Smith Mountain-Museville 138 kV Sag Study and Upgrades

General Information

Proposing entity name	AEPSCT
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Yes
Company proposal ID	AEP_B
PJM Proposal ID	332
Project title	Smith Mountain-Museville 138 kV Sag Study and Upgrades
Project description	Rebuild one span of the Smith Mountain-Museville 138 kV line. Mitigate clearance issues on the remaining portion of Smith Mountain-Museville 138 kV line to increase emergency ratings. Replace station equipment at Smith Mountain and Museville 138 kV stations. Rebuild one span of the Matt Funk-Cloverdale 345 kV line and mitigate clearance issues on other portions of the 345 kV line to increase emergency ratings. Mitigate clearance issues on the East Danville-Banister 138 kV line to increase emergency ratings. Replace station equipment at Banister station. Mitigate clearance issues on the Bearskin-Museville 138 kV line to increase emergency ratings. Mitigate clearance issues on the Claytor-South Christiansburg 138 kV line and replace station equipment at South Christiansburg to increase emergency ratings. Rebuild approximately 15 miles of the Fieldale-Thornton 138 kV double circuit line. Mitigate clearance issues on the Glen Lyn-Peters Mountain 138 kV line to increase emergency ratings.
Email	nckoehler@aep.com
Project in-service date	12/2029
Tie-line impact	No
Interregional project	No
Is the proposer offering a binding cap on capital costs?	No
Additional benefits	A portion of the proposal will rebuild a line originally constructed in the 1920s with steel lattice towers (Fieldale-Thornton). While this line does not have an active supplemental need identified on it, there would likely be one brought through the M-3 process within the next five years.

Project Components

1. Smith Mountain-Museville 138 kV Line Upgrade
2. Smith Mountain 138 kV Equipment Replacement
3. Museville Station Upgrades
4. Matt Funk-Cloverdale 345 kV Line Upgrade
5. East Danville-Banister 138 kV Line Upgrade
6. Bearskin-Museville 138 kV Sag Mitigation
7. Claytor-South Christiansburg 138 kV Sag Mitigation
8. South Christiansburg Station Equipment Replacement
9. Banister Station Equipment Replacement
10. Glen Lyn-Peters Mountain 138 kV Sag Mitigation
11. Fieldale-Thornton 138 kV Line Rebuild

Transmission Line Upgrade Component

Component title	Smith Mountain-Museville 138 kV Line Upgrade
Project description	Reconductor one span of the Smith Mountain-Museville 138 kV line and perform sag clearance mitigation on the remaining 11 miles of line between Smith Mountain and Museville. Mitigation includes replacement of three towers due to increased conductor tension.
Impacted transmission line	Smith Mountain-Museville 138 kV
Point A	Smith Mountain
Point B	Museville
Point C	
Terrain description	Mountainous
Existing Line Physical Characteristics	
Operating voltage	138
Conductor size and type	1033 ACSR

Hardware plan description	Existing hardware will be reused except on the three tower replacements and the single span of reconductor where new hardware will be installed.	
Tower line characteristics	1960s steel lattice	
Proposed Line Characteristics		
	Designed	Operating
Voltage (kV)	138.000000	138.000000
	Normal ratings	Emergency ratings
Summer (MVA)	409.000000	569.000000
Winter (MVA)	517.000000	639.000000
Conductor size and type	2-556 ACSR	
Shield wire size and type	N/A - existing shield wire to be used	
Rebuild line length	N/A - one span to be replaced	
Rebuild portion description	N/A. Reconductor will not use new poles. Three structures to be replaced utilizing existing conductor.	
Right of way	N/A. Supplemental ROW will only be acquired if needed.	
Construction responsibility	AEP	
Benefits/Comments		
Component Cost Details - In Current Year $		
Engineering & design	Detailed cost breakdown	
Permitting / routing / siting	Detailed cost breakdown	
ROW / land acquisition	Detailed cost breakdown	
Materials & equipment	Detailed cost breakdown	

Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	$3,838,429.08
Component cost (in-service year)	$3,838,429.08

Substation Upgrade Component

Component title	Smith Mountain 138 kV Equipment Replacement
Project description	At Smith Mountain station, replace breaker disconnect switches and switch jumpers with 3000A equipment. Replace breakers C and C1 with 3000A, 40 kA breakers. Replace jumpers and wavetrap with 3000A equipment.
Substation name	Smith Mountain
Substation zone	205 - AEP
Substation upgrade scope	At Smith Mountain station, replace breaker disconnect switches and switch jumpers with 3000A equipment. Replace breakers C and C1 with 3000A, 40 kA breakers. Replace jumpers and wavetrap with 3000A equipment.

Transformer Information

None

New equipment description	3000A switches, 3000A wavetrap, 3000A 40 kA circuit breakers
Substation assumptions	Equipment to be replaced in existing locations
Real-estate description	N/A
Construction responsibility	AEP

Benefits/Comments

Component Cost Details - In Current Year $

Engineering & design	Detailed cost breakdown
Permitting / routing / siting	Detailed cost breakdown
ROW / land acquisition	Detailed cost breakdown
Materials & equipment	Detailed cost breakdown
Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	$1,152,241.94
Component cost (in-service year)	$1,152,241.94

Substation Upgrade Component

Component title	Museville Station Upgrades
Project description	At Museville station, replace breakers B and D with 3000A, 40kA breakers. Replace wavetrap and associated jumpers with 3000A equipment
Substation name	Museville
Substation zone	205 - AEP
Substation upgrade scope	At Museville station, replace breakers B and D with 3000A, 40kA breakers. Replace wavetrap and associated jumpers with 3000A equipment

Transformer Information

None

New equipment description	3000A, 40 kA circuit breakers, 3000A wavetrap
Substation assumptions	Equipment to be replaced in existing location

Real-estate description	N/A
Construction responsibility	AEP
Benefits/Comments	
Component Cost Details - In Current Year $	
Engineering & design	Detailed cost breakdown
Permitting / routing / siting	Detailed cost breakdown
ROW / land acquisition	Detailed cost breakdown
Materials & equipment	Detailed cost breakdown
Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	$951,039.70
Component cost (in-service year)	$951,039.70

Transmission Line Upgrade Component

Component title	Matt Funk-Cloverdale 345 kV Line Upgrade
Project description	Reconductor one span outside Cloverdale station and perform sag mitigation on a portion of the Matt Funk-Cloverdale 345 kV Circuit outside Matt Funk station.
Impacted transmission line	Matt Funk-Cloverdale 345 kV
Point A	Matt Funk
Point B	Cloverdale
Point C	

Terrain description	Hilly	
Existing Line Physical Characteristics		
Operating voltage	345	
Conductor size and type	1414 ACSR/PE and 2303 ACAR	
Hardware plan description	Reconductored section will replace hardware; all other hardware to be reused.	
Tower line characteristics	1960s steel lattice	
Proposed Line Characteristics		
	Designed	Operating
Voltage (kV)	345.000000	345.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1161.000000	1367.000000
Winter (MVA)	1474.000000	1628.000000
Conductor size and type	2-954 ACSR	
Shield wire size and type	N/A - existing shield wire to be used	
Rebuild line length	N/A - one span to be replaced	
Rebuild portion description	N/A; towers not to be replaced.	
Right of way	Supplemental ROW to be acquired if/as needed	
Construction responsibility	AEP	
Benefits/Comments		
Component Cost Details - In Current Year $		
Engineering & design	Detailed cost breakdown	
Permitting / routing / siting	Detailed cost breakdown	

ROW / land acquisition	Detailed cost breakdown
Materials & equipment	Detailed cost breakdown
Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	$745,436.24
Component cost (in-service year)	$745,436.24

Transmission Line Upgrade Component

Component title	East Danville-Banister 138 kV Line Upgrade
Project description	Perform sag mitigation on the East Danville-Banister 138 kV Circuit by installing four new structures on the line and reconductor one span outside East Danville station
Impacted transmission line	East Danville-Banister 138 kV Line
Point A	East Danville
Point B	Banister
Point C	
Terrain description	Hilly, rural
Existing Line Physical Characteristics	
Operating voltage	138
Conductor size and type	556 ACSR
Hardware plan description	New towers will have new hardware installed along with new span. All other hardware to be reused.
Tower line characteristics	1960s steel lattice

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	138.000000	138.000000
	Normal ratings	Emergency ratings
Summer (MVA)	383.000000	449.000000
Winter (MVA)	485.000000	534.000000
Conductor size and type	2-556 ACSR	
Shield wire size and type	N/A - existing shield wire to be used	
Rebuild line length	N/A - one span to be replaced	
Rebuild portion description	N/A; towers not to be replaced.	
Right of way	Supplemental ROW to be acquired if/as needed	
Construction responsibility	AEP	
Benefits/Comments		
Component Cost Details - In Current Year $		
Engineering & design	Detailed cost breakdown	
Permitting / routing / siting	Detailed cost breakdown	
ROW / land acquisition	Detailed cost breakdown	
Materials & equipment	Detailed cost breakdown	
Construction & commissioning	Detailed cost breakdown	
Construction management	Detailed cost breakdown	
Overheads & miscellaneous costs	Detailed cost breakdown	

Contingency	Detailed cost breakdown
Total component cost	$4,149,215.66
Component cost (in-service year)	$4,149,215.66

Transmission Line Upgrade Component

Component title	Bearskin-Museville 138 kV Sag Mitigation
Project description	Perform sag mitigation on the Bearskin-Museville 138 kV Circuit
Impacted transmission line	Bearskin-Museville 138 kV Line
Point A	Bear Skin
Point B	Museville
Point C	
Terrain description	Hilly
Existing Line Physical Characteristics	
Operating voltage	138
Conductor size and type	2-556 ACSR
Hardware plan description	Hardware will be reused.
Tower line characteristics	1960s steel lattice
Proposed Line Characteristics	

	Designed	Operating
Voltage (kV)	138.000000	138.000000
	Normal ratings	Emergency ratings
Summer (MVA)	338.000000	483.000000

Winter (MVA)	427.000000	538.000000
Conductor size and type	2-556 ACSR	
Shield wire size and type	N/A - existing shield wire to be used	
Rebuild line length	N/A - one span to be replaced	
Rebuild portion description	N/A; towers not to be replaced.	
Right of way	Supplemental ROW to be acquired if/as needed	
Construction responsibility	AEP	
Benefits/Comments		
Component Cost Details - In Current Year $		
Engineering & design	Detailed cost breakdown	
Permitting / routing / siting	Detailed cost breakdown	
ROW / land acquisition	Detailed cost breakdown	
Materials & equipment	Detailed cost breakdown	
Construction & commissioning	Detailed cost breakdown	
Construction management	Detailed cost breakdown	
Overheads & miscellaneous costs	Detailed cost breakdown	
Contingency	Detailed cost breakdown	
Total component cost	$1,735,232.44	
Component cost (in-service year)	$1,735,232.44	

Transmission Line Upgrade Component

Component title	Claytor-South Christiansburg 138 kV Sag Mitigation
Project description	Perform sag mitigation on the Claytor-South Christiansburg 138 kV Circuit

Impacted transmission line	Claytor-South Christiansburg 138 kV Line	
Point A	Claytor	
Point B	South Christiansburg	
Point C		
Terrain description	Hilly	
Existing Line Physical Characteristics		
Operating voltage	138	
Conductor size and type	397 ACSR	
Hardware plan description	Hardware will be reused.	
Tower line characteristics	1960s steel lattice	
Proposed Line Characteristics		
	Designed	Operating
Voltage (kV)	138.000000	138.000000
	Normal ratings	Emergency ratings
Summer (MVA)	167.000000	245.000000
Winter (MVA)	210.000000	271.000000
Conductor size and type	397 ACSR	
Shield wire size and type	N/A - existing shield wire to be used	
Rebuild line length	N/A - one span to be replaced	
Rebuild portion description	N/A; towers not to be replaced.	
Right of way	Supplemental ROW to be acquired if/as needed	

Construction responsibility	AEP
Benefits/Comments	
Component Cost Details - In Current Year $	
Engineering & design	Detailed cost breakdown
Permitting / routing / siting	Detailed cost breakdown
ROW / land acquisition	Detailed cost breakdown
Materials & equipment	Detailed cost breakdown
Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	$2,539,330.20
Component cost (in-service year)	$2,539,330.20

Substation Upgrade Component

Component title	South Christiansburg Station Equipment Replacement
Project description	At South Christiansburg, replace MOAB W and associated jumpers with 3000A rated equipment
Substation name	South Christiansburg
Substation zone	205 - AEP
Substation upgrade scope	At South Christiansburg, replace MOAB W and associated jumpers with 3000A rated equipment

Transformer Information

None

New equipment description	3000A switch

Substation assumptions	Equipment to be replaced in existing locations
Real-estate description	N/A
Construction responsibility	AEP
Benefits/Comments	
Component Cost Details - In Current Year $	
Engineering & design	Detailed cost breakdown
Permitting / routing / siting	Detailed cost breakdown
ROW / land acquisition	Detailed cost breakdown
Materials & equipment	Detailed cost breakdown
Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	$799,174.86
Component cost (in-service year)	$799,174.86

Substation Upgrade Component

Component title	Banister Station Equipment Replacement
Project description	At Banister station, replace 1590 AAC station bus conductor with 3000A rated equipment
Substation name	Banister
Substation zone	205 - AEP
Substation upgrade scope	At Banister station, replace 1590 AAC station bus conductor with 3000A rated equipment

Transformer Information

None

New equipment description	N/A. Bus conductor only, no major equipment to be replaced
Substation assumptions	Equipment to be replaced in existing locations
Real-estate description	N/A
Construction responsibility	AEP
Benefits/Comments	
Component Cost Details - In Current Year $	
Engineering & design	Detailed cost breakdown
Permitting / routing / siting	Detailed cost breakdown
ROW / land acquisition	Detailed cost breakdown
Materials & equipment	Detailed cost breakdown
Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	$799,174.86
Component cost (in-service year)	$799,174.86

Transmission Line Upgrade Component

Component title	Glen Lyn-Peters Mountain 138 kV Sag Mitigation
Project description	Perform sag mitigation on the Glen Lyn-Peters Mountain 138 kV Circuit
Impacted transmission line	Glen Lyn-Peters Mountain 138 kV Line

Point A	Glen Lyn
Point B	Peters Mountain
Point C	
Terrain description	Mountainous
Existing Line Physical Characteristics	
Operating voltage	138
Conductor size and type	556 ACSR
Hardware plan description	Hardware will be reused. One structure to be replaced.
Tower line characteristics	1950s steel lattice
Proposed Line Characteristics	

	Designed	Operating
Voltage (kV)	138.000000	138.000000
	Normal ratings	Emergency ratings
Summer (MVA)	205.000000	285.000000
Winter (MVA)	258.000000	320.000000

Conductor size and type	556 ACSR
Shield wire size and type	N/A - existing shield wire to be used
Rebuild line length	N/A - one span to be replaced
Rebuild portion description	N/A; towers not to be replaced.
Right of way	Supplemental ROW to be acquired if/as needed
Construction responsibility	AEP

Benefits/Comments	
Component Cost Details - In Current Year $	
Engineering & design	Detailed cost breakdown
Permitting / routing / siting	Detailed cost breakdown
ROW / land acquisition	Detailed cost breakdown
Materials & equipment	Detailed cost breakdown
Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	$2,075,446.18
Component cost (in-service year)	$2,075,446.18

Transmission Line Upgrade Component

Component title	Fieldale-Thornton 138 kV Line Rebuild
Project description	Rebuild approximately 15 miles of the Fieldale-Thornton 138 kV double circuit line.
Impacted transmission line	Fieldale-Thornton 138 kV Line
Point A	Fieldale
Point B	Thornton
Point C	
Terrain description	Hilly, mix of urban and rural
Existing Line Physical Characteristics	
Operating voltage	138

Conductor size and type	336 ACSR	
Hardware plan description	All hardware to be replaced	
Tower line characteristics	1920s era steel lattice towers	
Proposed Line Characteristics		
	Designed	Operating
Voltage (kV)	138.000000	138.000000
	Normal ratings	Emergency ratings
Summer (MVA)	251.000000	335.000000
Winter (MVA)	317.000000	381.000000
Conductor size and type	1033 ACSR	
Shield wire size and type	7#8 and 144 OPGW	
Rebuild line length	15 miles	
Rebuild portion description	Rebuild 15 miles of line between Fieldale and Thornton stations utilizing double circuit towers and lattice structures.	
Right of way	50' of existing ROW will be used, additional 50' of ROW will need to be acquired for 14.75 miles of line. New 100' ROW will need to be acquired for 0.25 miles between structures 129A and 131A to route around existing structures.	
Construction responsibility	AEP	
Benefits/Comments		
Component Cost Details - In Current Year $		
Engineering & design	Detailed cost breakdown	
Permitting / routing / siting	Detailed cost breakdown	
ROW / land acquisition	Detailed cost breakdown	

Materials & equipment	Detailed cost breakdown
Construction & commissioning	Detailed cost breakdown
Construction management	Detailed cost breakdown
Overheads & miscellaneous costs	Detailed cost breakdown
Contingency	Detailed cost breakdown
Total component cost	$67,321,159.14
Component cost (in-service year)	$67,321,159.14

Congestion Drivers

None

Existing Flowgates

FG #	Fr Bus No.	From Bus Name	To Bus No.	To Bus Name	CKT	Voltage	TO Zone	Analysis type	Status
2025W1-ME1	290234	05MUSEVILLE	242802	05SMITHMTN	1	138	205	Market Efficiency	Included

New Flowgates

None

Financial Information

Capital spend start date	01/2026
Construction start date	03/2027
Project Duration (In Months)	47

Additional Comments

None