MINNESOTA DEPARTMENT OF COMMERCE

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July 17, 2015

Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota, 55101-2147

RE: **Comments of Minnesota Department of Commerce, Division of Energy Resources**
Docket No. E,G002/D-15-46

Dear Mr. Wolf:

Attached are the Comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

Northern States Power Company's (Xcel) 2015 Review of Remaining Lives.

The petition was filed on May 18, 2015 by:

Lisa H. Perkett
Director, Capital Asset Accounting
Xcel Energy
414 Nicollet Mall, 4th Floor
Minneapolis, MN 55401

The Department recommends **approval except for recommended changes in depreciation remaining lives of Sherco Units 1 and 2, Angus C. Anson Units 2 and 3, and Granite City Units 1 to 4.** The Department requests that Xcel provide in its Reply Comments the depreciation expense impacts for the three remaining lives changes recommended by the Department. The Department also requests that the Company address in its reply comments why no capital additions are planned for 2015 and 2016 for the Sibley gas production facility. The Department is available to answer any questions the Minnesota Public Utilities Commission may have.

Sincerely,

/s/ NANCY A. CAMPBELL
Financial Analyst

/s/ MICHELLE ST. PIERRE
Financial Analyst

JK/lt
Attachment

MINNESOTA DEPARTMENT OF COMMERCE

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

COMMENTS OF THE MINNESOTA DEPARTMENT OF COMMERCE DIVISION OF ENERGY RESOURCES

DOCKET NO. E,G002/D-15-46

I. SUMMARY

On May 18, 2015, Northern States Power Company, doing business as Xcel Energy (Xcel or the Company), filed its 2015 Review of Remaining Lives Petition (the Depreciation Petition) with the Minnesota Public Utilities Commission (Commission). The Company is requesting approval of its proposed remaining lives, salvage rates, and depreciation rates for its electric and natural gas production facilities and gas storage facilities. Specifically, the Company is requesting:

- passage-of-time adjustments from 2014 to 2016 to match the January 1, 2016 implementation date (two-year remaining life reductions) for all electric and natural gas production and gas storage facilities;
- eight-year remaining life extension for Blue Lake Units 1 to 4, which are oil fired combustion turbine plants (resulting in an 8-year remaining life as of January 1, 2016);
- ten-year remaining life extensions for both Red Wing and Wilmarth which are both refuse-derived fuel (RDF) plants (resulting in a 12-year remaining life as of January 1, 2016);
- ten-year remaining life extensions for Maplewood, Sibley and Wescott which are all peaking plants (resulting in a 14-year remaining life as of January 1, 2016);
- updates to the net salvage rates for electric and natural gas production and gas storage facilities based on a five-year Dismantling Study; and
- effective date of January 1, 2016 for the new remaining lives, except for the new wind farms (Pleasant Valley and Borders Wind) where the Company requests the effective date to be the in-service date in 2015.

In the Depreciation Petition, the Company requested an increase in total Company depreciation expense of $4.9 million based on beginning year balances for assets not presently included in rate riders. The Company noted that if the Commission approves the Minnesota Department of Commerce's (Department) recommendation in Docket No. E999/CI-13-626, *In the Mater of Commission Inquiry into Decommissioning Policies Related*

to Depreciation, the Company has estimated an increase in depreciation expense of $8.4 million (instead of the $4.9 million) as a result of eliminating probability percentages for net salvage estimates. The Company provided Alternative Attachments A, B, and G to show the changes caused by eliminating the probability percentages for net salvage estimates. The breakout for electric and gas depreciation expense changes are as follows:

	Without Probabilities (DOC)	With Probabilities (Xcel)
Electric	$7.0 million increase	$3.9 million increase
Gas	$1.4 million increase	$1.0 million increase
Total	$8.4 million increase	$4.9 million increase

The Company requested an effective date of January 1, 2016 for assets included in base rates, and effective with the in-service date for assets included in Riders.[1] Xcel requested a prospective effective date in order to align any changes approved in this depreciation docket with the effective date of the Company's upcoming Minnesota Electric Rate Case, set to be filed near the end of 2015.[2]

II. BACKGROUND

On June 16, 2014, the Commission approved, in Docket No. E,G002/D-14-181, Xcel's depreciation petition for remaining lives and net salvage rates with an effective date of January 1, 2014. The Commission's Order also required future depreciation filings to provide:

- a comparison and explanation of the differences between depreciation remaining lives and Integrated Resource Plan planning lives. This information was provided in the Company's Depreciation Petition as Attachment F.
- an attachment providing a historical comparison of changes in remaining lives and net salvage rates. This information was provided in the Company's Depreciation Petition at Attachment H.
- an update on removal costs for the Minnesota Valley Plant and the impact on depreciation reserves, including a final true-up when the retirement/removal is completed.

III. DEPARTMENT ANALYSIS

The Department examined Xcel's Depreciation Petition for compliance with filing requirements and previous Commission Orders, and for the reasonableness of the proposed remaining lives, salvage rates, and depreciation accruals.

[1] Petition, page 18.
[2] Petition, page 2.

A. DEPRECIATION RULES

Minnesota Statutes Section 216B.11 and Minnesota Rules, parts 7825.0500-7825.0900 require public utilities to seek Commission approval of their depreciation practices. Utilities must also file depreciation studies at least once every five years and must use straight-line depreciation unless the utility can justify a different method. When utilities use the average service life technique to depreciate group property accounts, life and salvage factors, as well as the resulting depreciation rates, remain unchanged between studies. When companies choose the remaining-life technique for depreciating group property accounts, the underlying life[3] and salvage factors may not change, but depreciation rates are adjusted annually to reflect the passage of time on remaining lives, as well as the impact of plant additions and retirements. Annual depreciation study updates are required when the remaining-life technique is employed to allow the Commission the opportunity to approve changes in depreciation rates.

B. DEPARTMENT ANALYSIS OF CHANGES TO REMAINING LIVES FOR ELECTRIC PRODUCTION FACILITIES

With the exception of the units described below, Xcel proposed two-year reductions to the remaining lives of all of its electric production facilities to reflect the passage of time (from 2014 to 2016). During its investigation, the Department sent information requests to the Company. See Department Attachment A for Xcel's responses. After review, the Department concludes that Xcel's proposed remaining lives are reasonable, except for the depreciation remaining lives of Sherco Units 1 and 2, Angus C. Anson Units 2 and 3, and Granite City Units 1 to 4, as discussed further in Section F.

1. Red Wing and Wilmarth RDF Plants

The Red Wing Steam Plant is located in Red Wing, Minnesota and is a two-unit generating plant that burns processed municipal solid waste called refuse-derived fuel or RDF. The power production capability of both units together is 20 megawatts (MW). Both units were originally placed in service in 1949 and converted to burn RDF in 1986.

The Wilmarth Steam Production Plant is located in Mankato, Minnesota on the Minnesota River. The Wilmarth plant is a two-unit generating plant that burns RDF. The power production capability of both units together is 20 MW. The units were placed in service originally in 1984 and were converted to burn RDF in 1987.

The Company noted on page 6 of the Depreciation Petition that the remaining lives for both the Red Wing and Wilmarth production plants are linked directly with the remaining term of the Company's contract with Resource Recovery Technology (RRT), the provider of the refuse for the plant's fuel. According to the Company, the current contract between Xcel Energy and RRT is set to expire at the end of 2017. The Company anticipates operating the plants through 2027, and is exploring a 10-year fuel contract extension (through the end of 2027)

[3] The underlying life is normally the average service life or whole life.

with the Company's RDF fuel supply contractor. Therefore, the Company requests that the remaining lives for both the Red Wing and Wilmarth RDF plants be extended by 10 years, to a 12-year remaining life as of January 1, 2016. The estimated depreciation expense impact of these changes to the remaining lives, combined with the recommended changes to net salvage discussed later in these comments, results in an annual decrease in depreciation expense of approximately $5.4 million for Red Wing and appropriately $4.2 million for Wilmarth.

Based on its review, the Department considers it reasonable for the Company to change the remaining lives of the Red Wing and Wilmarth RDF Plants by extending the lives by 10 years resulting in a 12-year remaining life as of January 1, 2016 to be consistent with the fuel supply contracts for these plants.

2. Other Production: Blue Lake Units 1-4

The Blue Lake Peaking Plant is located south of Shakopee, Minnesota, and consists of four 55 MW oil-fired combustion turbines. The plant became operational in 1974. The plant is primarily used for capacity accreditation, and lesser so for energy production during peak demand periods.

In the Company's 2016-2030 Resource Plan filing, the Company stated that Blue Lake Units 1-4 would provide reserve capacity through 2023. The Company noted, on page 6 of the Depreciation Petition, that the remaining life of Blue Lake Units 1-4 was allowed to expire at the end of 2012 and the plant is currently fully depreciated. The Company stated that currently, there are no major capital additions planned for the facility. However, the new Dismantling Study estimates show an increase in the cost of removal for Blue Lake Units 1-4 over what was assumed in the past. The Company has proposed a change in its net salvage rate for Blue Lake Units 1 to 4 from a negative 11.9 percent to a negative 22.9 percent.

The Company noted that if the remaining life of this plant is not changed and the new salvage rate is approved, the increase in the cost of removal would be expensed immediately in 2016. This would result in depreciation expense increase of approximately $2.7 million for 2016. To avoid the immediate expense of the increase in costs of removal in 2016 and to take into account that the plant is still in use, the Company proposed that the remaining life of the plant be set to eight years as of January 1, 2016, to correspond with the expected remaining life stated in the 2015 resource plan. With this new remaining life, the 2016 depreciation expense increase will be $336,000. The Company also noted that no depreciation expense was recorded for Blue Lake Units 1-4 in 2014 and none is expected in 2015.

The Department asked the Company in Department Information Request Nos. 15 and 16 to tie out the dismantling cost and scrap metal credits in the Dismantling Study for Blue Lake Units 1-4 and Sherco Units 1-3 to the net salvage rate changes. The Company provided the support for these calculations which required some further breakout of the dismantling costs and scrap metal credits by unit to calculate the negative net salvage rates. The Department considers the supporting calculations to be appropriate.

Based on its review, the Department considers it reasonable for the Company to change the remaining life and net salvage rate for Blue Lake Units 1-4 by extending the life by eight years to an eight-year remaining life for depreciation purposes as of January 1, 2016, which is consistent with the Company's resource plan life. The Department also considers it reasonable to increase the net salvage rate from a negative 11.9 percent to a negative 22.9 percent for Blue Lake Units 1-4, which is consistent with the Dismantling Study.

3. Other Production: Pleasant Valley Wind project and Borders Wind project

The Company has two wind production facilities that are scheduled to begin operation in late 2015. The first is the Pleasant Valley Wind project, which is a 200 MW wind farm to be located near Austin, Minnesota. The second is the Borders Wind project, which is a 150 MW facility to be located in northeastern Rolette County in North Dakota immediately south of the United States-Canadian Border. The Company noted that the 25-year remaining life and negative 8.5 percent salvage rate (discussed below) is estimated to result in 2015 depreciation expense of $3.1 million for Pleasant Valley and $1.4 million for Borders Wind. The Company's Schedule B, page 1 of 31, shows the depreciation expense impact from the wind additions is a $4.5 million increase in depreciation expense.

In the Company's most recent general rate case (E002/GR-13-868) the Company assumed in-service dates of late 2015 for these two wind projects. Company Witness, Lisa Perkett, in her Direct Testimony[4] addressed the use of a 25-year remaining life as of the in-service date of these facilities. The Department reviewed and supported the Company's estimated in-service dates and 25-year remaining life for Pleasant Valley Wind and Borders Wind projects in the rate case. As noted in the rate case and in the current depreciation filing, the 25-year remaining life is consistent with that of the Grand Meadow and Nobles Wind farms.

In Department Information Request No. 5, the Department asked the Company to reconcile any differences in capital additions for the Pleasant Valley and Borders Wind projects between what was included in the most recent rate case and what was included in the current depreciation filing. The Company noted that some minor transmission costs were included in the rate case that would not be included in this depreciation study which covers generation and not transmission. The Company also noted that in the rate case, the Company used beginning- and end-of-year balances, while this depreciation filing used the balance as of the in-service date.

In Department Information Request No. 6, the Department asked about possible double recovery of capital additions and depreciation expense for the Pleasant Valley and Borders Wind projects as a result of the Company placing these projects in service in 2015 for rate case purposes, but not recording depreciation expense until January 1, 2016 for book purposes (this depreciation filing). The Department relied on the Company's discussion on pages 1 and 2 of its petition, but Xcel noted that it clarified in its Summary of Filing on page 22 of Xcel's PDF document that Xcel is requesting an effective date of January 1, 2016 for new remaining lives and salvage rates, "except for the new wind farms which the Company

[4] Page 28.

requests an effective date of when the assets are in-service in 2015." The Department appreciates this clarification and considers the Company's response to the Department's Information Request Nos. 5 and 6 to be reasonable.

Based on its review, the Department considers the Company's proposed 25-year depreciation lives for Pleasant Valley and Borders Wind projects to be reasonable and consistent with the depreciation lives of Grand Meadow and Nobles wind farms. Additionally, the Company deprecation lives are consistent with the 25-year life and almost the same capital additions were used in the Company's most recent rate case.

C. DEPARTMENT ANALYSIS OF CHANGES TO NET SALVAGE RATES FOR ELECTRIC PRODUCTION FACILITIES

The Commission's June 16, 2014 Order in Docket No. E,G002/D-14-181 required the Company to submit a 5-year depreciation study for electric and gas production and gas storage. To meet this requirement, the Company had TLG Services, Inc. (TLG) perform a comprehensive dismantling study on all steam, hydro, and other production electric generation plants. The Company used TLG's estimated dismantling costs, and subtracted salvage value (scrap metal credits) to determine the net salvage rates. The Company also applied probabilities as follows:

- if the unit has a remaining life of less than ten years, then use 100 percent of the dismantling study estimate;
- if the unit has a remaining life greater than or equal to ten years, but less than 20 years, then use 75 percent of the dismantling study estimate;
- if the unit has a remaining life greater than or equal to 20 years, then use 50 percent of the dismantling study estimate; and
- for plants on a national waterway, like King and Hennepin Island, and for all wind facilities, use 100 percent of the dismantling study estimate.

The Company requested the following net salvage rates for electric production facilities (as discussed on pages 11 to 14 of the Company petition):

- Hydro Production – Hennepin Island: negative net salvage rate of 26.4 percent;
- Other Production – Pleasant Valley and Borders Wind projects: negative net salvage rate of 8.5 percent (approved in Docket No. E002/GR-13-868);
- Other Production – Blue Lake Units 1-4: negative net salvage rate of 22.9 percent (discussed in the remaining life section above);
- Other Production - Key City: Reserve Removal Update and Reserve Reallocation. The estimated cost of removal of $4.1 million is $0.776 million over what is currently in the depreciation reserve account; therefore, the Company requested a reallocation of reserves within the Other Production function to cover additional expected removal costs;
- Steam Production - Minnesota Valley: Removal Update and Reserve Reallocation. The estimated costs of removal of $22.1 million is $3.2 million over what is currently in the depreciation reserve account; therefore, the Company requested

another reallocation of reserves within the Steam Production function to cover additional expected removal costs; and,

- Steam Production – Black Dog Units Units 3 and 4: negative net salvage rate of 27.3 percent since this was a salvage rate reduction for units that were retired in April 2015; the additional net salvage for this account was reallocated to other Steam Production plants.

The Department reviewed these Company requested changes in electric net salvage rates and noted that these changes are supported by the TLG Dismantling Study and are consistent with approvals in past rate cases where applicable. Thus, the Department considers the Company's proposed electric net salvage rates to be reasonable and recommends that the Commission approve the Company's changes in net salvage rates.

The Department recommends that Xcel continue to provide in future depreciation filings updates on removal costs for the Minnesota Valley Plant, Key City Plant, and Black Dog Units 3 and 4, the impact on depreciation reserves, including a final true-up when the retirement/removal is completed.

D. DEPARTMENT ANALYSIS OF CHANGES TO REMAINING LIVES FOR GAS PRODUCTION AND GAS STORAGE

As stated above, Xcel proposed that the current remaining lives be adjusted by two years for the passage of time since the 2014 depreciation study to the proposed implementation date January 1 2016. Additionally, for the Maplewood, Sibley, and Wescott production facilities, the Company proposed that the remaining life be extended 10 years beginning January 1, 2015.[5] Significant changes are also proposed to the net salvage rates beginning January 1, 2016. Xcel proposed the following changes to the remaining lives.[6]

[5] Petition, pages 8-9.
[6] The data in Table 1 is taken from Xcel Energy's Schedule H, pages 7-8.

Table 1: Proposed Life Changes

		Current RL	Proposed RL
	Production:	**2014**	**2016**
	Maplewood		
G305	Structures	6	14
G311	LP Gas Equip.	6	14
G302	Other Equip.	6	14
	Sibley		
G305	Structures	6	14
G311	LP Gas Equip.	6	14
G302	Other Equip.	6	14
	Wescott LPG[7]		
G305	Structures	6	14
G311	LPG Equip.	6	14
G302	Other Equip.	6	14
	Gas Storage Wescott LNG[8]		
G361	Structures	10	8
G362	Gas Holders	10	8
G363	Purification	10	8
G363.1	Liquefaction	10	8
G363.2	Vaporizing	14	12
G363.3	Compressor	19	17
G363.4	Meas. & Reg.	10	8
G363.5	Other Equip.	10	8

In its Petition, Xcel stated that the Maplewood, Sibley, and Wescott plants were used extensively during the winter of 2014 and the Company is committed to capital improvements and maintenance of these plants in the coming years that will allow for the continued use of the facilities.[9] Xcel also provided its plans for capital additions for each gas production facility:

- Maplewood: replace the 4160-volt and 480-volt Motor Control Center panels, as well as several compressors.
- Sibley: replace the 4160-volt control panel and all compressors.
- Wescott: upgrade and modify the LNG and LPG control rooms, and replacing the liquefaction heat exchanger.

However, in response to DOC Information Request Nos. 9, 11, and 13, for each of the gas production facilities Xcel stated "Since the time of the filing in this docket, a new capital budget has been finalized." For Maplewood and Wescott, "the current plan does not include the same projects listed in our initial filing." For Sibley, "the current plan does not include

[7] LPG = liquefied petroleum gas.
[8] LNG = liquefied natural gas.
[9] Xcel provided further details for each plant on pages 7-9

large capital additions for 2015 and 2016." The most current plans and amounts for 2015 and 2016 are as follows:

- Maplewood: "replacing the heating system which was placed in-service in January 2015 [$407,384], and a programmable logic controller slated to go in-service in 2016 [$360,496]."
- Sibley: No capital additions are planned for 2015 or 2016.
- Wescott: "The new projects planned include instrument air dryer, fill line modifications, truck loading pumps and valves, and an MRL separator installation. These are all slated to go into service by the end of 2016 [$1,061,229 in 2015 and $359,522 in 2016]."

In its response to DOC Information Request No. 10, Xcel stated "Even with the changes in capital budgeting planning, the Company is committed to maintaining the production of these facilities."

To support the proposed 15-year remaining life (10 year extension) for the three production facilities, Xcel provided a detailed third-quarter 2014 study, *LNG & LPG Facility Life Assessment*, prepared by an outside consulting firm, Black & Veatch, in its response to DOC Information Request No. 10. Further, Xcel stated:

> The Company is proposing a 10-year extension of the remaining life for all three gas production facilities, based in large part on the high-level of use that occurred at the plant during recent winter heating seasons. All of the gas production plants proved vital in ensuring gas system stability during the 2013-2014 winter, where gas use was extremely high due to the cold snap which hit the Midwest. The Company has no current plans to replace these facilities with different facilities; therefore, these facilities will remain crucial in ensuring system reliability going forward.

Regarding the life assessment study for all three of the Company's gas production facilities in Minnesota, Xcel summarized:

> At a high-level, this report found that with capital additions to improve operability and reliability that the facilities could operate up to a 20-year life-span. The Company is proposing a 15-year life span for all three gas production facilities to recognize the commitment we have to maintaining gas system reliability.

The detailed study shows major findings and recommendations ranked by plant and importance some of which seem urgent due to the age of the equipment.[10] It is difficult to

[10] The study also includes Xcel's Eau Claire, WI production facility.

understand why no capital additions are planned for 2015 and 2016 for Sibley especially when the initial budget included replacing the 4160-volt control panel and all compressors and there are at least 10 recommendations (items 53-59, 63, 64, and 65) listed in the study for Sibley. The Department requests that Xcel fully explain in its Reply Comments why no capital additions are planned for 2015 and 2016 for the Sibley gas production facility.

Based on its analysis, the proposed extension of the remaining lives of the gas production facilities seems reasonable if the Company makes what appears to be the much-needed investment in the gas production facilities. Therefore, the Department recommends that the Commission approve Xcel's proposed changes to the gas production and gas storage facilities remaining lives. However, the Department requests that Xcel fully explain in its Reply Comments why no capital additions are planned for 2015 and 2016 for the Sibley gas production facility.

E. DEPARTMENT ANALYSIS OF CHANGES TO NET SALVAGE RATES FOR GAS PRODUCTION AND GAS STORAGE

As discussed above, Xcel based its net salvage rates on a five-year Dismantling Study. The dismantling estimate included the cost of removing the equipment and structures and limited restoration for the Maplewood, Sibley, and Wescott plants. Xcel proposed the following changes to the net salvage rates.[11]

[11] The data in Table 1 is taken from Xcel Energy's Schedule H, pages 7-8.

Table 2: Proposed Salvage Rate Changes

		Current SV %	Proposed SV %
	Production:	**2014**	**2016**
	Maplewood		
G305	Structures	-17.0	-70.3
G311	LP Gas Equip.	8	-70.3
G302	Other Equip.	0	-70.3
	Sibley		
G305	Structures	-1.0	-59.6
G311	LP Gas Equip.	8	-59.6
G302	Other Equip.	-1.0	-59.6
	Wescott LPG		
G305	Structures	-3.0	-14.4
G311	LPG Equip.	1.0	-14.4
G302	Other Equip.	3.0	-14.4
	Gas Storage Wescott LNG		
G361	Structures	-10.0	-14.4
G362	Gas Holders	-10.0	-14.4
G363	Purification	-10.0	-14.4
G363.1	Liquefaction	-10.0	-14.4
G363.2	Vaporizing	-10.0	-14.4
G363.3	Compressor	-10.0	-14.4
G363.4	Meas. & Reg.	-10.0	-14.4
G363.5	Other Equip.	-10.0	-14.4

For the salvage rates, Xcel proposed to use:

> ...the same salvage rate for all utility accounts at each facility. This includes the Wescott facility, which contains both Gas Production and Gas Storage assets. This is a departure from what we have used in the past, where each utility account had distinct net salvage percentages. The Company feels that the switch is appropriate since TLG analyzed each facility as a whole, and not by utility account.[12]

Based on its analysis, the Department concludes that the proposed salvage rates of the gas production and gas storage facilities are reasonable and supported by the study. Therefore, the Department recommends that the Commission approve Xcel's proposed changes to the gas production and gas storage facilities salvage rates.

F. COMPARISON OF RESOURCE PLANNING LIVES TO DEPRECIATION LIVES

The Commission's June 16, 2014 Order in Docket No. E,G002/D-14-181, Ordering Point No. 4 stated:

[12] Petition, page 17.

> Require Xcel to continue to provide in future depreciation filings a comparison of depreciation remaining lives and resource planning lives with an explanation of any differences.

The Department has reviewed Xcel's Attachment F and based on that review submitted information requests on three of the comparisons between depreciation remaining lives and resource planning remaining lives for Sherco Units 1 and 2, Angus C. Anson Units 2 and 3, and Granite City Units 1 to 4.

1. Sherco Units 1 and 2

In Department Information Request No. 1, the Department asked the Company to explain why a depreciation life of seven years for Sherco 1 and 2 is reasonable, in light of the fact that the earliest retirement for Sherco 1 and 2 is 2025 (as discussed in Attachment F on page 1 under Sherco 1 & 2 discussion) or alternatively through the end of the integrated resource plan (IRP) period in 2030 which is a 15 year remaining life. The Company provided the following response:

> In our 2016-2030 Resource Plan filing (Docket No. E002/RP-15-21), we provided a range of options for the continued operations of Sherco Units 1 and 2. The Supplement to the Resource Plan, which was filed on March 16, 2015, included additional Sherco retirement scenarios with unit operation dates ranging from 2020 to 2030. These include a scenario where Sherco Units 1 and 2 would be retired as early as 2020 and a scenario where both units would be retired in 2023, which lines up with the current remaining life of 7 years. The longer-term scenarios, especially anything past 2030, may require significant investment in environmental controls, investments the Company has yet evaluated. Depreciation life analysis generally does not include capital additions out further than the current year.
>
> While a definitive future for Sherco Units 1 and 2 has yet to be decided, the Company feels it is prudent to use a conservative life estimate towards the earlier end of the potential range of retirement dates. As this is an annual process, the financial remaining life can be reassessed following the outcome of the Resource Plan.

Based on the Department's review of the Company's Attachment F on page 1 under the Sherco Units 1 and 2 discussion which supports 2025 as the Company Preferred Plan in the IRP and the Company's response cited above, the Department recommends a depreciation life of 10 years which is consistent with the IRP remaining life to 2025, rather than the 2030 the Department was considering. The Department also notes that in the Company's most recent rate case (Docket No. E002/GR-13-868 in Mr. Mills Direct Testimony) the Company

included capital additions for emission control projects for Sherco Units 1 and 2, so extending the depreciation lives is consistent with the capital additions approved in the rate case.

2. Angus C. Anson Units 2 and 3

In Department Information Request No. 2, the Department asked the Company to explain why a depreciation life of 3.8 years for Angus C. Anson Units 2 and 3 is reasonable, in light of the fact that the Company is assuming a remaining life for the IRP of 2030 which is a 15-year remaining life. The Company provided the following response:

> In our 2016-2030 Resource Plan filing (Docket No. E002/RP-15-21), we identified Angus C. Anson Units 2 and 3 as capacity resources through the end of the planning period. The forecasted operational life extends beyond the current depreciation life because although we have no further capital addition investments planned that would extend the life of the plant, we believe we can continue to operate it to provide ongoing capacity benefits to our system and customers. The Company feels it is prudent to use a conservative 3.8 year life estimate in the review of the remaining life process. As this is an annual process, the financial remaining life of the units can be reassessed when more definite operational information is known. The Company will continue to analyze the operational and resource need for the units going forward.

Based on the Department's review of the Company's information request, the Department believes that Angus C. Anson Units 2 and 3 will be able to operate for a time period longer than the current 3.8-year remaining life. Additionally, the Company indicated that it has no plans for capital additions. Thus, the Department concludes that capital additions are likely not needed for the longer 15-year resource planning life. The Department notes the importance of balancing assigning appropriate costs to the correct customers who benefit from this plant over the useful life with ensuring that the Company is assured full rate recovery of their plant. As a result, the Department recommends that a more conservative 10-year remaining life for Angus C. Anson Units 2 and 3 be approved by the Commission, rather than the 15-year resource planning life noted in the Company's Attachment F.

3. Granite City Units 1 to 4

In Department Information Request No. 3, the Department asked the Company to explain why a depreciation life of 3.3 years for Granite City is reasonable, in light of the fact that the Company is assuming an 8-year remaining life for the IRP. The Company provided the following response:

> In our 2016-2030 Resource Plan filing (Docket No. E002/RP-15-21), we identified Granite City Units 1-4 as capacity resources through 2024. Currently, the site does not provide a

> major operational performance and is primarily used for capacity accreditation, and lesser so for energy production during peak demand periods. The forecasted operational life extends beyond the current depreciation life because although we have no further capital investments planned that would extend the life of the plant, we believe we can continue to operate it to provide ongoing capacity benefits to our system and to customers.
>
> The Company feels it is prudent to use a conservative 3.3 year life estimate in the review of the remaining life process. As this is an annual process, the financial remaining life of the units can be reassessed when more definite operational information is known. We will continue to analyze the operational and resource need for Granite City going forward and will readdress the remaining life when a more definite future is known.

Based on the Department's review of the Company's information request, the Department believes that Granite City Units 1 to 4 will be able to operate for a time period longer than the current 3.3-year remaining life. Additionally, the Company indicated that it has no plans for capital additions. Thus, the Department concludes that capital additions are likely not need for the longer 15-year resource planning life. Again, the Department notes the importance of balancing assigning appropriate costs to the correct customers who benefit from this plant over the useful life with ensuring that the Company is assured full rate recovery of their plant. As a result, the Department recommends a more conservative 10-year remaining life for Granite City Units 1 to 4 be approved by the Commission, rather than the 15-year resource planning life noted in the Company's Attachment F.

Except for Sherco Units 1 and 2, Angus C. Anson Units 2 and 3, and Granite City Units 1 to 4, where the Department recommends 10 year remaining lives, the Department concludes that Xcel has adequately explained the differences between its current resource plan and the 2015 Depreciation Petition. The Department requests that Xcel provide the depreciation expense impacts for the three remaining lives changes recommended by the Department. The Department recommends that the Commission continue to require Xcel to provide in future depreciation filings a comparison of depreciation remaining lives and resource planning remaining lives.

IV. RECOMMENDATIONS

The Department recommends that the Commission:

- approve Xcel's proposed depreciation lives and salvage rates for electric production, gas production and gas storage, except for the remaining lives of Sherco Units 1 and 2, Angus C. Anson Units 2 and 3, and Granite City Units 1 to 4;

- revise the remaining lives for Sherco Units 1 and 2, Angus C. Anson Units 2 and 3, and Granite City Units 1 to 4 to the Department recommended 10 years;
- require Xcel to file its next remaining life depreciation filing by February 17, 2017;
- require Xcel to continue to provide in future depreciation filings a comparison of depreciation remaining lives and resource planning lives for electric production with an explanation of any differences;
- require Xcel to continue to provide in future depreciation filings a historical comparison of changes in remaining lives and net salvage rates; and,
- require Xcel to continue to provide in future depreciation filings updates on removal costs for the Minnesota Valley Plant, Key City Plant and Black Dog Units 3 and 4, including the impact on depreciation reserves, and a final true-up when the retirement/removal is completed.

The Department requests that the Company provide in its Reply Comments the depreciation impacts for the three remaining lives changes recommended by the Department.

The Department also requests that the Company fully explain in its Reply Comments why no capital additions are planned for 2015 and 2016 for the Sibley gas production facility.

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 1
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Attachment F, Comparison of Depreciation Lives and Resource Planning Lives

Please fully explain why a depreciation life of 7 years for the Sherco Units 1 and 2 is reasonable. Should the depreciation life be at least 10 years in light of the fact that the earliest retirement for Sherco Units 1 and 2 is 2025, or alternatively, through the end of the Integrated Resource Planning (IRP) period in 2030 which results in a 15 year life?

Response:

In our 2016-2030 Resource Plan filing (Docket No. E002/RP-15-21), we provided a range of options for the continued operations of Sherco Units 1 and 2. The Supplement to the Resource Plan, which was filed on March 16, 2015, included additional Sherco retirement scenarios with unit operation dates ranging from 2020 through 2030. These include a scenario where Sherco Units 1 and 2 would be retired as early as 2020 and a scenario where both units would be retired in 2023, which lines up with the current remaining life of 7 years. The longer-term scenarios, especially anything past 2030, may require significant investment in environmental controls, investments the Company has yet evaluated. Depreciation life analysis generally does not include capital additions out further than the current year.

While a definitive future for Sherco Units 1 and 2 has yet to be decided, the Company feels it is prudent to use a conservative life estimate towards the earlier end of the potential range of retirement dates. As this is an annual process, the financial remaining life can be reassessed following the outcome of the Resource Plan.

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Date: July 6, 2015

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 2
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Attachment F, Comparison of Depreciation Lives and Resource Planning Lives

Please fully explain why a depreciation life of 3.8 years for the Angus C. Anson Units 2 and 3 is reasonable. Should the depreciation life be 15 years, in light of the fact that the retirement for Angus C. Anson Units 2 and 3 is through the end of the IRP period in 2030 which results in a 15 year life?

Response:

In our 2016-2030 Resource Plan filing (Docket No. E002/RP-15-21), we identified Angus C. Anson Units 2 and 3 as capacity resources through the end of the planning period. The forecasted operational life extends beyond the current depreciation life because although we have no further capital investments planned that would extend the life of the plant, we believe we can continue to operate it to provide ongoing capacity benefits to our system and to customers. The Company feels it is prudent to use a conservative 3.8 year life estimate in the review of remaining life process. As this is an annual process, the financial remaining life of the units can be reassessed when more definitive operational information is known. The Company will continue to analyze the operational and resource need for the units going forward.

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 3
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Attachment F, Comparison of Depreciation Lives and Resource Planning Lives

Please fully explain why the Granite City depreciation life of 3.3 years is reasonable. Should the depreciation life be 8 years consistent with IRP life?

Response:
In our 2016-2030 Resource Plan filing (Docket No. E002/RP-15-21), we identified Granite City Units 1-4 as capacity resources through 2024. Currently, the site does not provide a major operational performance and is primarily used for capacity accreditation, and lesser so for energy production during peak demand periods. The forecasted operational life extends beyond the current depreciation life because although we have no further capital investments planned that would extend the life of the plant, we believe we can continue to operate it to provide ongoing capacity benefits to our system and to customers.

The Company feels it is prudent to use a conservative 3.3 year life estimate in the review of remaining life process. As this is an annual process, the financial remaining life of the units can be reassessed when more definitive operational information is known. We will continue to analyze the operational and resource need for Granite City going forward and will readdress the remaining life when a more definitive future is known.

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 4
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Pages 1 and 2 of Xcel's Petition, Pleasant Valley Wind and Borders Wind Impact

Please fully explain why the change or impact in the 2015 depreciation expense for Pleasant Valley Wind and Borders Wind is not listed as a depreciation expense change and incorporated in the Company's total depreciation expense net increase of $4.9 million for 2015 on pages 1 and 2 of Xcel's Petition, since both wind generation plants are projected to be in-service in the later part of 2015?

Response:

Since the Pleasant Valley Wind and Borders Wind projects were authorized to be included in general rates assuming a 25-year remaining life with negative 8.5% net salvage, it was presented the way it was because it was not a change from what was approved in the rate case. Schedule B, page 1 of 31, shows the depreciation impact from the addition of $4.5 million.

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 5
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Attachment B, Pages 1 of 31 and 27 of 31, Pleasant Valley Wind and Borders Wind Amounts in Rate Case

Please compare the Pleasant Valley Wind and Borders Wind 2015 capital additions and 2015 depreciation expense shown in Attachment B on page 27 of 31 to the 2015 capital additions and 2015 depreciation expense assumed in Xcel's most recent rate case, Docket No. E002/GR-13-868, and explain any differences.

Response:

The numbers included in Attachment B, page 27 of 31, include the production portion of the total project included in the rate case. The grandparents for these projects included both the production and transmission portions. The table below summarizes the two projects separated by production and transmission. This information can be found in Exhibit 95 (JCR-1), Schedule 5, Page 1 of 3 of Company Witness Mr. Jeff Robinson's Direct Testimony (Volume 2A, Testimony and Supporting Schedules, 2015 Step Rev. Req, Rate Moderation, Rate Rider Minimization) in Docket No. E002/GR-13-868. The amount of plant in the rate case was shown as a beginning/ending average for the 2015 plant balance. This is different from how it is shown in this filing, which is just the balance at the time of in-servicing.

	Plant In-Service	Depreciation Expense
Production		
Pleasant Valley	$341,505,777	$3,090,097
Borders	264,886,066	1,437,063
Total	606,391,844	4,527,160
Transmission		
Pleasant Valley	$4,263,336	$23,194
Total Wind Projects	$610,655,180	$4,550,354

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 6
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Page 2 of Xcel's Petition, Pleasant Valley Wind and Borders Wind Recovery

The Company requested a January 1, 2016 effective date for depreciation changes rather than the January 1, 2015 effective date that would normally occur. For Pleasant Valley Wind and Borders Winds that were included in the Company's 2015 step (see Table 4 of Mr. Robinson's Direct Testimony in Docket No. E002/GR-13-868) and are shown on the Company's current petition in Attachment B page 27 of 31 (capital additions and depreciation expense for 2015), please explain how the Company is not double recovering these 2015 wind facilities' costs by including in the rate case for 2015, but not recording for book purposes until January 1, 2016.

Response:

The following sentence was included in the one page Summary of Filing, page 22 of the Petition pdf:

> The Company requests that upon Commission approval, the new remaining lives become effective January 1, 2016, except for the new wind farms where the effective date is requested to be when the assets are in service in 2015.

We do not believe that there is any double recovery because the filing requests the same treatment that was included in the rate case and approved by the Commission.

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 7
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: All 2015 Step Projects' Recovery

Please explain if the Company would double recover all depreciation expense and return on capital for all 2015 step projects in Docket No. E002/GR-13-868, by deferring depreciation changes implementation until January 1, 2016.

Response:

The Company would not double recover any of the depreciation included in the rate case for the 2015 Step, as the depreciation was estimated using the current approved depreciation lives and net salvage rates except the new wind projects which were proposed and approved in the last rate case. The current depreciation expense for the 2015 Step projects are not being proposed for deferral as the expense will be recognized in 2015. For each functional class presented in Schedule B, there was a 2015 and a 2016 calculation. The 2015 depreciation showed no change in remaining life or net salvage, except the new wind projects. The 2016 depreciation was calculated using the net plant, which was the 2015 plant balance less the 2015 depreciation reserve increased for the 2015 depreciation expense. Thus the estimation of depreciation expense for 2016 already accounted for the 2015 depreciation expense.

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 8
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Implementation of Depreciation Changes

Please identify any depreciation filing where the Company has not implemented its depreciation changes in the same year of its depreciation filing, but instead implemented the depreciation changes in the following year as requested in the current Xcel Petition.

Response:

The following list shows all dockets since 1990 where the effective date for depreciation changes were in a year after the original filing date:

Docket No.	Description	Filing Date	Effective Date
E,G002-D-92-869	Average Service Life	July 31, 1992	January 1, 1993
E,G002-D-92-1066	Remaining Life - 1993	September 1, 1992	January 1, 1993
E002-D-93-504	Nuclear Decommissioning	June 1, 1993	January 1, 1994
E,G002-D-93-1247	Remaining Life	December 7, 1993	January 1, 1994
E,G002-D-95-1352	Computer Software Lives	December 11, 1995	January 1, 1996
E002-M-02-1766	Nuclear Decommissioning	October 11, 2002	January 1, 2003
E002-M-05-1648	Nuclear Decommissioning	October 11, 2005	January 1, 2006
E,G002-D-07-1528	Average Service Life	December 3, 2007	January 1, 2008
E002-M-08-1201	Nuclear Decommissioning	October 13, 2008	January 1, 2009
E002-M-11-939	Nuclear Decommissioning	November 30, 2011	January 1, 2013
E,G002-D-12-858	Average Service Life	July 31, 2012	January 1, 2013

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 9
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Pages 7 and 8 of Xcel's Petition, Maplewood Gas Production Plant Additions

The Company stated it is replacing the Motor Control Panels as well as several compressors. Please provide the 2015 and 2016 total capital additions planned for the Maplewood Gas Production Plant, include cost estimates, studies, any information that supports the Company's capital additions.

Response:

The total capital additions planned for the Maplewood gas production plant are $407,384 in 2015 and $360,496 in 2016.

Since the time of the filing in this docket, a new capital budget has been finalized; the current plan does not include the same projects listed in our initial filing. Additions at the plant include replacing the heating system, which was placed in-service in January 2015, and a programmable logic controller slated to go in-service in 2016. A detailed study of the life of the plants is included as Attachment A to our response to DOC Information Request No. 10.

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 10
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Pages 7 and 8 of Xcel's Petition, Life of the Maplewood Gas Production Plant

Please provide support for the proposed 15-year remaining life (10 year extension) for the Maplewood Gas Production Plant, include studies, comparisons to other propane plants depreciation lives, manufacture information, or any information that support the Company's proposed remaining life.

Response:

The Company is proposing a 10-year extension of the remaining life for all three gas production facilities, based in large part on the high-level of use that occurred at the plant during recent winter heating seasons. All of the gas production plants proved vital in ensuring gas system stability during the 2013-2014 winter, where gas use was extremely high due to the cold snap which hit the Midwest. The Company has no current plans to replace these facilities with different facilities; therefore, these facilities will remain crucial in ensuring system reliability going forward.

In our initial filing, we mentioned several capital additions which were planned for the gas production facilities. However, since the time of the filing a new capital budget has been finalized and the current plan includes different planned capital additions. Even with the changes in capital budget planning, the Company is committed to maintaining the production of these facilities.

Finally, in late 2014, the Company contracted with Black and Veatch to complete a life assessment study for all three of the Company's gas production facilities in Minnesota. At a high-level, this report found that with capital additions to improve operability and reliability that the facilities could operate up to a 20-year life-span.

The Company is proposing a 15-year life span for all three gas production facilities to recognize the commitment we have to maintaining gas system reliability. Please see Attachment A for a copy of the Black and Veatch Study.

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LNG & LPG FACILITY LIFE ASSESSMENT

BLACK & VEATCH PROJECT NO. 181136.1300

PREPARED FOR

Xcel Energy

Q3 2014

BLACK & VEATCH
Building a world of difference.

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LIST OF TABLES

1.0 Executive Summary

Northern States Power Company, doing business as Xcel Energy (Xcel), is operating four liquefied natural gas (LNG) and liquefied propane gas (LPG) facilities which are approximately forty years old.

Xcel has requested Black & Veatch perform a life assessment of the facilities which include the evaluation of the LNG/LPG processes, equipment, and controls and instrumentation systems and determine prospective improvements to enhance operability and reliability, which will yield an additional 20 year life span.

Each facility was visited by the Black & Veatch project team to conduct the life assessments. This report summarizes the life assessment findings and associated recommendations, targeting a 20 year life-span.

Section 2.0 Scope of Work describes how the life assessment was performed, the purpose of the study, and the underlying assumptions. Section 3.0 Plant Life Assessment and Recommendations describes the findings and recommendations. A comprehensive list of findings is included in Appendix A.

1.1 MAJOR FINDINGS

Reliability

Reliability is a concern with old production plants that have original equipment. Most of the pumps and compressors that are original to the plants are close to, or have exceeded their predicted lifespan and will need replacement for the plants to operate for 20 more years. The only rotating pieces of equipment that have been replaced recently are the Wescott refrigeration compressor (C101), Wescott fuel gas compressor (C201), Wescott feed gas compressor (C301), and Maplewood Atlas Copco compressor. Without inline spare equipment, new equipment would increase plant reliability. Further discussion can be found below in Section 3.1.3.

Debottlenecking

The two liquefaction plants each look to remove bottlenecks to obtain a higher throughput. At Wescott, an obvious bottleneck is the air coolers. At high ambient temperatures, the refrigerant air coolers operate at max capacity and do not obtain set points. The effective area of these air coolers should be increased and the two services within E109 could be decoupled. Other bottlenecks are the Wescott main refrigerant exchanger effective heat transfer area and the Eau Claire LNG product pumps.

Ease of Operation

The ease of operation of the Wescott liquefaction facility should be improved. There are many valves throughout this facility that are placed in manual which once were in automatic. These should be put back into automatic to allow for reliable operation. Target refrigerant composition and corresponding dew point should be determined. Without suction drums, operators must be cautious in how far they cool the refrigerant so that no liquids are sent to any compressor suctions. Operation and maintenance can be aided by a complete and accurate set of process flow diagrams (PFD) and piping and instrumentation diagrams (P&ID). The following are useful information listed on a typical set of P&IDs: equipment design and operating conditions, line sizes and design information, materials of construction, valve and instrumentation details including mechanical and electrical details, control loops, etc.

1.2 RECOMMENDATIONS

Replace Pumps and Compressors

At least partial capacity of pumps and compressors that are old and toward the end of their predicted lifespan should be replaced with new. If parts can no longer be found for old equipment, these pieces should be heavily considered for replacement.

Debottleneck the Wescott Air Coolers

Air coolers that are bottlenecking the Wescott liquefaction process should have their effective area increased. This can be achieved by solvent cleaning the fins, confirming adjustable pitch fan blades are at maximum angle, or replacing the air coolers with bigger units. Decoupling the two services in E109 will allow each service to be controlled separately and allow the process to achieve desired operation.

Ambient Temperatures versus Refrigerant Compositions

Additional work by Black & Veatch should be considered for the creation of various ambient temperatures versus refrigerant compositions, along with better PFDs and P&IDs. With these tools, plant personnel can safely and efficiently run the plant year round without damaging the refrigerant compressor. In addition, these tools provide documentation which can be used for overall process safety management.

2.0 Scope of Work

2.1 PURPOSE OF THE LIFE ASSESSMENT

The purpose of the life assessment is to evaluate the condition of the existing LNG/LPG facilities to determine their capability to reliably achieve their designated production rates in the future over a required economic life estimated at 20 years.

This life assessment includes the evaluation of Xcel's current liquefaction process and the general condition of the current LNG/LPG plants including the equipment (compression and refrigeration), piping, measurement, and control room facilities.

Recommendations were developed using process simulations, studies, and expert judgment to improve the efficiency, operability, and output of the plant. The findings and recommendations from this effort are documented in this report.

2.1.1 Site locations

The plants that are included in this life assessment are identified in Table 2.1.1.

Table 2.1.1 Xcel Plants

PLANT NAME	LOCATION	DESCRIPTION	VINTAGE
Wescott	10326 S Robert Trail, Inver Grove Heights MN	A single mixed refrigerant LNG production plant and a refrigerated LPG storage facility	1973
Maplewood	1555 N Century, Maplewood, MN	Pressurized LPG storage with a propane-air mixing facility	1960's
Sibley	800 Highway 13, Mendota Heights, MN	Pressurized LPG storage with a propane-air mixing facility	1960's
Eau Claire	1501 Black Ave, Eau Claire, WI	An expander LNG production plant	1968

2.2 LIFE ASSESSMENT METHODOLOGY

The life assessment methodology included the following tasks.

2.2.1 Task 1: Data Collection

Black & Veatch collected documents to support the life assessment during the Wescott Startup project which occurred during April of 2014. The information collected included site descriptions, P&ID's, plot plans, and operating procedures.

As the life assessment project was kicked-off, Black & Veatch issued a data collection request to Xcel. Black & Veatch also collected documents while performing the site visits.

2.2.2 Task 2: Site Visits

The Black & Veatch project team conducted a walking tour of the Xcel Plants to observe the general condition systems, equipment, tanks, structures and buildings. Wescott was operating in liquefaction mode at the time of the site visit. None of the other plants were operating during the site visits.

The site visits began with an on-site kick-off meeting. The on-site kick-off meeting took place at the Wescott plant. Following the completion of the on-site meeting, the Black & Veatch team began the site walk downs.

The site visits included a walk down of each unit to conduct visual inspections, interview key plant personnel, gather critical data and documents not previously available, and take reference photos. Black & Veatch's on-site team included the project manager, two process engineers, equipment engineer, and controls engineer.

Observations for specific pieces of equipment are noted in Appendix A.

2.2.3 Task 3: Review of Existing Systems and Process Studies

After the Site Visits were completed, the life assessment was performed from Black & Veatch's offices using the information from the previous tasks to evaluate the findings and develop recommendations.

During this task, Black & Veatch performed process studies to evaluate the potential recommendations for upgrades, modifications, and retrofitting that support the objective of improving the operation of the facility and its life span.

2.2.4 Task 4: Prepare Recommendations

Black & Veatch has assembled this report outlining the findings, conceptual information, and documentation to support identified recommendations.

3.0 Plant Life Assessment Findings and Recommendations

Based on performing the Scope of Work, the Black & Veatch team has noted the life assessment findings in this section. A comprehensive list of life assessment findings is included in Appendix A. The life assessment findings are separated into two categories:

- **Fleet-Wide Findings and Recommendations.** These Findings and Recommendations are high-level items that apply to all of the Xcel Plants.
- **Major Plant Findings and Recommendations.** These Findings and Recommendations are specific to each Xcel Plants and are the most importance findings.

3.1 FLEET-WIDE FINDINGS AND RECOMMENDATIONS

3.1.1 Plant Operation and Documentation

The senior Xcel employees have a vast amount of knowledge about the plant and process. Senior staff knowledge is not well documented or stored in an electronic database. Many employees are within three years of retirement and when they leave, knowledge and experience for proper operation and maintenance leaves with them.

Improved plant operations documentation is recommended to facilitate knowledge transfer and to educate new workers that will replace the key retirements.

Many plant PFDs and P&IDs are lacking information about the different areas process, such as equipment and piping design data and instrumentation. There are inconsistencies between drawings and plant piping along with repeated equipment on separate pages. Design data for all pieces of equipment are not listed on the current P&IDs.

Consistent and high level PFDs and P&IDs can greatly reduce learning time and improve day to day operations. Along with high level drawings, a well designed and implemented Maintenance Management System (mentioned below) will organize all maintenance procedures, track equipment parts and suppliers, and record maintenance history.

3.1.2 Maintenance and Site Practices

Equipment Exercising

When not in operation, current practice is that most rotating equipment (pumps and compressors) sit idle. It is recommended for reliable operation to operate these pieces of equipment in recycle at least every 2 months, depending on equipment type and manufacturer recommendations. Running equipment keeps bearings in good conditions and can identify problems that may affect reliable operation.

Manufacturer recommendations should be taken into account. Equipment exercising should be built into the Maintenance Management System along with manufacturer recommended routine maintenance activities.

Evaluate Reliability and Spare Parts Availability

Every year or two, Xcel should evaluate reliability of each of the aging pumps and compressors. Each piece of aging equipment is susceptible to availability of spare parts, and could be out of service for extended periods, depending on lead time of replacement parts. Inventory should be

tracked for each pump and compressor to aide in obtaining parts, and to identify when they are no longer available. This will identify what can be fixed quickly and what would cause a complete replacement. When it is determined that maintenance parts are no longer available for a piece of equipment, it should be strongly considered for replacement.

As part of a comprehensive Maintenance Management System, spare parts, suppliers, maintenance records, preventative maintenance, etc., should be scheduled and stored electronically for knowledge transfer between retiring and upcoming personnel. Weaknesses should be identified where critical pieces of equipment are no longer supported with spare parts inventory while building this database.

Removal of Decommissioned Equipment

Decommissioned equipment and associated piping needs to be removed and disposed of properly. If it is not possible to remove them, they should be isolated and removed from live lines to eliminate the possibility of failure while connected to the process. In particular, decommissioned LNG pumps for T2 at Wescott are connected to a live line with no isolation and are currently flooded with LNG. Removing unused equipment and piping increases safety and reduces confusion for new personnel who are unfamiliar with the plant.

PSV Isolation Rotation

A concern was raised about old, leaking valves along with the reconfiguration of piping that has led to the inability to isolate the inlet/outlet line to the large LNG storage tank (T2). This raises the challenge of PSV testing since Xcel currently removes all PSVs from the line and takes them to the shop for required testing. For instances where a perfect system isolation cannot be obtained, a spare PSV should be purchased and pretested. This PSV will be quickly changed out with the on-line PSV. The old PSV can then be tested and if it still passes, can be used next time the PSVs need to be changed and tested.

3.1.3 Expected System Reliability

Replacement of Vintage and Crucial Equipment

The plants were built in the 1960's and early 1970's, and most pieces of original equipment are well into, or have exceeded, their design lifetime. The reciprocating compressors and the expander are of concern because of their replacement cost, lead time, and lost profit exposure if they fail. In combination with the aforementioned Maintenance Management System, the identified crucial pieces of rotating equipment should be evaluated for replacement. Replacements should be at least the current rated or greater capacity. Where two old 50% capacity machines are in operation, replacing one with a 100% capacity machine will provide redundancy and the option of running at reduced capacity.

Throughout all 4 facilities, there has consistently been no sparing of any equipment. When two compressors are together in a service, they have 50% capacity and run in parallel to obtain total plant capacity. This provides some redundancy. When one compressor is down for maintenance, the plant can obtain 50% total capacity. Shutdowns and startups are costly for lost profit and costs associated with getting the plant back in operation. It is recommended to identify crucial pieces of rotating equipment with poor reliability and long replacement lead times and to replace these items with new equipment at the same or greater capacity. Items that the Black & Veatch team has identified as requiring immediate replacement have been identified in the tables of Section 3.2. Replacing these items before they fail will ensure that natural gas is available to users when required.

Automatic Value Control

For more reliable operation, all plants should have most control valves in automatic control. This allows for smoother operation and less chance for high variation within any of the process streams. This is mostly an issue at the Wescott plant. Since the addition of the new refrigerant compressor, many valves that were originally in automatic are now in manual. The LNG product temperature was once controlled by automatic control of the product valve and the refrigerant let down valve. This should be reinstated along with the other valves that have been changed over to manual.

3.1.4 Year Round Operation in Liquefaction Facilities

To operate these plants year round, Xcel must make changes to areas within the plants so that reliability of operation is increased. Currently, as mentioned before, there are a lot of old and worn down pieces of equipment across all sites. These pieces may be considered reliable for a peak shaving operation because of the short run time as well as off season down time for maintenance. When a plant switches to year round operation, there is much less flexibility in the plant to handle long stretches of downtime. Critical pieces of equipment that are original to the plant should look to be replaced with new.

Summer Operation

For summer operation, the major concern is the increased ambient temperature, which leads to lower production rates. This is due to the inability to control process outlet temperatures, which increases volume flow through the refrigerant compressor, which results in less LNG production for the same power input. With two air coolers at Wescott already bottlenecking production at an ambient temperature of 85 °F, Xcel will have a significantly lower production rate at the same power consumption levels, unless the air coolers are restored or replaced.

A relatively inexpensive way to increase production both for peak shaving and year round operation is to increase the effective area of the air coolers, either through cleaning/tuning of the existing air coolers or through replacement. See Appendix A. item #40 for more information.

Winter Operation

For winter operation, a minimum temperature for operation to safely run the process must be determined. Certain piping and equipment may need to be depressured if the process is shut down at extreme low temperatures to prevent exceeding allowable metal stress tolerances. To prevent overcooling of process streams, boxed air coolers that allow for some hot air recirculation may need to be installed.

Certain lines would need to be heat traced to prevent, for instance, condensing liquids in compressor suction lines. The production rate will increase during the cold temperatures, but this will require changes to the operational procedures.

The dew point of the refrigerant will need to be known so that no liquids are sent to the compressor suction. Black & Veatch can provide refrigerant compositions at various ambient temperatures under additional scope.

3.2 MAJOR PLANT FINDINGS AND RECOMMENDATIONS

This section outlines the individual plant findings and recommendations.

3.2.1 Wescott Plant - Major Findings

Table 3.2.1.1 Wescott Plant – Life Assessment

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
Process Systems	Gas Purification	The gas purification system of the plant appears to be in good shape. There are minor issues with the insulation on piping around the adsorbers which is coming off of the pipe on corners downstream of the adsorbers. The mole sieve material currently is about 10 years old. The lifetime expectancy of LNG mole sieve catalyst within industry is approximately 15 years or less. The catalyst will need replacement within the next five years, per industry practices.			
Process Systems	Coldbox and heat Exchangers	The brazed aluminum heat exchanger (coldbox) was replaced in 2005 and, with proper maintenance and operating practices should provide good service for 20 more years. One concern is the plugging of the low pressure refrigerant pass with lube oil. To properly maintain the coldbox, Black & Veatch recommends performing a solvent wash to remove the lube oil from the system. This should be performed at least once every quarter, and may need to be repeated if the problem is not fully resolved. In addition, each time the plant is shut down for the season, the coldbox should be derimed with warm gas. This will help to keep the coldbox operating at a high efficiency with each consecutive			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
		run. (Refer to Appendix A. item #29) Black & Veatch conducted a discussion with Halliburton. Halliburton believes that using hexane, heptane, or toluene could dilute the lube oil within the hydrocarbon to the point that it freely drains from the system. The Halliburton contact was Brad Mokry, Account Representative – Multi-Chem (Bradley.Mokry@halliburton.com). Care should be taken to select a solvent which does not freeze at LNG temperatures. All of the suggested solvents have limited solubility at low temperature. The air coolers are of concern for an additional 20 year lifespan. The paint coating the fins on the tubes causes a drop in efficiency. These fins are very thin and the paint will be difficult to remove without damaging the tube bundles. Also, E109 and E108 reach maximum fan speed around an ambient temperature of 85 °F. As the temperature gets hotter, then the process suffers from running away from the desired set points.			
Process Systems	Refrigeration Loop	The recent replacement of the refrigeration compressor greatly increases the lifetime of the refrigeration loop. However, there should be modifications to the piping around the compressor which would help protect the machine over the course of its operating lifetime. Dead legs within the piping, no suction drums, and the current configuration of the anti-surge valves could all possibly lead to liquid being sent to the compressor causing severe damage.			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
		The dew point of the specific refrigeration composition being used is an important value to know for safe operation. If requested, Black & Veatch could develop alternate refrigerant compositions for various ambient temperatures, which all would have defined dew points. With the refrigerant dew point, the operators know how far they can cool down the refrigerant loop without sending liquids to the compressors and severely damaging them. The various refrigerant compositions would allow for optimal operation across a broader range of temperatures and increase LNG production throughout the year. Currently, there is a temporary line that has been added to makeup methane into the refrigeration loop. This temporary line and should be replaced with a permanent line. The ball valve used to regulate flow should be replaced with a needle or globe valve. This will provide better results, with regard to leaks, for this type of service. A block and bleed around the new valve should also be considered for easier valve maintenance.	Ron Shilts	Completed	7/9/2014
Process Systems	Piping	There were a few issues with piping throughout the plant. All lines that are showing ice formation should be reinsulated to give better energy conservation throughout the plant. This will alleviate strain on your refrigeration compressor. Also, the dead legs around C101 could send liquid to the compressor and cause damage. A continuity valve and line could be added so that			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
		refrigerant could be bypassed from the 2nd stage discharge of C101 to the 1st stage suction of C101. This helps remove possible stresses within the compressor body while both stages are starting up and are operating at different pressures. To isolate the coldbox from the compressor, the 1st stage suction valve and the 2nd stage discharge valves can be used. This will allow the coldbox to be isolated during startup to help control the cool down rate. To do this, pressurization valves will need to be installed across the isolation valves that were mentioned above. The WEG loop supplying cooling/heating to the compressors needs to be redesigned to provide more heating capacity. To help fully warm the BOG during holding mode, there are a couple of things to consider. A new study would have to be performed to fully understand the current issue. • Increase the WEG loop capacity by increasing pump capacity, E110 capacity, and performing a hydraulic study. • Increase P110, P111 size to send more WEG from the loop to E114. • Add an electric heater to help maintain a warm WEG temperature before E114. • Check insulation on piping to alleviate ambient temperature loss.			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
Controls & Instrumentation	Controls & Instrumentation, Control Room Facilities	Xcel should consider reapplying temperature control of the product sent to the storage tank. The original plant control scheme used automatic temperature control to control valves TCV-53B and PCV-E101, but changed to manual control when the new refrigeration compressor, C101, was installed. The temperature control scheme would help in controlling the process and this optimization could result in more LNG product. Thermowells with thermocouples for temperature measurements and monitoring will allow the operators to monitor and know an accurate temperature of the process within the piping. This will lead to a smoother plant operation and less strain on all equipment within the process.			
Equipment	Compression and Refrigeration	The flashback compressors (C102, C103), the holding BOG compressor (C107), and the small LNG tank pumps (P10, P20) are past their predicted lifespan, and therefore are decreasing the reliability of the plant. Without any sparing, if one piece breaks, the plant must shut down to fix the piece of equipment. When critical equipment breaks, the plant might be down an extended period while a new piece is engineered and installed. The addition of a seal gas booster compressor for C101 would help the ease of operation of the process. This booster compressor would use refrigerant as the seal gas within C101 instead of methane. Using methane has the chance to leak into			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
		the refrigerant system and dilute the mixed refrigerant. When the composition is off-spec, some must be purged off and made up. Using refrigerant as seal gas would allow some leaking into the system without changing the current refrigerant composition. A way to possibly reduce the amount of seal gas leaking into the system is to lower the seal gas supply pressure. This would need to be verified by the compressor vendor, but a seal gas pressure of 30 psi above the compressor suction pressure would help to reduce the leaking of seal gas.			

Table 3.2.1.2 Wescott Plant – Major Findings and Recommendations

Importance Rank	Area	Description of Major Finding	Recommendations	Responsible Person	Status	Date Completed
Item #1	Refrigeration Loop	C101 is a large investment and has many issues surrounding it. There is no 2nd stage suction drum to protect the compressor from receiving liquids. Many dead legs within the piping could lead to liquids being sent to the unprotected stage when certain valves must be opened.	A 2nd stage suction drum should be installed along with reconfiguring the anti-surge valves so that both surge lines feed back into their respective suction drums. All piping should gravity drain into a vessel instead of into the compressor stages. Any long lines should be insulated and electrically traced in order to protect			

Importance Rank	Area	Description of Major Finding	Recommendations	Responsible Person	Status	Date Completed
			against liquids settling out. Various refrigerant compositions versus ambient temperature should be determined. This will help with increased throughput while still protecting C101 by staying above the dew point of the refrigerant.			
Item #2	Air Coolers	E108 and E109 have had their finned tubes covered in paint and have lost efficiency. Moderate damage to the fins was evident from an above view. Also, the variable pitch fan blades have been detached from pneumatic control and the position they are set at is unclear. On warm days, these air coolers run at 100% fan speed and still don't cool the process down to the set points.	A full replacement of these heat exchangers would greatly impact the operation and efficiency of the plant. Xcel should separate the MRL system cooling and the NG system cooling that is currently both within E109. Decoupling these services will greatly increase operational control of the plant. To help with hot air recirculation, induced draft should be considered. This will push the air away from the unit with higher velocity and allow cool air into the bottom. If new air coolers are installed, consider moving them farther away from buildings to help mitigate this problem.			

Importance Rank	Area	Description of Major Finding	Recommendations	Responsible Person	Status	Date Completed
			To verify optimum fan blade pitch, the motor amperage should be checked against the motor rating.			
Item #3	WEG Heaters	The heaters are tuned in warm air conditions. This machine only operates efficiently when the inlet air temperature is close to the value at which the machine was tuned. Also, the garage doors to the building have to be open so that the heaters draw in fresh air instead of exhaust.	Install a temperature driven fuel gas controller. After measuring the inlet air temperature, the boiler settings will change to correspond to the measured value. This will require additional instrumentation and for the heater to be tuned to various different ambient temperatures.			

3.2.2 Eau Claire Plant - Major Findings

Table 3.2.2.1 Eau Claire Plant – Life Assessment

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
Process Systems	Gas Purification	The front end of the plant has one issue that could affect the lifetime of the system during the next 20 years. There are new switching valves around the adsorbers, as well as new mole sieve in 2005. The major issue is the high outlet carbon dioxide concentration coming out of bed #2. When CO_2 concentrations reach approximately 150 ppm, they can freeze within cryogenic systems. The bed #2 outlet has been upwards of 250 ppm, but to the Eau			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
		Claire staff's knowledge, they have not had any freezing within their equipment. This high outlet concentration could mean there is a bypass within the adsorber. The piece of equipment should be opened and checked for any cracking which could allow any bypass around the mole sieve.			
Process Systems	Coldbox and heat Exchangers	The coldbox has minor issues with the surrounding equipment. There are issues with piping showing worn insulation. Anywhere the insulation appears old and exposed, it should be replaced with new insulation to give better energy conservation throughout liquefaction. Vessels S3 and S4 have collected too many liquid heavies during a startup. This has only happened once and most likely was caused by being sent bad feed gas. If the level of the heavies were to become high enough and sent through the vapor line to the coldbox, this could cause serious plugging within the passes of the coldbox.			
Process Systems	Piping	There are a couple of valves near the LNG tank that have issues. A check valve on return line to tank (52V) has been plugged once but this issue seems to have stopped. This should be monitored during operation to make sure that the problem has been fully resolved. Also, an isolation valve (182V) has a slow leak which means a PSV cannot safely be isolated. A spare PSV should be purchased and pre tested, which can then be installed on the live line quickly while 182V is closed as best as possible.			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
Controls & Instrumentation	Controls & Instrumentation, Control Room Facilities	Cables that have been run in underground conduit have begun to show signs of decay and have caused reliability concerns as conductor failures have started to occur. To resolve this issue, new cables should be routed and installed within the cable tray and rack system that has been previously installed throughout the plant.			
Equipment	General	There are issues with the lifetime of the compressor/expander machine. There is a leaking seal on the expander side during start up, as well as the vibration monitor needing better calibration to better protect the equipment. This piece of equipment is getting old and is a crucial piece of equipment to the plant operation. Last time the expander needed to be sent out for repair, the tank level was diminished to two feet and LNG was trucked in to the tank just to keep a level in it. Depending on the results of an analysis of the expander, it may be desirable to procure a new rotating section and retain the old one as a critical spare. The LNG storage tank pumps are the original installed pumps and are very old. One pump seems to operate as it should, but when the second pump is brought online at the same time, the overall pump outlet flow through the two machines combined is decreased. This could be caused by a plug in the outlet of the second pump, worn parts, or just a characteristic of the pumps due to their performance curve. To be able to reliably run the plant at full capacity during the next 20 years, these			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
		pumps should be looked into for a replacement.			

Table 3.2.2.2 Eau Claire Plant – Major Findings and Recommendations

Importance Rank	Area	Description of Major Finding	Recommendations	Responsible Person	Status	Date Completed
Item #1	Gas Purification	Adsorber bed #2 has a very high outlet carbon dioxide concentration of 250-300 ppm. CO_2 can freeze within the coldbox at concentrations above 150 ppm. It is not recommended to go over an outlet concentration of 50 ppm. This high outlet concentration may be caused by an internal crack, leading to a bypass around the molecular sieve bed.	Xcel should contract third party inspection of bed #2 for any cracks or possible locations for bypass around the mole sieve. Based on the results of the inspection, the adsorber should be fixed or replaced to make both beds operate smoothly and remove the unwanted CO_2.			
Item #2	Liquefaction Train	The expander has a couple of issues with regard to reliably operating this piece of equipment. The major issue is the vibration monitor that was recently fixed on the machine. This fixed vibration monitor needs better calibration in order to ensure it can properly protect the machine. Also, the Bently	The expander (EX-1) should really be looked into for replacement. The reliability of the equipment and controls that are protecting the expander is very low since there are no spares or repairs available. The expander is the central piece of equipment within the plant and is crucial. The last time this machine went down for repairs, the			

Importance Rank	Area	Description of Major Finding	Recommendations	Responsible Person	Status	Date Completed
		Nevada control system is obsolete and the company has stated that there are no spare parts or repairs available for these controls.	plant was inoperable for about a year.			
Item #3	LNG Storage	The current, original LNG product pumps have a limit in the output capacity due to complications of running both pieces of equipment at the same time. One machine can easily reach 50% of the plant capacity, but when the second pump is brought online, the total flow through the two pumps decreases. If the plant was ever called on to vaporize at 100% capacity, than the current pumps would not be able to provide this flow.	The characteristics of the pump curves show that there is very little head rise to shutoff, which causes poor performance when the pumps are called upon to operate in parallel. The current pumps are original to the plant and could be rebuilt to update the internal parts that have become worn, but this would not correct the characteristics of the performance curves. To assure that the issues are resolved, the pumps should be replaced with new ones that have steeper performance curves. There have also been significant advances in the technology of LNG pumps, and newer models are more efficient and reliable. A pump system study may be beneficial to diagnose if there are other issues causing the loss of flow when the second pump is brought on line, but a likely			

Importance Rank	Area	Description of Major Finding	Recommendations	Responsible Person	Status	Date Completed
			result is that full replacement would be required.			

3.2.3 Sibley Plant - Major Findings

Table 3.2.3.1 Sibley Plant – Life Assessment

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
Process Systems	Air Compressors	The reciprocating compressors have significant oil carryover as evident by the blowdown of oil from the collection vessels and the leaking of oil from the propane-air mixer. Given these conditions, it is not expected the five compressors could last for 20 years. To fully pressurize the air, multiple compressors are used. Multiple old compression systems in series severely decrease the availability of the plant.			
Process Systems	Boilers	The boilers could use replacements to the combustion air blower, PLC, igniter, and fuel gas train components. This will help the boiler run smoother and should cause less wear and tear on the machine.			
Process Systems	LPG Storage	The propane pumps which send liquid propane to the vaporizers are very old and do not appear reliable. If these pumps were to break, then Sibley would not be able to produce propane-air for the line and the pipeline pressure would not be held			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
		during high use peaks. These should be replaced with new pumps to ensure better reliability. If Xcel is considering truck loading at the Sibley facility than these pumps may be necessary for taking propane from storage to the trucks.			
Process Systems	Vaporizer/Mixing	The isolation valves for the propane sent to the vaporizers have a slight leak. This poses a problem when the high capacity vaporizer is run with the other two vaporizers not in operation. The slight leak allows propane to flood both vaporizers that are not online and in service. This can be hazardous to have flooded equipment that is not being used within the process. Also, there is no safe way to isolate these pieces of equipment for maintenance purposes. The isolation valves to all vaporizers should be replaced in order to increase the safety and lifetime of this plant area. It can be extremely dangerous if a piece of equipment cannot be isolated in case of emergency.			
Controls & Instrumentation	Controls & Instrumentation, Control Room Facilities	The Modicon PLCs presently being used within the compressor building are obsolete with no spare parts availability. The PLCs should be replaced with the current version of both hardware and software.			
Equipment	General	The steam condensate pumps are old and when they trip, the plant must shut down. To improve the reliability over the next 20 years, it is recommended to replace these small pumps with pumps of similar capacity.			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
		The firewater pump is sized too small and only has the capacity to charge 1 or 2 nozzles. This could cause major problems if a large fire were to break out on site. A further fire system study should be performed to ensure the safety of all plants as well as bringing each facility up to current codes. There is a homemade flare on site at Sibley that can be moved and manually hooked up to what is being purged. There are a couple of concerns with this unit. This flare is about 10 feet tall and is not taller than the buildings on site. There is also a concern with how the unit is ignited. There is no pilot, so the unit must be tilted over and ignited by hand which can be extremely dangerous. Also, the stability of the flare is concerning in the case of a large gust of wind were to come and knock down the homemade flare while it is in operation. It is recommended to replace this with a properly engineered ground flare for onsite purging.			

Table 3.2.3.2 Sibley Plant – Major Findings and Recommendations

Importance Rank	Area	Description of Major Finding	Recommendations	Responsible Person	Status	Date Completed
Item #1	Air Compressor	There are five old compressors on site. Three low pressure compressors bring air to an intermediate pressure and two high pressure compressors to bring the air up to a final	Replace all five of the compressors with two centrifugal compressors in parallel, each with their own PLC. With new machines, the air can be fully pressurized in one machine, without an			

Importance Rank	Area	Description of Major Finding	Recommendations	Responsible Person	Status	Date Completed
		pressure. There is significant oil leak into the system from these old reciprocating compressors.	intermediate pressure. This will greatly increase plant reliability.			
Item #2	Boilers	The boilers are old and getting less reliable. Various components of the boiler are out dated and could use an update to allow smoother operation. Oil vapor has been leaking into the process, but this can't be tightened to fix the problem because it would ruin the old boiler.	Either replace with new or change existing as noted below: A proper blowdown tank is highly recommended for the boilers. A tube inspection within the boiler should be performed, which could then lead to having to retube the boiler. The firing burners should be upgraded to new, high efficiency burners to provide better operation. Lastly, the control components of the boiler should be upgraded to allow smooth operation of this piece of equipment.			
Item #3	LPG Storage	The three liquid propane can pumps are all old and may become unreliable over the next 20 year lifespan. There are no spare parts available for pumps of this age.	New can pumps of similar capacity should be purchased and installed to greatly increase the reliability of the process. This can be done all at once or by replacing one pump on a yearly basis until all have been replaced.			

3.2.4 Maplewood Plant - Major Findings

Table 3.2.4.1 Maplewood Plant – Life Assessment

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
Process Systems	Air Compressors	The old Clark compressors have low reliability due to their age, but the Atlas Copco compressor appears very well maintained and should have good reliability for the next 20 years. It is recommended to replace the old Clark compressors with a new, same Atlas Copco compressor that is currently in service, so that total plant capacity is achieved from two compressors in parallel.			
Process Systems	Boilers	Both boilers are run in parallel without sparing. The reliability of this system is low and has a low chance of surviving for the next 20 years. It would be good to replace one of the boilers with a new boiler at the same capacity or 100% of the total capacity. If the old boilers are kept in service, replacements to the equipment would help extend the life of the machines. A tube inspection of the boilers should be performed and retubing inside the boiler may need to occur. Removing the old firing burners with high efficiency burners will also help the operation of this old piece of equipment.			
Process Systems	LPG Storage	The propane pumps which send liquid propane to the vaporizers are very old and do not appear reliable. At their old age, there are no spare parts for these machines and if they were to go offline, the plant will have to shut down for a long period of time while new pumps are ordered. These			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
		should be replaced with new pumps to ensure better reliability. This replacement could happen all at once, or by replacing one pump each year until they are all upgraded. If Xcel is considering truck loading at the Maplewood facility then these pumps could be used for taking propane from storage to the trucks.			
Process Systems	Vaporizer/Mixing	A replacement of the gas Solartron with a new meter would help increase the consistency of the product heating value. A new unit can more accurately control the mixing process and ensure that the BTU content of the propane-air matches the natural gas pipeline.			
Controls & Instrumentation	Controls & Instrumentation, Control Room Facilities	An update to the boiler controls will be necessary for a more efficient operation and control of the process equipment.			
Equipment	General	The steam condensate and boiler condensate pumps are old and when they trip, the plant must shut down. To improve the reliability over the next 20 years, it is recommended to replace these small pumps with pumps of similar capacity. The natural gas padding compressor is too small to be able to remove all the padding to the pressure of the line. Currently, gas control must lower the pressure of the line while Maplewood removes the padding. Over the next 20 years, that line pressure may increase and gas control won't be able to			

Discipline	System	Life Assessment	Responsible Person	Status	Date Completed
		lower the line pressure to the necessary value. The glycol storage tanks on site should be covered with a lid in order to protect the system from solid particles. Without suction strainers to the pumps, the glycol pumps could be damaged if solids were to be sent to them.			

Table 3.2.4.2 Maplewood Plant – Major Findings and Recommendations

Importance Rank	Area	Description of Major Finding	Recommendations	Responsible Person	Status	Date Completed
Item #1	Boilers	The boilers are running in parallel with no sparing and are both very old pieces of equipment. The reliability of this system to provide steam for the vaporizers is low.	Replace one of the boilers with new that has the capacity of the two old boilers combined. An alternative to replacement would be to inspect the tubing and replace where necessary along with replacing the firing burners.			
Item #2	LPG Storage	The three liquid propane can pumps are old and rundown. The reliability of these pieces of equipment appears to be low. Also, the pumps tend to leak a little during operation.	New pumps of similar capacity should be purchased and installed to greatly improve the reliability of the process. These can be replaced all at once or by replacing one pump each year until they are all upgraded.			

Importance Rank	Area	Description of Major Finding	Recommendations	Responsible Person	Status	Date Completed
Item #3	Small Process Pumps	The glycol circulation, steam condensate, and boiler condensate pumps appear very old and unreliable. When these small pumps trip, the whole plant must shut down to fix the problem.	Xcel should replace the pumps within the three services. These pumps are small and should not have a sizable capital cost, but would help with the reliability of the plant over the next 20 years.			

4.0 Conclusion

Based on information obtained from the site visit, staff interviews, data collected, and Black & Veatch's experience with other units of similar design and vintage, it is anticipated that the Xcel Plants will:

- Replace old pumps and compressors that are near the end of their useful lifespan. If a piece of equipment can no longer have replacement parts made, it should be replaced as a first priority.
- Resolve any major bottlenecks within the plants. The most notable bottlenecks are the air coolers E108 and E109 at Wescott, the plug within one of the coldbox passes at Wescott, and the LNG pumps at Eau Claire. These pieces of equipment will need to be replaced in order to allow more throughput.
- Develop and maintain an accurate set of plant drawings to aid in plant operation and the ease of training new employees. Xcel should also consider having Black & Veatch propose different refrigerant compositions versus ambient temperature with corresponding dew points.

A further study is recommended to be performed to fully advise Xcel how to optimize their plants year round. In this study we could provide maximum and minimum ambient operating temperatures, as well as what changes would need to be made to the plant in order to safely operate under all ambient conditions. Black & Veatch could recommend refrigerant combinations with different ambient temperatures, as seen in Appendix A. item #25, to increase throughput.

Black & Veatch has presented this report as a high-level life assessment for the evaluation of the general condition of the Xcel plants. The list of recommendations focuses on improving the reliability, efficiency, operability, and output of the plants. Engineering will be crucial for recommendations needing technical evaluations to ensure the intent and objective of the recommendation is achieved.

Black & Veatch was impressed with the knowledge of the Xcel staff, the professional environment, and the outstanding safety record. As Xcel pursues the reinvestment in their fleet of plants, these attributes coupled with the recommendations outlined in this report, will improve upon the operation of the plants for many years to come.

Appendix A. Comprehensive List of Life Assessment Findings

This comprehensive list includes all the findings identified by the Black & Veatch project team and the recommendations associated with each finding.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
1	General	General	Develop and maintain a set of plant drawings	Recommend developing an up to date set of process flow diagrams and piping and instrumentation drawings for the plant. Current drawings are inconsistent with process streams and repeat equipment on multiple drawings. Not all valves are shown on drawings and there are no clear off-page connectors between lines. Also, Eau Claire drawings are not digitally stored within Xcel's servers.
2	General	General	Color code all piping	Currently at Wescott, the piping has been painted different colors to distinguish which service is within which pipe. This greatly helps personnel understand what they are looking at while in the field and reduces the learning time for oncoming personnel who are new to the plant.
3	General	General	Remove decommissioned equipment and piping	Removal of decommissioned equipment and piping throughout the plant is recommended to remove confusion for workers as well as removing possible hazards. Some notable pieces are the old T2 LNG pumps which are still connected to a live line and currently flooded with LNG.

Purpose:		**Plant Life Assessment and Procedures**		**Client: Xcel Energy**
#	**Plant Location**	**Plant Area**	**Recommendation**	**Remarks**
4	General	General	Spinning rotating equipment every 2 months	This helps maintain the equipment that is necessary for reliable operation. This is necessary for all rotating equipment that is stagnant while not in use, including the small tank LNG pumps. Different vendors may advise turning more often, so vendor recommendations should be taken under advisement when constructing a schedule for turning equipment. Pump turning should be built into an overall plant maintenance management system.
5	General	General	Replace insulation on lines with ice forming on them	If Xcel sees icing on any cryogenic line, the insulation should be replaced on that section. This will help reduce refrigeration demands.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
6	General	General	Evaluate which pieces of equipment have low reliability and consider changing these out	If Xcel relies on a certain rotating or fired piece of equipment, they should look to replace at least one of the pieces with a new piece at same or higher capacity. If a piece of equipment could put the plant down for a season and the lead time to replace is a concern, replace this equipment.
7	General	Compressors	Evaluate the reliability of each compressor every year or two	Xcel to track down information on what parts of the compressor they can get. If they can get all the necessary parts currently, then the compressor can be relied upon. If parts are not available, then that piece of equipment may need to be replaced. As part of a comprehensive Maintenance Management System, spare parts, suppliers, maintenance records, preventative maintenance, etc. should be stored electronically for simpler knowledge transfer between retiring and new personnel. While building this database, weaknesses should be identified where critical (unspared) pieces of equipment are no longer supported with spare parts inventory.
8	General	Truck Loading	Evaluate valving around all truck loading stations	A valve overhaul should be considered for all plants when truck loading is being done.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
9	Wescott	General	Clean all strainers prior to start up	During early operation clean strainers at a higher frequency. The equipment replacement and piping modifications introduced foreign particles and debris into the refrigerant loop. There is also evidence of residual lubricating oil from the old reciprocating compressor still in the system. Do not wait for a high differential pressure reading across the strainers before cleaning. It is especially important to clean upstream of the brazed aluminum heat exchanger. After the compressor has been in steady state for a while the strainer will have captured most particulate. When strainers are no longer dirty, return to normal inspection and maintenance schedule.
10	Wescott	General	Only use vendor strainers(i.e. avoid field-modifications)	The discussions indicated that screens had been welded into the inside of the cone strainers on the compressor suction piping. Following observation the strainers were inspected and the screens had torn loose. It is recommended to only use strainers and filters approved by manufacturers of the equipment they protect.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
11	Wescott	General	Increase the air cooler effective area by replacing each air cooler and decoupling the two cooling services within E109	The air coolers currently have paint coating the underside of the fins. Additional fouling has occurred over the years of operation. It may be possible to use a solvent to remove paint. Black & Veatch can run simulation to determine how much efficiency is being lost (at the cost of additional hours) and make further recommendations on resizing/replacing/cleaning. Moderate damage to the fins is also visible from above. Variable pitch fan blades have been detached from pneumatic control. It is unclear what position the fan blades are set at. Fan motors are now VFD controlled.
12	Wescott	General	Install thermowells /thermocouples on all temperature readings	Thermowells with thermocouples for temperature measurements and monitoring will allow the operators to monitor and know an accurate temperature of the process within the piping. This will lead to a smoother plant operation and less strain on all equipment within the process.
13	Wescott	Refrigeration Loop	Check low point drains prior to startup	In the absence of an interstage scrubber, the low point drains in the interstage pipe should be checked prior to starting the compressor to eliminate any liquids from the system.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
14	Wescott	Refrigeration Loop	Add suction pressure control for C101	Currently control is by controlling turbine speed, and adjusting PCV-101A to add more refrigerant to increase the discharge pressure. If discharge pressure is too high PCV-101B is opened and releases refrigerant into V-101. Add control for suction pressure. This will help on start up by holding the suction pressure constant and varying the discharge pressure. With a lower discharge pressure the heavies of the early pack will not liquefy out and will create less thermal strain on E101 during startup.
15	Wescott	Refrigeration Loop	Add continuity valve	In order to protect the brazed aluminum exchanger E-101 from rapid temperature fluctuations while restarting the compressor, a continuity valve could be added that would allow the bypass of the mixed refrigerant around the coldbox. This valve provides an alternate route that allows full circulation of the refrigerant while keeping the JT valve (PCV-E101) closed. This continuity valve would only be operated while the compressor is starting. Once the compressor is running the JT valve can be opened and the continuity valve closed. This valve and its use during compressor restarts can reduce the thermal stresses experienced by E-101 and extend its life. The addition of a continuity valve would reduce the loss of refrigerant during startup, because the refrigerant will not have to be purged twice.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
16	Wescott	Refrigeration Loop	Add seal gas booster compressor	Currently the plant uses methane as seal gas and the methane leaks into the refrigerant. This dilutes the refrigerant and causes the pressure to be too high. Consider using refrigerant as seal gas during start-up instead of methane. This would reduce the loss of refrigerant.
17	Wescott	Refrigeration Loop	Fix seal gas supply pressure	Reduce the required seal gas supply pressure or put seal gas pressure on differential control. A high seal gas pressure causes more seal gas to leak into the refrigeration loop. Recommendation is to consult the vendor to reduce the supply pressure. Estimated supply pressure to be 30 psi above suction pressure (approximately 100 psi).
18	Wescott	Refrigeration Loop	Change the configuration of the anti-surge valves	Currently the anti-surge valve feeds back to the outlet of the first stage scrubber, but needs to be changed to feed to the inlet of the first stage scrubber. Also, the 2nd stage ASV should be sent back into the line at a point upstream of the new 2nd stage suction drum, if installed.
19	Wescott	Refrigeration Loop	Install a 2nd stage suction drum for C101	A 2nd stage suction drum for C101 would need to be located on the line to where both sides of piping drain down into the drum. Currently there are issues with rises and drops in the piping from E109 to the 2nd stage suction. The suction drum could be located by E112 and the piping redone in both directions. This suction drum would help to protect the investment of C101 by ensuring no liquids are sent to the compressor.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
20	Wescott	Refrigeration Loop	Add electric tracing and insulation to long horizontal sections around C101	There are significant concerns with the piping around C101, most notably along the 2nd stage anti-surge line. Also, the upstream of the 1st stage ASV drains back toward the valve. This could cause liquid to be pushed into the 1st stage if the anti-surge valve (ASV) were to open. A rerouting of the ASV piping to before the 1st stage suction drum would help to resolve this issue, but an immediate fix might be to add electric tracing and insulation.
21	Wescott	Refrigeration Loop	Replace and reconfigure the isolation valves around C101	The isolation valves for C101 should be reconfigured to be before the 1st stage suction drum and after E108. This would help to drain the liquid back to the 1st stage suction drum, the 2nd stage suction drum for the interstage, or to S103.
22	Wescott	Refrigeration Loop	Replace temporary methane makeup line with permanent line	The temporary methane makeup line should be replaced with a permanent makeup line taking off from the same location. The valving should be changed from using a ball valve to a needle or globe valve. These provide better results for this type of service to not leak. A block and bleed should also be considered for easier valve maintenance.
23	Wescott	Refrigeration Loop	Find alternative to strainer oriented in wrong way	2nd stage suction to C101 has a cone strainer which is installed in the direction of the flow. This will impede downstream orifice flow measurement accuracy due to not enough upstream horizontal pipe to give a good reading.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
24	Wescott	Refrigeration Loop	Consider possibility of collecting the heavy hydrocarbons and disposing of them properly	Added new 1" vent line for refrigerant vent system. This goes to the outside of the building where light hydrocarbons are vented at the top of the building and heavy hydrocarbons (C3/C4) are drained through a hose to the dike.
25	Wescott	Refrigeration Loop	Reevaluate the calibration of the level indication on S110	The refrigeration compressor outlet separator, S110, level indication concerned operations at low levels. The operators are unsure whether or not there is a liquid level in the tank at low levels. A displacer level transmitter is currently being used on the vessel and is appropriate for this application, but the calibration range for the controls should be reevaluated.
26	Wescott	Refrigeration Loop	Recommend refrigerant combinations with several ambient temperatures	Simulation could be used to obtain different combinations of mixed refrigerant to use at different ambient temperatures to increase throughput with varying weather. The dew point of these combinations needs to be known so that this temperature is not approached and excess liquid is formed within the loop. Each recommended refrigerant composition would come with the corresponding dew point.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
27	Wescott	Refrigeration Loop	Work with Siemens to identify leaks and solutions to this issue	Lube oil is leaking in many places around C101. The oil does not seem to be entering the process, but still could lead to issues around the compressor area.
28	Wescott	Liquefaction	Clean E-101	Discussions indicated that the brazed aluminum heat exchanger shows a reduction in thermal capability of about 10%. Discussions revealed that when the unit is taken off line, oil drains out of E-101. Past efforts, including a methanol wash, have not improved performance. If reduced performance of E-101 becomes more of a concern, following a cleaning procedure recommended by the manufacturer of E-101 could lead to an improvement in the performance of E-101. Personnel have noticed a pressure increase in Stream D (18 psi) which may result from buildup.
29	Wescott	Liquefaction	Reapply temperature control to LNG	Natural gas flow through the plant could be controlled with the product valve of LNG on temperature control. Another consideration would be to add pressure control to the supply gas. This would allow easier control for the system and ensure the LNG product to be at the correct temperature.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
30	Wescott	Liquefaction	Use natural gas with hot regen gas to deryme the coldbox.	Black & Veatch recommends using natural gas from after the adsorbers with hot regen gas and mixed to a temperature less than 150 F (approximately 145 F) and send this to the coldbox. Also, deriming should be used only to remove hydrocarbon solids from the cores within the coldbox. Oil within the cores will require the use of a solvent.
31	Wescott	LNG Storage	Evaluate if the valve can safely be isolated and replaced or insulate the valve as best possible	LNG tank outlet ESD valve is iced over. This ice could prevent closure on ESD. It would also be difficult to insulate sufficiently to prevent icing due to multiple protruding objects. Xcel could reinsulate to prevent icing or attempt to isolate and replace the valve with a different type (modern ESD pneumatically actuated butterfly valve).
32	Wescott	LNG Storage	Buy spare PSVs for all PSVs and pretest them before changing them out	For PSVs in between the liquefaction isolation valve and the block valves to the LNG tank pumps, a spare PSV should be purchased and pretested. These should then be quickly switched out with the old PSVs while on line. The old PSVs can be tested and used next time if they pass inspection.
33	Wescott	Fuel Gas Compressor	Control LNG tank pressure with BOG compressor	Depending upon current valving, consider controlling LNG tank pressure with BOG compressor. This allows automatic control of the tank pressure and should allow better control when using the flashback compressor to process BOG.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
34	Wescott	WEG Heaters	Preheat the inlet air or measure the inlet air temperature to the WEG heaters	WEG heaters are tuned in warm air conditions and incorporate a direct mechanical linkage between the gas valve and inlet damper. This tuning works well only if the operating conditions are close to the conditions the heaters were tuned. Any major changes in these conditions result in the heaters running inefficiently. Presently garage doors must remain open to draw air into the building, but the cold air has density concerns. Black & Veatch recommends two possible solutions. First, to use the hot WEG outlet stream to preheat the inlet air to a consistent temperature. This will allow the boiler to be tuned to one intake temperature and run smoothly. Second, a temperature driven fuel gas controller could be installed to modulate the fuel/air mixture depending on ambient conditions. The datasheet shows that the units are designed for 65F ambient conditions, so the fuel gas burners may not be sized sufficiently to provide enough gas when running in sub-zero conditions. If the burner is sufficiently sized, it may be possible to tune the boiler at lower ambient conditions so it will perform at sub-zero temperatures. This would require additional instrumentation and a new tuning scheme to allow the boiler settings to reflect the air inlet temperature.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
35	Wescott	WEG Loop - Compressor Building	Change the coding of the valves within the WEG loop to bypass unnecessary sections during holding . Use only C107 pumps to circulate WEG in winter months	The WEG system in the winter is used only for cooling of the BOG compressor (C107). A bypass of the larger WEG pumps would allow for only the small pumps to circulate the lower amount of WEG needed during winter operation. Also, a bypass around the flashback compressors would alleviate unnecessary cooling of the lube oil in those compressors which may trip the flashback compressors if the lube oil becomes too cold and viscous.
36	Wescott	LPG	Install a new custody transfer meter	Installing a new custody transfer meter will greatly improve the accuracy of the flow reading of the outlet of Wescott's LPG facility. This more accurate reading will help to determine the amount of LPG being sent to Sibley to be used for Propane-Air.
37	Wescott	LPG	Install new level indication on incondensable separator	Incondensable separator, V7, does not have a functioning level sensor. A possible solution could be replacing the existing indicator with a Magnetrol Aurora Magnetic Level Indicator. This has device provides both local indication along with a guided wave radar transmitter.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
38	Wescott	Truck Loading	Install additional isolation valve and verify that T1 pumps can operate	The truck loading line has not been in service since 1992 and most equipment in the area is showing wear from sitting idle for so long and equipment reliability may be compromised. The pumps were most recently run in recycle as of three years ago. If Xcel is looking to use these pumps for truck loading again, they should be run and verified to be operational.
39	Wescott	Truck Loading	Evaluate additional plant area for truck turn around.	The original road for truck turnaround has been partially blocked by the addition of the WEG heater building. If truck loading was brought back online, the road may have to be reconfigured to allow trucks to get to fill area.
40	Wescott	Fire Protection	Investigate possibilities of relining or replacing the underground steel piping.	Fire protection system pops leaks every year. Steel piping that is underground is corroding and sending rust and debris to the foam generators. When the generators are tested each year, they have to be unplugged from the foreign objects in the water lines. This can destroy the foam generators if enough reaches them and severely inhibits the reliability of the system if they are required to be put on line.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
41	Wescott	Fire Protection	Automate valves needed for firewater system	The firewater system in the WEG boiler building has many valves in manual that require the operator to go to location to send water where it is needed. The procedures are also confusing for a system that needs immediate response. Potentially the fire protection control valves could be automated and controlled through the Fire Protection PLC.
42	Wescott	Year Round Operation - Summer	Further study to ensure that the process will be able to run throughout the year	Ensure the air cooler area is adequate for desired operation. The air cooler capacity will need to be increased to help with the increased ambient temperature. Current air coolers will need to be cleaned, fan blade angle checked and possibly reset, and the capacity may still not be sufficient for summer operation. E109 appears to be the bottle neck, it currently has two services. The bundle could be replaced for one service and the other service moved to its own cooler.
43	Wescott	Year Round Operation - Winter	Further study to ensure that the process will be able to run throughout the year	Find a minimum temperature for operation to safely run the process. Certain piping may have to be flushed if the process is shut down at extreme low temperatures. Boxed air coolers to help with hot air recirculation would need to be installed. Potentially could need to heat trace lines and valves. Operational procedure changes for low temperature operations. ETC

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
44	Eau Claire	Pretreatment	Check Bed #2 for any cracks or possible locations for bypass	Bed #2 may have bypass around the mole sieves due to the large outlet ppm of CO2. This bypass could be occurring around the refractory measurement system. Since CO2 can freeze at 150 ppm, it would be good to fix and lower the outlet ppm from bed #2. Further evaluation required to attempt to identify and diagnose the bypass and develop a mitigation plan.
45	Eau Claire	Expander	Repair issues with the expander to better improve reliability of the plant	There is an issue with a leaking seal on the outlet of the expander. This problem ceases to exist once the process is running and cooled down. Also, the vibration monitor on the shaft of the expander-compressor has been replaced, but needs better calibration. The improvised nature of this fix could greatly impact the reliability of the expander which is a crucial piece of equipment to keep online. The vibration sensors on the shaft of the expander-compressor have been replaced but the Bently Neveda Monitoring control system presently being used is obsolete and per Bently Neveda "No spare parts are available, no repair available, not recommended for continued use".

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
46	Eau Claire	Compressors	Leave doors to the compressor building open to better expel air	Xcel can leave a door open to keep the building cool at all times. The site is secured with a fence. An open door should not be an issue.
47	Eau Claire	Air Coolers	Install VFDs or separate air cooler services into different fans or units	Currently, E-6, E-12, and E-13 are all operating with the same fan that has no variable speed control. This could make for difficult operation if one part of the process needs excess cooling, because then the other two sections will be over cooled. There is also no way of controlling the set point temperatures other then turning the fan on and off. Installing a VFD would help with the temperature control slightly, but having each service being cooled by a separate fan would greatly impact the ease of operation for the plant.
48	Eau Claire	LNG Storage	Replace or rebuild the LNG pumps. A pump study may need to be performed to fully decide which option is better.	The limit in capacity is affected if the plant is called on to vaporize for use with these two low hp pumps in use. Possibly perform a flow study on these pumps before they are upgraded to see if they are just operating at the wrong point on the curves. In one operating scenario, flow dropped overnight from 105 gpm down to 90 gpm. In a separate scenario, they tried to bring on second pump and overall flow was decreased. With one pump on full, the second pump could only reach about 10% open on discharge valve and total flow started to drop. Possible plug in the outlet line or it may

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
				be cause by other worn parts or may just be a characteristic of the pumps due to very flat performance curve.
49	Eau Claire	LNG Storage	Monitor this valve during operation and verify the problem has been fixed	When exercising the pumps, PdCV 22 is fully open to allow for recycle. Once, 52V (check valve on return to tank) plugged and built up pressure within the system and popped HR 250). Can't safely close 216V to be able to go in and fix the issue. Seems to have unjammed its self.
50	Eau Claire	LNG Storage	Buy a spare safety valve and have this pre tested to be switched out quickly on the live line	Valve 182V has a slow leak when trying to shut it for isolation needs. Since SV 424 cannot be isolated, it has never been removed and tested. A spare valve should be purchased and pre tested. Then close 182V as best you can and switch out the old SV for the new one. The old valve can then be repaired, tested and reused.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
51	Eau Claire	Truck Loading	Consider adding weigh station for accurate loading measurements	Xcel desires to reestablish truck loading. There is no weigh station on site and if truck loading wants to be brought back, this would greatly help with accurate inlet and outlet measurements.
52	Eau Claire	Electrical	Remove underground cables and install them within the cable racks	Cables in underground conduit have begun to show signs of decay and have caused reliability concerns as conductor failures have started to occur. To resolve this issue, new cables should be routed and installed within the cable tray and rack system that has been previously installed throughout the plant.
53	Sibley	Compressors	Replace the compressors with 2 new compressors, each at 100% capacity	All reciprocating compressors have excessive oil carryover.Replacing all the compressors with two new compressors at 100% will greatly increase plant reliability. Going from low pressure to high pressure in one compressor body alleviates issues that were present during startup. Depending on operating mode, the airflow may operate in either direction and can flush back collected oil/debris to high pressure compressors. This has caused damage and fouling issues in the past. The MCC should also be upgraded with the compressors to allow for a more reliable start of the new compressor motors.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
54	Sibley	Compressors	Update the Modicon PLCs	Concerns were expressed about control equipment reliability. The Modicon PLCs presently being used within the compressor building are obsolete with no spare parts availability. The PLCs should be replaced with the current version of both hardware and software.
55	Sibley	Boiler	Update various components of the boiler or replace capacity with a new boiler	Update the combustion air blower, PLC, igniter, and fuel gas train components. A proper blowdown tank should be installed.
56	Sibley	Vaporizers	Replace isolation valves around the vaporizers	When using only the large capacity vaporizer, the isolation valves to the two smaller vaporizers are closed. These valves have a slight leak and are allowing propane into the vaporizers and flooding them while not in operation. A simple replacement of the isolation valves would ensure that the system is fully isolated when not in operation.
57	Sibley	Steam Condensate Pumps	Replace pumps with new pumps of same capacity	These pumps are old and when they trip, they cause a plant shut down. They are very small and would not cost too much to replace and improve the reliability of the plant.
58	Sibley	Fire Protection	Replace the firewater pumps with new, higher capacity pumps to	The potable water tank, which is also used for firewater tank, has an old small pump that can only charge the line for 1-2 nozzles. Sibley must wait for fire department to charge rest of line. This could be very hazardous if a larger fire were to

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
			better charge the lines	break out that needed immediate attention.
59	Sibley	Truck Loading	Change the relief pressure of some PSVs along the truck loading line	While on site, it was noted that there was a PSV along the truck loading line that was set to 450 psig on a line that is rated for 300 psig. This is can be hazardous as the integrity of the line could be compromised before the PSV can safely relieve pressure. A check of all PSVs along the truck loading line should be performed to verify that they are all at the correct set pressure.
60	Maplewood	Boiler	Replace one old boiler with a new boiler at the same capacity as the two old boilers	The reliability of the two old boilers is a serious concern since they operate with no sparing. It is recommended to replace at least one boiler with a new boiler at the capacity of the two old boilers together. This change will require emissions monitoring and boiler code compliance, but would help the site reliability.
61	Maplewood	Steam Condensate Pumps	Replace pumps with new pumps of same capacity	These pumps are old and when they trip, they take the plant down. They are very small and would not cost much to replace and improve the reliability of the plant.

Purpose:		Plant Life Assessment and Procedures		Client: Xcel Energy
#	Plant Location	Plant Area	Recommendation	Remarks
62	Maplewood	WEG System	Replace the glycol pumps with new ones of the same capacity	The glycol pumps on site are very old and could use a replacement. They are very small operational pumps and the cost to replace would not be that high.
63	Sibley/ Maplewood	Propane Storage	Replace the propane can pumps with similar equipment	The three liquid propane pumps are old and reliability of these pieces of equipment doesn't appear to be good. A replacement of these three pumps with new pumps would ensure that the reliability is greatly increased. Rated performance of these pumps appears to be for a much higher head pressure than what should be required for this service. A hydraulic analysis may be beneficial to ensure that when the pumps are replaced, they are properly sized.
64	Sibley/ Maplewood	WEG System	Install lids or suction strainers to the glycol loop	The glycol storage tanks have no lid on them. This could lead to particulates entering the system and damaging the glycol pumps or exchangers. Lids on the glycol vessels, suction strainers to all pump inlets, or both would help to protect the pumps and exchangers from damage/fouling. In addition, this would inhibit atmospheric oxidation of the glycol during storage.

Purpose:		**Plant Life Assessment and Procedures**		**Client: Xcel Energy**
#	**Plant Location**	**Plant Area**	**Recommendation**	**Remarks**
65	Sibley/ Maplewood	Flare	Buy a ground or portable flare and install properly on site	For personnel safety, buy a ground flare to be permanently installed on site. There are also manufactured portable flares which could be purchased and used. A vendor flare will significantly increase the safety of operation compared to the current homemade flare on site. This flare can be used for maintenance needs. Make sure that the flare comes with an automated shutoff (ESD valve) and an automatic pilot light.

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 11
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Page 8 of Xcel's Petition, Sibley Gas Production Plant Additions

The Company stated it is replacing the control panel and all compressors. Please provide the 2015 and 2016 total capital additions planned for the Sibley Gas Production Plant, include cost estimates, studies, any information that supports the Company's capital additions.

Response:

There are no capital additions currently planned for the Sibley gas production plant in 2015 and 2016. In our initial filing, we mentioned several capital additions which were planned for the gas production facilities. However, since the time of filing, a new capital budget has been finalized and the current plan does not include large capital additions for the plants for 2015 and 2016. While there are no longer capital additions planned, the company is still committed to the continued operations of the facilities. A detailed study of the life of the plants is included as Attachment A to our response to DOC Information Request No. 10.

Preparer: Brandon Kirschner
Title: Accounting Consultant
Department: Capital Asset Accounting
Telephone: 612-215-5361
Date: July 6, 2015

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 12
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Pages 7 and 8 of Xcel's Petition, Life of the Sibley Gas Production Plant

Please provide support for the proposed 15-year remaining life (10 year extension) for the Sibley Gas Production Plant, include studies, comparisons to other propane plants depreciation lives, manufacture information, or any information that support the Company's proposed remaining life.

Response:

Please see our response to DOC Information Request No. 10.

Preparer: Brandon Kirschner
Title: Accounting Consultant
Department: Capital Asset Accounting
Telephone: 612-215-5361
Date: July 6, 2015

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 13
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Pages 8 and 9 of Xcel's Petition, Wescott Gas Production Plant Additions

The Company stated it is upgrading and modifying the LNG and LPG control rooms and replacing the liquefaction heat exchanger. Please provide the 2015 and 2016 total capital additions planned for the Wescott Gas Production Plant, include cost estimates, studies, any information that supports the Company's capital additions.

Response:

The total capital additions planned for the Wescott gas production plant are $1,061,229 in 2015 and $359,522 in 2016.

In our initial filing, we mentioned several capital additions which were planned for the Wescott facility. However, since the time of filing, a new capital budget has been finalized and the current plan does not include the same projects as we mentioned initially. The new projects planned include instrument air dryer, fill line modifications, truck loading pumps and valves, and an MRL separator installation. These are all slated to go into service by the end of 2016. A detailed study of the life of the plants is included as Attachment A to our response to DOC Information Request No. 10.

Preparer: Brandon Kirschner
Title: Accounting Consultant
Department: Capital Asset Accounting
Telephone: 612-215-5361
Date: July 6, 2015

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 14
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Pages 8 and 9 of Xcel's Petition, Life of the Wescott Gas Production Plant

Please provide support for the proposed 15-year remaining life (10 year extension) for the Wescott Gas Production Plant, include studies, comparisons to other propane plants depreciation lives, manufacture information, or any information that support the Company's proposed remaining life.

Response:

Please see our response to DOC Information Request No. 10.

Preparer: Brandon Kirschner
Title: Accounting Consultant
Department: Capital Asset Accounting
Telephone: 612-215-5361
Date: July 6, 2015

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Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 15
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Attachment I pages 11 and 44 of 81, Blue Lake Units 1 to 4

For Blue Lake Units 1 to 4, with dismantling costs of $13.716 million and $5.182 million in scrap metal credits, please show how this is used to calculate the change from 11.6% to 22.9% negative net salvage for Blue Lake Units 1 to 4 as shown on Attachment B.

Response:

The two dismantling cost numbers mentioned in the question are for the entire station and include Units 7 and 8. The change in net salvage rate was from negative 11.9% to negative 22.9%. Please see Attachment A to this response for the allocation of the dismantling costs between Units 1-4 and Units 7-8 along with the calculation of the two negative net salvage rates.

Preparer: Lisa Perkett
Title: Director
Department: Capital Asset Accounting
Telephone: 612-330-6950
Date: July 6, 2015

Net Salvage Estimate (2015 Remaining Life Filing, Docket E,G002/D-15-46)

Blue Lake	Removal	Scrap Credit	Total Net Removal
Units 1-4	8,094,918	(2,530,646)	5,564,272
Units 7-8	10,802,812	(2,650,941)	8,151,871
	18,897,730	(5,181,586)	13,716,144

2015 TLG Dismantling Study, Section 5, page 4 of 23	18,897,730	(5,181,586)	13,716,144

Plant Balance - Units 1-4	24,304,528
Net Salvage Rate	22.9%

Net Salvage Estimate (2010 Remaining Life Filing, Docket E,G002/D-10-173)

Blue Lake	Removal	Scrap Credit	Total Net Removal
Units 1-4	4,960,204	(2,077,435)	2,882,769
Units 7-8	9,795,281	(2,562,897)	7,232,384
	14,755,485	(4,640,332)	10,115,153

2010 TLG Dismantling Study, Section 5, page 3 of 17	14,755,485	(4,640,332)	10,115,153

Plant Balance - Units 1-4	24,223,439
Net Salvage Rate	11.9%

Dismantling Cost Estimate

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Unit 7	Unit 8	Common	Station	Station Total
Blue Lake Unit Rating (MWe)	45	45	45	45	165	165	510		
Characterization / Temporary Services	11,500	11,500	11,500	11,500	36,500	36,500	-	176,861	295,861
Worker Access	-	-	-	-	-	-	-		0
Asbestos Remediation	-	-	-	-	-	-	-		0
Equipment Removal	486,837	486,837	486,837	486,837	1,258,778	1,258,778	617,926		5,082,832
Boiler(s)	-	-	-	-	-	-	-		0
Structures Demolition	228,079	198,182	198,182	198,182	436,101	436,101	943,937		2,638,766
Backfill / Grade / Landscaping	149,426	149,426	149,426	149,426	251,288	251,288	337,112	-	1,437,390
NOT USED								0	0
Pre-Demolition Cleaning (Tanks)	-	-	-	-	-	-	160,000		160,000
Utility Management / Oversight								1,520,797	1,520,797
Demolition Contractor Management / Supervisory / Safety Staff								1,381,178	1,381,178
Security								174,772	174,772
Property Taxes	-	-	-	-	-	-	-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers					-	-		1,508,421	1,508,421
Small Tool Allowance	17,517	16,919	16,919	16,919	39,653	39,653	37,980	n/a	185,560
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								30,086	30,086
Permits								159,001	159,001
Demolition Contractors Insurance								374,138	374,138
Demolition Contractors Fee								1,484,007	1,484,007
Sub-Total									16,432,808
Contingency (excluding activities currently under contract)									2,464,921
Project Total (before scrap credit)									18,897,730
Scrap Credit	(660,203)	(575,787)	(575,787)	(575,787)	(1,220,662)	(1,220,662)	(352,698)	-	(5,181,586)
Project Total									13,716,144

Xcel Energy Calculations:									
Unit Specific Costs	233,156	287,077	287,077	287,077	801,658	801,658	1,744,258	6,809,261	
Percentage of Total Plant Specific Costs	8.6428%	10.6415%	10.6415%	10.6415%	29.7163%	29.7163%			
Allocated Common/Station/Contingency	952,297	1,172,530	1,172,530	1,172,530	3,274,277	3,274,277			
Allocated Unit Cost Estimate	1,185,453	1,459,607	1,459,607	1,459,607	4,075,936	4,075,936			13,716,144
				5,564,272		8,151,871			13,716,144

Comparison of Present to Proposed Net Salvage Rates

Electric Other Production

FERC Account	Plant Balance 1/1/2015 (1)	Present Net Salv % (2)	Present Estimated Net Salvage in Reserve at End-of Life (3)	Proposed Net Salv % (4)	Proposed Estimated Net Salvage in Reserve at End-of Life (5)	Proposed Less Present (6)
Blue Lake Units 1 thru 4						
E341	$ -	-11.9	$ -	-22.9	$ -	$ -
E342	$ 1,311,529	-11.9	$ 156,072	-22.9	$ 300,261	$ 144,189
E344	$ 21,198,509	-11.9	$ 2,522,623	-22.9	$ 4,853,181	$ 2,330,559
E345	$ 1,369,569	-11.9	$ 162,979	-22.9	$ 313,549	$ 150,570
E346	$ 424,921	-11.9	$ 50,566	-22.9	$ 97,281	$ 46,716
	$ 24,304,528		$ 2,892,239		$ 5,564,272	$ 2,672,034
From 2014 TLG Dismantling Study for Blue Lake Units 1 - 4				-22.9%	$ 5,564,272	
Proposed based on 100% for Remaining Life < 10 years				-22.9%		
Blue Lake Units 7 & 8						
E341	$ 1,587,263	-5.2	$ 82,538	-5.8	$ 92,468	$ 9,931
E342	$ 45,374	-5.2	$ 2,359	-5.8	$ 2,643	$ 284
E344	$ 60,450,578	-5.2	$ 3,143,430	-5.8	$ 3,521,642	$ 378,212
E345	$ 7,849,102	-5.2	$ 408,153	-5.8	$ 457,262	$ 49,108
E346	$ 32,958	-5.2	$ 1,714	-5.8	$ 1,920	$ 206
	$ 69,965,275		$ 3,638,194		$ 4,075,936	$ 437,741
From 2014 TLG Dismantling Study for Blue Lake Units 7 & 8				-11.7%	$ 8,151,871	
Proposed based on 50% for Remaining Life > 20 years				-5.8%		

Dismantling Cost Estimate

Blue Lake
Northern States Power Company - Minnesota
Xcel Energy
Project number 1617: Fossil Fleet 2009 DCEs

		TLG Dismantling Study									Common & Station Allocation							Unit Total (with Common & Station Allocated)						
Activities (Costs)		*Unit1*	*Unit 2*	*Unit 3*	*Unit 4*	*Unit 7*	*Unit 8*	*Common*	*Station*	*Station Total*	*Unit1*	*Unit 2*	*Unit 3*	*Unit 4*	*Unit 7*	*Unit 8*	*Total*	*Unit1*	*Unit 2*	*Unit 3*	*Unit 4*	*Unit 7*	*Unit 8*	*Total*
Blue Lake Unit Rating (MWe)		45	45	45	45	165	165	510		510	45	45	45	45	165	165	510	45	45	45	45	165	165	510
Characterization / Temporary Services	13	11,000	11,000	11,000	11,000	34,500	34,500	0	164,000	277,000	10,620	10,620	10,620	10,620	60,760	60,760	164,000	21,620	21,620	21,620	21,620	95,260	95,260	277,000
Scaffolding / Worker Access	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asbestos Remediation	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equipment Removal	2	443,684	443,684	443,684	443,684	1,140,421	1,140,421	556,400	0	4,611,978	36,030	36,030	36,030	36,030	206,140	206,140	556,400	479,714	479,714	479,714	479,714	1,346,561	1,346,561	4,611,978
Boiler(s)	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Structures Demolition	1	222,763	195,339	195,339	195,339	413,137	413,137	490,078	0	2,125,132	31,735	31,735	31,735	31,735	181,568	181,568	490,078	254,498	227,074	227,074	227,074	594,705	594,705	2,125,132
Backfill / Grade / Landscaping	8	24,098	24,098	24,098	24,098	137,628	137,628	143,320	0	514,968	9,281	9,281	9,281	9,281	53,098	53,098	143,320	33,379	33,379	33,379	33,379	190,726	190,726	514,968
Ongoing environmental monitoring (quarterly for 5 years)	14	0	0	0	0	0	0	0	172,000	172,000	11,138	11,138	11,138	11,138	63,724	63,724	172,000	11,138	11,138	11,138	11,138	63,724	63,724	172,000
Utility Management / Oversight	9	0	0	0	0	0	0	0	758,703	758,703	49,130	49,130	49,130	49,130	281,091	281,091	758,703	49,130	49,130	49,130	49,130	281,091	281,091	758,703
Demolition Contractor Management / Supervisory / Safety Staff	6	0	0	0	0	0	0	0	1,163,312	1,163,312	75,331	75,331	75,331	75,331	430,994	430,994	1,163,312	75,331	75,331	75,331	75,331	430,994	430,994	1,163,312
Security	12	0	0	0	0	0	0	0	229,176	229,176	14,840	14,840	14,840	14,840	84,907	84,907	229,176	14,840	14,840	14,840	14,840	84,907	84,907	229,176
Property Taxes		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Expenses																								
Shared Heavy Equipment / Operating Engineers	5	0	0	0	0	0	0	0	1,290,425	1,290,425	83,562	83,562	83,562	83,562	478,088	478,088	1,290,425	83,562	83,562	83,562	83,562	478,088	478,088	1,290,425
Small Tool Allowance	17	8,769	8,427	8,427	8,427	22,002	22,002	14,872	0	92,926	963	963	963	963	5,510	5,510	14,872	9,732	9,390	9,390	9,390	27,512	27,512	92,926
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)	18	0	0	0	0	0	0	0	24,636	24,636	1,595	1,595	1,595	1,595	9,127	9,127	24,636	1,595	1,595	1,595	1,595	9,127	9,127	24,636
Permits	16	0	0	0	0	0	0	0	102,724	102,724	6,652	6,652	6,652	6,652	38,058	38,058	102,724	6,652	6,652	6,652	6,652	38,058	38,058	102,724
Demolition Contractors Insurance	11	0	0	0	0	0	0	0	300,359	300,359	19,450	19,450	19,450	19,450	111,280	111,280	300,359	19,450	19,450	19,450	19,450	111,280	111,280	300,359
Demolition Contractors Fee	4	0	0	0	0	0	0	0	1,167,518	1,167,518	75,603	75,603	75,603	75,603	432,552	432,552	1,167,518	75,603	75,603	75,603	75,603	432,552	432,552	1,167,518
Sub-Total		710,314	682,548	682,548	682,548	1,747,688	1,747,688	1,204,670	5,372,853	12,830,857	425,931	425,931	425,931	425,931	2,436,899	2,436,899	6,577,523	1,136,245	1,108,479	1,108,479	1,108,479	4,184,587	4,184,587	12,830,857
Contingency	3	0	0	0	0	0	0	0	1,924,628	1,924,628	124,630	124,630	124,630	124,630	713,053	713,053	1,924,628	124,630	124,630	124,630	124,630	713,053	713,053	1,924,628
Project Total (before scrap credit)		710,314	682,548	682,548	682,548	1,747,688	1,747,688	1,204,670	7,297,481	14,755,485	550,562	550,562	550,562	550,562	3,149,952	3,149,952	8,502,151	1,260,876	1,233,110	1,233,110	1,233,110	4,897,640	4,897,640	14,755,485
Scrap Credit		(517,334)	(448,015)	(448,015)	(448,015)	(972,416)	(972,416)	(834,121)	0	(4,640,332)	(54,014)	(54,014)	(54,014)	(54,014)	(309,033)	(309,033)	-834,121	(571,348)	(502,029)	(502,029)	(502,029)	(1,281,449)	(1,281,449)	-4,640,332
Project Total		192,980	234,533	234,533	234,533	775,272	775,272	370,549	7,297,481	10,115,153	496,548	496,548	496,548	496,548	2,840,920	2,840,920	7,668,030	689,528	731,081	731,081	731,081	3,616,192	3,616,192	10,115,153
Price per MWe										19,834								15,323	16,246	16,246	16,246	21,916	21,916	19,834
Plant Balance (January 1, 2010)		6,055,860	6,055,860	6,055,860	6,055,860	34,647,662	34,647,662		-	93,518,764								6,055,860	6,055,860	6,055,860	6,055,860	34,647,662	34,647,662	93,518,764
Net Salvage Rate										10.82%								11.39%	12.07%	12.07%	12.07%	10.44%	10.44%	10.82%
	Blue Lake 1-4, 7 and 8 Combined	93,518,763							Unit Percentage of Total Station		6.4756%	6.4756%	6.4756%	6.4756%	37.0489%	37.0489%	100.0000%	Blue Lake 1-4 Combined	11.90%					

Comparison of Present to Proposed Net Salvage Rates

Electric Other Production

		Present			Proposed		
	FERC Account	Plant Balance 12/31/09	Net Salv %	Estimated Net Salvage in Reserve at End-of Life	Net Salv %	Estimated Net Salvage in Reserve at End-of Life	Proposed Less Present
		(1)	(2)	(3)	(4)	(5)	(6)
Blue Lake Units 1 thru 4							
	E341	-	0.0	-	-11.9	-	-
	E342	1,311,529	0.0	-	-11.9	156,072	156,072
	E344	21,096,786	0.0	-	-11.9	2,510,518	2,510,518
	E345	1,390,203	0.0	-	-11.9	165,434	165,434
	E346	424,921	0.0	-	-11.9	50,566	50,566
		24,223,439		-		2,882,589	2,882,589
	From 2009 TLG Dismantling Study for Blue Lake Units 1 - 4				-11.9	2,882,769	
	Proposed based on 100% for Remaining Life < 10 years				-11.9		
Blue Lake Units 7 & 8							
	E341	1,587,263	-25.0	396,816	-5.2	82,538	(314,278)
	E342	-	0.0	-	-5.2	-	-
	E344	59,829,027	0.0	-	-5.2	3,111,109	3,111,109
	E345	7,849,102	0.0	-	-5.2	408,153	408,153
	E346	29,932	0.0	-	-5.2	1,556	1,556
		69,295,325		396,816		3,603,357	3,206,541
	From 2009 TLG Dismantling Study for Blue Lake Units 7 & 8				-10.4	7,232,384	
	Proposed based on 50% for Remaining Life > 20 years				-5.2		

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☒ **Public Document**

Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 16
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Attachment I pages 12 and 44 of 81, Sherco Units 1-3

For Sherco Units 1-3 with dismantling costs of $154.416 million and $49.724 million in scrap metal credits, please show how this is used to calculate the change from 5.1% to 17.0% negative net salvage for Sherco Units 1 and 2 as shown on Attachment B.

Response:

The two dismantling cost numbers mentioned in the question are for the entire station, Units 1-3, however the negative net salvage percentages are for Sherco Units 1-2 only. Please see Attachment A to this response for the allocation of the dismantling costs between Units 1-2 and Unit 3 along with the calculation of the two negative net salvage rates.

Preparer: Lisa Perkett
Title: Director
Department: Capital Asset Accounting
Telephone: 612-330-6950
Date: July 6, 2015

Net Salvage Estimate (2015 Remaining Life Filing, Docket E,G002/D-15-46)

Sherco	Removal	Scrap Credit	Total Net Removal
Units 1-2	112,685,359	(2,530,646)	110,154,713
Unit 3	46,912,457	(2,650,941)	44,261,517
	159,597,816	(5,181,586)	154,416,230

2015 TLG Dismantling Study, Section 5, page 4 of 23	204,140,592	(49,724,362)	154,416,230

Plant Balance - Units 1-2	646,292,026
Net Salvage Rate	17.0%

Net Salvage Estimate (2010 Remaining Life Filing, Docket E,G002/D-10-173)

Sherco	Removal	Scrap Credit	Total Net Removal
Units 1-2	61,958,984	(25,722,031)	36,236,953
Unit 3	64,261,703	(16,405,319)	47,856,384
	126,220,687	(42,127,350)	84,093,337

2010 TLG Dismantling Study, Section 5, page 3 of 17	126,220,687	(42,127,350)	84,093,337

Plant Balance - Units 1-2	531,358,203
Net Salvage Rate (unadjusted)	6.8%
Net Salvage Rate (75%)	5.1%

Dismantling Cost Estimate

Activities	*Unit 1*	*Unit 2*	*Unit 3*	*Common*	*Station*	*Station Total*
Sherco Unit Rating (MWe)	750	750	900	2,400		
Characterization / Temporary Services	153,000	153,000	169,000	-	530,583	1,005,583
Worker Access	546,595	546,595	598,765	-		1,691,955
Asbestos Remediation	2,115,384	2,115,384	-	500,000		4,730,768
Equipment Removal	7,012,753	7,012,753	8,067,601	4,004,077		26,097,184
Boiler(s)	3,673,167	3,673,167	4,057,077	-		11,403,411
Structures Demolition	9,138,108	9,138,108	9,937,439	6,295,832		34,509,486
Backfill / Grade / Landscaping / Well Closure	1,542,252	1,542,252	1,689,452	4,565,603	100,000	9,439,558
Coal Yard Closure				7,250,000		7,250,000
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds / Ash Pond Dewatering	1,860,375	1,860,375	1,900,589	29,650,000		35,271,338
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	1,081,050	1,081,050	1,081,050	-		3,243,150
Utility Management / Oversight					3,723,229	3,723,229
Demolition Contractor Management / Supervisory / Safety Staff					5,421,101	5,421,101
Security					1,003,469	1,003,469
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers					5,732,502	5,732,502
Small Tool Allowance	483,625	483,625	490,387	307,310	n/a	1,764,947
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					76,087	76,087
Permits					1,845,463	1,845,463
Demolition Contractors Insurance					4,342,468	4,342,468
Demolition Contractors Fee					18,550,488	18,550,488
Sub-Total						177,102,187
Contingency						27,038,405
Project Total (before scrap credit)						204,140,592
Scrap Credit	(14,316,845)	(14,316,845)	(17,311,622)	(3,779,051)	-	(49,724,362)
Project Total						154,416,230

Xcel Energy Calculation:						
Unit Specific Costs	13,289,463	13,289,463	10,679,739	48,793,771	41,325,390	
Percentage of Total Plant Specific Costs	35.6681%	35.6681%	28.6638%			
Allocated Common/Station/Contingency	41,787,894	41,787,894	33,581,778			
Allocated Unit Cost Estimate	55,077,357	55,077,357	44,261,517			154,416,230
		110,154,713	44,261,517			154,416,230

			Present		Proposed		
	FERC Account	Plant Balance 1/1/2015	Net Salv %	Estimated Net Salvage in Reserve at End-of Life	Net Salv %	Estimated Net Salvage in Reserve at End-of Life	Proposed Less Present
		(1)	(2)	(3)	(4)	(5)	(6)
Allen S. King							
	E311	$ 38,745,715	-5.5	$ 2,131,014	-8.2	$ 3,169,641	$ 1,038,626
	E312	$ 504,006,208	-5.5	$ 27,720,341	-8.2	$ 41,230,847	$ 13,510,505
	E314	$ 92,980,018	-5.5	$ 5,113,901	-8.2	$ 7,606,345	$ 2,492,444
	E315	$ 43,404,998	-5.5	$ 2,387,275	-8.2	$ 3,550,799	$ 1,163,524
	E316	$ 7,876,988	-5.5	$ 433,234	-8.2	$ 644,387	$ 211,152
		$ 687,013,927		$ 37,785,766		$ 56,202,018	$ 18,416,252
				From 2014 Dismantling Study for King	-8.2%	$ 56,202,018	
				Proposed based on 100% because on national waterway	-8.2%		
Black Dog Units 3 and 4							
	E312	$ 56,060,968	-29.7	$ 16,650,108	-27.3	$ 15,303,979	$ (1,346,128)
	E314	$ 39,055,694	-29.7	$ 11,599,541	-27.3	$ 10,661,741	$ (937,800)
	E315	$ 14,812,768	-29.7	$ 4,399,392	-27.3	$ 4,043,710	$ (355,682)
	E316	$ 3,153,700	-29.7	$ 936,649	-27.3	$ 860,923	$ (75,726)
		$ 113,083,130		$ 33,585,690		$ 30,870,353	$ (2,715,337)
				From 2014 Dismantling Study after Allocation to Black Dog Units 2, 3, & 4	-27.3%	$ 30,870,353	
				Proposed based on 100% for Remaining Life < 10 years	-27.3%		
Sherco Units 1 & 2							
	E311	$ 91,678,021	-5.1	$ 4,675,579	-17.0	$ 15,625,701	$ 10,950,122
	E312	$ 393,827,768	-5.1	$ 20,085,216	-17.0	$ 67,124,432	$ 47,039,215
	E314	$ 98,551,343	-5.1	$ 5,026,118	-17.0	$ 16,797,198	$ 11,771,079
	E315	$ 50,332,906	-5.1	$ 2,566,978	-17.0	$ 8,578,795	$ 6,011,817
	E316	$ 11,901,988	-5.1	$ 607,001	-17.0	$ 2,028,588	$ 1,421,586
		$ 646,292,026		$ 32,960,893		$ 110,154,713	$ 77,193,820
				From 2014 Dismantling Study for Sherco 1 & 2	-17.0%	$ 110,154,713	
				Proposed based on 100% for Remaining Life < 10 years	-17.0%		
Sherco Unit 3 (*)							
	E311	$ 132,175,992	-4.3	$ 5,683,568	-3.0	$ 3,991,249	$ (1,692,318)
	E312	$ 397,716,678	-4.3	$ 17,101,817	-3.0	$ 12,009,642	$ (5,092,175)
	E314	$ 89,533,194	-4.3	$ 3,849,927	-3.0	$ 2,703,587	$ (1,146,340)
	E315	$ 81,922,467	-4.3	$ 3,522,666	-3.0	$ 2,473,770	$ (1,048,896)
	E316	$ 31,543,737	-4.3	$ 1,356,381	-3.0	$ 952,510	$ (403,871)
		$ 732,892,069		$ 31,514,359		$ 22,130,758	$ (9,383,601)
				From 2014 Dismantling Study for Sherco 3	-6.0%	$ 44,261,517	
				Proposed based on 50% for Remaining Life > 20 years	-3.0%		

* Amounts reported in this section are for the entire unit, not just Xcel Energy's share.

Dismantling Cost Estimate

Northern States Power Company - Minnesota
Xcel Energy
Project number 1617: Fossil Fleet 2009 DCEs

		TLG Dismantling Study						Common & Station Allocation				Unit Total (with Common & Station Allocated)			
Activities (Costs)		***Unit1***	***Unit 2***	***Unit 3***	***Common***	***Station***	***Station Total***	***Unit1***	***Unit 2***	***Unit 3***	***Total***	***Unit1***	***Unit 2***	***Unit 3***	***Total***
Sherco Unit Rating (MWe)		750	750	900	2,400		2,400	750	750	900	2,400	750	750	900	2,400
Characterization / Temporary Services	13	142,000	142,000	156,000	0	490,588	930,588	79,105	79,105	332,377	490,588	221,105	221,105	488,377	930,588
Scaffolding / Worker Access	15	494,142	494,142	541,306	0	0	1,529,590	0	0	0	0	494,142	494,142	541,306	1,529,590
Asbestos Remediation	10	0	0	0	500,000	0	500,000	80,623	80,623	338,754	500,000	80,623	80,623	338,754	500,000
Equipment Removal	2	7,065,591	7,065,591	7,358,207	3,470,802	0	24,960,191	559,653	559,653	2,351,496	3,470,802	7,625,244	7,625,244	9,709,703	24,960,191
Boiler(s)	7	3,340,536	3,340,536	3,687,636	0	0	10,368,708	0	0	0	0	3,340,536	3,340,536	3,687,636	10,368,708
Structures Demolition	1	9,325,532	9,325,532	10,207,507	7,484,754	0	36,343,325	1,206,887	1,206,887	5,070,981	7,484,754	10,532,419	10,532,419	15,278,488	36,343,325
Backfill / Grade / Landscaping	8	470,825	470,825	515,763	2,892,652	0	4,350,065	466,429	466,429	1,959,795	2,892,652	937,254	937,254	2,475,558	4,350,065
Ongoing environmental monitoring (quarterly for 5 years)	14	0	0	0	0	1,543,000	1,543,000	248,803	248,803	1,045,395	1,543,000	248,803	248,803	1,045,395	1,543,000
Utility Management / Oversight	9	0	0	0	0	2,612,451	2,612,451	421,247	421,247	1,769,957	2,612,451	421,247	421,247	1,769,957	2,612,451
Demolition Contractor Management / Supervisory / Safety Staff	6	0	0	0	0	4,558,283	4,558,283	735,005	735,005	3,088,273	4,558,283	735,005	735,005	3,088,273	4,558,283
Security	12	0	0	0	0	1,329,261	1,329,261	214,338	214,338	900,585	1,329,261	214,338	214,338	900,585	1,329,261
Property Taxes		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Expenses															
Shared Heavy Equipment / Operating Engineers	5	0	0	0	0	4,993,999	4,993,999	805,262	805,262	3,383,474	4,993,999	805,262	805,262	3,383,474	4,993,999
Small Tool Allowance	17	260,483	260,483	280,830	179,353	0	981,149	28,920	28,920	121,513	179,353	289,403	289,403	402,343	981,149
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)	18	0	0	0	0	62,940	62,940	10,149	10,149	42,642	62,940	10,149	10,149	42,642	62,940
Permits	16	0	0	0	0	911,218	911,218	146,930	146,930	617,358	911,218	146,930	146,930	617,358	911,218
Demolition Contractors Insurance	11	0	0	0	0	2,664,357	2,664,357	429,617	429,617	1,805,123	2,664,357	429,617	429,617	1,805,123	2,664,357
Demolition Contractors Fee	4	0	0	0	0	11,074,516	11,074,516	1,785,721	1,785,721	7,503,074	11,074,516	1,785,721	1,785,721	7,503,074	11,074,516
Sub-Total		21,099,109	21,099,109	22,747,249	14,527,561	30,240,613	109,713,641	7,218,688	7,218,688	30,330,798	44,768,174	28,317,797	28,317,797	53,078,047	109,713,641
Contingency	3	0	0	0	0	16,507,046	16,507,046	2,661,695	2,661,695	11,183,656	16,507,046	2,661,695	2,661,695	11,183,656	16,507,046
Project Total (before scrap credit)		21,099,109	21,099,109	22,747,249	14,527,561	46,747,659	126,220,687	9,880,383	9,880,383	41,514,454	61,275,220	30,979,492	30,979,492	64,261,703	126,220,687
Scrap Credit		(12,112,401)	(12,369,521)	(13,800,033)	(3,845,395)	0	(42,127,350)	(620,054)	(620,054)	(2,605,286)	(3,845,395)	(12,732,455)	(12,989,575)	(16,405,319)	(42,127,350)
Project Total		8,986,708	8,729,588	8,947,216	10,682,166	46,747,659	84,093,337	9,260,328	9,260,328	38,909,168	57,429,825	18,247,036	17,989,916	47,856,384	84,093,337
Price per MWe							35,039					24,329	23,987	53,174	35,039
Plant Balance (January 1, 2010)		265,679,102	265,679,102	1,116,305,193	-	-	1,647,663,396					265,679,102	265,679,102	1,116,305,193	1,647,663,396
Net Salvage Rate							5.10%					6.87%	6.77%	4.29%	5.10%
	Sherco 1 & 2 Combined	531,358,203				Unit Percentage of Total Station		16.1246%	16.1246%	67.7508%	100.0000%	16.1246%	16.1246%	67.7508%	100.0000%

	FERC Account	Plant Balance 12/31/09	Present Net Salv %	Present Estimated Net Salvage in Reserve at End-of Life	Proposed Net Salv %	Proposed Estimated Net Salvage in Reserve at End-of Life	Proposed Less Present
		(1)	(2)	(3)	(4)	(5)	(6)
Sherco Units 1 & 2							
	E311	81,066,226	-30.0	24,319,868	-5.1	4,134,378	(20,185,490)
	E312	311,136,043	0.0	-	-5.1	15,867,938	15,867,938
	E314	94,750,813	0.0	-	-5.1	4,832,291	4,832,291
	E315	35,501,875	0.0	-	-5.1	1,810,596	1,810,596
	E316	8,903,246	0.0	-	-5.1	454,066	454,066
		531,358,203		24,319,868		27,099,268	2,779,401
				From 2009 Dismantling Study for Sherco 1 & 2	-6.8	36,236,953	
				Proposed based on 75% for Remaining Life > 10 years but < 20 years	-5.1		
Sherco Unit 3 (*)							
	E311	221,537,303	-20.0	44,307,461	-4.3	9,526,104	(34,781,357)
	E312	635,290,680	0.0	-	-4.3	27,317,499	27,317,499
	E314	96,197,402	0.0	-	-4.3	4,136,488	4,136,488
	E315	115,522,832	0.0	-	-4.3	4,967,482	4,967,482
	E316	47,756,976	0.0	-	-4.3	2,053,550	2,053,550
		1,116,305,193		44,307,461		48,001,123	3,693,663
				From 2009 Dismantling Study for Sherco 3	-4.3	47,856,384	
				Proposed based on 100% because TLG calculated rate < 5%	-4.3		

* Amounts reported in this section are for the entire unit, not just Xcel Energy's share.

☐ **Non Public Document – Contains Trade Secret Data**
☐ **Public Document – Trade Secret Data Excised**
☒ **Public Document**

Xcel Energy
Docket No.: E,G-002/D-15-46
Response To: Department of Commerce Information Request No. 17
Requestor: Nancy Campbell, Michelle St. Pierre
Date Received: June 25, 2015

Question:

Reference: Page 14 of Xcel's Petition, Black Dog Units 3 and 4

The Company stated that Black Dog Units 3 and 4 were retired from service in April 2015. Please identify in the Company's most recent rate case, Docket No. E002/GR13-868, the capital costs and depreciation costs included in both the 2014 and 2015 test years.

Response:

Below is a table showing the amounts of additions and depreciation which were budgeted in 2014-2016 for Black Dog Units 3 and 4 in the Company's most recent rate case:

Year	Plant Additions	Depreciation Expense	Remediation Reg Asset Amortization
2014	$0	$5,591,668	$2,210,000
2015	0	5,657,837	2,210,000
2016	0	0	2,210,000

Preparer: Brandon Kirschner
Title: Accounting Consultant
Department: Capital Asset Accounting
Telephone: 612-215-5361
Date: July 6, 2015

CERTIFICATE OF SERVICE

I Marcella Emeott, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

Minnesota Department of Commerce, Division of Energy of Energy Resources
Comments

Docket No. E,G002/D-15-46

Dated this 17th day of July, 2015

/s/Marcella

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