Application for Certificate of Public Convenience and Necessity and Utility Permit

APPENDIX E

EMF and Stray Voltage Studies

- E-1 EMF Tables (CPCN Impact Table 4)
- E-2 NEV Study

Appendix E – Exhibit E-1 Stone Lake – Couderay 161/69 kV Transmission Line Project EMF Cross-Reference Table				
Line Segment	Proposed Structure Figure Number	Table Number		
Calculated Electric Fie	lds			
23,24,24A,24B,37	1	1		
4,5,6,7,9,10,11,12,13,35,36,40,41,42,43,44,45,46,61,71,72	2	2		
7,8,10,12,13,35,36,40,41,42,43,44,45,46,61	5	3		
15,46	8	4		
20,21,30,50,51,52,53,54,55,62	10	5		
21	12	6		
17,63,65,68,69	15	7		
2,3,14A,16C,17,18A,18B,64,66,67,68,70,74	16	8		
2,3,14A,16C,17,18A,18B,63,64,65,66,67,68,69,70,74	17	9		
14A,16C	18	10		
Calculated Magnetic Fi	elds			
23,24,24A,24B,37	1	11		
4,5,6,7,9,10,11,12,13,35,36,40,41,42,43,44,45,46,61,71,72	2	12		
7,8,10,12,13,35,36,40,41,42,43,44,45,46,61	5	13		
15,46	8	14		
20,21,30,50,51,52,53,54,55,62	10	15		
21	12	16		
17,63,65,68,69	15	17		
2,3,14A,16C,17,18A,18B,64,66,67,68,70,74	16	18		
2,3,14A,16C,17,18A,18B,63,64,65,66,67,68,69,70,74	17	19		
14A,16C	18	20		

Table 1 - Calculated Electric Fields Table

	Calculated Electri
Transmission Line Segments: 23,	, 24, 24A, 24B, 37
Facility Description: ⁴ Proposed Si Double Circuit 69kV	ingle Pole, Davit Arm Configur
Distance from Centerline (feet)	Electric Field (kV/m)
Centerline	1.25
25	0.34
50	0.12
100	0.03
150	0.02
200	0.01
300	0

Assumptions: Midspan Sag = 5.75 feet

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

Table 2 - Calculated Electric Fields Table

Calculated Electric Field Data ³					
Transmission Line Segments: 4, 5, 6, 7, 9, 10, 11, 12, 13, 35, 36, 40, 41, 42, 43, 44, 45, 46, 61, 71, 72					
Facility Description: ⁴ Proposed Single Pole, Horizontal Post Delta Configuration Single Circuit 69kV					
Distance from Centerline (feet)	Electric Field (kV/m)				
Centerline	0.62				
25	0.19				
50	0.02				
100	0.02				
150	150 0.01				
200	0.01				
300 0					

Assumptions: Midspan Sag = 6.5 feet

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

Table 3 - Calculated Electric Fields Table

Calculated Electric Field Data ³					
Transmission Line Segments: 7, 8	8, 10, 12, 13, 35, 36, 40, 41, 42	43, 44, 45, 46, 61			
Facility Description: ⁴ Proposed Si Single Circuit 69kV	ingle Pole, Horizontal Post Vert	ical Configuration			
Distance from Centerline (feet)	Electric Field (kV/m)				
Centerline	0.79	1			
25	0.14]			
50	0.02				
100	0.02				
150 0.01					
200	0.01				
300 0					

Assumptions:

Midspan Sag = 6.5 feet

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

⁴Describe facility - Structure type, configuration, location

Table 4 - Calculated Electric Fields Table

	Calculated 1	Electric Field Data ³
Transmission Line Segments: 15,	46	
Facility Description: ⁴ Proposed Si Single Circuit 69kV	ngle Pole, H-Frame	
Distance from Centerline (feet)	Electric Field (kV/m)	
Centerline	0.59	1
25	0.76	1
50	0.24]
100	0.04]
150	0.01]
200	0.01]
300	0	7

Assumptions:

Midspan Sag = 8.0 feet

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

⁴Describe facility - Structure type, configuration, location

Table 5 - Calculated Electric Fields Table

Calculated Electric Field Data ³					
Transmission Line Segment: 20, 21, 30, 50, 51, 52, 53, 54, 55, 62					
Facility Description: ⁴ Proposed Si Single Circuit 161kV	ngle Pole, Davit Arm Delta Co	nfiguration			
Distance from Centerline (feet)	Electric Field (kV/m)				
Centerline	1.39	1			
25	1.59				
50	0.47]			
100	7				
150	0.05]			
200	0.03]			
300 0.01					

Assumptions:

Midspan Sag = 19.5 feet

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

⁴Describe facility - Structure type, configuration, location

Table 6 - Calculated Electric Fields Table

	Calculated 1
Transmission Line Segment: 21	
Facility Description: ⁴ Proposed Si	ngle Pole, Horizontal Post Delt
Distance from Centerline (feet)	Electric Field (kV/m)
Centerline	1.24
25	1.52
50	0.47
100	0.11
150	0.05
200	0.03
300	0.01

Assumptions:

Midspan Sag = 25 feet

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

⁴Describe facility - Structure type, configuration, location

Table 7 - Calculated Electric Fields Table

	Calculated 1
Transmission Line Segment: 17,	63, 65, 68, 69
Facility Description: ⁴ Proposed Si Double Circuit 161/69kV	ingle Pole, Davit Arm Configur
Distance from Centerline (feet)	Electric Field (kV/m)
Centerline	1.7
25	1.37
50	0.28
100	0.07
150	0.04
200	0.03
300	0.01

Assumptions:

Midspan Sag = 19 feet (69kV); 22 feet(169kV)

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

⁴Describe facility - Structure type, configuration, location

Table 8 - Calculated Electric Fields Table

	Calculated 1					
Transmission Line Segment: 2, 3	s, 14A, 16C, 17, 18A, 18B, 64, 6					
Facility Description: ⁴ Proposed S Double Circuit 161/69kV	ingle Pole, Davit Arm Configur					
Distance from Centerline (feet)	Electric Field (kV/m)					
Centerline	Centerline 1.58					
25	1.24					
50 0.24						
100	100 0.07					
150 0.04						
200	0.02					
300	0.01					

Assumptions:

Midspan Sag = 22 feet (69kV); 25.5 feet (161kV)

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

⁴Describe facility - Structure type, configuration, location

Table 9 - Calculated Electric Fields Table

Calculated Electric Field Data ³				
Transmission Line Segment: 2, 3	, 14A, 16C, 17, 18A, 18B, 63, 6	4, 65, 66, 67, 68, 69, 70, 74		
Facility Description: ⁴ Proposed Si Double Circuit 161/69kV	ingle Pole, Davit Arm Configur	ation		
Distance from Centerline (feet)	Electric Field (kV/m)			
Centerline	1.37	1		
25	1.74	1		
50	0.31]		
100	0.08]		
150	0.05]		
200	0.03]		
300	0.01	1		

Assumptions:

Midspan Sag = 22 feet (69kV); 25 feet (161kV)

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

⁴Describe facility - Structure type, configuration, location

Table 10 - Calculated Electric Fields Table

Calculated Electric Field Data ³				
Transmission Line Segment: 14A	a, 16C			
Facility Description: ⁴ Proposed Single Pole, Davit Arm Configuration Double Circuit 161/69kV				
-				
Distance from Centerline (feet)	Electric Field (kV/m)			
Centerline	1.92			
25	1.35			
50	0.22			
100	0.07			
150	0.05			
200	0.03			
300	0.01			

Assumptions:

Midspan Sag = 18 feet (69kV); 21 feet (161kV)

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

⁴Describe facility - Structure type, configuration, location

Table 11 - Calculated Magnetic Fields Table

Calculated Magnetic Field Data ³							
Transmission Line	Transmission Line Segments: 23, 24, 24A, 24B, 37						
Facility Description: ⁴ Proposed Single Pole, Davit Arm Configuration Double Circuit 69kV							
(2016) ¹ Nor	(2016) ¹ Normal Load (2016) Normal Peak (2021) ² Normal Load (2021) Normal Peak						mal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	26.15	Centerline	32.6	Centerline	24.45	Centerline	31.73
25	15.09	25	18.82	25	14.69	25	18.31
50	6.41	50	7.99	50	6.24	50	7.78
100	1.93	100	2.41	100	1.88	100	2.35
150	0.89	150	1.12	150	0.87	150	1.09
200	0.51	200	0.64	200	0.5	200	0.62
300	0.23	300	0.29	300	0.23	300	0.28

Assumptions:

Midspan Sag = 5.75 feet

¹Expected in-service date of new facility

²Calculated MF based on expected loads 5 years in the future after in-service date

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

		(Calculated Mag	netic Field Data ³			
Transmission Line	e Segments: 4, 5	5, 6, 7, 9, 10, 11, 12	2, 13, 35, 36, 40), 41, 42, 43, 44, 45	5, 46, 61, 71, 72		
Facility Descriptic Single Circuit 69k	on: ⁴ Proposed Si V	ngle Pole, Horizon	tal Post Delta C	onfiguration			
(2016) ¹ Nor	mal Load	(2016) Nor	mal Peak	$(2021)^2$ Nor	mal Load	(2021) Nor	mal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	13.11	Centerline	16.35	Centerline	12.76	Centerline	15.91
25	7.84	25	9.77	25	7.63	25	9.51
50	3.21	50	4.01	50	3.13	50	1.99
100	1.01	100	1.25	100	0.98	100	1.22
150	0.52	150	0.64	150	0.5	150	0.63
200	0.33	200	0.42	200	0.33	200	0.41
300	0.19	300	0.24	300	0.19	300	0.24

Table 12 - Calculated Magnetic Fields Table

Assumptions:

Midspan Sag = 6.5 feet

¹Expected in-service date of new facility

²Calculated MF based on expected loads 5 years in the future after in-service date

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

		(Calculated Mag	netic Field Data ³			
Transmission Line	e Segments: 7, 8	3, 10, 12, 13, 35, 36	5, 40, 41, 42, 43	, 44, 45, 46, 61			
Facility Descriptic Single Circuit 69k	on: ⁴ Proposed Si V with out prov	ngle Pole, Horizon vision for distributi	tal Post Vertica on underbuild	l Configuration			
(2016) ¹ Nor	mal Load	(2016) Nor	mal Peak	(2021) ² Nor	mal Load	(2021) Nor	mal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	18.41	Centerline	22.95	Centerline	17.92	Centerline	22.34
25	8.96	25	11.17	25	8.72	25	10.88
50	4.09	50	5.09	50	3.98	50	4.96
100	1.4	100	1.74	100	1.36	100	1.7
150	0.71	150	0.89	150	0.69	150	0.86
200	0.45	200	0.56	200	0.44	200	0.54
300	0.24	300	0.3	300	0.24	300	0.29

Table 13 - Calculated Magnetic Fields Table

Assumptions:

Midspan Sag = 8 feet

¹Expected in-service date of new facility

²Calculated MF based on expected loads 5 years in the future after in-service date

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

Table 14 - Calculated Magnetic Fields Table

			Calculated Mag	netic Field Data ³			
Transmission Line	e Segments: 15,	46					
Facility Descriptic Single Circuit 69k	on: ⁴ Proposed Si	ngle Pole, H-Fram	e				
(2016) ¹ Nor	mal Load	(2016) Nor	mal Peak	$(2021)^2$ Nor	mal Load	(2021) Nor	mal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	31.71	Centerline	39.53	Centerline	30.86	Centerline	38.47
25	20.28	25	25.28	25	19.74	25	24.61
50	8.13	50	10.13	50	7.91	50	9.86
100	2.44	100	3.04	100	2.37	100	2.96
150	1.1.7	150	1.46	150	1.14	150	1.42
200	0.7	200	0.87	200	0.68	200	0.85
300	0.35	300	0.43	300	0.34	300	0.42

Assumptions:

Midspan Sag = 8 feet

¹Expected in-service date of new facility

²Calculated MF based on expected loads 5 years in the future after in-service date

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

Table 15 - Calculated Magnetic Fields Table

			Calculated Mag	netic Field Data ³			
Transmission Line	e Segments: 20,	21, 30, 50, 51, 52,	53, 54, 55, 62				
Facility Description Single Circuit 161	on: ⁴ Proposed Si kV	ingle Pole, Davit A	rm Delta Config	guration			
(2016) ¹ Nor	mal Load	(2016) Nor	mal Peak	$(2021)^2$ Nor	mal Load	(2021) Nor	mal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	15.15	Centerline	19.02	Centerline	15.15	Centerline	19.02
25	11.32	25	14.2	25	11.32	25	14.2
50	5.05	50	6.34	50	5.05	50	6.34
100	1.51	100	1.89	100	1.51	100	1.89
150	0.68	150	0.85	150	0.68	150	0.85
200	0.38	200	0.47	200	0.38	200	0.47
300	0.16	300	0.2	300	0.16	300	0.2

Assumptions:

Midspan Sag = 19.5 feet

¹Expected in-service date of new facility

²Calculated MF based on expected loads 5 years in the future after in-service date

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

Table 16 - Calculated Magnetic Fields Table

			Calculated Mag	netic Field Data ³			
Transmission Line	e Segments: 21						
Facility Descriptic Single Circuit 161	on: ⁴ Proposed Si kV	ingle Pole, Horizon	tal Post Delta C	Configuration			
(2016) ¹ Nor	mal Load	(2016) Nor	mal Peak	$(2021)^2$ Nor	mal Load	(2021) Nor	mal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	15.16	Centerline	19.03	Centerline	15.16	Centerline	19.03
25	10.83	25	13.6	25	10.83	25	13.6
50	4.71	50	5.91	50	4.71	50	5.91
100	1.38	100	1.73	100	1.38	100	1.73
150	0.62	150	0.78	150	0.62	150	0.78
200	0.34	200	0.43	200	0.34	200	0.43
300	0.15	300	0.19	300	0.15	300	0.19

Assumptions:

Midspan Sag = 25 feet

¹Expected in-service date of new facility

²Calculated MF based on expected loads 5 years in the future after in-service date

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

Table 17 - Calculated Magnetic Fields Table

			Calculated Mag	netic Field Data ³			
Transmission Line	e Segments: 17,	63, 65, 68, 69					
Facility Descriptic Double Circuit 16	on: ⁴ Proposed Si 1/69kV	ingle Pole, Davit A	rm Configuratio	on			
(2016) ¹ Nor	mal Load	(2016) Nor	mal Peak	(2021) ² Nor	rmal Load	(2021) Nor	mal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	22.69	Centerline	28.33	Centerline	22.22	Centerline	22.75
25	10.45	25	13.08	25	10.34	25	12.94
50	5.38	50	6.73	50	5.32	50	6.66
100	2.14	100	2.67	100	2.1	100	2.63
150	1.1	150	1.38	150	1.08	150	1.36
200	0.68	200	0.84	200	0.66	200	0.83
300	0.34	300	0.42	300	0.33	300	0.42

Assumptions:

Midspan Sag = 19 feet (69kV); 22 feet(169kV)

¹Expected in-service date of new facility

²Calculated MF based on expected loads 5 years in the future after in-service date

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

Table 18 - Calculated Magnetic Fields Table

		(Calculated Mag	netic Field Data ³			
Transmission Line	e Segments: 2, 3	3, 14A, 16C, 17, 18	A, 18B, 64, 66	, 67, 68, 70, 74			
Facility Description Double Circuit 16	on: ⁴ Proposed Si 1/69kV	ingle Pole, Davit A	rm Configuratio	n			
(2016) ¹ Nor	mal Load	(2016) Nor	mal Peak	$(2021)^2$ Nor	mal Load	(2021) Nor	mal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	20.42	Centerline	25.5	Centerline	20	Centerline	24.97
25	9.21	25	11.53	25	9.12	25	11.42
50	4.59	50	5.75	50	4.54	50	5.69
100	1.74	100	2.17	100	1.71	100	2.14
150	0.89	150	1.11	150	0.88	150	1.09
200	0.55	200	0.69	200	0.54	200	0.67
300	0.29	300	0.36	300	0.28	300	0.35

Assumptions:

Midspan Sag = 22 feet (69kV); 25.5 feet (161kV)

¹Expected in-service date of new facility

²Calculated MF based on expected loads 5 years in the future after in-service date

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

			Calculated Mag	netic Field Data ³			
Transmission Line	e Segment: 2, 3	, 14A, 16C, 17, 18A	A, 18B, 63, 64,	65, 66, 67, 68, 69,	70, 74		
Facility Descriptic Double Circuit 16	on: ⁴ Proposed Si 1/69kV	ingle Pole, Davit A	rm Configuratio	on			
(2016) ¹ Nor	mal Load	(2016) Nor	mal Peak	$(2021)^2$ Nor	mal Load	(2021) Nor	mal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	22.06	Centerline	27.55	Centerline	21.63	Centerline	27.02
25	11.11	25	13.93	25	11.05	25	13.86
50	4.89	50	6.13	50	4.87	50	6.11
100	1.84	100	2.3	100	1.81	100	2.27
150	0.96	150	1.21	150	0.95	150	1.18
200	0.61	200	0.76	200	0.59	200	0.74
300	0.32	300	0.4	300	0.32	300	0.39

Table 19 - Calculated Magnetic Fields Table

Assumptions:

Midspan Sag = 22 feet (69kV); 25 feet (161kV)

¹Expected in-service date of new facility

²Calculated MF based on expected loads 5 years in the future after in-service date

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

Table 20 - Calculated Magnetic Fields Table

			Calculated Mag	netic Field Data ³			
Transmission Line	e Segment: 14A	., 16C					
Facility Descriptic Double Circuit 16	on: ⁴ Proposed Si 1/69kV	ngle Pole, Davit A	rm Configuratio	n			
(2016) ¹ Nor	mal Load	(2016) Nor	mal Peak	$(2021)^2$ Nor	mal Load	(2021) Nor	mal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	13.97	Centerline	17.51	Centerline	13.88	Centerline	17.4
25	10.68	25	13.4	25	10.66	25	13.37
50	5.67	50	7.11	50	5.64	50	7.08
100	2.05	100	2.56	100	2.03	100	2.54
150	1.03	150	1.28	150	1.02	150	1.27
200	0.62	200	0.78	200	0.62	200	0.77
300	0.32	300	0.4	300	0.32	300	0.39

Assumptions:

Midspan Sag = 18 feet (69kV); 21 feet (161kV)

¹Expected in-service date of new facility

²Calculated MF based on expected loads 5 years in the future after in-service date

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

Table 21 - Calculated Electric Fields Table

	Calculated Electr
Transmission Line Segments: Exi	isting
Facility Description: ⁴ Existing Sin Single Circuit 69kV	ngle Pole, H-Frame
Distance from Centerline (feet)	Electric Field (kV/m)
Centerline	0.34
25	0.75
50	0.24
100	0.04
150	0.01
200	0.01
300	0

Assumptions: Midspan Sag = 8 feet

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.

 $^{4}\text{Describe facility}$ - Structure type, configuration, location Figure 8A

Table 22 - Calculated Magnetic Fields Table

		(Calculated Mag
Transmission Line	e Segment: Exis	sting	
Facility Description	on: ⁴ Existing Sir	ngle Pole, H-Frame	Configuration
(2011) ¹ Nor	mal Load	(2011 Norr	nal Peak
Distance from Centerline (feet)	Magnetic Field (mG)	Distance from Centerline (feet)	Magnetic Field (mG)
Centerline	56.01	Centerline	70.06
25	30.6	25	38.28
50	11.08	50	13.85
100	3.02	100	3.78
150	1.36	150	1.7
200	0.77	200	0.96
300	0.34	300	0.43

Assumptions:

Midspan Sag = 8 feet

¹Expected in-service date of new facility

³Provide a measured diagram of structures showing the height of conductors from the ground at the structure.



414 Nicollet Mall Minneapolis, Minnesota 55401-1993

September 6th, 2011

Mr. Mark A. Cook Public Service Commission of Wisconsin 610 North Whitney Way P.O. Box 7854 Madison, WI 53707-7854

Re: Neutral to Earth Voltage (NEV) Assessment for Northern States Power Company – Wisconsin's Proposed Stone Lake - Couderay Transmission Line Upgrade Project Towns of Bass Lake, Sand Lake, Edgewater and Couderay Sawyer County; and the Lac Courte Oreilles Reservation, Wisconsin PSCW Docket No. 4220-CE-173

Dear Mr. Cook,

Northern States Power Company, a Wisconsin corporation ("NSPW"), conducted a Neutral to Earth Voltage ("NEV") assessment for the above referenced project which included identifying shared transmission and distribution corridors. The Stone Lake – Couderay Transmission Line Upgrade Project ("Project") involves upgrading approximately 17 miles of existing 69 kilovolt ("kV") transmission line W3472 from the Stone Lake Substation to the Radisson Substation, a new substation in the vicinity of and replacing the Couderay Substation to a 69/161 kV transmission line. Depending on the final route selected by the Wisconsin Public Service Commission, the line would either be along existing right-of-way or would encompass new right-of-way.

NSPW conducted the initial NEV assessment for the Project that included identifying possible commercial agriculture businesses with confined animals. For the proposed Project, we only found one commercial agriculture business with confined livestock that meets the "Physical Proximity Criteria". This appears to be a beef operation north of Stone Lake, Wisconsin, on McLeod Road. The farmer is a Barron Electric Cooperative customer served off a single phase distribution line running parallel to the Alternate Route "A" of our proposed Stone Lake to Couderay transmission line upgrade project. The farm is about 0.2 miles from the shared corridor. NSPW will work with Barron Electric Cooperative to offer stray voltage testing before and after the Project. NSPW will also be working with Barron Electric Cooperative and the PSCW regarding potential proactive mitigation options.

Please let us know if you have any questions or concerns regarding the NEV assessment. Thank you for your time and consideration of this matter.

Sincerely,

win Schnack

Kevin Schnack Manager, Agricultural Customer Relations