romeo project is not approved, otherwise, move this project to Appendix B.

ITCT-16011 Lenox 2nd 345/120 kV Transformer MISO's Project Justification: Analysis Summary

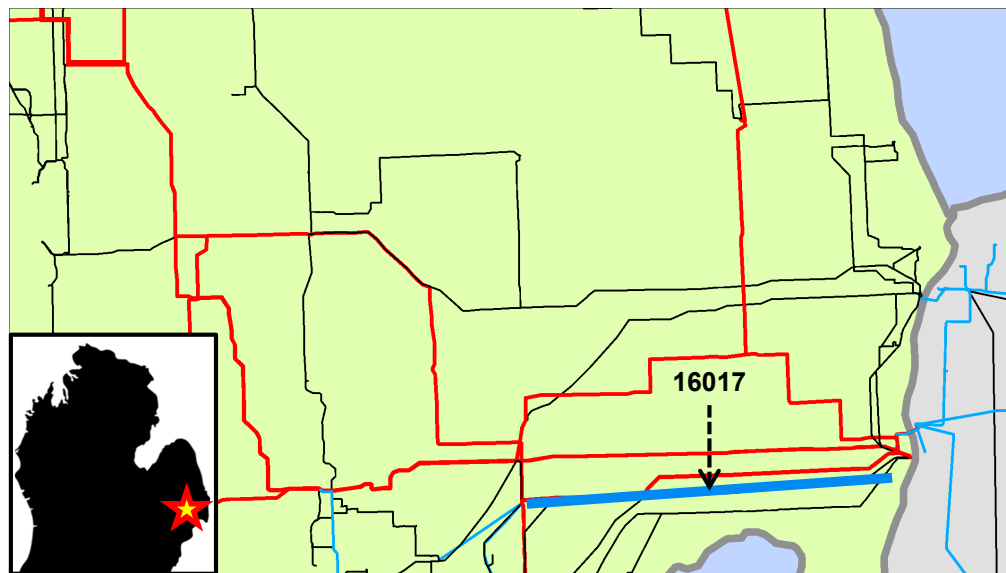
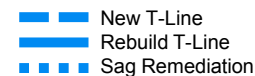
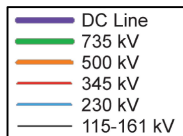
Monitored Facility	Rating (MVA)	Before Detroit Cable Project and Caniff Station Equipment Upgrade							After Detroit Cable Project and Caniff Station Equipment Upgrade										
		Worst Loading (%)									Worst Loading (%)								
		N-1					N-1-1		Count of OL Cases	N-1					N-1-1		Count of OL Cases		
P0	P1	P11	P2	P7	P20	P3	P6	P0		P1	P11	P2	P7	P20	P3	P6			
264888 19LENOX 345 264749 19LENOX1 120 1	739								98.7	1								98.7	1

Analysis Summary:

- MISO identified 2 marginal overload issues in double contingency events seen in one summer peak 2024 scenario the loading decreases to 95.5% in 2029 case.
- ITCT's proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. The scope of Romeo project is not yet finalized; please refer to ITCT's presentation about it.
- MISO recommends moving this project to Appendix B; this project may be revisited in a future planning cycle if the load forecast changes and Romeo 345 kV Project is not approved.

ITCT: Target Appendix A Projects: Baseline Reliability Projects.

ITCT-16017 Jewell – St. Clair #1 345 kV Rebuild



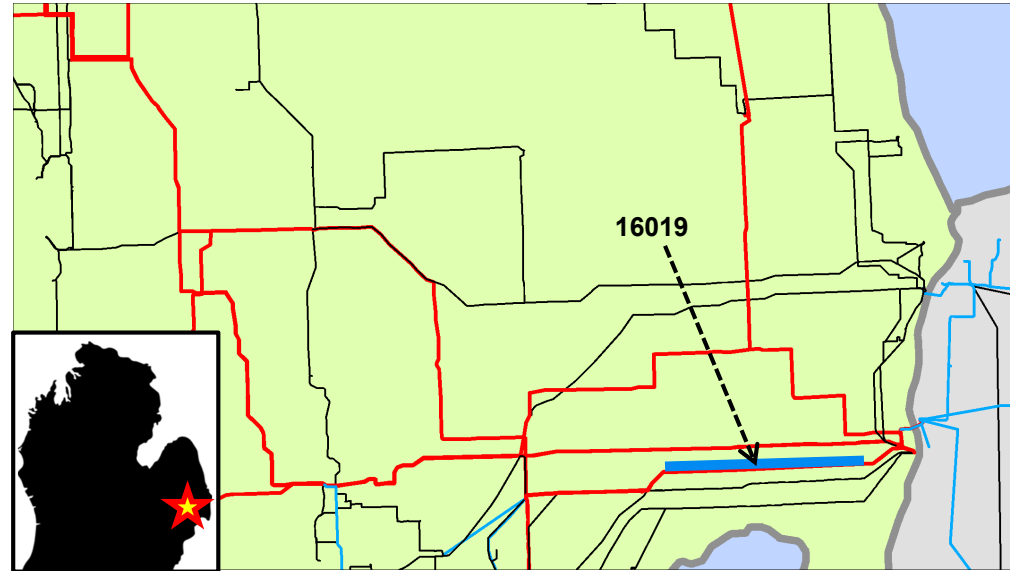
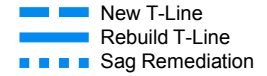
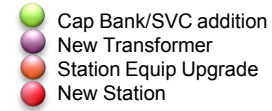
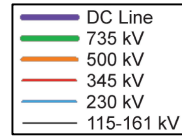
ITCT-16017 Jewell – St. Clair #1 345 kV Rebuild MISO’s Project Justification: Analysis Summary

Monitored Facility in PSS-E	Rating (MVA)	Worst Loading (%)								Count of OL Cases
		N-1						N-1-1		
		P0	P1	P11	P2	P7	P20	P3	P6	
264580 19JEWEL 345 264656 19STCPP 345 1	1328					123.8			121.7	7

Analysis Summary:

- MISO identified multiple open issues in single-initiating and double contingency events seen in 7 cases. No system adjustment found.
- ITCT’s proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. The scope of Romeo project is not yet finalized; please refer to ITCT’s presentation about it.
- MISO recommends moving this project to Appendix A if Romeo project is not approved, otherwise, move this project to Appendix B.

ITCT: Target Appendix A Projects: Baseline Reliability Projects. ITCT-16019 Belle River – Lenox 345 kV Rebuild



ITCT-16019 Belle River – Lenox 345 kV Rebuild MISO’s Project Justification: Analysis Summary

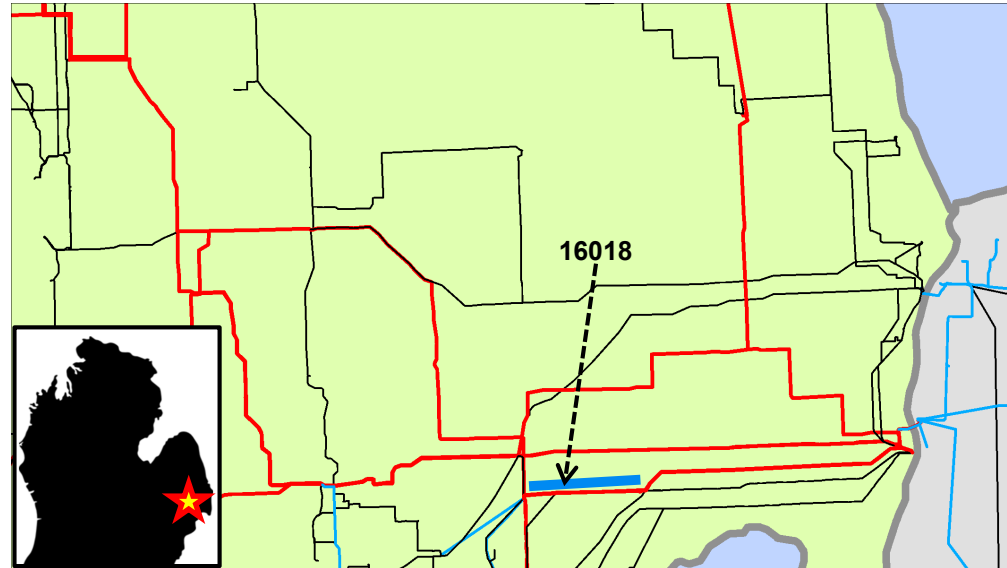
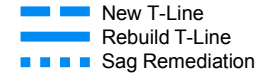
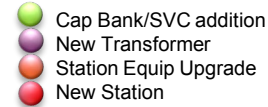
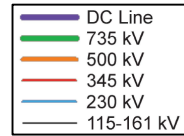
Monitored Facility in PSS-E	Rating (MVA)	Worst Loading (%)								Count of OL Cases
		N-1						N-1-1		
		P0	P1	P11	P2	P7	P20	P3	P6	
264604 19BLRPP 345 264888 19LENOX 345 1	1517		102.3		116.4	102.5		98.0	125.4	5

Analysis Summary:

- MISO identified multiple open issues in single-initiating and double contingency events seen in 5 cases. No system adjustment found.
- ITCT’s proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. The scope of Romeo project is not yet finalized; please refer to ITCT’s presentation about it.
- MISO recommends moving this project to Appendix A if Romeo project is not approved, otherwise, move this project to Appendix B.

ITCT: Target Appendix A Projects: Baseline Reliability Projects.

ITCT-16018 Jewell – Lenox 345 kV Rebuild



ITCT-16018 Jewell – Lenox 345 kV Rebuild

MISO’s Project Justification: Analysis Summary

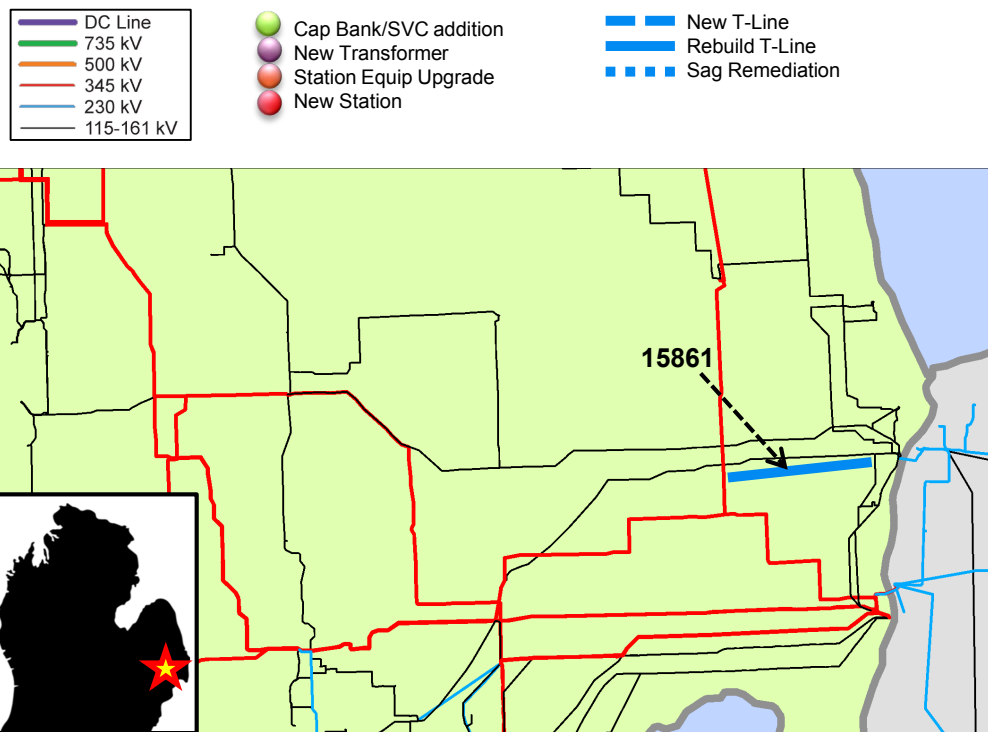
Monitored Facility in PSS-E	Rating (MVA)	Worst Loading (%)								Count of OL Cases
		N-1						N-1-1		
		P0	P1	P11	P2	P7	P20	P3	P6	
264580 19JEWEL 345 264888 19LENOX 345 1	1277		95.3		110.4	95.0			123.2	5

Analysis Summary:

- MISO identified multiple open issues in single-initiating and double contingency events seen in 5 cases. No system adjustment found.
- ITCT’s proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. The scope of Romeo project is not yet finalized; please refer to ITCT’s presentation about it.
- MISO recommends moving this project to Appendix A if Romeo project is not approved, otherwise, move this project to Appendix B.

ITCT: Target Appendix A Projects: Baseline Reliability Projects.

ITCT-15861 Bunce Creek – Fitz 120 kV Rebuild



ITCT-15861 Bunce Creek – Fitz 120 kV Rebuild

MISO's Project Justification: Analysis Summary

Monitored Facility in PSS-E	Rating (MVA)	Worst Loading (%)								
		N-1						N-1-1		Count of OL Cases
		P0	P1	P11	P2	P7	P20	P3	P6	
264536 19BUNCE1 120 265228 19FITZ 120 1	314								130.3	6

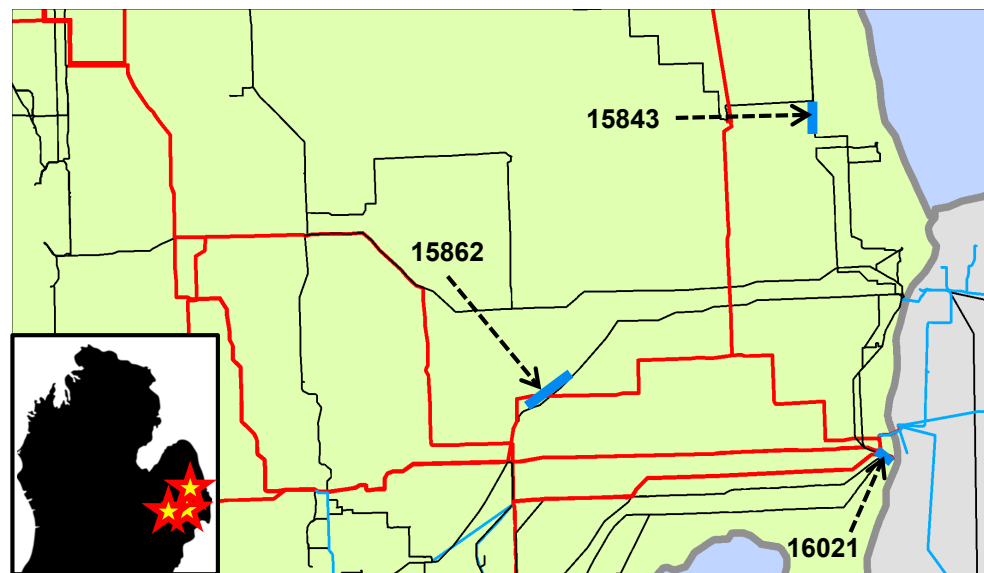
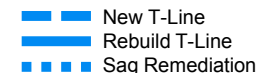
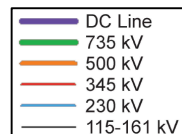
Analysis Summary:

- MISO identified multiple open issues in double contingency events seen in 6 cases. No system adjustment found.
- ITCT's proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. The scope of Romeo project is not yet finalized; please refer to ITCT's presentation about it.
- MISO recommends moving this project to Appendix A if Romeo project is not approved, otherwise, move this project to Appendix B.

ITCT: Target Appendix A Projects: Baseline Reliability Projects.

23 line rebuild/reconductor projects below \$10 million (1/4)

ID	Project Name	Description / ITCT's Justification	ISD	Cost
15843	Lee – Lake Huron Pumping 1 Tap 120 kV Rebuild	Rebuild 5.4 miles utilizing 954 ACSR conductor and upgrade the 266 ACSR line entrance at Lee.	12/31/2027	\$7.1M
15862	Adams – Burns 2 120 kV Rebuild	Rebuild 0.3 mile of 795 ACSR conductor to 1431 ACSR	12/31/2027	\$432k
16021	Belle River – St. Clair 345 kV Rebuild	Rebuild 1.13 miles of the Belle River – St. Claire 345 kV line using 2-T2 795 ACSR conductor. Also, upgrade station equipment at Belle River and St. Clair 345 kV stations.	12/31/2023	\$7.7M



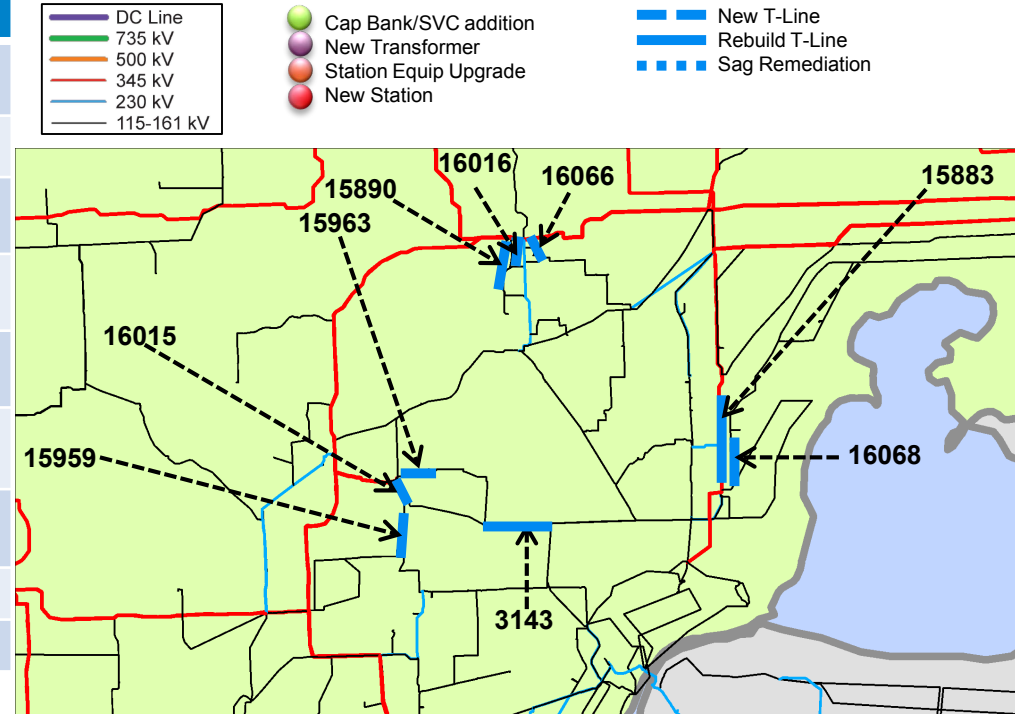
ITCT-15843 Lee – Lake Huron Pumping 1 Tap 120 kV Rebuild, ITCT-15862 Adams – Burns 2 120 kV Rebuild, and ITCT-16021 Belle River – St. Clair 345 kV Rebuild MISO’s Project Justification: Analysis Summary

Proj. ID	MTEP19 Project Name	Monitored Facility in PSS-E	Rating (MVA)	Worst Loading (%)										Max loading with Romeo 345 kV project	Preliminary Recommendation	Thermal Violations and Analysis Summary	
				N-1						N-1-1		Count of OL Cases					
				P0	P1	P11	P2	P7	P20	P3	P6						
15843	Lee – Lake Huron Pumping 1 Tap 120 kV Rebuild	264588 19LEE1 120 264732 19LHPMPT 120 1	128				94.9						109.6	5	<90%	Move to Appendix A	-MISO identified 8 open issues double contingency events seen in 6 cases. No system adjustment found. -ITCT’s proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. -MISO recommends moving this project to Appendix A if Romeo project is not approved, otherwise, move this project to Appendix B.
15862	Adams – Burns 2 120 kV Rebuild	264520 19ADAMS 120 264556 19BURNS2 120 1	289				93.4	97.4			90.2	123.0	8	N/A	Move to Appendix A	-MISO identified multiple open issues double contingency events seen in 8 cases. No system adjustment found. -MISO recommends moving this project to Appendix A	
16021	Belle River – St. Clair 345 kV Rebuild	264604 19BLRPP 345 264656 19STCPP 345 1	1983				90.4				91.8	110.8	3	<90%	Move to Appendix A	-MISO identified 7 open issues double contingency events seen in 3 cases. No system adjustment found. -ITCT’s proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. -MISO recommends moving this project to Appendix A if Romeo project is not approved, otherwise, move this project to Appendix B.	

ITCT: Target Appendix A Projects Baseline Reliability Projects.

23 line rebuild/reconductor projects below \$10 million (2/4)

MTE P ID	Project Name	Description	Exp. ISD	Cost
3143	Northwest - Southfield 120 kV	Rebuild 0.13 mile of 477 ACSR conductor to 1431. Upgrade the station equipment at Northwest 120 kV.	12/31/2029	\$172k
15883	Bismarck-Stephens #2 120 kV Rebuild	Rebuild 3.61 miles of 795 ACSS and 954 ACSR conductors to 2156 ACSR.	12/31/2027	\$4.8M
15890	Pontiac - Walton 120 kV Rebuild	Rebuild 4.8 miles of 477 ACSR X2 and 1431 ACSR conductors using 2156 ACSR. Upgrade station equipment at Pontiac 120kV and Walton 120 kV.	12/31/2025	\$6.4M
15959	Hager - Sunset 120 kV Rebuild	Rebuild 4.33 miles using 1431 ACSR conductor with single circuit steel structures and replace equipment at Hager Pos HD.	12/31/2026	\$9.3M
15963	Quaker-Drexel Tap 120 kV Rebuild	Rebuild 2.6 miles of 954 ACSR conductor to 2156 ACSR. Upgrade the station equipment at Quaker 120 kV.	12/31/2028	\$2.7M
16015	Sunset - Quaker 120 kV Rebuild	Rebuild 0.259 mile using 2156 ACSR conductor with single circuit steel structures and replace equipment at Quaker Pos HD and Sunset Pos HN.	12/31/2025	\$482k
16016	Pontiac - Joslyn 120 kV Rebuild	Rebuild 0.797 using 2156 ACSR conductor with single circuit steel structures and replace t equipment at Joslyn Pos HI.	12/31/2028	\$1.2M
16066	Pontiac - Colorado Tap 120 kV Rebuild	Rebuild 1.9 miles of 954 ACSR conductor to 1431 ACSR and upgrade equipment at Pontiac 120 kV.	12/31/2028	\$2.5M
16068	Benson - Stephens 120 kV Rebuild	Rebuild 1.17 miles of 795 ACSR conductor to 1431 ACSR and upgrade equipment at Stephens 120 kV.	12/31/2028	\$1.6M



ITCT-16016 Pontiac - Joslyn 120 kV Rebuild, ITCT-16066 Pontiac – Colorado Tap 120 kV Rebuild, and ITCT-16068 Benson – Stephens 120 kV Rebuild MISO’s Project Justification: Analysis Summary

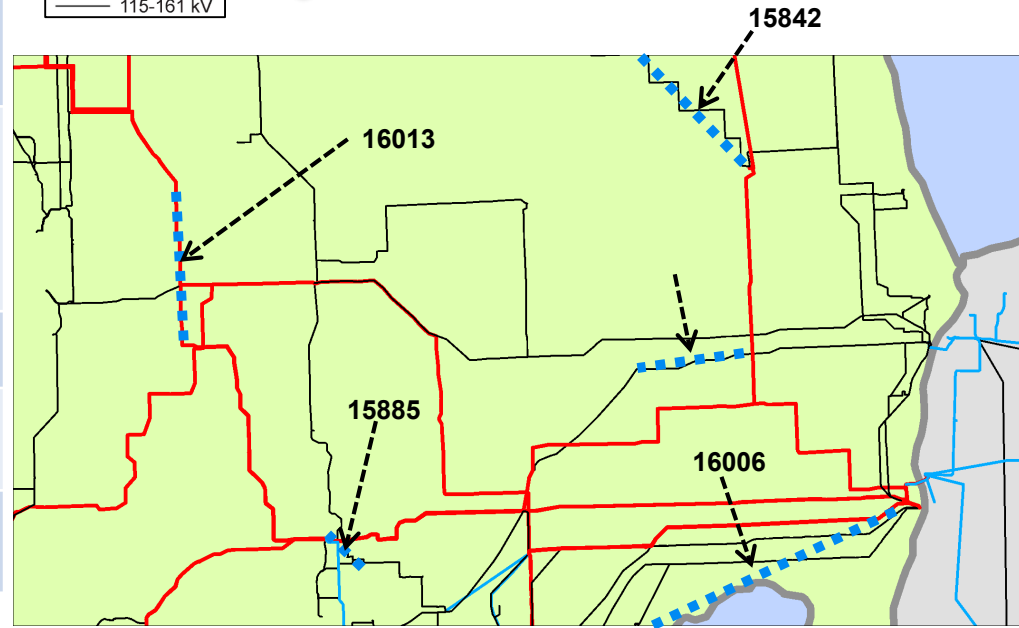
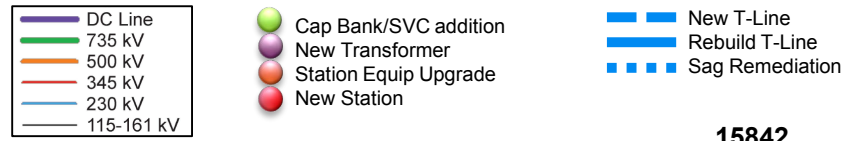
Proj. ID	MTEP19 Project Name	Monitored Facility in PSS-E	Rating (MVA)	Worst Loading (%)								Max loading with Romeo 345 kV project	Preliminary Recommendation	Thermal Violations and Analysis Summary		
				N-1					N-1-1		Count of OL Cases					
				P0	P1	P11	P2	P7	P20	P3					P6	
16016	Pontiac - Joslyn 120 kV Rebuild	264634 19PONTC1 120 264794 19JSLYN 120 1	375				97.0					100.4	2	<90%	Move to Appendix A	-MISO identified 8 open issues double contingency events seen in 2 cases. No system adjustment found. -ITCT’s proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. -MISO recommends moving this project to Appendix A if Romeo project is not approved, otherwise, move this project to Appendix B.
16066	Pontiac – Colorado Tap 120 kV Rebuild	264903 19CLRDT1 120 264940 19PONTC2 120 1	289				90.7					97.4	2	<90%	Move to Appendix B	- MISO identified that this line can get loaded at up to 98% of its emergency rating due to double contingency events seen in 3 case. No system adjustment found. - ITCT’s proposed project # 17164 (Romeo 345 kV) as alternative, if approved, can reduce the identified loading to below 90% - MISO recommends moving this project to Appendix B. This project may be revisited in a future planning cycle if the load forecast changes and Romeo project not approved
16068	Benson – Stephens 120 kV Rebuild	264535 19BENS 120 264663 19STEPH 120 1	248		91.1		92.0				93.6	115.4	7	<90%	Move to Appendix A	-MISO identified 8 open issues double contingency events seen in 7 cases. No system adjustment found. -ITCT’s proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. -MISO recommends moving this project to Appendix A if Romeo project is not approved, otherwise, move this project to Appendix B.



ITCT: Target Appendix A Projects: Baseline Reliability Projects.

14 sag remediation projects (2/3)

MTEP ID	Project Name	Description	Exp. ISD	Cost
15842	Bennett - Greenwood 120 kV Sag Remediation	Remediate the sag limit on the entire ~29.9 mile-long length of 954 ACSR conductor of the Bennett – Greenwood 120 kV line to at least the planned target summer normal/summer emergency rating of 170 MVA/816 Amps.	12/31/2022	\$138k
15844	Burns 2 Tap – Fitz 120 kV Sag Remediation	The proposed solution is to remediate the sag limit on the Burns 2 Tap – Fitz 120 kV section of the Adams – Fitz 120 kV line to increase its summer emergency rating to a minimum of 377 MVA/1814 Amps. The in-service date of the proposed project is December 31, 2022.	12/31/2022	\$198k
15885	Giddings - Colorado 120 kV Sag Remediation	Raise the sag limit on the Giddings – Colorado 120 kV section to at least 272 MVA.	12/31/2021	\$222k
16006	St. Clair - Stephens #2 345 kV Sag Remediation and Station Equipment Upgrade	Completely remove sag limit on the St. Clair – Stephens #2 345kV to conductor limit and replace station equipment at Stephens and St. Clair substations.	12/31/2021	\$2.8M
16013	Thetford – Jewell 345 kV Sag Remediation	Raise the sag limit on the Thetford – Jewell 345 kV line to at least 1537 MVA and upgrade equipment at Thetford 345 kV station.	12/31/2021	\$5.5M



All project justifications provided by ITCT can be found in Appendix 1

ITCT-15842 Bennett - Greenwood 120 kV Sag Remediation

ITCT-15844 Burns 2 Tap – Fitz 120 kV Sag Remediation

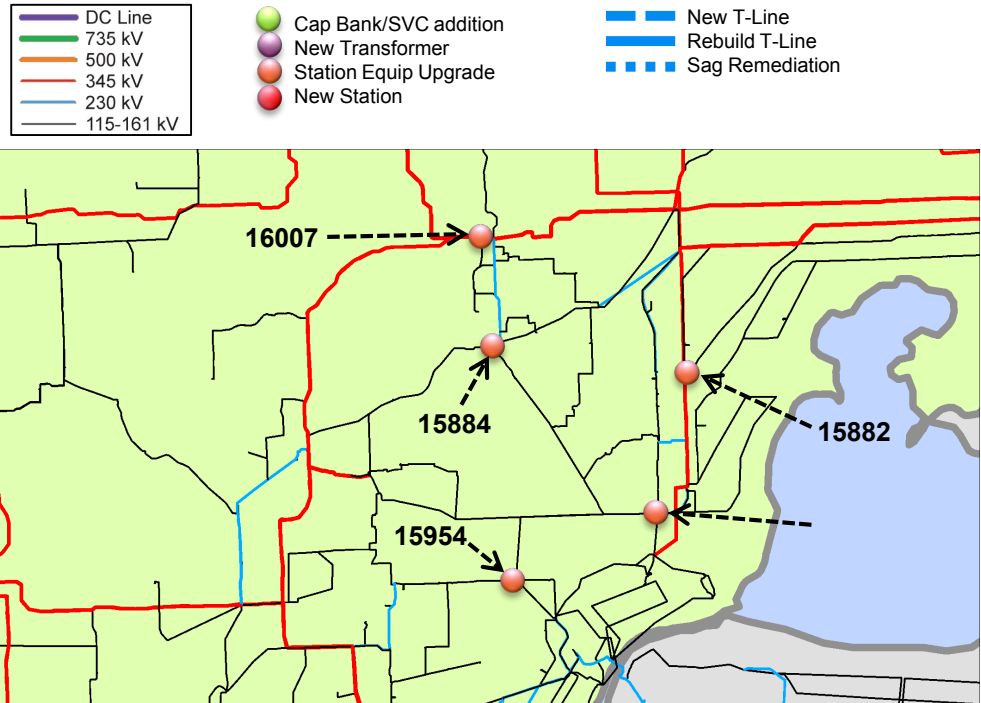
ITCT-15885 Giddings - Colorado 120 kV Sag Remediation

MISO's Project Justification: Analysis Summary

Proj. ID	MTEP19 Project Name	Monitored Facility in PSS-E	Rating (MVA)	Worst Loading (%)								Preliminary Recommendation	Thermal Violations and Analysis Summary		
				N-1						N-1-1				Count of OL Cases	
				P0	P1	P11	P2	P7	P20	P3	P6				
15842	Bennett - Greenwood 120 kV Sag Remediation	264567 19GRNEC 120 264721 19BENET 120 1	144									0	Move to Appendix B	No thermal violations identified; loading < 90% - Move to Appendix B	
15844	Burns 2 Tap – Fitz 120 kV Sag Remediation	264556 19BURNS2 120 265228 19FITZ 120 1	339				110					0	Move to Appendix A	MISO identified multiple open issues in double Loading decrease if Romeo 345 kV project gets approved. MISO recommends moving this project to Appendix A if Romeo project is not approved.	
15885	Giddings - Colorado 120 kV Sag Remediation	264833 19GIDDINGTP1 120 264904 19CLRDT2 120 1	212				95.9					104.8	3	Move to Appendix A	MISO identified multiple open issues in double contingency events seen in 7 cases. No system adjustment found. - MISO recommends moving this project to Appendix A

ITCT: Target Appendix A Projects: Baseline Reliability Projects. 16 terminal/station equipment upgrade (2/2)

MTEP ID	Project Name	Description	Exp. ISD	Cost
15882	Bismarck 120 kV – Upgrade JC Station Equipment	Upgrade the station equipment at Bismarck 120 kV position "JC".	12/31/2021	\$25k
15884	Bloomfield - Hood Station Equipment Upgrade	Upgrade the station equipment at Bloomfield 120 kV position "HE".	12/31/2021	\$25k
15954	Evergreen 120 kV – Upgrade HG Station Equipment	Upgrade the station equipment at Evergreen 120 kV position "HG".	12/31/2021	\$75k
16009	Northeast 120 kV Upgrade KD Reactor	Upgrade the Northeast 120 kV reactor at position "KD".	12/31/2022	\$1.2M
16007	Pontiac 120 kV – Upgrade HC & GQ Station Equipment	Upgrade the station equipment at Pontiac 120 kV positions "HC" and "GQ".	12/31/2021	\$40k
15739	Northeast 120 kV Breaker HE Replacement	Replace the existing Northeast 120 kV circuit breaker HE with a circuit breaker capable of interrupting at least 50 kA (short circuit limitations).	12/31/2020	\$254k



System Need for these project, provided by ITCT, can be found in Appendix 1

171-15739 Northeast 120 kV Breaker HE Replacement ITCT-16009 Northeast 120 kV Upgrade KD Reactor ITCT-16007 Pontiac 120 kV – Upgrade HC & GQ Station Equipment MISO’s Project Justification: Analysis Summary

Proj. ID	MTEP19 Project Name	Monitored Facility in PSS-E	Rating (MVA)	Worst Loading (%)									Max loading with Romeo 345 kV project	Preliminary Recommendation	Thermal Violations and Analysis Summary	
				N-1						N-1-1		Count of OL Cases				
				P0	P1	P11	P2	P7	P20	P3	P6					
16007	Pontiac 120 kV – Upgrade HC & GQ Station Equipment	264635 19PONTC 345 264634 19PONTC1 120 1	624									97.1	2	<90%	Move to Appendix A	- MISO identified that this line can get loaded at up to 97% of its emergency rating due to double contingency events seen in 2 case. No system adjustment found. - ITCT’s proposed project # 17164 (Romeo 345 kV) as alternative. If approved, it can mitigate the identified overloading. - Considering the low cost, MISO recommends moving this project to Appendix A (if Romeo project is not approved).
		264635 19PONTC 345 264638 19PONTC3 120 3	624										93.8	1		
16009	Northeast 120 kV Upgrade KD Reactor	264623 19NEASTS 120 264625 19NEAST 120 2	170												Move to Appendix B	-MISO identified multiple open issues in single-initiating and double contingency events seen in 6 cases. No system adjustment found. -ITCT’s proposed project # 15981 (DCP) as alternative. If approved, it can mitigate the identified overloading. -MISO recommends moving this project to Appendix A if DCP is not approved, otherwise, move this project to Appendix B.
15739	Northeast 120 kV Breaker HE Replacement	Short circuit analysis conducted by ITCT											Move to Appendix A	- ITCT conducted short circuit analysis and identified the need to replace the existing Northeast 120 kV circuit breaker HE with a circuit breaker capable of interrupting at least 50 kA -MISO recommends moving this project to Appendix A		

