



AN ALLETE COMPANY

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July 23, 2018

Mr. Darrell Nitschke  
Executive Secretary  
North Dakota Public Service Commission  
600 E. Boulevard Ave., Dept. 408  
Bismarck, North Dakota 58505-0480

**RE:** Southwest Oliver Transmission Line Project  
Case No. **PU-11-620**

DC Line Reroute in Cass County, North Dakota  
Case No. **PU-13-121**

Bison 4 Wind Project  
Case No. **PU-13-127**

Dear Mr. Nitschke:

Attached please find the Final Report of Minnesota Power's 2018 Tree and Shrub Survival Report in the above-referenced Cases. An original for each Case Number has been placed in today's mail.

Please let me know if you have any questions related to this matter.

Yours truly,

A handwritten signature in black ink that reads 'David R. Moeller'.

David R. Moeller

DRM:  
Attach.

121 PU-13-127 Filed 07/23/2018 Pages: 34  
2018 tree and shrub survival report  
21 PU-13-121 Filed 07/23/2018 Pages: 34  
2018 tree and shrub survival report  
82 PU-11-620 Filed 07/23/2018 Pages: 34  
2018 tree and shrub survival report



## **Minnesota Power 2018 Tree and Shrub Survival Report**

**Bison 4 (PU-13-127), SW Oliver 230 HVTL (PU-11-620)  
and DC Line Reroute (PU-13-121)**



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Appendix B- Minnesota Power's Tree and Shrub Mitigation Plans

Introduction

In 2014 Minnesota Power (an ALLETE Company) completed construction of its Bison 4- 205 MW wind facility (PU-13-127), 11 mile SW Oliver 230 kV high voltage transmission line (PU-11-620) and 0.7 mile DC Line Reroute (PU-13-121) (collectively the “Projects”). During construction of the Projects some trees and shrubs were removed.

In keeping with the Certificate of Site Compatibility and Route Permits issued for the Projects by the North Dakota Public Service Commission (PSC), Minnesota Power developed a Tree and Shrub Mitigation Plans (Plans) to facilitate Tree and Shrub Mitigation associated with the Projects (Appendix B). The Plans were filed with the PSC prior to beginning mitigation activities. The Plans specified the replacement of trees and shrubs disturbed during construction to minimize any associated environmental impacts.

Per PSC order requirement, tree and shrub mitigation species were planted at a ratio of at least 2:1 for every stem removed during construction. Additionally, mitigation is expected to achieve at least 75% survival at three years post planting.

The following is Minnesota Powers 2018 Tree and Shrub Survival Report for the Projects.

Survival Report

All three Project mitigation plantings were combined and comprise the same planting effort. For purposes of discussion, the combined planting effort will be referred to as Planting 4.

Minnesota Power preformed the third and final round of survival surveys for Planting 4 in the fall of 2018. Below, Table 1-1 outlines the corresponding survival rates and percent survival for Planting 4.

Table 1-1	Number of stems needed for 2:1 Ratio	Number of Stems Observed	Mitigation % Survival*
Trees/Tall Shrubs	350	459	131%
Low Shrubs	120	198	165%

\* Mitigation % Survival greater than 100%, exceeds mitigation requirements

Results/Conclusion

Upon review of the 2018 survey results for Planting 4, all mitigation survival ratios were adequate as referenced in Table 2-1. All PSC tree and shrub mitigation requirements have been met, no further survival surveys will be conducted.

Table 2-1	2016	2017	2018
Trees/Tall Shrubs	Adequate	Adequate	Adequate
Low Shrubs	Adequate	Adequate	Adequate

## **Appendix A**

-2018 Planting 4 Survival Survey Results



## APPENDIX A

### Woodland Plant Survival Monitoring For Minnesota Power- Planting 4 Conducted 07/12/18

A survival count of Planting 4 for the Bison 4 wind farm, SW Oliver 230 kV HVTL and DC Line Reroute was conducted by Minnesota Power (MP) staff on July 12, 2018. The Survival results can be found in Table 1-2 in the MP 2018 Tree and Shrub Survival Report.

Tree and Tall Shrub Survival for Planting 4's third growing season was 131%. 459 living Tall Trees/Shrubs were identified and a total of 350 mitigation stems are required based upon Minnesota Power's 2014 disturbance sampling. The Tree/Tall Shrub replacement numbers are well above the 2:1 replacement survival numbers required by the North Dakota Public Service Commission (PSC).

Low Shrub survival for the third growing season was 165%. 198 living Low Shrubs were identified and a total of 120 mitigation stems are required based upon Minnesota Power's 2014 disturbance sampling. The Low Shrub replacement numbers are well above the 2:1 replacement survival numbers required but the PSC.

This represents the third and final survival survey for Planting 4. MP has complied with PSC Tree and Shrub Mitigation requirements.

APPENDIX A

Minnesota Power- An ALLETE Company  
Bison 4, SW Oliver 230 HVTL and DC Line Reroute  
Woodland Plant Survival Monitoring 2018 for Planting 4  
12-Jul-18

Planting 4- 2018 Check

Overall Survival: 2018

<u>Species</u>	<u>Total Alive</u>
Chokecherry	98
Green Ash	247
Plum	43
Box Elder	71
Lilac	198

Total Needed for 2:1 Mitigation

	Number of stems needed for 2:1 Ratio	Number of stems observed	Mitigation % Survival*
Trees/Tall Shrubs	350	459	131%
Low Shrubs	120	198	165%

\* If Mitigation % Survival is greater than 100%, survival exceeds mitigation requirements

## **Appendix B**

-Minnesota Power's Tree and Shrub Mitigation Plans

## Minnesota Power Tree and Shrub Mitigation Plan

For Bison 4 (PU-13-127) and 230 kV HVTL (PU-11-620)



A WIND ENERGY INITIATIVE OF MINNESOTA POWER IN NORTH DAKOTA

APPENDIX B



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Tree and Shrub Mitigation Plan- Bison 4 & 230 kV HVTL

**Contents**

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**Appendix A- Alternative Mitigation Location Agreements**

**Appendix B- Woodland Inventory Procedures & Survey Results**

- **Bison 4**
- **SW Oliver 230 HVTL Extension**
- **Mitigation Survey Results**

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Case # PU-13-127 & PU-11-620

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## Introduction

Throughout 2013 and 2014 Minnesota Power (an ALLETE company) constructed its Bison 4, 204 MW wind energy conversion facility (Facility) as well as an associated 11 mile long 230 kilovolt (kV) high voltage transmission line (HVTL). During construction of both, some trees and shrubs were disturbed. In keeping with the North Dakota Public Service Commission's (PSC) Certificate of Site Compatibility for Bison 4 and the Certificate of Corridor Compatibility for the HVTL, Minnesota Power has developed this Tree and Shrub Mitigation Plan. This mitigation plan will facilitate the replacement of the trees and shrubs disturbed during construction and minimize any associated environmental impacts.

## Number and Variety of Trees

Post construction vegetation surveys were performed for both the Bison 4 and HVTL project areas to determine the number of stems disturbed, the species disturbed and their location. The post construction vegetation surveys were performed by Western Ecosystems Technology Inc. (WEST). The following table (Table 1-1) shows the total number of trees and shrubs disturbed during construction of Minnesota Power's Bison 4 Facility.

Table 1-1 Trees Disturbed During Construction

<b>Trees/Tall Shrubs</b>	-	-
American elm	Ulmus americana	32
Boxelder	Acer negundo	13
Chokecherry	Prunus virginiana	50
Eastern cottonwood	Populus deltoides	4
Green ash	Fraxinus pennsylvanica	31
Hawthorn	Crataegus	15
Peachleaf willow	Salix amygdaloides	2
Russian olive	Elaeagnus angustifolia	5
Siberian elm	Ulmus pumila	52
American plum	Prunus americana	6
<b>Total</b>		<b>210</b>
<b>Shrubs</b>	-	-
Buffaloberry	Shepherdia	45
Siberian peashrub	Caragana arborescens	35
<b>Total</b>	-	<b>80</b>



### Mitigation Plan

Following the requirements of the PSC Certificate of Site Compatibility for the Bison 4 Facility and the Certificate of Corridor Compatibility for the HVTL, Minnesota Power will mitigate trees and shrubs disturbed during construction. The disturbed trees and shrubs will be replaced at a minimum ratio of 2:1. However, the actual planting of most species will be at a ratio closer 3:1 to account for mortality associated with any planting/re-vegetation effort.

All disturbed trees and shrubs will be replaced by the same or similar species in following with the PSC's Tree and Shrub Mitigation Specifications.

Upon completion of mitigation activities, the planting site will then be monitored for three years to ensure that there has been a 75% survival rate based on a **2:1** planting regime. Survival surveys will occur in the fall of each year and will be used to determine if any additional mitigation activities will be required.

### Proposed Number, Variety, Type

Table 1-2 lists the number of stems disturbed during construction, the species disturbed and the minimum number of mitigation stems required. The percent survival will be determined assuming a 2:1 planting ratio.

In following with recommendations provided by local Soil Conservation Districts, range management professionals and local expertise, Minnesota Power has opted to replace the species that were disturbed by construction with species that are native, that do not have noxious qualities, are suitable for available soil types and are available for purchase with local NRCS offices in North Dakota. As a result of these parameters, the following adjustments to mitigation species have been made:

- Trees/Tall Shrubs  
Siberian elm and Russian olive are non-native species and will not be used for mitigation. Instead, both species will be replaced with Green Ash which is native to North Dakota. Due to problems with disease resistance and availability, both Eastern cottonwood and American elm will be replaced with Green Ash as well. Hawthorn is considered a noxious species in North Dakota. As a result, Minnesota Power will be replace those disturbed stems with chokecherry. The two disturbed peachleaf willows will be replaced with American Plum.

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Tree and Shrub Mitigation Plan- Bison 4 & 230 kV HVTL

- **Shrubs**  
Due to soil type, availability and desired species, Buffaloberry and Siberian pea shrub will be replaced with Common lilac.

Table 1-2 # Replacement stems (by Species) for Bison 4 and associated 230 kV HVTL

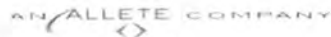
Common Name	Scientific Name	Plants Removed	Minimum mitigation stems
Green ash	Fraxinus pennsylvanica	124	248
Chokecherry	Prunus virginiana	65	130
Boxelder	Acer negundo	13	26
American plum	Prunus americana	8	16
Lilac	Syringa vulgaris	80	160

**Location and Date of Replacements**

A total of 17 landowners had trees or shrubs affected by the project. In an effort to maintain customer satisfaction, project acceptance and a high standard of public relations, Minnesota Power has developed an alternative site for the mitigation plantings to occur, if requested by land owners. Land owners have their choice to have mitigation activities occur either on their ownership or on Minnesota Power’s alternative site.

Four landowners preferred to have mitigation plantings occur on their property. Nine land owners preferred mitigation (planting) activities not occur on their ownership and have instead opted for Minnesota Power’s alternative site. Four landowners did not respond after two direct mailings and three phone call attempts. As a result, those mitigation stems will be planted at Minnesota Power’s alternative site as well.

The Minnesota Power alternate site is located in Morton County in Section 4 - Township 140N - Range 86W. See Attached Figure #1 for mitigation site location information.



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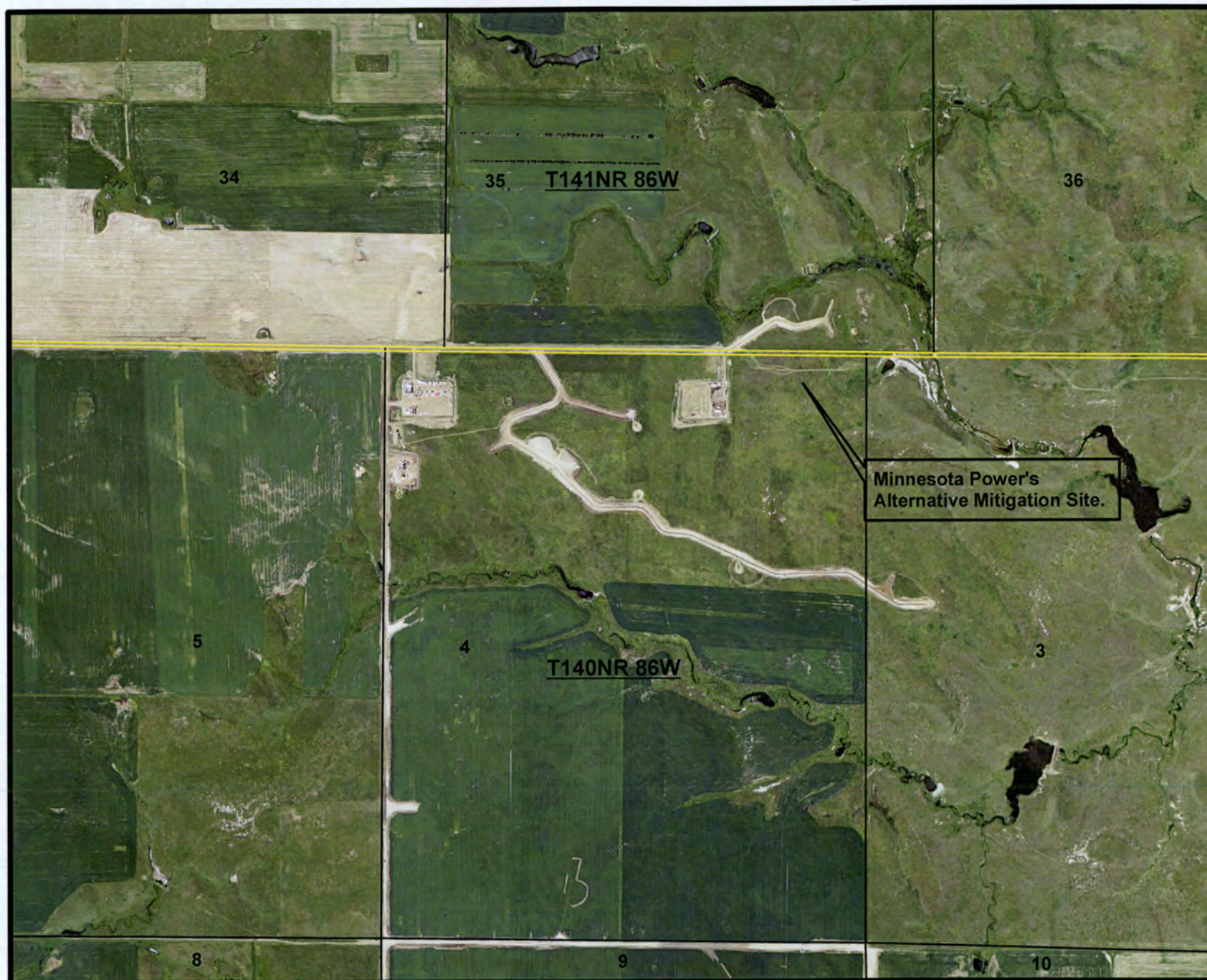
**Figure 1**

-Mitigation Site Location




Figure 1

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# Minnesota Power Alternative Mitigation Site.



**Legend**

-  Bison Area Roads
-  PLSS\_townships
-  PLSS\_sections



0.25

Miles



APPENDIX B

**Appendix A**

-Alternative Mitigation Agreements

APPENDIX B



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**Alternative Mitigation Location Agreement**

Warren E. and Delores C. Reiner, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities preformed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE Warren Reiner

NAME HERE Delores Reiner

COUNTY OF Oliver.

This instrument was drafted by:  
Minnesota Power  
30 West Superior Street  
Duluth, MN 55802

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**Alternative Mitigation Location Agreement**

David L. and Carol J. Skalsky, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities performed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE

Handwritten signature of David L. Skalsky in cursive.

NAME HERE

Handwritten signature of Carol J. Skalsky in cursive.

COUNTY OF Oliver.

This instrument was drafted by:  
Minnesota Power  
30 West Superior Street  
Duluth, MN 55802

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**Alternative Mitigation Location Agreement**

Clinton H. Redmann, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities performed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE

*Clinton Redmann*

COUNTY OF Oliver.

This instrument was drafted by:  
Minnesota Power  
30 West Superior Street  
Duluth, MN 55802

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**Alternative Mitigation Location Agreement**

Jason J. and Melanee L. Pulver, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities preformed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE Jason J. Pulver

NAME HERE Melanee Pulver

COUNTY OF Oliver.

This instrument was drafted by:  
Minnesota Power  
30 West Superior Street  
Duluth, MN 55802

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**Alternative Mitigation Location Agreement**

William and Louise Schultz, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities performed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE William Schultz

NAME HERE Louise Schultz

COUNTY OF Oliver.

This instrument was drafted by:  
Minnesota Power  
30 West Superior Street  
Duluth, MN 55802



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**Alternative Mitigation Location Agreement**

Darren and Cheri Klingenstein, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities performed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE Darren Klingenstein NAME HERE Cheri Klingenstein

COUNTY OF Oliver.

This instrument was drafted by:  
Minnesota Power  
30 West Superior Street  
Duluth, MN 55802

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**Alternative Mitigation Location Agreement**

Dennis and Joan Peltz, CONSENTOR, for valuable consideration, hereby acknowledge consent and convey unto MINNESOTA POWER legally incorporated as ALLETE, Inc., a Minnesota corporation, CONSENTEES and its successors, the right to perform tree and shrub mitigation activities at a mitigation restoration site which is not located on the CONSENTOR personal property.

The CONSENTOR understand that this replaces their rights to have tree and shrub mitigation, as required by applicable permits issued by the North Dakota Public Service Commission, activities performed on the CONSENTOR personal property in favor of a location determined at the CONSENTEES discretion.

CONSENTOR

NAME HERE

NAME HERE

COUNTY OF Oliver.

This instrument was drafted by:  
Minnesota Power  
30 West Superior Street  
Duluth, MN 55802

**Appendix B**

**-Woodland Inventory Procedures & Survey Results**

- Bison 4
- SW Oliver 230 HVTL Extension
- Mitigation Survey Results

## **Mitigation Survey Results**

APPENDIX B

**Tree and Shrub Mitigation Survey Results/Requirements Per Site Permits**

**For Minnesota Power's Bison 4 and SW Oliver 230 KV HVTL Extension**

ND PUC Docket Numbers PU-13-127 & PU-11-620

<b>Landowner and Species of Tree/Shrub</b>	<b>Trees/Shrubs Removed</b>
<b>Anton &amp; Cynthia Heidrich</b>	<b>33</b>
Eastern cottonwood	1
Hawthorn	6
Russet buffaloberry	6
Silver buffaloberry	20
<b>Clinton Redmann</b>	<b>14</b>
Siberian elm	4
Silver buffaloberry	10
<b>David &amp; Carol Skalsky, Leonard &amp; Mary Hueske</b>	<b>5</b>
Chokecherry	3
Peachleaf willow	2
<b>Dennis &amp; Joan Peltz</b>	<b>36</b>
American elm	10
Green ash	13
Siberian elm	13
<b>Duane &amp; Lynette Keller</b>	<b>52</b>
American elm	8
American plum	4
Boxelder	1
Chokecherry	20
Green ash	3
Hawthorn	9
Siberian peashrub	7
<b>Elmer &amp; Mable Bauer</b>	<b>4</b>
American elm	4
<b>Esther Keller</b>	<b>5</b>
American elm	5
<b>Eunice Schirado L.E.; ETAL</b>	<b>30</b>
Siberian elm	30
<b>Evelyn Conitz ~ LE</b>	<b>16</b>
American plum	2
Canada buffaloberry	4
Chokecherry	5

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Silver buffaloberry	5
<b>Frances Windhorst</b>	<b>5</b>
Chokecherry	4
Green ash	1
<b>Jason &amp; Melanee Pulver</b>	<b>2</b>
Russian olive	2
<b>Jerome &amp; Yvonne Voegelé</b>	<b>15</b>
Boxelder	12
Russian olive	3
<b>Kenny Klingenstein - Kari &amp; John Barlund</b>	<b>5</b>
American elm	5
<b>Lyle Kinnischtzke</b>	<b>13</b>
Cottonwood	3
Green ash	10
<b>Roger &amp; Eunice Bueligen</b>	<b>8</b>
Chokecherry	7
Siberian elm	1
<b>Roger &amp; Marvel Klingenstein</b>	<b>7</b>
Chokecherry	7
<b>Schultz Trust</b>	<b>4</b>
Siberian elm	4
<b>Terrence Leingang</b>	<b>32</b>
Green ash	4
Siberian peashrub	28
<b>Warren &amp; Delores Reiner</b>	<b>4</b>
Chokecherry	4
<b>Total Total</b>	<b>285</b>

**Minnesota Power Tree and Shrub Replacement Plan for the  
DC Line Reroute Project**

Case#: PU-14-121



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**Minnesota Power Tree and Shrub Mitigation Plan. Pages 2-3**

**Figure 1. Mitigation Site Location**

**Appendix A- Woodland Inventory Survey Results**



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Tree and Shrub Mitigation Plan- DC Line Reroute  
Case # PU-14-121

### **Introduction**

In 2014 and 2015 Minnesota Power (an ALLETE company) constructed a 0.7 mile long reroute of its 250 kilovolt (kV) direct current high voltage transmission line (DC Line). During construction, some trees and shrubs were disturbed. In keeping with the North Dakota Public Service Commission's (PSC) Certificate of Corridor Compatibility, Minnesota Power has developed this Tree and Shrub Mitigation Plan. This mitigation plan will facilitate the replacement of the trees and shrubs disturbed during construction and minimize any associated environmental impacts.

### **Number and Variety of Trees**

Post construction vegetation surveys were performed to determine the number of stems disturbed, the species disturbed and their location. The post construction vegetation surveys were performed by KDK Consulting Inc. The following table (Table 1-1) shows the total number of trees and shrubs disturbed during construction of Minnesota Power's DC Line reroute.

Table 1-1 Trees Disturbed During Construction

<b>Trees/Tall</b>		
<b>Shrubs</b>	-	-
Boxelder	Acer negundo	3
Siberian elm	Ulmus pumila	20
<b>Total</b>	-	<b>23</b>

### **Mitigation Plan**

Following the requirements of the PSC Certificate of Corridor Compatibility for Minnesota Powers DC Line Reroute Project, Minnesota Power will mitigate trees and shrubs disturbed during construction. The disturbed trees and shrubs will be replaced at a minimum ratio of 2:1. However, the actual planting will be at a ratio closer 3:1 to account for mortality associated with any planting/re-vegetation effort.

All disturbed trees and shrubs will be replaced by the same or similar species in following with the PSC's Tree and Shrub Mitigation Specifications.

Upon completion of mitigation activities, the planting site will then be monitored for three years to ensure that there has been a 75% survival rate based on a **2:1** planting regime. Survival surveys will occur in the fall of each year and will be used to determine if any additional mitigation activities will be required.

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**Proposed Number, Variety, Type**

Table 1-2 lists the number of stems disturbed during construction, the species disturbed and the minimum number of mitigation stems required. The percent survival will be determined assuming a 2:1 planting ratio.

In following with recommendations provided by local Soil Conservation Districts, range management professionals and local expertise, Minnesota Power has opted to replace the species that were disturbed by construction with species that are native, that do not have noxious qualities, are suitable for available soil types and are available for purchase with local NRCS offices in North Dakota. As a result of these parameters, the following adjustments to mitigation species have been made:

- **Trees/Tall Shrubs**  
Siberian are non-native species and will not be used for mitigation. Instead, the species will be replaced with Green Ash which is native to North Dakota.

Table 1-2 Replacement stems by species for DC Line Reroute

Common Name	Scientific Name	Plants Removed	Minimum mitigation stems
Green ash	Fraxinus pennsylvanica	20	40
Boxelder	Acer negundo	3	6

**Location and Date of Replacements**

One landowner had trees or shrubs affected by the project. In an effort to maintain customer satisfaction, project acceptance and a high standard of public relations, Minnesota Power has developed an alternative site for the mitigation plantings to occur, if requested by land owners. Land owners have their choice to have mitigation activities occur either on their ownership or on Minnesota Power's alternative site.

The landowner did not respond after two phone call attempts and two mailing attempts. As a result, the mitigation plantings will occur on Minnesota Power's Alternative Site.

The Minnesota Power alternate site is located in Morton County in Section 4-Township 140N-Range 86W. See Attached Figure #1 for mitigation site location information.

Figure 1

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# Minnesota Power Alternative Mitigation Site.



- Legend**
- Bison Area Roads
  - ▭ PLSS\_townships
  - ▭ PLSS\_sections



0.25 Miles



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**Appendix A-**

- Woodland Inventory Survey Results

APPENDIX B

**SHELTERBELT DISTURBANCE- DC LINE REROUTE (PU-14-121)  
FOR MINNESOTA POWER- A DIVISION OF ALLETE, INC.  
WITHIN T137N-R54W- SECTION 11**

**Conducted by KDK Consulting October 22, 2015**

An estimated count of trees removed within a 120 foot right-of-way through a shelterbelt for a DC Line reroute was conducted by KDK Consulting on October 22, 2015. Each row had an original tree spacing of 6', thusly a potential of 20 trees present for each row within the sampled 120' right-of-way provided by Mr. Dan McCourtney of Minnesota Power. The shelterbelt is in declining health due to age and/or disease. Most surviving trees were mature with large canopies allowing the shelterbelt to still function as a windbreak for the adjacent cropland, thus reducing wind erosion.

Six rows were present within the shelterbelt with a row spacing of 10' between rows. The easternmost row had faded from existence well north of the right-of-way, with no evidence of any trees disturbed. The remaining five rows had variable survival within the right-of-way. From east to west, the rows had an estimated survival of 60%, 30%, 20%, 40%, and 40%, respectively. The latter 3 rows appear to have had no survival in the south 3/4 of the 120' right-of-way based on review of aerial photography and ground reconnaissance indicators. All trees in the shelterbelt were Siberian Elm, with the exception of the first row from the east that was disturbed. Boxelder trees were embedded within the row (approximately 1/4 of the trees were Boxelder within the immediate vicinity of the right-of-way. A higher percentage of Boxelder trees were surviving in the row the further north one moved away from the right-of-way and were a majority of the surviving trees in the north half of the shelterbelt).

Based on that information, and if the survival patterns within each row followed what was observed to the north of the right-of-way, the following estimates for trees removed would be as follows:

From east to west:

- Row 1: 20 trees possible \* 60% = 12 trees (9 Siberian Elm, 3 Boxelder)
- Row 2: 20 trees possible \* 30% = 6 trees (All Siberian Elm)
- Row 3: 5 trees possible \* 20% = 1 tree (Siberian Elm)
- Row 4: 5 trees possible \* 40% = 2 trees (Both Siberian Elm)
- Row 5: 5 trees possible \* 40% = 2 trees (Both Siberian Elm)

An estimated total of 23 trees were present prior to disturbance within the 120' right-of-way with 20 of these trees being Siberian Elm and 3 Boxelder. This number of trees present prior to disturbance may be slighter lower as the survival percentages appears to drop off in the sampled right-of-way based on a recent aerial photo and the current ground reconnaissance. Based on available evidence, it appears that the 23 trees would likely be a worst case scenario for the amount disturbed during the reroute.