STATE OF MINNESOTA
BEFORE THE PUBLIC UTILITIES COMMISSION

Nancy Lange	Chair
Dan Lipschultz	Vice Chair
Matt Schuerger	Commissioner
Katie Sieben	Commissioner
John Tuma	Commissioner

In the Matter of Xcel's 2017 Annual Review of Remaining Lives

DOCKET NO. E,G002/D-17-147

COMMENTS OF THE OFFICE OF THE ATTORNEY GENERAL

The Office of the Attorney General – Residential Utilities and Antitrust Division ("OAG") respectfully submits the following Comments regarding Northern State Power Company's ("Xcel" or "the Company") 2017 Review of Remaining Lives Petition filing on February 17, 2017.

There are several problems with Xcel's requests. The Company has failed to align actual and projected removal costs with the cost estimates provided in its net salvage rate study. Also, it is likely that the depreciation reserve for Black Dog Units 3 and 4 will be insufficient to cover all removal costs that the Company is projecting. Finally, it is concerning that the Company decided to "maintain the Key City facility in a dormant state to support continued operations of Granite City."[1] To remedy these concerns, the Commission should order the Company to provide further explanation of its cost monitoring process, order the Company to expense any depreciation shortfalls rather than shifting depreciation reserve balance between plants, and not allow the Key City facility to be held in a dormant state.

[1] Petition at 11 (Feb. 17, 2017).

I. BACKGROUND INFORMATION

In Xcel's previous remaining lives petition,[2] the depreciation reserve of Black Dog Units 3 and 4 was reallocated to the Minnesota Valley plant to cover $3.2 million in additional removal costs projected for the plant at that time. Additionally, $776,000 of "excess" depreciation reserve from nine facilities within the "Other Production" function was moved to cover the additional removal costs projected at that time for the Key City plant. As a result, Xcel was ordered to provide removal cost updates for the Minnesota Valley plant, the Key City plant, and Black Dog Units 3 and 4, including the impact on depreciation reserves, and a final true up when dismantling work is completed.[3]

The Commission should be concerned about the fluctuation of removal cost estimates and the reallocation of depreciation reserves that is used to address cost estimate increases, because of the intergenerational inequity that would arise from the Company collecting depreciation expense from ratepayers for facilities no longer in service which no longer provide any ratepayer benefits. Additionally, there are significant issues with the Company's removal cost update in the current filing.

II. XCEL IS UNABLE TO ALIGN ACTUAL AND PROJECTED COSTS TO THE COST ESTIMATES IN ITS NET SALVAGE RATE STUDY.

In this proceeding, the Company provided a summary update for Black Dog Units 3 and 4, stating that $20.6 million in actual removal costs had been incurred as of January 1, 2017, with a total depreciation reserve balance of $30.9 million available to cover general dismantling costs. The Company also described additional dismantling work that was in-progress or projected to

[2] *In the Matter of the Petition of Northern States Power Company for Approval of the 2015 Review of Remaining Lives*, MPUC Docket No. E/G002/D-15-46, PETITION (May 18, 2015).

[3] *In the Matter of Northern States Power Company's Request for Approval of the Annual Review of Remaining Lives Depreciation for Electric and Gas Production and Gas Storage Facilities and Net Salvage Rates for 2015*, MPUC Docket No. E,G-002/D-15-45, ORDER SETTING DEPRECIATION LIVES AND SALVAGE RATES, ALLOWING REALLOCATION OF SPECIFIC DEPRECIATION RESERVES, AND SETTING EFFECTIVE DATE (Nov. 13, 2015).

occur. Some of the in-progress work included coal yard remediation, for which the Company stated that it is currently collecting an additional $33.2 million of depreciation reserve.[4]

The OAG requested additional details about the actual removal costs incurred for Black Dog Units 3 and 4 so that it could compare the actual costs incurred with the cost estimates provided in the Company's most recent net salvage rate study completed by TLG Services, Inc. ("TLG").[5] Additionally, because the Company stated that only 35% of the dismantling work had been completed, the OAG asked the Company to provide its projected costs for the dismantling work that had yet to be incurred.[6]

The Company explained in its response that its "ability to align its costs with the TLG study categories is limited"[7] because "the Company does not maintain its removal records using the same categorizations as the tables TLG Services provides with their study."[8] Further, the Company explained that the estimated costs in the study used an allocation for some costs (e.g. estimated asbestos removal costs were allocated to different pieces of equipment) whereas the actual costs, when incurred, would be directly assigned.

The problem with this is that it will make it harder to track how actual removal costs compare to the cost estimates in the Company's net salvage rate study. It also calls into question the Company's ability to use the cost estimates to inform its on-site dismantling plan and manage the removal costs that are actually incurred. The Company has stated that it "does not manage against the cost estimates provided TLG services when performing removal activities as this is

[4] Petition at 9–10 (Feb. 17, 2017).
[5] The 2015 TLG Study was attached to Xcel's Petition in Docket No. E,G002/D-15-46, and is included here as Attachment A.
[6] OAG Information Request No. 3 is included as Attachment B.
[7] *Id.*
[8] *Id.*

not the intended purpose of the study."[9] While it is understood that the TLG study is not intended to replace the on-site dismantling plan, there is a relationship between the TLG cost estimates, the net salvage value which uses these cost estimates to set the depreciation rate, and the resulting depreciation reserve that is collected from ratepayers to cover actual removal costs.

The net salvage rate study performed by TLG states that the cost estimates are established using a site-specific inventory of materials to be removed, upon which cost factors are applied to the corresponding inventory quantities.[10] There are two types of cost factors that dismantling work fall under: activity-dependent cost factors that are "estimated using item quantities developed from plant drawings and inventory documents" and period-dependent cost factors that are "developed to determine the total dismantling program schedule."[11] Given that TLG conducted "site walk-downs (including discussions with the Operations & Maintenance staff), station-provided equipment databases, and plant drawings"[12] and have worked with the Company in its approach to develop the cost estimates, it is reasonable to expect that the projected and actual removal costs incurred should be comparable to the TLG study. While there may be some minor variances in the comparability of these amounts due to the time value of money, the method used to track actual and projected removal costs should be comparable with the method used to develop the cost estimates in its net salvage rate study. This is important because the cost estimates in the net salvage rate study are used to set depreciation rates, in which depreciation reserve is collected to cover removal costs.

The Commission should require that the Company further explain the current process it uses to determine the reasonableness of actual removal costs incurred, and how it manages its

[9] OAG Information Request No. 7 is included as Attachment C.
[10] Attachment A.
[11] *Id.*
[12] *Id.*

dismantling activities to ensure that they are efficient and economical in order to keep removal costs low. Furthermore, the Commission should require the Company to develop a process to compare actual and projected removal costs with the cost categories and cost estimates shown in its net salvage rate study, and provide a revised update on removal costs for the Minnesota Valley plant, the Key City plant, and Black Dog Units 3 and 4 that shows details regarding the actual and projected costs and the impact on the depreciation reserve balances.

III. DEPRECIATION RESERVE FOR BLACK DOG UNITS 3 & 4 MAY BE INSUFFICIENT TO COVER PROJECTED REMOVAL COSTS.

The Company stated in its filing that there is a total of $30.9 million of depreciation reserve to cover general dismantling activities, with an additional $33.2 million still being collected for Black Dog Units 3 and 4, for a total depreciation reserve balance of $64 million.[13] The Company also provided an updated projection of total removal costs for the plant, which consisted of actual costs as of January 1, 2017, and projected costs for the period from 2017 to 2023. Based on this information, the Company's current projection for general dismantling work is approximately $42.6 million with an additional $25.4 million for coal yard remediation, for a total of approximately $68 million[14] in removal costs for Black Dog Units 3 and 4, as summarized in Table 1.

[13] Petition at 9–10 (Feb. 17, 2017).
[14] OAG Information Request No. 3 (Attachment B).

Table 1
Xcel Projection of Removal Costs for Black Dog Units 3 & 4

	Total Projection
Characterization / Temporary Services	$87,735
Worker Access	$0
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	$176,160
Asbestos Remediation	$190,424
Equipment Removal	$8,567,422
Boiler(s)	$15,606,765
Structures Demolition	$7,200,000
Backfill / Grade / Landscaping / Well Closure	$0
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds	$0
Utility Management / Oversight	$7,071,360
Demolition Contractor Management / Supervisory / Safety Staff	$0
Security	$0
Property taxes	$0
Shared Heavy Equipment / Operating Engineers	$0
Small Tool Allowance	$0
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)	$0
Permits	$0
Demolition Contractors Insurance	$0
Demolition Contractors Fee	$0
Contingency	$5,578,506
Scrap Credit	($1,883,516)
Subtotal – General Dismantling Costs	**$42,594,855**
Coal Yard	$25,444,819
Grand Total	**$68,039,674**

The Company's current projection of removal costs exceeds the depreciation reserve balance by approximately $4 million. The Company stated that it intends to use depreciation reserve reallocations to address shortfalls.[15] The same intergenerational equity concerns exist with any potential future reserve reallocations as those expressed in the Company's previous remaining lives petition.[16]

The OAG compared the Company's current projection of general dismantling costs of $42 million to the cost estimates provided in the Company's most recent net salvage rate study. In order to allocate the common and station cost estimates, as well as the contingency cost estimate, included in the net salvage rate study to Black Dog Units 3 and 4, the OAG used an

[15] OAG Information Request No. 3 (Attachment B).
[16] *In the Matter of the Petition of Northern States Power Company for Approval of the 2015 Review of Remaining Lives*, MPUC Docket No. E/G002/D-15-46, COMMENTS OF THE OFFICE OF THE ATTORNEY GENERAL at 1–3 (May 18, 2015).

allocation rate of 62%.[17] To compare the net salvage rate study cost estimate based on 2014 dollars with the current projection reported in future dollars, the OAG applied a 2% annual inflation factor to bring the 2014 cost estimate to 2017 dollars of $31,464,358,[18] and the $42,594,855 projection to 2017 dollars of $40,773,128.[19] This comparison results in a difference of $9.3 million between the cost estimate in the Company's last net salvage rate study and the Company's current projection. Additionally, although the Company's coal yard remediation work is projected to total $25,444,819, the expected total collection of $33,200,000 to cover this cost leaves only $7.7 million to cover any other future cost increases for coal yard remediation work or other general dismantling costs.

The Commission should require that the Company clarify whether, based on its current projection, the depreciation reserve balance will be sufficient to cover all general dismantling costs and coal yard remediation costs, and explain why its current projection is higher than the cost estimate provided in its most recent net salvage rate study, even though the cost estimate included a contingency amount established using industry accepted methods, to account for unforeseeable future events. Furthermore, since the Company transferred $3.2 million of depreciation reserve out of Black Dog Units 3 and 4 to the Minnesota Valley plant in its previous remaining lives petition, the Commission should require that going forward, the Company expense any removal costs that exceed the depreciation reserve balance and that no additional depreciation reserve balance is reallocated to fund any reserve shortfalls for closed plants.[20]

[17] OAG Information Request No. 7 (Attachment C).
[18] $29,649,568*(1.02)^3 = $31,464,358.
[19] $42,594,855 brought back to 2014 dollars using 2% inflation factor. $38,421,429*(1.02)^3 = $40,773,128.
[20] The recommendation to expense the removal costs at issue is the result of the unique and specific facts in this docket. Because of those unique and specific facts, including the fact that the OAG raised concerns about moving depreciation expense between different facilities in Xcel's last depreciation filing, expensing removal costs in this instance is a more appropriate accounting treatment than reserve reallocation. It would prevent intergenerational
(Footnote Continued on Next Page)

IV. KEY CITY FACILITY SHOULD NOT BE HELD IN DORMANT STATE.

The Company stated that it intends to maintain the Key City facility in a dormant state to support the operations at the Granite City facility by using Key City as a source of spare parts. The OAG requested more information on what parts have been taken from the Key City facility for use in the Granite City facility, and the Company's plans for transferring parts from Key City to Granite City. The Company responded that it had not yet transferred any parts and that it did not have any forecast of which parts would need to be transferred. The OAG also wanted to understand the value for maintaining Key City in a dormant state where there would be maintenance costs and possible year-over-year increases to the dismantling costs, as compared to the savings of the market cost of a part that would have to be purchased by the Company if Key City was dismantled. The Company could not provide any information on this,[21] and has not fully explained the financial implications of maintaining Key City compared to dismantling it in a timely manner.

Because the net salvage rate study cost estimates do not include any post-shutdown "dormancy" costs"[22] and "does not account for an extended period of time between final shutdown of the unit(s) and onset of the dismantling program,"[23] these costs have not been built into the depreciation rates, nor reflected in the depreciation reserve balance. It is important for

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(Footnote Continued from Previous Page)
inequity and provide the Company with incentives to keep costs low. This recommendation does not, however, extend to all removal costs, and does not dictate ratemaking treatment for future removal costs in other instances.

[21] OAG Information Request No. 4 is attached as Attachment D.
[22] *In the Matter of the Petition of Northern States Power Company for Approval of the 2015 Review of Remaining Lives*, MPUC Docket No. E/G002/D-15-46, PETITION at Attachment I, Page 33 (May 18, 2015).
[23] *In the Matter of the Petition of Northern States Power Company for Approval of the 2015 Review of Remaining Lives*, MPUC Docket No. E/G002/D-15-46, PETITION at Attachment I, Page 20 (May 18, 2015).

the Company to justify why it is more economical to keep the Key City facility in a dormant state rather than dismantle it, and the Company has not done so.

In general, due to inflation and unforeseeable future events that could increase costs, it is in the best interest of the ratepayers to have the dismantling work started soon after a plant is shut down and no longer used and useful or providing ratepayers any benefit. Since the removal cost estimate for the Key City facility from the 2010 net salvage rate study of $3,318,488 increased to $4,096,222 in the 2015 net salvage rate study, the Company previously transferred $776,000 of depreciation reserve from other plants within the "Other Production" function. The Company has not shown that maintaining Key City in a dormant state would not result in future cost increases.

Given the fact that the Company's net salvage rate study cost estimates include a contingent cost for unforeseeable future events, it is reasonable to assume that dismantling costs will increase as dismantling work is either delayed or stretched out over long periods of time. This increases the potential for depreciation reserve shortfalls and the risk of intergenerational inequities should the Company continue to reallocate depreciation reserves. Therefore, the Company should provide a detailed analysis on the financial benefits to ratepayers to justify its decision to hold the Key City facility in a dormant state for over four years[24] before a projected dismantling start date in mid-2019. Unless the Company can demonstrate that delay will provide a clear financial benefit to ratepayers, the dismantling work for Key City should not be delayed.

[24] Plant shutdown was March 31, 2015.

V. CONCLUSION

It is important to understand how reasonable the removal cost estimates in the Company's net salvage rate studies are because the depreciation rates are set using this information, and the resulting depreciation reserve is used to pay for those removal costs. The Company's summary, which describes the removal costs and depreciation reserves for the Minnesota Valley plant, Key City plant, and Black Dog Units 3 and 4, is insufficient to understand if there have been any cost increases to the estimates provided in the Company's most recent net salvage rate study, or any projected depreciation reserve shortfalls for any of the plants.

The Company has habitually reallocated depreciation reserves in the past to cover reserve shortfalls. The Company may lack an incentive to keep dismantling costs low for ratepayers by ensuring that dismantling activities are efficient and economical, because it knows that it can simply shift its depreciation reserves around to make up the difference.

The Commission should require that the Company provide further details on its management of dismantling activities and costs, develop a method to compare its actual and projected removal costs to the cost estimates from its net salvage rate study, and provide a revised update for these costs and the depreciation reserve balance for all three facilities. Further, the Commission should require that the Company fully explain any increases in removal costs for any of the three facilities, and that the Company expense any removal costs that exceed the depreciation reserve balance. Finally, the Commission should require that the Company

provide a detailed analysis on the financial benefits to ratepayers to justify its decision to hold the Key City facility in a dormant state, or that it begin the dismantling work for Key City.

Dated: August 18, 2017

Respectfully submitted,

LORI SWANSON
Attorney General
State of Minnesota

s/ **Shoua Lee**
SHOUA LEE
Financial Analyst

445 Minnesota Street, Suite 1400
St. Paul, Minnesota 55101-2131
(651) 757-1417 (Voice)
(651) 296-9663 (Fax)
shoua.lee@ag.state.mn.us

s/ **Joseph C. Meyer**
JOSEPH C. MEYER
Assistant Attorney General
Atty. Reg. No. 0396814

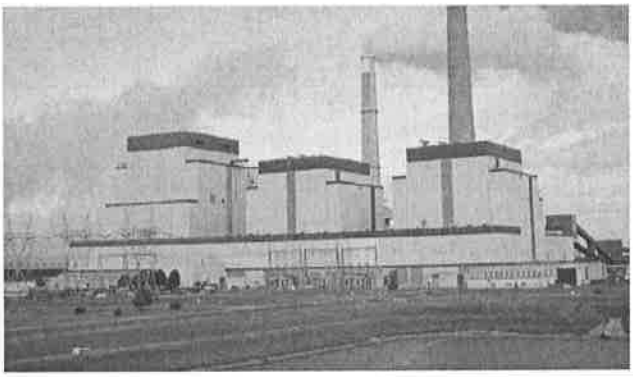
445 Minnesota Street, Suite 1400
St. Paul, Minnesota 55101-2131
(651) 757-1433 (Voice)
(651) 296-9663 (Fax)
joseph.meyer@ag.state.mn.us

ATTORNEYS FOR OFFICE OF THE
ATTORNEY GENERAL – RESIDENTIAL
UTILITIES AND ANTITRUST DIVISION

DOCKET NO. E,G002/D-17-147

INITIAL COMMENTS OF THE OAG

ATTACHMENT A

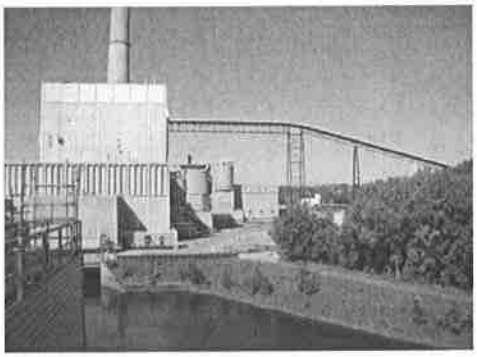


DISMANTLING COST STUDY

for

Allen S. King Unit 1
Angus Anson Units 1-4
Black Dog Units 2-5
Blue Lake Units 1-4, 7 and 8
Grand Meadow Wind Farm
Granite City Units 1-4
Hennepin Island
High Bridge Units 1-3
Inver Hills Units 1- 6
Key City Units 1-4
Maplewood Gas Plant
Minnesota Valley 1-3
Nobles Wind Farm
Red Wing 1 & 2
Riverside Units 7, 8, 9 and 10
Sherburne County Units 1-3
Sibley Gas Plant
Wescott Gas Plant
Wilmarth 1 & 2

Stations

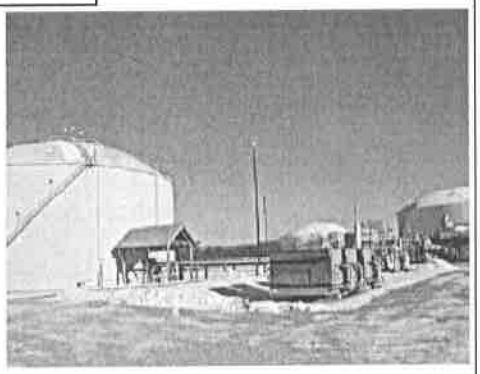


prepared for

Xcel Energy

prepared by

TLG Services, Inc.
An Entergy Company
148 New Milford Road East
Bridgewater, CT



May 2015

APPROVALS

Project Engineer	Benjamin J. Stochmal	5/12/15 Date
Project Manager	Francis. W. Seymore	5/12/15 Date
Technical Manager	Geoffrey M. Griffiths	5/12/15 Date

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REVISION LOG

Rev. No.	CRA No.	Date	Item Revised	Reason for Revision
0		05/12/2015		Original Issue

ACRONYMS / DEFINITIONS

• AIF	Atomic Industrial Forum
• CT	Combustion Turbine
• CCT	Combined Cycle Turbine
• DOC	Decommissioning Operations Contractor
• DOE	Department of Energy
• HRSG	Heat Recovery Steam Generator
• Mw	Megawatt
• MWe	Megawatt (electric)
• NESP	National Environmental Studies Project
• NG	Natural Gas
• NRC	Nuclear Regulatory Commission
• OSHA	Occupational Safety & Health Administration
• RDF	Refuse Derived Fuel
• TLG	TLG Services, Inc.

EXECUTIVE SUMMARY

This report, prepared by TLG Services, Inc. (TLG), provides estimated costs for the complete dismantling of the following electric generating stations, gas storage and production plants operated by Xcel Energy, which either owns or has a share in ownership in each of these facilities:

Generating Stations Located In Minnesota:

- Allen S. King
- Black Dog
- Blue Lake
- Grand Meadow Wind Farm
- Granite City
- Hennepin Island
- High Bridge
- Inver Hills
- Key City
- Minnesota Valley
- Nobles Wind Farm
- Red Wing
- Riverside
- Sherburne County (Sherco)
- Wilmarth

Generating Station Located In South Dakota:

- Angus Anson

Gas production and storage plants (all located in Minnesota):

- Maplewood
- Sibley
- Wescott

The dismantling estimate includes the cost of removing the equipment and structures for each of the above-referenced facilities and limited restoration of the sites. The electrical switchyards are assumed to remain in place and are not included in the estimate.

The scope of the dismantling estimate includes the following significant work activities and labor, equipment, material, and waste disposal cost elements:

- Preparation of the units for safe dismantling

- Abatement of asbestos containing materials prior to dismantling (where applicable)
- Removal and disposition of all installed equipment
- Demolition and disposition of subsurface utilities and buildings and foundations
- Removal of below grade foundations (Minnesota facilities only)
- Coal yard and ash pond remediation (Sherburne County, King, and Minnesota Valley)
- Limited site restoration (grading and seeding for drainage and erosion control)
- Demolition contractor's on-site management, engineering, safety, and administrative staff
- Demolition contractor's expenses, including profit, insurance, permits, and fees
- Owner's on-site management, oversight, and security staff
- A cost credit associated with the disposition of scrap metals
- Cost contingency

The general approach in assembling the estimate was to develop an inventory of equipment and structures designated to be removed for each facility. This inventory was established using site walk-downs (including discussions with the Operations & Maintenance staff), station-provided equipment databases, and plant drawings. This inventory accounted for similarities between facilities.

The abatement, removal, demolition and restoration activity costs are estimated by applying unit factors (developed for each inventory item) against the inventory. Costs for project management, shared equipment and consumables, and similar types of costs are estimated on a period-dependent basis (i.e., the magnitude of the expense depends, in part, on the duration of the project and the types of activities taking place). The potential value of scrap from materials generated in dismantling the plant components and building structural steel is included as a credit in the dismantling cost estimate. Contingency is provided within this estimate to account for unpredictable project events.

OSHA states that demolition involves additional hazards due to unknown factors which make demolition work particularly dangerous. OSHA states that the hazards of demolition work can be controlled and eliminated with the proper planning, the right personal protective equipment, necessary training, and compliance with OSHA standards. This cost estimate is intended to provide sufficient monies to allow Xcel management to perform the project using these principles and standards.

The dismantling costs, expressed in thousands of 2014 dollars, are provided in the following table.

SUMMARY OF DISMANTLING COSTS
(All costs are in thousands of 2014 dollars)

Station	Unit	MWe rating	Type	Fuel	In Service	Station Cost
Electric Generation Facilities						
Allen S. King	1	588	Steam	Coal	1968	56,202
Angus Anson	1		Steam	N/A	1966	10,179
	2	106	CT	NG/Oil	1994	
	3	110	CT	NG/Oil	1994	
	4	165	CT	NG/Oil	2005	
Black Dog	2	98	Steam	Coal/NG	1952	48,458
	3	108	Steam	Coal/NG	1955	
	4	170	Steam	Coal/NG	1960	
	5	162	CT	Coal/NG	2002	
Blue Lake	1	45	CT	NG/Oil	1974	13,716
	2	45	CT	NG/Oil	1974	
	3	45	CT	NG/Oil	1974	
	4	45	CT	NG/Oil	1974	
	7	165	CT	NG/Oil	2005	
	8	165	CT	NG/Oil	2005	
Grand Meadow	1-67	101	Wind	Wind	2008	22,189
Granite City	1	18	CT	NG/Oil	1969	4,423
	2	18	CT	NG/Oil	1969	
	3	18	CT	NG/Oil	1969	
	4	18	CT	NG/Oil	1969	
Hennepin Island	1-5	14	Hydro	Water	1882	6,133
High Bridge	1	160	CT	NG/Oil	2008	13,364
	2	160	CT	NG/Oil	2008	
	3	250	Steam	(note 1)	2008	
Inver Hills	1	60	CT	NG/Oil	1972	10,721
	2	60	CT	NG/Oil	1972	
	3	60	CT	NG/Oil	1972	
	4	60	CT	NG/Oil	1972	
	5	60	CT	NG/Oil	1972	
	6	60	CT	NG/Oil	1972	

SUMMARY OF DISMANTLING COSTS
(continued)
(All costs are in thousands of 2014 dollars)

Station	Unit	MWe rating	Type	Fuel	In Service	Station Cost
Key City	1	18	CT	NG/Oil	1970	4,096
	2	18	CT	NG/Oil	1970	
	3	18	CT	NG/Oil	1970	
	4	18	CT	NG/Oil	1970	
Minnesota Valley	1	10	Steam	Coal	1949	22,063
	2	10	Steam	Coal	1949	
	3	44	Steam	Coal	1953	
Nobles	1-134	201	Wind	Wind	2011	30,794
Red Wing	1	10	Steam	RDF	1949	16,183
	2	10	Steam	RDF	1949	
Riverside	7	165	CCT	(note 2)	1964	34,399
	8	231	Steam	Coal	2009	
	9	173	CT	NG/Oil	2009	
	10	173	CT	NG/Oil	2009	
Sherco	1	750	Steam	Coal	1976	154,416
	2	750	Steam	Coal	1977	
	3	900	Steam	Coal	1987	
Wilmarth	1	10	Steam	RDF	1948	14,195
	2	10	Steam	RDF	1951	
Gas Production/Storage Facilities						
Maplewood					1957	4,563
Sibley					1953	4,135
Wescott					1962	11,419
Fleet Totals		**6,741**				**$481,649**

NOTES:
1 Unit 3 receives steam from Units 1 and 2 HRSGs
2 Unit 7 receives steam from Units 9 and 10 HRSGs

1. INTRODUCTION

1.1 OBJECTIVE OF STUDY

The objective of this dismantling cost study prepared by TLG Services is to present an estimate of the costs to dismantle Xcel Energy's fossil-fueled and wind farm generating electrical generating facilities, plus their gas production and storage facilities, in Minnesota and South Dakota. This study is not intended to be a dismantling plan for each of the stations, but a cost estimate prepared to support current financial planning for future dismantling.

1.2 FACILITY DESCRIPTIONS

Electric Generation Facilities

Allen S. King is a single unit coal fired generating facility with a cyclone-fired boiler. It has a generating capacity of 588 MWe while burning low sulfur Wyoming coal. The plant is located in Oak Park Heights, Minn., on the St. Croix River. The unit was installed in 1968. From 2004 to 2007 the unit was completely refurbished as part of an emissions reduction project.

Angus Anson is a three unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. Units 1 and 2 were placed in service in 1994. Unit 3 was placed in service in 2005. The station generating capacity is 381 megawatts. Unit 1, 2 and 3 are rated at 106, 110 and 165 MWe, respectively. The station is located in Sioux Falls, South Dakota adjacent to the decommissioned Pathfinder nuclear facility. The existing Pathfinder facility holds the remnants of the test nuclear power plant (minus the reactor) built in 1965.

Black Dog is a coal and gas fired generating station located on the Minnesota River just south of the Twin Cities. Unit 5, which is a natural gas fired combined cycle combustion gas turbine, replaced the original Unit 1 boiler and steam turbine. The exhaust heat from Unit 5 gas turbine generates steam in the HRSG and powers the original Unit 2 steam turbine that was installed in the 1950's. Units 3 and 4 were dual fuel boilers with steam turbines, using coal as a primary fuel and natural gas for back up. Unit 2, 3, 4 and 5 are rated a 98, 108, 170, and 162 MWe, respectively. Units 2, 3 and 4 were installed during the 1950's. Unit 5 was placed in service in 2002. Units 3 and 4 were retired in April, 2015. The station generating capacity is currently 260 MWe, the generating

equipment assumed in place for this estimate had a combined capacity of 538 MWe.

Blue Lake is a six unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 510 megawatts. Units 1-4 are rated at 45 MWe each. Units 7 and 8 are rated at 165 MWe each. The station is located in Shakopee, Minnesota along the Minnesota River. Units 1-4 were placed in service in 1974. Units 7 and 8 were placed in service in 2005.

Grand Meadow is a 67 unit wind turbine complex located in a stretch of farm fields six miles long and four miles wide. The farm is spread out over roughly 10,000 acres southeast of Interstate 90 in Grand Meadow, Clayton, and Dexter Townships, Mower County, Minnesota. Each wind turbine / generator set has a rated capacity of 1.5 MWe, for a complex total of 100.5 MWe. The units were placed in service in 2008.

Granite City is a four unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 72 megawatts with each of the four units rated at 18 MWe. The station is located in St. Cloud, Minnesota. The units were installed in 1970.

Hennepin Island is a hydroelectric power plant located on the Mississippi River in Minneapolis MN, on the west side of Hennepin Island. The station consists of five turbine-generator sets, and has a combined generating capacity is 13.9 megawatts. The plant was installed in 1882; it was last refurbished in 1954.

High Bridge is a three unit facility consisting of two combined cycle combustion gas turbines and one steam turbine. The combustion turbines are each direct coupled to a 160 MWe electric generator. The exhaust gas of each combustion turbine is ducted through its own HRSG. The steam from the HRSG is piped to a 250 MWe steam turbine. The station has a net dependable capacity of 570 MWe. The station was placed in service in 2008. It is located in downtown St. Paul, Minnesota, on the Mississippi River.

Inver Hills is a six unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 360 megawatts. Units 1-6 are rated at 60 MWe each. The station is located in Inver Grove Heights, Minnesota. The units were placed in service in 1972.

Key City was a four unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity was 72 megawatts with Units 1-4 at 18 MWe each. The station is located in Mankato, Minnesota. The units were installed in 1970, and retired in March of 2015.

Minnesota Valley is a three unit facility abandoned in place. The station consists of two 10 MWe and one 46 MWe coal fired units. The station is located in Chippewa County, Granite Falls, Minnesota. The two 10 MWe units were installed in the late 1940's. The third unit was installed in 1953. The station was retired from service in 2003.

Nobles is a 134 unit wind turbine complex located in the Buffalo Ridge area of Minnesota. The wind farm is spread out over roughly 42 square miles in Nobles County, Minnesota, in Olney, Dewald, Larkin, and Summit Lake townships. Each wind turbine / generator set has a rated capacity of 1.5 MWe, for a complex total of 201 MWe. The units were placed in service in 2011.

Red Wing is a two unit generating facility that burns processed municipal solid waste, referred to as refuse-derived fuel (RDF). The station employs a combination duct scrubber with a baghouse to effectively cut emissions from burning RDF. The scrubber treats flue gas with a water spray and dry lime. The baghouse traps particulate by forcing gas streams through large filter bags. The generating capacity of each unit is 10 MWe. The station is located in Red Wing, Minnesota. The units were installed in the early 1950's (coal fired units) and later modified to burn RDF.

Riverside is a three unit facility consisting of two combined cycle combustion gas turbine generators (Units 9 and 10) and one steam turbine (refurbished Unit 7 steam turbine). The combustion turbines are each direct coupled to a 173 MWe electric generator. The exhaust gas of each combustion turbine is ducted through its own HRSG. The steam from the HRSG is piped to the Unit 7 165 MWe steam turbine. Abandoned in place, and included in this estimate, are the retired Units 6, 7 and 8 boilers, and the Unit 8 steam turbine with all its associated piping and system components. The three operational units went into service in 2009. The station is located northeast of Minneapolis on the Mississippi River.

Sherburne County (Sherco) is a three unit 2,400 MWe coal-fired facility. The station is located in Becker, Minnesota, 45 miles northeast of the Twin Cities, on the Mississippi River. Units 1, 2 and 3 have a net dependable capacity of 750, 750 and 900 MWe each, respectively. The units were installed in 1976, 1977, and 1987.

Wilmarth is an electric generating facility that burns RDF. The station employs a combination duct scrubber with a baghouse to effectively cut emissions from burning RDF. The scrubber treats flue gas with a water spray and dry lime. The baghouse traps particulate by forcing gas streams through large filter bags. The generating capacity of Unit 1 and 2 is 10 MWe each. The station is located in Mankato, Minnesota. The units were installed in the early 1950's and modified in 1987 to burn RDF.

Gas Production/Storage Facilities

Maplewood is a propane storage facility with an effective propane storage capacity of 1.355 million gallons. The plant, located in Maplewood, Minnesota, was placed in-service in 1957.

Sibley is a propane storage facility used to supplement natural gas supplies during peak demand periods, with an effective propane storage capacity of 1.2 million gallons. The plant, located in Mendota Heights, Minnesota, was placed in service in 1953.

Wescott is a liquefied natural gas and propane peak-shaving plant. The facility collects and stores propane and natural gas for future supply to the local propane and natural gas distribution systems during cold winter periods when regional natural gas and propane supplies may not meet the increased demand. The facility is located in Inver Grove Heights, Minnesota, and was completed in 2000.

1.3 SCOPE

The scope of the dismantling estimate includes the following significant cost elements:

- Preparation for safe dismantling;
  - Hazardous materials characterization for such items as ACM (asbestos-containing materials), lead, mercury, PCBs, hydrocarbons in soil, etc.
  - Isolation of the units in preparation for safe dismantling (e.g. ensuring systems are de-energized, fuel and chemical storage tanks are drained and cleaned, etc. (where applicable))
- Abatement of ACM prior to dismantling (where applicable)

- Labor, equipment, and material costs associated with the removal and disposition of all installed equipment
- Labor, equipment, and material costs associated with the demolition and disposition of buildings and foundations
- Demolition contractor's on-site management, engineering, safety, and administrative staff
- Demolition contractor's expenses, including insurance, permits, and fees.
- Owner's on-site management, oversight, and security staff
- A cost credit associated with the disposition of scrap metals
- Cost contingency
- Ongoing environmental monitoring of the facilities after the completion of the dismantling and demolition

Costs are provided for each generating station or facility, identified by significant cost element. The cost per station includes the costs for dismantling the generating unit and the common station facilities. Costs are provided in 2014 dollars.

1.4 GENERAL APPROACH

The general approach in assembling the estimate was to develop an inventory of equipment and structures designated to be removed for each facility. This inventory was established using site walk-downs (including discussions with the Operations & Maintenance staff), station-provided equipment databases, and plant drawings. This inventory accounted for similarities between facilities.

The abatement, removal, demolition and restoration activity costs are estimated by applying unit factors (developed for each inventory item) against the inventory. Costs for project management, shared equipment and consumables, and similar types of costs are estimated on a period-dependent basis (i.e., the magnitude of the expense depends, in part, on the duration of the project and the types of activities taking place). The potential value of scrap from materials generated in dismantling the plant components and building structural steel is included as a credit in the dismantling cost estimate. Contingency is provided within this estimate to account for unpredictable project events.

OSHA states that demolition involves additional hazards due to unknown factors which make demolition work particularly dangerous. OSHA states that the hazards of demolition work can be controlled and eliminated with the

proper planning, the right personal protective equipment, necessary training, and compliance with OSHA standards. The cost estimate is intended to provide sufficient monies to allow Xcel management to perform the project using these principles and standards.

Limited site landscaping is included, which covers grading and seeding for drainage and erosion control.

Section 2 of this report identifies the activities and sequence of activities necessary to dismantle a generating station. Section 3 provides the specific bases for the estimate. Section 4 discusses scrap metal and associated credits to the dismantling costs. Section 5 provides the results. Appendices, noted throughout this report, provide additional information important to understanding this estimate.

2. DISMANTLING OPERATIONS

The estimate for dismantling the stations is based on the complete removal of the units and common station facilities (except where noted). The following sections describe the project organization, basic activities, and special equipment necessary for accomplishing the dismantling project.

The actual dismantling program begins once the station owner has decided to dismantle the site, either immediately following final shutdown, or after a period of storage following final shutdown. The dismantling program has been organized into three distinct periods: Period 1 - Engineering/Planning and Asbestos and Other Hazardous Material Abatement (if necessary); Period 2 - Dismantling Operations; and Period 3 - Site Restoration. This section summarizes the activities performed under each Period of the program.

For the purposes of this estimate it is assumed that once the decision to dismantle has been made and a project start date established, the work in each of these periods will be completed successively (no delay between periods). This report does not attempt to describe all of the activities necessary to dismantle a station, but identifies representative activities appropriate to this type of project.

2.1 PRE-SHUTDOWN ACTIVITIES

The estimates include a planning staff for a year prior to final shutdown to plan for the dismantling program. A staff of seven full-time equivalent personnel is included in this estimate; smaller stations will have a reduced staffing amount.

2.2 POST-SHUTDOWN PLANT STAFF TRANSITION ACTIVITIES

The estimate is based on each station being shut down and placed into a post-shutdown configuration by the plant staff. The length of time that the facility is in this configuration is indeterminate and the costs for maintaining the facility in this configuration is not included within the scope of this dismantling effort. The activities to be completed post-shutdown, but prior to station dismantling, include:

- Removal of consumables and supplies not needed in the post-shutdown configuration
- Removal of residual fuels (including oil/coal)
- Removal of acids and caustics; flushing and cleaning of storage tanks

- Disposition of surplus bulk chemicals and gas storage containers
- Removal of miscellaneous hazardous wastes and combustible materials
- Installation of any appropriate physical barriers (sealing circulating water system) and/or security barriers

The estimate does not account for an extended period of time between final shutdown of the unit(s) and onset of the dismantling program. As such, the plant operations and maintenance staff would be expected to perform the following activities in the interval of time between final plant shutdown, and the onset of the dismantling program.

- If the unit is to be maintained in a condition where lighting, electricity, heating, water, sanitary, and similar services are to remain active, reconfigure these systems to minimize maintenance requirements
- Maintenance of the facility (maintaining roofs and windows, drain systems, and electrical systems to preclude creating hazardous working conditions in the future)

2.3 DISMANTLING ENGINEERING / PLANNING AND ASBESTOS ABATEMENT

When the decision is made to begin physical dismantling of a station, Xcel Energy will begin field dismantling activities, beginning with engineering and planning, and removal of asbestos and other hazardous materials from the station.

2.3.1 Engineering and Planning

A preliminary planning phase of the program begins once it is has been determined that a station will be dismantled and the project has been authorized to proceed. During this phase, the owner assembles its dismantling management organization, makes appropriate decisions regarding the extent of dismantling and the approach to managing the activities, and accomplishes those site preparation activities necessary to transition from a plant shutdown configuration to site dismantling. For purposes of this estimate it is assumed that the intent is to dismantle the entire station as a single project. Costs incurred during this preliminary phase of the program are included in the dismantling costs presented in this study.

Xcel Energy prepares the stations for dismantling by performing the following activities:

- Prepare specifications that identify and describe the objectives and major work activities to be accomplished (establishing the final site configuration)
- Assemble plant documentation that may be relevant to dismantling (drawings, hazardous material reports, environmental studies, etc.)
- Select an asbestos abatement contractor (if required) and Dismantling Contractor
- Assemble and mobilize the management and oversight team responsible for the project
- Documenting hazardous materials location and inventory

2.3.2 Asbestos / Hazardous Material Abatement (as applicable)

The asbestos abatement contractor prepares for this work by thoroughly understanding the scope of the asbestos remediation work and obtaining the permits necessary to initiate the work. Abatement of asbestos is considered an important prerequisite to dismantling the station's systems and structures. The method by which asbestos is abated is strictly controlled by federal and/or state regulations and includes the following requirements:

- Work will be done inside enclosures designed to capture any asbestos-containing particles. With the exception of removal of small quantities of asbestos in local areas, it would be expected that most work will be done in large enclosures (containment tents). The enclosures will have a filtered exhaust and be maintained under negative air pressure (air will leak into the enclosure rather than leak out).
- The air outside of the enclosures will be monitored to ensure barriers are effective.
- Workers, while working inside enclosures, will wear respiratory protective equipment as well as protective clothing.
- All materials removed from the enclosure will be packaged in accordance with regulations (minimum double-bag), and will be removed via a materials handling access area.
- Workers will enter and exit the enclosures through a personnel decontamination chamber in a controlled manner (ensuring asbestos contamination does not spread beyond the containment).

- After the asbestos abatement is complete, the effectiveness of the process will be established via regulatory-specified processes (generally verifying that there is no asbestos containing material capable of becoming airborne).
- Asbestos containing materials will be disposed of at a properly licensed disposal facility.
- After ensuring that all asbestos has been removed, the enclosures will be taken down in accordance with regulatory requirements and disposed of at a licensed facility.
- Clean coal-fired boilers by washing down all surfaces interior to the boilers.
- Clean fly-ash handling equipment, e.g., filters and holding tanks.
- De-water ash settling ponds and/or basins.

2.3.3 Dismantling Preparations

The dismantling contractor prepares the station for dismantling by performing the following activities:

- Installing environmental barriers and monitoring equipment
- Reviewing plant drawings and specifications that may be useful for the dismantling project
- Identifying the processes to achieve the final desired station configuration
- Identifying the major work sequence
- Preparing dismantling activity specifications and work orders/forms
- Preparing detailed dismantling procedures
- Preparing a dismantling plan
- Preparing permit application(s) for plant demolition
- Mobilizing site staff
- Configuring temporary services/facilities to support dismantling operations
- Arranging for heavy lift and dismantling equipment, rigging, and tooling
- Hiring and training the labor force

2.4 DISMANTLING OPERATIONS

Dismantling activities are initiated after completing the engineering and planning process, and after asbestos abatement and removal of hazardous materials is complete. The sequence of activities will be determined at the time of dismantling, but typically a sequence would include the following items. Dismantling sequences are presented for each of the Xcel Energy facility types. In all types the station is electrically disconnected from all power sources; the Dismantling Contractor will provide temporary power as needed to support the removal activities.

2.4.1 Steam Plants

- Removing coal yard equipment, including unloading structures, conveyors, transfer towers, and reclaim systems
- Removing above-ground storage tanks
- Removing large equipment from rooftops or at higher elevations
- Removing equipment that must be removed prior to start of boiler structure removal, including fly-ash handling, coal handling, burner fuel supply, scrubbers, air and flue gas ducts, etc.
- Removing electrostatic precipitator and bag houses by cutting casings and connecting gas ducts
- Removing the top of the boiler enclosure to allow access to the platens
- Removing the boiler waterwalls
- Removing steam drum and deaerator by severing all connections and lowering to grade
- Removing boiler structural steel
- Disassembling the turbine/generator and condenser
- Removing all other equipment and components required prior to structures demolition
- Removing the turbine building superstructure and interior floors
- Blasting/dismantling the concrete turbine-generator pedestal(s)
- Removing siding from buildings
- Dismantling steel framing
- Demolishing structural concrete

- Removing the stack(s)
- Removing cooling tower(s) and / or cooling water intake and discharge structures
- Removing all other site structures within the scope of the dismantling program
- Sorting and organizing materials for pickup by the scrap dealer(s)
- Size reducing concrete rubble to remove reinforcing steel
- Removing any temporary services used to support the dismantling effort (lighting / ventilation / electrical / groundwater management)

2.4.2 Combustion Turbines

- Removing above-ground storage tanks
- Removing large equipment from rooftops or at higher elevations
- Disassembling the turbine and generator
- Removing all other equipment and components required prior to building demolition
- Blasting/dismantling the concrete turbine-generator foundation(s)
- Demolishing remaining concrete
- Removing cooling tower(s) and / or cooling water intake and discharge structures (High Bridge only)
- Removing all other site structures within the scope of the dismantling program
- Sorting and organizing materials for pickup by the scrap dealer(s)
- Size reducing concrete rubble to remove reinforcing steel

2.4.3 Internal Combustion Plants

Not applicable for Xcel Energy.

2.4.4 Hydroelectric Plants

- Installing cofferdams at inlet to power channel and discharge channel
- Removing large equipment from rooftops or at higher elevations
- Disassembling and removing the generators

- Disassembling and removing the water turbines
- Removing all other equipment and components required prior to structures demolition
- Removing the powerhouse structure and interior floors
- Blasting/dismantling the concrete turbine-generator foundations
- Dismantling steel framing
- Demolishing brick walls and structural concrete
- Removing all other site structures within the scope of the dismantling program
- Sorting and organizing materials for pickup by the scrap dealer(s)
- Size reducing concrete rubble to remove reinforcing steel

2.4.5 Wind Turbines

- Removing turbine blades from turbine shaft
- Removing turbine-generator housings from towers
- Removing towers from foundations
- Removing all other equipment and components required prior to structures demolition
- Blasting/dismantling the concrete tower foundations
- Excavating and removing all buried electrical cables
- Removing all other site structures within the scope of the dismantling program
- Sorting and organizing materials for pickup by the scrap dealer(s)
- Size reducing concrete rubble to enhance its suitability for backfill

2.4.6 Photovoltaic Plants

Not applicable for Xcel Energy.

2.5 SITE RESTORATION

Site restoration activities are initiated following completion of the dismantling operations. The objective of site restoration in this estimate is to restore the station grounds to a configuration that does not pose a

safety hazard; and plant vegetation for erosion control. As such, landscaping will be limited to grading, placement of top soil, and seeding. Site restoration as used in this estimate is not intended to re-configure the station for redevelopment, e.g. use as a recreational or industrial facility.

A typical site restoration sequence would be:

- Crush all concrete rubble and remove reinforcing steel. Concrete debris will be shipped off site for disposal as construction debris. Reinforcing steel will be recycled
- Backfill below grade voids with clean compactible fill as necessary
- General grading of the station
- Placement of top soil or other suitable surface material necessary to maintain erosion control
- Landscaping to the extent necessary to re-vegetate the station (grass or similar plant materials), and
- Demobilizing personnel and equipment

3. COST ESTIMATE

The basis, methodology, and assumptions for the site-specific cost estimate are described in the following paragraphs.

3.1 BASIS OF ESTIMATE

Inventory of Materials to be Removed

The inventory is an essential element of the estimate, since dismantling costs are determined by applying unit cost factors against the corresponding inventory quantities. For each of these estimates a site-specific inventory of materials to be removed was developed using a combination of methods. The inventory used in developing the estimate for each station is provided in Appendix A.

Comparable Boiler / Turbine Unit Information Available to TLG Where TLG had previously developed inventory information for a boiler and turbine of similar size, fuel type and vintage, referred to as "reference unit", this information was used to represent the boiler / turbine systems inventory for the comparable Xcel Energy unit. In the same manner, non-steam power facilities were also used as reference units for other, similar Xcel Energy facilities. The inventory was adjusted to reflect the difference between the rating of the Xcel Energy reference unit and the rating of the comparable unit.

There are expected differences in other facilities, even if the power generating equipment are similar between comparable units. These include systems and structures associated with cooling water intake and discharge, fuel handling, exhaust gas, maintenance buildings and shops, pollution-control, and the quantity and extent of asbestos containing material (if applicable). For these systems and structures TLG developed the inventory by conducting a walk-down of the station, and extracting information from station-specific drawings and photos.

Comparable Plant Information Not Available to TLG Where the Xcel Energy unit(s) had no comparable match in the TLG database, the site specific inventory was developed "from scratch", by completing a physical walk-down of each such unit, discussions with the stations' Operations & Maintenance staff, and extracting data from station-specific maintenance databases (lists of equipment), drawings, and photos.

Economic Cost Drivers

In developing an estimate, the cost of labor, equipment and material, credit for scrap, and similar costs will influence the results of the estimate. The basis for the significant cost drivers are:

1. Craft labor rates are based on existing contracts with craft labor contractors. These rates were provided by Xcel Energy (Ref. 1).
2. Utility labor rates are based on current labor costs for positions likely to be employed during the dismantling project. These rates were provided by Xcel Energy (Ref. 2).
3. Material and equipment costs for conventional demolition and/or construction activities, Contractors Insurance, Small Tools Allowance, Permit / Fees, and Contractor's Fee are based on R.S. Means Construction Cost Data (Ref. 3).
4. Scrap metal prices are based on published indices (Ref. 4).
5. Contingency, contractor fee, contractor insurance, environmental sampling, and permits & fees are based upon R.S. Means Construction Cost Data.
6. Costs in this estimate are in 2014 dollars.
7. Property taxes (or payments in lieu of taxes) are not included within the estimate.
8. The estimate to dismantle the stations does not address credit associated with the residual value of the land.

Project Organization

For the purposes of this study, the dismantling project for each station is assumed to be managed by Xcel Energy's Project Director, who would have the primary responsibility for dismantling the station. A Dismantling Contractor, experienced in dismantling similar facilities, would be hired as the prime contractor for the removal of plant components and site facilities. The Dismantling Contractor's Project Manager would report to the Project Director. The Dismantling Contractor would manage and supervise the dismantling activities of the station and be responsible for completing the work in an expeditious and safe manner. Contractor personnel would manage and direct the labor force in accordance with approved procedures and in accordance with a health and safety program. The owner's staff would maintain and/or provide the engineering, safety, and environmental compliance oversight, and the security services necessary to support dismantling operations. Figures 3.1 and

3.2 identify typical organizations for the plant/utility staff and the associated contractor personnel during the dismantling phase of the project. The smaller facilities included within this estimate would have a commensurately smaller project organization (Angus Anson, Blue Lake, Grand Meadow, Granite City, Inver Hills, and Key City).

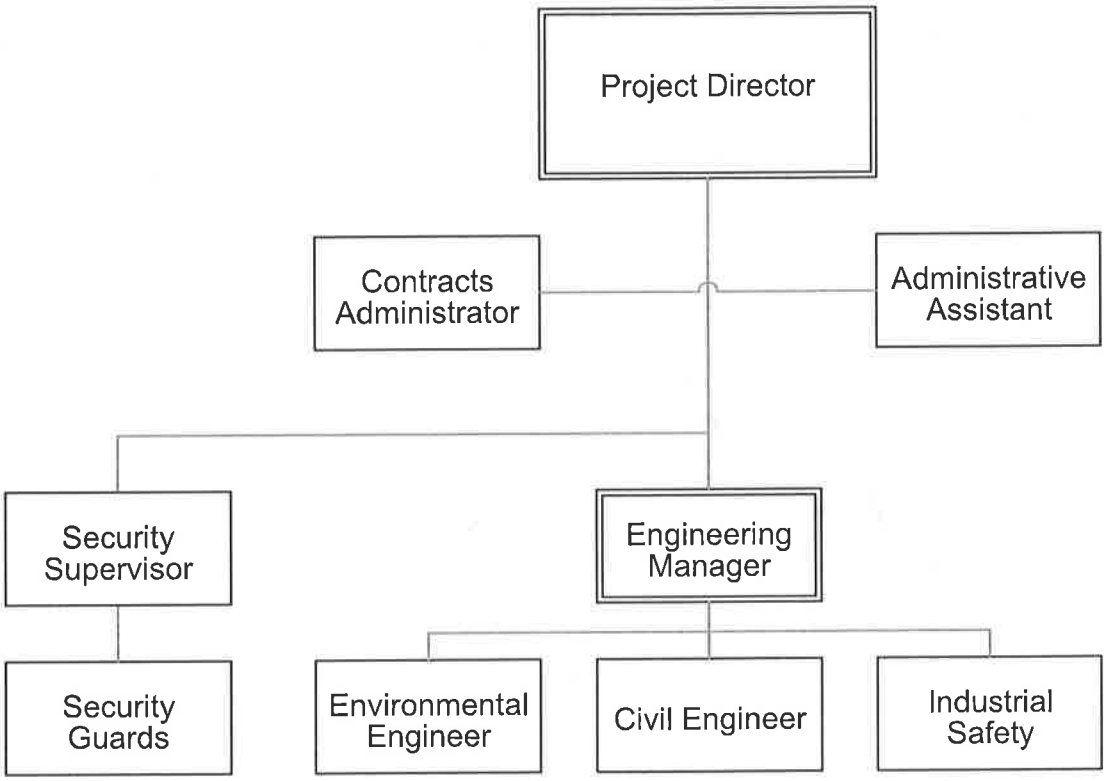
3.2 METHODOLOGY

The methodology used to develop the cost estimate follows the basic approach presented in the AIF/NESP-036, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates" (Ref. 5) and the US DOE "Decommissioning Handbook" (Ref. 6). These publications utilize a unit factor method for estimating decommissioning activity costs to simplify the estimating calculations. Unit cost factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/in) are developed from the labor cost information from R. S. Means. The activity-dependent costs are estimated using item quantities (cubic yards, tons, inches, etc.) developed from plant drawings and inventory documents. The unit factors used in this study reflect the latest available information on worker productivity in plant dismantling. A sample unit cost factor is provided in Appendix B. A list of unit cost factors is provided in Appendix C.

An activity duration critical path is developed to determine the total dismantling program schedule. This program schedule is then used to determine the period-dependent costs for program management, administration, field engineering, equipment rental, quality assurance, and security. TLG estimated typical salary and hourly rates for personnel associated with period-dependent costs. The costs for conventional demolition of structures, materials, backfill, landscaping, and equipment rental are obtained from R.S. Means. Examples of such unit factor development are presented in AIF/NESP-036.

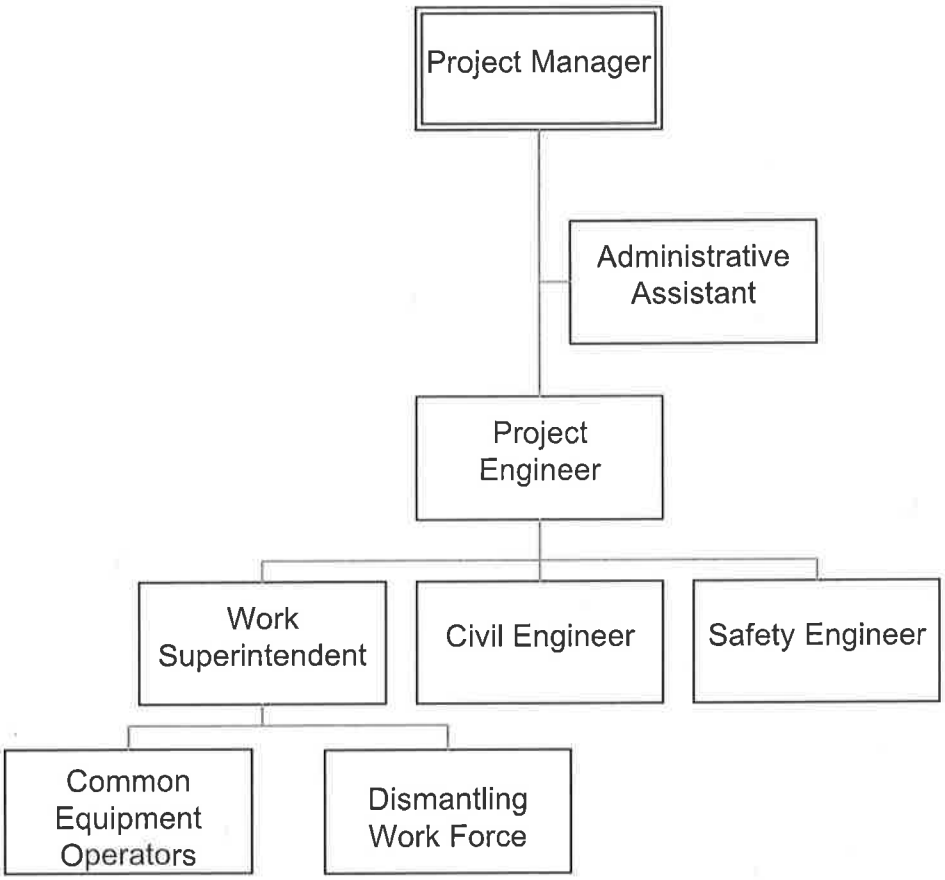
The unit cost factor method provides a demonstrable basis for establishing reliable cost estimates. The detail of activities for labor costs, equipment and consumables costs provide assurance that cost elements have not been omitted. Detailed unit cost factors, coupled with the site-specific inventory of piping, components and structures provide confidence in the cost estimates.

FIGURE 3.1
DISMANTLING PROJECT ORGANIZATION
UTILITY STAFF



For a large station such as Sherburne County, this represents a full-time equivalent staffing level of six personnel. This value is reduced for smaller stations.

FIGURE 3.2
DISMANTLING PROJECT ORGANIZATION
DECOMMISSIONING CONTRACTOR STAFF



For a large station such as Sherburne County, this represents a full-time equivalent staffing level of 11.5 personnel. This value is reduced for smaller stations.

The activity-dependent and period-dependent costs are combined with applicable collateral costs to yield the direct decommissioning cost. A contingency is then applied. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook" (Ref. 7) as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this estimate are based on ideal conditions; therefore, a contingency factor has been applied.

Examples of items that could occur but have not otherwise been accounted for in this estimate include: labor work stoppages, bad weather delays, equipment/tool breakage, changes in the anticipated plant shutdown conditions, etc. These types of unforeseeable events are discussed in the AIF/NESP-036 study. Guidelines are also provided for applying contingency.

3.3 ASSUMPTIONS

The following assumptions were used in developing the dismantling estimate.

Pre-requisite Activities

1. Dismantling of the station will not commence until all units are retired (cost estimate is not based on independent dismantling of units while adjacent units are operating).
2. The arrangements of the unit facilities as they exist in 2014 based upon walk-downs conducted by TLG, and databases and drawings provided by owner.
3. The dismantling process will be an engineered process with substantial consideration for occupational (worker) safety.
4. The demolition will be performed by a Dismantling Contractor who is responsible to provide adequate staff and equipment to complete the dismantling in a safe manner.
5. Site security costs to restrict access to the demolition project by unauthorized personnel are included.
6. The estimates are based on industrial safety and environmental regulations effective in 2014.
7. All power to the structures will be disconnected prior to beginning removal activities ("Cold and Dark"). The Decommissioning Contractor

will provide for temporary power as needed to support dismantling activities.

8. Ash ponds will be dewatered and closed after shutdown.
9. On-site fuel inventories will be used and/or removed prior to start of dismantling.
9. Silos, precipitators, hoppers, tanks, etc., will be emptied by operations and maintenance staff after shutdown.
10. Acids, caustics, and similar hazardous materials will be removed by operations and maintenance staff after shutdown.
11. Consumables, such as ion exchange materials and filters, will also be removed by operations and maintenance staff after shutdown.
12. Stores, spare parts, gas storage containers, laboratory equipment, office furniture, etc., will be removed by the owner after shutdown.
13. Oils used in station transformers are PCB-free. Lubricating and transformer oils are drained and removed by operations and maintenance staff after shutdown.
14. Asbestos (if present) will be removed prior to the start of dismantling. Asbestos insulation and PACM (presumed asbestos containing materials) will be disposed of at licensed facilities. Quantities of asbestos are based on owner-provided information where available. Where such information was not available, the quantities of asbestos were estimated.
15. Prior to initiating dismantling, essentially all live circuits will have been de-energized (to preclude creating an industrial hazard). If required, temporary services systems (air, water, electrical, fire water, etc.) will be used to support dismantling operations and will remain in service throughout the project until no longer required.

<u>Economic Assumptions</u>

16. Post-shutdown "dormancy" costs (i.e., security and maintenance on any of the units retired prematurely) are not included in the study.
17. Escalation/inflation of the costs over the remaining operating life is not included.
18 An allowance of 2% of craft labor costs is used for small tools.

19. A 12.5% fee is added to the Demolition Contractor's cost to account for its overhead and profit.
20. A 25% contingency is applied to asbestos remediation activities.
21. A 15% contingency is applied to all remaining dismantling-related costs.
22. An allowance has been included for post-dismantling environmental monitoring costs (where applicable).
23. A credit for scrap metal cost recovery is included in the estimates. Retired plant equipment is assumed to have no value as salvage (sold for re-use).

Physical Work Assumptions

24. The costs for disposition (if required) of contaminated soil (e.g., PCBs, hydrocarbons, lead, asbestos, mercury, acids or caustics) are outside the scope of this estimate.
25. Large equipment and components will be removed prior to structures demolition.
26. An environmental hazards crew will be maintained throughout the demolition period to address such items as lead paint and asbestos that was inaccessible during the asbestos remediation period (where applicable).
27. Turbine pedestals and powerhouse building foundations will be removed by controlled blasting and back-filled to grade.
28. Structures and foundations will be removed to a depth of three feet below grade, with any resulting voids back-filled to grade level.
29. Chimney stacks will be blasted to the ground and broken into rubble, the steel liners cut and removed, and the foundations control-blasted to break the concrete in place so that groundwater drainage is provided.
30. The dismantling of the electrical equipment terminates at the switch yard boundary. The switch yard is left intact.
31. Concrete rubble generated during dismantling will be crushed, reinforcing steel removed, and the concrete disposed of offsite as construction debris.
32. The site will be graded; however, no effort was included in this estimate to restore the original contour of the land. Ground cover will be established for erosion control.

33. Roads, parking lots, etc., are removed after the facility is dismantled (with the exception of the immediate area around the switchyard).

Scheduling Assumptions

34. All work is performed during an eight-hour workday, five days per week, with no overtime.
35. Multiple crews work parallel activities to the maximum extent possible, consistent with efficiency (adequate access for cutting, removal, and laydown space) and with industrial safety appropriate for demolition of heavy components and structures.
36. Scheduling was calculated without constraints on availability of labor, equipment, or materials.

3.4 STATION-SPECIFIC NOTES

3.4.1 Allen S. King

- All currently operational coal handling equipment and the abandoned-in-place coal barge unloader facility with the twenty-two dolphin-type barge piers are included in the estimate.
- A cofferdam will be installed to allow removal of the condenser cooling water discharge structure and the discharge structure from the cooling tower.
- The boiler and precipitator will be cleaned prior to dismantling.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.
- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM).
- The soil beneath the area of the coal pile will be removed to a depth of five feet; the soil will be disposed of offsite as hazardous material.
- The ash pond will be backfilled with clean fill prior to placement of the closure cap.

3.4.2 Angus Anson

- The Pathfinder Unit 1 building has been included in this estimate.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.
- Concrete will be removed to three feet below grade.
- Four large oil storage tanks are included in the estimate.

3.4.3 Black Dog

- The abandoned-in-place Unit 2 boiler and chimney, and the original Unit 3 chimney are included in the estimate.
- All currently operational coal handling equipment e.g. conveyors, rail car unloader, transfer towers, stacker conveyor etc. are included in the estimate.
- A cofferdam will be installed to remove the intake condenser cooling water structure.

3.4.4 Blue Lake

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- Two large oil storage tanks are included in the estimate. Cleaning of these tanks is included.

3.4.5 Grand Meadow Wind Farm

- All underground power and control cables will be excavated and removed.
- Tower foundations are completely removed.
- All access roads surfaces will be excavated and removed. The excavated areas will be back-filled with soil.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.6 Granite City

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- Two large oil storage tanks are included in the estimate. Cleaning of these tanks is included.

3.4.7 Hennepin Island

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- The estimate does not include dam or earthworks.
- Inlet channel to turbines will be backfilled.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.

3.4.8 High Bridge

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- A cofferdam will be installed to remove the river intake and discharge structure.

3.4.9 Inver Hills

- The oil storage facilities which include 3-ten million gallon oil storage tanks are included in this estimate. Cleaning of these tanks is included.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.10 Key City

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- Two large oil storage tanks are included in the estimate. Cleaning of these tanks is included.

3.4.11 Maplewood Gas Plant

- Facility includes multiple liquefied natural gas storage tanks.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.12 Minnesota Valley

- All three of the abandoned in-place units are included in the estimate.

- The asbestos quantities were calculated considering unit three to be all asbestos and Units 1 and 2 to only have small amounts on the partially dismantled boilers.
- A cofferdam will be installed to remove the river intake and discharge structure.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- The boiler and precipitator will be cleaned prior to dismantling.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.
- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM).
- The soil beneath the area of the coal pile will be removed to a depth of five feet; the soil will be disposed of offsite as hazardous material.
- The ash pond will be backfilled with clean fill prior to placement of the closure cap.

3.4.13 Nobles Wind Farm

- All underground power and control cables will be excavated and removed.
- Tower foundations are completely removed.
- All access roads surfaces will be excavated and removed. The excavated areas will be back-filled with soil.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.14 Red Wing

- The RDF unloading facility and the conveyor transport system are included in the estimate.
- A cofferdam will be installed to remove the cooling water intake and discharge structure.
- The barge unloading facility in not included in the estimate.
- The boiler and precipitator will be cleaned prior to dismantling.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.

- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM).

3.4.15 Riverside

- Included in this estimate are the following abandoned-in-place facilities and equipment:
    - Unit 6, 7 and 8 building structure
    - Unit 6 and 7 boilers
    - Unit 8 boiler, turbine and associated equipment
- Cofferdams will be installed to remove the four cooling water intake and discharge structures.
- Includes barge unloading dock and concrete piles.
- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM).

3.4.16 Sherburne County

- All coal handling facilities e.g. coal barn, rail car dumper building, coal yard control and maintenance facility, earthen storage berms, conveyor systems, transfer towers etc. are included in this estimate.
- All warehouse/storage type buildings on the site are included in the estimate.
- A cofferdam will be installed to remove the cooling water intake and discharge structure.
- The boiler and precipitator/baghouse will be cleaned prior to dismantling.
- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM) – Units 1 and 2 only.
- The soil beneath the area of the coal pile will be removed to a depth of five feet; the soil will be disposed of on site in the ash pond.
- The ash pond will be backfilled with coal yard soil prior to placement of the closure cap.
- Some of the planning for Sherburne County includes a unit shutdown with the other units remaining in operation for a number of years. In this event, the costs in Table 5.2p, for the shutdown unit only, should be increased by some fraction to allow for constraints on demolition activities on the shutdown with the other units operational. Based

upon discussions with Xcel Energy personnel, an increase of 20% can be used for planning purposes.

3.4.17 Sibley Gas Plant

- Facility includes multiple liquefied natural gas storage tanks.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.18 Wescott Gas Plant

- Facility includes two large insulated liquefied natural gas storage tanks, and two large propane storage tank.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.19 Wilmarth

- The RDF bulk storage facility is not included in the estimate. Only the transport section of the facility with conveyor systems and transfer towers.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- The boiler and precipitator will be cleaned prior to dismantling.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.
- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM).

4. SCRAP METAL CREDITS

The dismantling of a typical fossil plant occurs after a lengthy plant operating life. The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Xcel Energy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that buyers prefer equipment stripped down to very specific requirements before they would consider purchase. This can require expensive work to remove the equipment from its installed location, which is inconsistent with the rapid dismantling approach assumed in this estimate. Since placing a salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall cost of dismantling, this analysis does not attempt to quantify the value that an owner may realize based upon those efforts.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property is removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts are made available for alternative use.

The materials used in the equipment and buildings are suitable for recycle as scrap metals. As such, an estimated value of the scrap metal credit has been developed and applied to each station's cost estimate. The value of scrap was estimated using current market values extracted from published sources and applying this value to the estimated quantities of materials generated from the dismantling project. There were four basic types of metals used in the scrap estimates; carbon steel (the most common material used at the station), copper, stainless steel (high alloy steel) and aluminum. The scrap credit, in addition to considering the quantity and types of materials, also considered the cost of handling and transporting these materials to a major scrap processing location in the Twin Cities area where scrap is used or sold. The value of the scrap is reduced by the transportation costs.

The basis for scrap metal value is summarized in Table 4.1. A summary of the basis for the scrap credit is provided in Tables 4.2 which details the scrap quantities by material type from each unit, and Table 4.3 lists the dollar value of these quantities.

TABLE 4.1
BASIS FOR SCRAP METAL VALUE
(2014 dollars)

Type of Material	Scrap Category [1]	Market Value [2]	Units	Transport Cost [3]	Scrap Metal Credit [4] (per ton)
Carbon Steel	Cast Iron	269.76	Per Ton	41.10	228.67
	No. 1	337.21	Per Ton	41.10	296.11
	Mixed Scrap	269.77	Per Ton	41.10	228.67
	Galvanized	70.24	Per Ton	41.10	0.00
Stainless Steel	SS-1	1.03	Per Pound	0.02	2,015.97
Copper	Insulated Cable	1.75	Per Pound	0.02	3,448.92
	No. 2 Copper	2.79	Per Pound	0.02	5,543.60
	Copper-Nickel	5.12	Per Pound	0.02	10,203.41
	Large Motor	0.42	Per Pound	0.02	796.51
Non-Ferrous	Aluminum	0.33	Per Pound	0.02	613.31

Note 1: Scrap categories are consistent with information provided in Recycler's World

Note 2: The market value for scrap metal used in this estimate is based on Recycler's World U.S. Scrap Metal Index Spot Market Prices. Values shown represent the average over a 5-year period from January 1, 2010 to December 31, 2014.

Note 3: The estimated cost for handling and transporting the materials to a major scrap processing center in the Twin Cities area is $41.10 / ton or $0.021 / pound.

Note 4: The scrap metal credit reflects the market value of scrap adjusted for handling and transport cost to local scrap metal recycler.

TABLE 4.2
QUANTITY OF SCRAP METALS BY STATION
(pounds)

	Carbon Steel			Stainless Steel	Galvanized	Copper			Copper		
Station Name	**Cast Iron**	**No. 1**	**Mixed Scrap**	**SS-1**	**Steel**	**Insul Cbl**	**No. 2 Cu**	**Large Mtr**	**Nickel**	**Aluminum**	**Total**
Allen S . King	2,976,846	41,253,822	53,751,220	231,075	1,010,675	157,197	590,394	1,816,821	515,763	-	102,303,814
Angus Anson	944,532	7,869,287	10,367,485	366,129	262,382	62,845	555,614	235,889	90,000	-	20,754,163
Black Dog	2,434,233	30,461,484	52,799,508	990,598	1,025,647	270,288	459,962	2,588,984	365,615	-	91,396,320
Blue Lake	562,895	7,151,454	16,794,779	471,749	151,311	66,137	534,704	167,052	-	-	25,900,081
Grand Meadow	-	3,819,000	25,238,012	-	-	-	398,519	-	-	1,562,880	31,018,411
Granite City	415,622	1,347,785	3,827,752	14,999	123,454	19,672	117,956	37,557	-	-	5,904,796
Hennepin Island	-	696,327	1,821,010	1,204	32,320	17,700	44,413	-	-	-	2,612,973
High Bridge	844,602	11,853,600	18,671,353	312,326	572,357	113,539	661,690	1,016,734	-	-	34,046,202
Inver Hills	203,824	4,123,874	17,462,898	911,580	66,005	-	537,241	6,408	-	-	23,311,831
Key City	415,622	1,000,333	3,795,209	14,999	123,454	19,672	107,108	37,557	-	-	5,513,953
Maplewood	55,689	2,277,558	514,983	109,319	31,504	6,904	16,564	374	-	-	3,012,895
Minnesota Valley	638,559	13,635,046	21,078,078	554,769	397,131	68,843	241,331	1,395,489	294,202	-	38,303,448
Nobles Wind Farm	-	7,638,000	50,476,023	-	-	-	797,039	-	-	3,125,760	62,036,822
Redwing	269,371	5,792,041	7,537,990	459,747	242,290	29,016	21,797	235,896	34,301	-	14,622,450
Riverside	717,166	26,334,947	48,412,618	275,384	437,669	61,010	596,359	1,432,370	-	-	78,267,523
Sherco	4,008,245	133,744,558	185,765,812	2,132,542	3,718,089	836,673	893,799	5,411,303	-	103	336,511,124
Sibley	53,710	1,828,422	373,174	103,107	43,503	6,703	13,829	7,250	-	-	2,429,699
Wescott	55,399	10,536,504	1,806,381	233,361	74,887	33,887	12,231	2,591	-	1,826,475	14,581,717
Wilmarth	303,646	5,170,263	7,265,649	153,131	168,520	29,016	21,797	235,896	80,000	-	13,427,919
Total	**14,899,962**	**316,534,305**	**527,759,936**	**7,336,019**	**8,481,199**	**1,799,103**	**6,622,348**	**14,628,171**	**1,379,881**	**6,515,217**	**905,956,140**

TABLE 4.3
SCRAP METAL CREDITS BY STATION
(thousands of 2014 dollars)

	Carbon Steel			Stainless Steel	Galvanized	Copper			Copper		
Station Name	**Cast Iron**	**No. 1**	**Mixed Scrap**	**SS-1**	**Steel**	**Insul Cbl**	**No. 2 Cu**	**Large Mtr**	**Nickel**	**Aluminum**	**Total**
Allen S . King	$ 340	$ 6,108	$ 6,146	$ 233	$ 0	$ 271	$ 1,636	$ 724	$ 2,631	$ -	$ 18,089
Angus Anson	$ 108	$ 1,165	$ 1,185	$ 369	$ 0	$ 108	$ 1,540	$ 94	$ 459	$ -	$ 5,029
Black Dog	$ 278	$ 4,510	$ 6,037	$ 999	$ 0	$ 466	$ 1,275	$ 1,031	$ 1,865	$ -	$ 16,461
Blue Lake	$ 64	$ 1,059	$ 1,920	$ 476	$ 0	$ 114	$ 1,482	$ 67	$ -	$ -	$ 5,182
Grand Meadow	$ -	$ 565	$ 2,886	$ -	$ -	$ -	$ 1,105	$ -	$ -	$ 479	$ 5,035
Granite City	$ 48	$ 200	$ 438	$ 15	$ 0	$ 34	$ 327	$ 15	$ -	$ -	$ 1,076
Hennepin Island	$ -	$ 103	$ 208	$ 1	$ 0	$ 31	$ 123	$ -	$ -	$ -	$ 466
High Bridge	$ 97	$ 1,755	$ 2,135	$ 315	$ 0	$ 196	$ 1,834	$ 405	$ -	$ -	$ 6,736
Inver Hills	$ 23	$ 611	$ 1,997	$ 919	$ 0	$ -	$ 1,489	$ 3	$ -	$ -	$ 5,041
Key City	$ 48	$ 148	$ 434	$ 15	$ 0	$ 34	$ 297	$ 15	$ -	$ -	$ 990
Maplewood	$ 6	$ 337	$ 59	$ 110	$ 0	$ 12	$ 46	$ 0	$ -	$ -	$ 571
Minnesota Valley	$ 73	$ 2,019	$ 2,410	$ 559	$ 0	$ 119	$ 669	$ 556	$ 1,501	$ -	$ 7,905
Nobles Wind Farm	$ -	$ 1,131	$ 5,771	$ -	$ -	$ -	$ 2,209	$ -	$ -	$ 959	$ 10,070
Redwing	$ 31	$ 858	$ 862	$ 463	$ 0	$ 50	$ 60	$ 94	$ 175	$ -	$ 2,593
Riverside	$ 82	$ 3,899	$ 5,535	$ 278	$ 0	$ 105	$ 1,653	$ 570	$ -	$ -	$ 12,123
Sherco	$ 458	$ 19,802	$ 21,240	$ 2,150	$ 0	$ 1,443	$ 2,477	$ 2,155	$ -	$ 0	$ 49,724
Sibley	$ 6	$ 271	$ 43	$ 104	$ 0	$ 12	$ 38	$ 3	$ -	$ -	$ 476
Wescott	$ 6	$ 1,560	$ 207	$ 235	$ 0	$ 58	$ 34	$ 1	$ -	$ 560	$ 2,662
Wilmarth	$ 35	$ 765	$ 831	$ 154	$ 0	$ 50	$ 60	$ 94	$ 408	$ -	$ 2,398
Total	**$ 1,704**	**$ 46,864**	**$ 60,341**	**$ 7,395**	**$ 0**	**$ 3,102**	**$ 18,356**	**$ 5,826**	**$ 7,040**	**$ 1,998**	**$ 152,626**

5. RESULTS

An estimate for dismantling each of the Xcel Energy fossil-fuel and wind farm generating stations in Minnesota and South Dakota was developed by applying the system and structures inventories against the associated unit cost factors and accounting for program support costs. A summary of each station's major cost categories is presented in Table 5.1. Breakdowns of the major cost categories by unit and common facilities are provided in Tables 5.2a through s. Note that columns may not total due to rounding.

The following is an explanation of the contents of each line item in these tables:

Station Unit Rating (MWe) – This is the nominal electrical rating of each unit at the station. In Table 5.1 this represents the sum of all units on site.

Characterization / Temporary Services – The cost associated with performing a hazardous materials survey of the site prior to beginning field activities. Includes costs associated with de-energizing systems and isolation of the electrical systems in the buildings scheduled for dismantling. Costs for installing temporary services to support the dismantling are also included.

Worker Access – The cost associated with providing safe access to areas of the station being dismantled.

Pre-Demolition Cleaning (Boiler / Precipitator / Tanks) – The cost associated with cleaning coal-fired boilers and precipitators / baghouses, and associated flue-gas emission control systems. This line item also includes costs to clean acid and caustic storage tanks.

Asbestos / Lead Paint Remediation– The cost associated with remediating asbestos from the station prior to initiating dismantling activities. It should be noted that dismantling can proceed much more efficiently if asbestos containing materials have been removed. This line item also includes lead paint abatement from concrete surfaces in the buildings.

Equipment Removal – The cost associated with removing all station equipment (piping, valves, heat exchangers, tanks, electrical equipment, etc.).

Boiler(s) – The cost associated with removing the boiler.

Structures Demolition – The cost associated with demolishing the buildings and concrete foundations (to three feet below grade).

Backfill / Grade / Landscaping / Well Closure – The cost associated with backfilling below grade voids, and grading and landscaping the grounds to preclude erosion of soils. This line item also includes costs to seal groundwater monitoring wells.

Coal Yard Closure – The cost associated with removal and disposal of soil waste beneath the footprint of the coal field, and backfilling the void.

Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds / Ash Pond Dewatering – The cost associated with closure of the ponds on site, including placement of a cap on the pond(s) after backfilling.

Utility Management / Oversight – The staff directly assigned to manage the dismantling project, including planning, execution, oversight, and restoration.

Demolition Contractor Mgmt. / Super. / Safety Staff – The contractor's staff assigned to manage, engineer, and supervise the dismantling project, including site safety personnel.

Security – Personnel assigned to control access to the dismantling site.

Property Taxes – Not included in this estimate.

The following six items, grouped as Project Expenses, are calculated on a station basis, but are apportioned among the generating units on site by a ratio of the craft labor hours for each generating unit.

> *Shared Heavy Equipment / Operating Engineers* – The cost for renting / operating equipment in general use throughout the dismantling project (cranes, trucks, forklifts, front-end loaders, etc.).
>
> *Small Tool Allowance* – The cost for procuring small tools; this is consistent with R.S. Means 2014 Item 01 54 39.70-0100.
>
> *Utilities Allowance (Office Equip & Supplies / Telephone, Electric etc.)* – The cost for procuring utility services and office supplies in support of the field office for the utility management and demolition contractor staffs.
>
> *Permits* – The cost of obtaining permits; this is consistent with R.S. Means 2014 Item 01 41 26.50.

Demolition Contractors Insurance – The cost of the demolition contractors insurance; the value is consistent with the R.S. Means 2014 Item 01 31 13.30, lines 0020, 0200, and 0600.

Demolition Contractors Fee – A fee applied to contractor activities; this represents the Contractors overhead and profit payment for the project and is consistent with R.S. Means 2014 Item 01 31 13.80 lines 0350, 0400 and 0450.

Contingency – The cost to cover expenses for unforeseen events that are likely to occur. The estimate assumes 25% [consistent with TLG's experience for similarly highly regulated activities in the nuclear industry) for the asbestos remediation work, and 15% for all other project activities, consistent with the R.S. Means 2014 Item 01 21 16.50 lines 0050 and 0100.

Scrap Credit – A credit to the project for the recovery of scrap metals. This corresponds to value shown in Table 4.3.

The following is an explanation of the contents of each column in the 5.2 Tables:

Unit – Costs directly attributed to the physical work associated with dismantling a generating unit.

Common – Costs directly attributed to the physical work associated with dismantling facilities shared by more than one unit.

Station – Costs associated with supporting the physical dismantling work for a station.

Station Total – The summation of all Unit columns, plus Common and Station columns.

This study provides an estimate for dismantling under current requirements, based on present-day costs and available technology. As inputs to the cost model change over time, such as labor rates, equipment costs, scrap metal value, etc., this cost estimate should be reviewed and updated to reflect these changes.

TABLE 5.1
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities (Costs)	Allen S. King	Angus Anson	Black Dog	Blue Lake	Grand Meadow	Granite City	Hennepin Island	High Bridge	Inver Hills	Key City	Maplewood	Minnesota Valley	Nobles Wind Farm	Redwing	Riverside	Sherco	Sibley	Wescott	Wilmarth	Fleet Totals
Station Rating (MWe)	588	381	538	510	101	72	14	570	360	72	0	64	201	20	830	2400	0	0	20	6741
Characterization / Temporary Services	310,861	267,194	796,583	295,861	253,600	212,861	211,861	408,861	235,194	212,861	113,431	464,722	284,061	419,722	918,583	1,005,583	113,431	201,861	420,000	7,147,133
Worker Access	536,770	-	1,109,121	-	-	-	-	-	-	-	-	159,201	-	104,997	-	1,691,955	-	-	104,997	3,707,041
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	1,080,300	320,000	1,080,900	160,000	-	160,000		-	582,500	160,000	-	500,900	-	515,600	526,800	3,243,150	-	-	515,600	8,845,750
Asbestos / Lead Paint Remediation	3,899,121	128,672	5,752,025	-	-	-	131,195	-	-	-	-	3,374,329	-	1,402,685	2,996,105	4,730,768	-	-	1,402,685	23,817,585
Equipment Removal	8,149,644	4,819,480	8,243,133	5,082,832	1,510,171	750,276	272,182	3,940,502	3,878,294	750,276	1,172,429	2,501,705	3,020,341	1,740,926	3,627,608	26,087,184	972,121	5,176,749	1,495,966	83,201,821
Boiler(s)	3,047,244	-	4,359,237	-	-	-	-	-	-	-	-	1,019,305	-	460,726	2,344,537	11,403,411	-	-	736,735	23,371,195
Structures Demolition	12,359,547	1,832,319	7,113,517	2,638,766	4,760,405	894,248	1,585,150	4,263,507	2,601,870	751,462	114,455	4,544,261	9,520,809	2,466,813	9,362,586	34,509,486	82,946	1,006,271	2,010,809	102,419,229
Backfill / Grade / Landscaping / Well Closure	3,536,523	1,168,248	2,711,115	1,437,390	6,348,648	357,297	797,889	1,654,627	1,245,629	229,004	147,923	1,571,641	12,709,304	1,051,803	2,347,747	9,439,558	151,177	927,486	769,206	48,602,215
Coal Yard Closure	9,402,791	-	-	-	-	-	-	-	-	-	-	1,875,000	-	-	-	7,250,000	-	-	-	18,527,791
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds / Ash Pond Dewatering	2,496,967	-	3,315,000	-	-	-	-	-	-	-	-	-	-	2,208,615	-	35,271,338	-	-	1,310,464	44,602,384
Utility Management / Oversight	2,916,915	907,029	3,465,413	1,520,797	2,041,297	757,105	763,130	1,561,889	1,297,074	752,268	836,153	1,903,079	1,185,115	1,075,850	3,360,001	3,723,229	807,886	974,737	1,075,850	30,924,819
Demolition Contractor Mgmt / Super. / Safety Staff	3,274,705	777,319	4,595,219	1,381,178	2,519,614	439,332	376,197	1,471,055	891,851	428,430	483,054	1,936,531	1,404,229	997,570	4,233,101	5,421,101	441,690	929,958	997,570	32,999,700
Security	686,045	173,645	898,515	174,772	303,314	103,736	135,307	184,920	119,522	101,481	170,262	262,722	303,314	240,171	854,997	1,003,469	156,731	205,216	240,171	6,318,309
Property Taxes	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	3,321,555	931,723	4,767,615	1,508,421	2,766,361	519,346	705,581	1,607,732	967,728	506,043	911,769	2,084,313	1,696,617	1,253,672	4,339,134	5,732,502	831,954	1,117,958	1,253,672	36,823,697
Small Tool Allowance	631,257	158,781	589,083	185,560	259,456	40,756	56,428	199,813	155,683	35,335	29,196	263,629	507,153	143,879	384,032	1,764,947	24,625	142,710	129,728	5,696,052
Utilities Allowance	52,019	29,891	68,129	30,086	52,213	17,857	23,292	31,832	20,575	17,469	29,309	45,225	52,213	41,343	64,829	76,087	26,980	35,326	41,343	756,020
Permits	651,241	130,420	556,258	159,001	230,806	42,400	51,997	169,724	132,242	38,636	37,520	254,260	364,934	160,104	389,313	1,845,463	33,062	119,229	139,860	5,506,470
Demolition Contractors Insurance	1,532,403	306,886	1,308,904	374,138	543,098	99,769	122,352	399,369	311,171	90,912	88,285	598,285	858,708	376,734	916,074	4,342,468	77,795	280,552	329,097	12,957,000
Demolition Contractors Fee	6,376,031	1,261,702	5,221,327	1,484,007	2,089,845	386,851	494,741	1,584,196	1,266,361	349,000	330,540	2,407,097	3,626,768	1,543,452	3,527,169	18,550,488	289,261	1,126,018	1,332,520	53,247,673
Sub-Total	64,261,940	13,213,309	55,951,093	16,432,808	23,672,826	4,781,835	5,727,302	17,478,328	13,705,892	4,423,177	4,464,327	25,766,207	35,533,566	16,204,663	40,192,617	177,102,187	4,009,660	12,244,072	14,306,272	549,471,882
Contingency	10,029,203	1,994,864	8,967,866	2,464,921	3,550,924	717,275	872,215	2,621,749	2,055,854	663,476	669,649	4,202,364	5,330,035	2,570,968	6,328,503	27,038,405	601,449	1,836,611	2,286,209	84,802,541
Project Total (before scrap credit)	74,291,143	15,208,173	64,918,959	18,897,730	27,223,750	5,499,110	6,599,517	20,100,078	15,761,546	5,086,653	5,133,975	29,968,571	40,863,601	18,775,631	46,521,121	204,140,592	4,611,109	14,080,683	16,592,482	634,274,423
Scrap Credit	(18,089,125)	(5,029,021)	(16,460,995)	(5,181,586)	(5,034,891)	(1,075,661)	(466,139)	(6,735,948)	(5,041,021)	(990,431)	(570,610)	(7,905,236)	(10,069,782)	(2,593,006)	(12,122,503)	(49,724,362)	(476,224)	(2,661,541)	(2,397,811)	(152,625,894)
Project Total	56,202,018	10,179,152	48,457,964	13,716,144	22,188,859	4,423,449	6,133,378	13,364,130	10,720,525	4,096,222	4,563,365	22,063,335	30,793,819	16,182,625	34,398,617	154,416,230	4,134,885	11,419,141	14,194,671	481,648,529

TABLE 5.2a

ALLEN S. KING STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Common	Station	Station Total
Allen S . King Unit Rating (MWe)	588	588		
Characterization / Temporary Services	134,000	-	176,861	310,861
Worker Access	536,770	-		536,770
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	1,000,300	80,000		1,080,300
Asbestos / Lead Paint Remediation	3,899,121	-		3,899,121
Equipment Removal	6,718,423	1,431,220		8,149,644
Boiler(s)	3,047,244	-		3,047,244
Structures Demolition	9,927,726	2,431,822		12,359,547
Backfill / Grade / Landscaping / Well Closure	2,511,069	925,454	100,000	3,536,523
Coal Yard Closure		9,402,791		9,402,791
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds		2,496,967		2,496,967
Utility Management / Oversight			2,916,915	2,916,915
Demolition Contractor Management / Supervisory / Safety Staff			3,274,705	3,274,705
Security			686,045	686,045
Property Taxes	-	-	-	0
Project Expenses				
Shared Heavy Equipment / Operating Engineers			3,321,555	3,321,555
Small Tool Allowance	535,487	95,770	n/a	631,257
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)			52,019	52,019
Permits			651,241	651,241
Demolition Contractors Insurance			1,532,403	1,532,403
Demolition Contractors Fee			6,376,031	6,376,031
Sub-Total				64,261,940
Contingency				10,029,203
Project Total (before scrap credit)				74,291,143
Scrap Credit	(16,349,511)	(1,739,614)	-	(18,089,125)
Project Total				56,202,018

TABLE 5.2b

ANGUS ANSON STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Common	Station	Station Total
Angus Anson Unit Rating (MWe)	0	106	110	165	381		
Characterization / Temporary Services	25,000	20,333	20,667	24,333	-	176,861	267,194
Pre-Demolition Cleaning (Tanks)	-	-	-	-	320,000		320,000
Lead Paint Remediation	128,672	-	-	-	-		128,672
Equipment Removal	2,259,688	505,332	507,846	1,255,090	291,524		4,819,480
Structures Demolition	1,102,072	166,515	169,628	332,919	61,186		1,832,319
Backfill / Grade / Landscaping / Well Closure	226,806	70,677	111,262	475,490	184,013	100,000	1,168,248
Utility Management / Oversight						907,029	907,029
Demolition Contractor Management / Supervisory / Safety Staff						777,319	777,319
Security						173,645	173,645
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						931,723	931,723
Small Tool Allowance	74,845	15,257	16,188	41,757	10,734	n/a	158,781
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						29,891	29,891
Permits						130,420	130,420
Demolition Contractors Insurance						306,886	306,886
Demolition Contractors Fee						1,261,702	1,261,702
Sub-Total							13,213,309
Contingency							1,994,864
Project Total (before scrap credit)							15,208,173
Scrap Credit	(2,024,367)	(754,277)	(765,087)	(1,367,322)	(117,968)	-	(5,029,021)
Project Total							10,179,152

TABLE 5.2c

BLACK DOG STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 2	Unit 3	Unit 4	Unit 5	Common	Station	Station Total
Black Dog Unit Rating (MWe)	98	108	170	162	538		
Characterization / Temporary Services	59,000	61,000	74,000	72,000	-	530,583	796,583
Worker Access	329,423	345,822	433,876	-	-		1,109,121
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	333,633	333,633	333,633	-	80,000		1,080,900
Asbestos Remediation	1,886,017	1,898,180	1,962,994	-	4,833		5,752,025
Equipment Removal	1,961,219	1,963,405	2,380,890	1,168,331	769,288		8,243,133
Boiler(s)	1,550,318	1,244,399	1,415,698	148,822	-		4,359,237
Structures Demolition	952,825	1,412,127	2,054,476	1,220,545	1,473,544		7,113,517
Backfill / Grade / Landscaping / Well Closure	410,734	431,181	755,977	191,102	822,121	100,000	2,711,115
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds					3,315,000		3,315,000
Utility Management / Oversight						3,465,413	3,465,413
Demolition Contractor Management / Supervisory / Safety Staff						4,595,219	4,595,219
Security						898,515	898,515
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						4,767,615	4,767,615
Small Tool Allowance	142,991	147,122	181,558	56,016	61,396	n/a	589,083
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						68,129	68,129
Permits						556,258	556,258
Demolition Contractors Insurance						1,308,904	1,308,904
Demolition Contractors Fee						5,221,327	5,221,327
Sub-Total							55,951,093
Contingency							8,967,866
Project Total (before scrap credit)							64,918,959
Scrap Credit	(3,562,849)	(4,328,957)	(5,885,729)	(1,861,776)	(821,684)	-	(16,460,995)
Project Total							48,457,964

TABLE 5.2d

BLUE LAKE STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

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
Pre-Demolition Cleaning (Tanks)	-	-	-	-	-	-	160,000		160,000
Equipment Removal	486,837	486,837	486,837	486,837	1,258,778	1,258,778	617,926		5,082,832
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
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

TABLE 5.2e

GRAND MEADOW STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit, each (typ. of 67)	Common	Station	Station Total
Grand Meadow Unit Rating (MWe)	1.5	100.5		
Characterization / Temporary Services	800	-	200,000	253,600
Equipment Removal	22,540	-		1,510,171
Structures Demolition	71,051	-		4,760,405
Backfill / Grade / Landscaping	29,932	4,343,212	-	6,348,648
Utility Management / Oversight			2,041,297	2,041,297
Demolition Contractor Management / Supervisory / Safety Staff			2,519,614	2,519,614
Security			303,314	303,314
Property Taxes	-	-	-	0
Project Expenses				
Shared Heavy Equipment / Operating Engineers			2,766,361	2,766,361
Small Tool Allowance	2,486	86,864	n/a	253,456
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)			52,213	52,213
Permits			230,806	230,806
Demolition Contractors Insurance			543,098	543,098
Demolition Contractors Fee			2,089,845	2,089,845
Sub-Total				23,672,826
Contingency				3,550,924
Project Total (before scrap credit)				27,223,750
Scrap Credit	(51,830)	(1,562,263)	-	(5,034,891)
Project Total				22,188,859

TABLE 5.2f

GRANITE CITY STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Common	Station	Station Total
Granite City Unit Rating (MWe)	18	18	18	18	72		
Characterization / Temporary Services	9,000	9,000	9,000	9,000	-	176,861	212,861
Pre-Demolition Cleaning (Tanks)	-	-	-	-	160,000		160,000
Equipment Removal	187,569	187,569	187,569	187,569	-		750,276
Structures Demolition	138,680	138,680	138,680	138,680	339,530		894,248
Backfill / Grade / Landscaping	77,363	77,363	77,363	77,363	47,847	-	357,297
Utility Management / Oversight						757,105	757,105
Demolition Contractor Management / Supervisory / Safety Staff						439,332	439,332
Security						103,736	103,736
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						519,346	519,346
Small Tool Allowance	8,252	8,252	8,252	8,252	7,748	n/a	40,756
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						17,857	17,857
Permits						42,400	42,400
Demolition Contractors Insurance						99,769	99,769
Demolition Contractors Fee						386,851	386,851
Sub-Total							4,781,835
Contingency							717,275
Project Total (before scrap credit)							5,499,110
Scrap Credit	(223,217)	(223,217)	(223,217)	(223,217)	(182,793)	-	(1,075,661)
Project Total							4,423,449

TABLE 5.2g

HENNEPIN ISLAND STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1-5	Station	Station Total
Hennepin Island Unit Rating (MWe)	14		
Characterization / Temporary Services	35,000	176,861	211,861
Lead Paint Remediation	131,195		131,195
Equipment Removal	272,182		272,182
Structures Demolition	1,585,150		1,585,150
Grade / Landscaping	797,889	-	797,889
Utility Management / Oversight		763,130	763,130
Demolition Contractor Management / Supervisory / Safety Sta		376,197	376,197
Security		135,307	135,307
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		705,581	705,581
Small Tool Allowance	56,428	n/a	56,428
Utilities Allowance (Office Equip & supplies / Telephone, Elec		23,292	23,292
Permits		51,997	51,997
Demolition Contractors Insurance		122,352	122,352
Demolition Contractors Fee		494,741	494,741
Sub-Total			5,727,302
Contingency			872,215
Project Total (before scrap credit)			6,599,517
Scrap Credit	(466,139)	-	(466,139)
Project Total			6,133,379

TABLE 5.2h

HIGH BRIDGE STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Common	Station	Station Total
High Bridge Unit Rating (MWe)	160	160	250	570		
Characterization / Temporary Services	72,000	72,000	88,000	-	176,861	408,861
Equipment Removal	1,191,232	1,191,232	1,244,020	314,018		3,940,502
Structures Demolition	1,016,413	1,016,413	1,702,241	528,440		4,263,507
Backfill / Grade / Landscaping / Well Closure	309,658	309,658	754,653	180,659	100,000	1,654,627
Utility Management / Oversight					1,561,889	1,561,889
Demolition Contractor Management / Supervisory / Safety Staff					1,471,055	1,471,055
Security					184,920	184,920
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers					1,607,732	1,607,732
Small Tool Allowance	51,786	51,786	75,778	20,462	n/a	199,813
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					31,832	31,832
Permits					169,724	169,724
Demolition Contractors Insurance					399,369	399,369
Demolition Contractors Fee					1,584,496	1,584,496
Sub-Total						17,478,328
Contingency						2,621,749
Project Total (before scrap credit)						20,100,078
Scrap Credit	(1,997,606)	(1,997,606)	(2,575,061)	(165,674)	-	(6,735,948)
Project Total						13,364,130

TABLE 5.2i

INVER HILLS STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Common	Station	Station Total
Inver Hills Unit Rating (MWe)	60	60	60	60	60	60	360		
Characterization / Temporary Services	8,333	8,333	8,333	8,333	8,333	8,333	8,333	176,861	235,194
Pre-Demolition Cleaning (Tanks)	-	-	-	-	-	-	582,500		582,500
Equipment Removal	598,620	598,620	598,620	598,620	598,620	598,620	286,573		3,878,294
Structures Demolition	226,898	226,898	226,898	226,898	226,898	226,898	1,240,483		2,601,870
Backfill / Grade / Landscaping	177,312	177,312	177,312	177,312	177,312	177,312	181,756	-	1,245,629
Utility Management / Oversight								1,297,074	1,297,074
Demolition Contractor Management / Supervisory / Safety Staff								891,851	891,851
Security								119,522	119,522
Property Taxes	-	-	-	-	-	-	-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers								967,728	967,728
Small Tool Allowance	20,223	20,223	20,223	20,223	20,223	20,223	34,343	n/a	155,683
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								20,575	20,575
Permits								132,242	132,242
Demolition Contractors Insurance								311,171	311,171
Demolition Contractors Fee								1,266,361	1,266,361
Sub-Total									13,705,692
Contingency									2,055,854
Project Total (before scrap credit)									15,761,546
Scrap Credit	(718,958)	(718,958)	(718,958)	(718,958)	(718,958)	(718,958)	(727,272)	-	(5,041,021)
Project Total									10,720,525

TABLE 5.2j

KEY CITY STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Common	Station	Station Total
Key City Unit Rating (MWe)	18	18	18	18	72		
Characterization / Temporary Services	9,000	9,000	9,000	9,000	-	176,861	212,861
Pre-Demolition Cleaning (Tanks)	-	-	-	-	160,000		160,000
Equipment Removal	187,569	187,569	187,569	187,569	-		750,276
Structures Demolition	104,981	104,981	104,981	104,981	331,538		751,462
Backfill / Grade / Landscaping	47,274	47,274	47,274	47,274	39,908	-	229,004
Utility Management / Oversight						752,268	752,268
Demolition Contractor Management / Supervisory / Safety Staff						428,430	428,430
Security						101,481	101,481
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						506,043	506,043
Small Tool Allowance	6,976	6,976	6,976	6,976	7,429	n/a	35,335
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						17,469	17,469
Permits						38,636	38,636
Demolition Contractors Insurance						90,912	90,912
Demolition Contractors Fee						349,000	349,000
Sub-Total							4,423,177
Contingency							663,476
Project Total (before scrap credit)							5,086,653
Scrap Credit	(202,629)	(202,629)	(202,629)	(202,629)	(179,914)	-	(990,431)
Project Total							4,096,222

TABLE 5.2k

MAPLEWOOD GAS PLANT
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Station	Station Total
Maplewood Unit Rating (MWe)	0		
Characterization / Temporary Services	25,000	88,431	113,431
Equipment Removal	1,172,429		1,172,429
Structures Demolition	114,455		114,455
Grade / Landscaping	147,923	-	147,923
Utility Management / Oversight		836,153	836,153
Demolition Contractor Management / Supervisory / Safety Staff		483,054	483,054
Security		170,262	170,262
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		911,769	911,769
Small Tool Allowance	29,196	n/a	29,196
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)		29,309	29,309
Permits		37,520	37,520
Demolition Contractors Insurance		88,285	88,285
Demolition Contractors Fee		330,540	330,540
Sub-Total			4,464,327
Contingency			669,649
Project Total (before scrap credit)			5,133,975
Scrap Credit	(570,610)	-	(570,610)
Project Total			4,563,365

TABLE 5.21

MINNESOTA VALLEY STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Common	Station	Station Total
Minnesota Valley Unit Rating (MWe)	10	10	44	64		
Characterization / Temporary Services	33,000	33,000	45,000		353,722	464,722
Worker Access	-	-	159,201	-		159,201
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	166,967	166,967	166,967	-		500,900
Asbestos / Lead Paint Remediation	111,145	111,145	3,152,039	-		3,374,329
Equipment Removal	304,032	304,032	1,847,506	46,137		2,501,705
Boiler(s)	218,193	218,193	582,920	-		1,019,305
Structures Demolition	1,064,150	1,064,150	2,083,452	332,510		4,544,261
Backfill / Grade / Landscaping / Well Closure	393,366	393,366	376,342	308,567	100,000	1,571,641
Coal Yard Closure				1,875,000		1,875,000
Utility Management / Oversight					1,903,079	1,903,079
Demolition Contractor Management / Supervisory / Safety Staff					1,936,531	1,936,531
Security					262,722	262,722
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers					2,084,313	2,084,313
Small Tool Allowance	42,478	42,478	164,929	13,744	n/a	263,629
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					45,225	45,225
Permits					254,260	254,260
Demolition Contractors Insurance					598,285	598,285
Demolition Contractors Fee					2,407,097	2,407,097
Sub-Total						25,766,207
Contingency						4,202,364
Project Total (before scrap credit)						29,968,571
Scrap Credit	(1,769,960)	(1,769,960)	(4,162,973)	(202,342)	-	(7,905,236)
Project Total						22,063,335

TABLE 5.2m

NOBLES STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit, each (typ. of 134)	Common	Station	Station Total
Nobles Wind Farm Unit Rating (MWe)	1.5	201		
Characterization / Temporary Services	800	-	176,861	284,061
Equipment Removal	22,540	-		3,020,341
Structures Demolition	71,051	-		9,520,809
Backfill / Grade / Landscaping	29,932	8,698,432	-	12,709,304
Utility Management / Oversight			1,185,115	1,185,115
Demolition Contractor Management / Supervisory / Safety Staff			1,404,229	1,404,229
Security			303,314	303,314
Property Taxes	-	-	-	0
Project Expenses				
Shared Heavy Equipment / Operating Engineers			1,696,617	1,696,617
Small Tool Allowance	2,486	173,969	n/a	507,153
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)			52,213	52,213
Permits			364,934	364,934
Demolition Contractors Insurance			858,708	858,708
Demolition Contractors Fee			3,626,768	3,626,768
Sub-Total				35,533,566
Contingency				5,330,035
Project Total (before scrap credit)				40,863,601
Scrap Credit	(51,830)	(3,124,525)	-	(10,069,782)
Project Total				30,793,819

TABLE 5.2n

RED WING STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Common	Station	Station Total
Redwing Unit Rating (MWe)	10	10	20		
Characterization / Temporary Services	33,000	33,000	-	353,722	419,722
Worker Access	52,498	52,498	-		104,997
Pre-Demolition Cleaning (Boiler / Precipitator /	257,800	257,800	-		515,600
Asbestos / Lead Paint Remediation	701,342	701,342	-		1,402,685
Equipment Removal	668,601	668,601	403,725		1,740,926
Boiler(s)	230,363	230,363	-		460,726
Structures Demolition	728,965	728,965	1,008,883		2,466,813
Backfill / Grade / Landscaping / Well Closure	217,741	217,741	516,322	100,000	1,051,803
Ash Landfills / Ash Ponds & Landfills Inculding Evaporation Ponds			2,208,615		2,208,615
Utility Management / Oversight				1,075,850	1,075,850
Demolition Contractor Management / Supervisory / Safety Staff				997,570	997,570
Security				240,171	240,171
Property Taxes	-	-	-	-	0
Project Expenses					
Shared Heavy Equipment / Operating Engineers				1,253,672	1,253,672
Small Tool Allowance	52,650	52,650	38,579	n/a	143,879
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)				41,343	41,343
Permits				160,104	160,104
Demolition Contractors Insurance				376,734	376,734
Demolition Contractors Fee				1,543,452	1,543,452
Sub-Total					16,204,663
Contingency					2,570,968
Project Total (before scrap credit)					18,775,631
Scrap Credit	(956,453)	(956,453)	(680,100)	-	(2,593,006)
Project Total					16,182,625

TABLE 5.2o

RIVERSIDE STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 6 Boiler	Unit 7 Boiler	Unit 7 Turbine	Unit 8	Unit 9	Unit 10	Commom	Station	Station Total
Riverside Unit Rating (MWe)	44	44	165	231	173	173	830		
Characterization / Temporary Services	45,000	45,000	73,000	85,000	70,000	70,000	-	530,583	918,583
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	170,600	170,600	-	170,600	-	-	15,000		526,800
Asbestos Remediation	968,955	968,955	-	1,058,195	-	-	-		2,996,105
Equipment Removal	-	-	850,207	407,541	1,177,091	1,177,091	15,679		3,627,608
Boiler(s)	769,377	769,377	-	805,783	-	-	-		2,344,537
Structures Demolition	1,049,977	1,049,977	545,313	2,639,702	872,956	872,956	2,331,705		9,362,586
Backfill / Grade / Landscaping / Well Closure	183,305	183,305	341,701	547,510	233,241	233,241	525,442	100,000	2,347,747
Utility Management / Oversight								3,360,001	3,360,001
Demolition Contractor Management / Supervisory / Safety Staff								4,233,101	4,233,101
Security								854,997	854,997
Property Taxes			-		-		-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers								4,339,134	4,339,134
Small Tool Allowance	60,332	60,332	36,204	110,875	29,416	29,416	57,457	n/a	384,032
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								64,829	64,829
Permits								389,313	389,313
Demolition Contractors Insurance								916,074	916,074
Demolition Contractors Fee								3,527,169	3,527,169
Sub-Total									40,192,617
Contingency									6,328,503
Project Total (before scrap credit)									46,521,121
Scrap Credit	(1,747,647)	(1,747,647)	(1,579,572)	(3,512,820)	(1,662,032)	(1,662,032)	(210,754)	-	(12,122,503)
Project Total									34,398,617

TABLE 5.2p

SHERBURNE COUNTY STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

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
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	1,081,050	1,081,050	1,081,050	-		3,243,150
Asbestos Remediation	2,115,384	2,115,384	-	500,000		4,730,768
Equipment Removal	4,872,060	4,872,060	5,607,769	4,004,077		19,355,966
Boiler(s)	3,673,167	3,673,167	4,057,077	-		11,403,411
Turbine Generator & Condensor	527,108	527,108	593,427			1,647,644
Exhaust Gas Treatment Equipment and Structures	3,730,433	3,730,433	4,183,087			11,643,954
Structures Demolition	7,021,259	7,021,259	7,620,758	6,295,832		27,959,107
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 Pounds & Landfills Including Evaporation Ponds / Ash Pond Dewate	1,860,375	1,860,375	1,900,589	29,650,000		35,271,338
Utility Management / Oversight	1,039,934	1,039,934	1,162,483	480,878		3,723,229
Demolition Contractor Management / Supervisory / Safety Staff	1,514,166	1,514,166	1,692,600	700,169		5,421,101
Security	280,279	280,279	313,307	129,604		1,003,469
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers	1,601,144	1,601,144	1,789,826	740,388		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 (excluding activities currently under contract)						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

TABLE 5.2q

SIBLEY GAS PLANT
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Station	Station Total
Sibley Unit Rating (MWe)	0		
Characterization / Temporary Services	25,000	88,431	113,431
Equipment Removal	972,121		972,121
Structures Demolition	82,946		82,946
Grade / Landscaping	151,177	-	151,177
Utility Management / Oversight		807,886	807,886
Demolition Contractor Management / Supervisory / Safety Staff		441,690	441,690
Security		156,731	156,731
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		831,954	831,954
Small Tool Allowance	24,625	n/a	24,625
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)		26,980	26,980
Permits		33,062	33,062
Demolition Contractors Insurance		77,795	77,795
Demolition Contractors Fee		289,261	289,261
Sub-Total			4,009,660
Contingency			601,449
Project Total (before scrap credit)			4,611,109
Scrap Credit	(476,224)	-	(476,224)
Project Total			4,134,885

TABLE 5.2r

WESCOTT GAS PLANT
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Station	Station Total
Wescott Unit Rating (MWe)	0		
Characterization / Temporary Services	25,000	176,861	201,861
Equipment Removal	5,176,749		5,176,749
Structures Demolition	1,006,271		1,006,271
Grade / Landscaping	927,486	-	927,486
Utility Management / Oversight		974,737	974,737
Demolition Contractor Management / Supervisory / Safety Staff		929,958	929,958
Security		205,216	205,216
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		1,117,958	1,117,958
Small Tool Allowance	142,710	n/a	142,710
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)		35,326	35,326
Permits		119,229	119,229
Demolition Contractors Insurance		280,552	280,552
Demolition Contractors Fee		1,126,018	1,126,018
Sub-Total			12,244,072
Contingency			1,836,611
Project Total (before scrap credit)			14,080,683
Scrap Credit	(2,661,541)	-	(2,661,541)
Project Total			11,419,141

TABLE 5.2s

WILMARTH STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Common	Station	Station Total
Wilmarth Unit Rating (MWe)	10	10	20		
Characterization / Temporary Services	33,000	33,000	-	354,000	420,000
Worker Access	52,498	52,498	-		104,997
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	257,800	257,800	-		515,600
Asbestos / Lead Paint Remediation	701,342	701,342	-		1,402,685
Equipment Removal	668,601	668,601	158,764		1,495,966
Boiler(s)	368,367	368,367	-		736,735
Structures Demolition	640,708	640,708	729,394		2,010,809
Backfill / Grade / Landscaping / Well Closure	218,876	218,876	231,454	100,000	769,206
Ash Landfills			1,310,464		1,310,464
Utility Management / Oversight				1,075,850	1,075,850
Demolition Contractor Management / Supervisory / Safety Staff				997,570	997,570
Security				240,171	240,171
Property Taxes	-	-	-	-	0
Project Expenses					
Shared Heavy Equipment / Operating Engineers				1,253,672	1,253,672
Small Tool Allowance	53,668	53,668	22,392	n/a	129,728
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)				41,343	41,343
Permits				139,860	139,860
Demolition Contractors Insurance				329,097	329,097
Demolition Contractors Fee				1,332,520	1,332,520
Sub-Total					14,306,272
Contingency					2,286,209
Project Total (before scrap credit)					16,592,482
Scrap Credit	(1,076,944)	(1,076,944)	(243,922)	-	(2,397,811)
Project Total					14,194,671

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APPENDIX A
SUMMARY OF STATION SYSTEM AND STRUCTURES INVENTORIES

TABLE A
SUMMARY OF STATION SYSTEMS AND STRUCTURES INVENTORIES

Index	System/Structure Inventory Data Point	Allen S. King	Angus Anson	Black Dog	Blue Lake	Grand Meadow	Granite City	Hennepin Island	High Bridge	Inver Hills	Key City	Maplewood	Minnesota Valley	Nobles Wind Farm	Redwing	Riverside	Sherco	Sibley	Wescott	Wilmarth
Station Rating (Mwe)		585	381	538	510	101	72	14	370	360	72	0	64	201	20	830	2400	0	0	20
2	Piping 0.25 to 2 inches diameter, linear foot	79,830	31,521	10,719	20,178	-	1,501	-	24,690	3,268	1,501	-	492	-	4,919	24,046	233,790	-	-	4,919
3	Piping >2 to 4 inches diameter, linear foot	53,123	31,014	55,395	13,452	-	1,001	-	16,460	2,579	1,001	2,195	12,745	-	3,279	16,031	157,111	2,110	-	3,279
4	Piping >4 to 8 inches diameter, linear foot	35,133	14,059	36,265	10,357	-	3,138	-	11,173	9,964	3,138	1,120	6,427	-	2,186	10,687	103,907	520	7,935	2,186
5	Piping >8 to 14 inches diameter, linear foot	50,662	8,006	24,552	6,220	-	445	-	8,015	1,348	445	330	4,978	-	1,457	7,125	89,271	385	2,385	1,457
6	Piping >14 to 20 inches diameter, linear foot	7,208	2,614	9,315	4,259	-	148	-	5,377	1,139	148	90	2,454	-	794	4,750	26,401	75	20	794
7	Piping >20 to 36 inches diameter, linear foot	9,734	1,880	5,418	2,419	-	-	-	3,971	-	-	70	1,803	-	269	3,716	37,053	16	-	269
8	Piping >36 inches diameter, linear foot	5,335	895	4,186	1,796	-	-	-	2,420	-	-	-	17	-	173	2,126	15,991	-	60	173
9	Valves <2 inches	1,373	1,308	99	144	-	108	-	-	216	108	-	54	-	540	1,418	4,118	-	-	540
10	Valves >2 to 4 inches	935	1,660	2,633	672	-	72	-	698	174	72	330	402	-	360	698	2,605	346	-	360
11	Valves >4 to 8 inches	610	592	1,220	464	-	80	-	381	264	80	78	207	-	240	369	1,830	47	136	240
12	Valves >8 to 14 inches	1,519	272	771	142	-	24	-	159	62	24	44	134	-	120	123	1,115	54	35	120
13	Valves >14 to 20 inches	158	84	182	48	-	-	-	78	-	-	2	29	-	50	66	587	-	4	50
14	Valves >20 to 36 inches	128	22	36	24	-	-	-	30	-	-	-	14	-	16	36	470	-	-	16
15	Valves >36 inches	56	6	27	12	-	-	-	26	-	-	-	1	-	14	18	104	-	-	14
24	Pipe hangers for small bore piping, each	5,018	3,641	4,375	1,449	-	81	-	1,742	246	81	88	847	-	909	1,742	14,975	84	-	909
25	Pipe hangers for large bore piping, each	3,351	1,245	2,156	1,089	-	121	-	1,249	511	121	64	401	-	543	1,237	9,618	40	416	543
26	Pump and motor set < 300 pounds	77	17	89	72	-	16	-	13	108	16	6	32	-	38	13	597	3	7	38
27	Pumps, 300-1000 pound pump	23	16	13	12	-	-	-	13	-	-	-	4	-	8	13	73	-	7	8
28	Pumps, >1000-10,000 pound pump	14	5	21	-	-	-	-	2	-	-	-	4	-	11	2	44	-	-	11
29	Pumps, >10,000 pound pump	13	5	17	4	-	-	-	8	-	-	-	5	-	8	4	9	-	-	8
32	Pump motors, 300-1000 pound pump	23	32	13	12	-	-	-	13	-	-	-	4	-	8	13	28	-	7	8
33	Pump motors, >1000-10,000 pound pump	13	5	21	-	-	-	-	3	-	-	-	4	-	11	3	63	2	-	11
34	Pump motors, >10,000 pound pump	13	5	17	4	-	-	-	8	-	-	-	5	-	4	4	18	-	-	4
37	Turbine-driven pumps > 10,000 pounds	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-
38	Main turbine-generator (pounds per MW(e) input)	1	1	3	-	-	-	-	1	-	-	-	3	-	2	2	3	-	-	2
39	Heat exchanger <3000 pound	16	12	41	101	-	-	-	6	210	-	-	15	-	12	6	60	-	-	12
40	Heat exchanger >3000 pound	-	27	14	48	-	-	-	5	96	-	-	7	-	14	5	21	-	-	14
41	Feedwater heater/deaerator	9	6	29	2	-	-	-	2	-	-	-	7	-	12	2	31	-	-	12
49	Main condenser (pounds per MW(e) input)	1	1	3	-	-	-	-	1	-	-	-	3	-	2	1	3	-	-	2
51	Tanks, <300 gallons, filters, and ion exchangers	38	30	59	20	-	16	2	10	24	16	5	39	-	12	10	66	28	33	12
52	Tanks, 300-3000 gallons	12	32	33	4	-	12	-	11	5	12	6	7	-	2	6	132	9	14	2
53	Tanks, >3000 gallons, square foot surface	27,566	75,184	14,482	62,690	-	2,847	-	23,259	7,069	2,847	101,764	87,790	-	33,585	1,658	162,458	81,889	489,542	6,871
54	Electrical equipment, <300 pound	742	686	1,207	647	-	420	54	150	846	420	21	232	-	322	128	6,686	36	-	322
55	Electrical equipment, 300-1000 pound	144	296	501	350	-	48	16	298	164	40	17	53	-	18	280	936	13	21	18
56	Electrical equipment, 1000-10,000 pound	122	190	148	280	67	80	25	207	175	80	7	39	134	56	201	122	2	41	56
57	Electrical equipment, >10,000 pound	12	99	10	128	-	28	36	16	168	28	5	4	-	16	16	30	3	-	16
59	Electrical transformers < 30 tons	3	13	31	14	-	2	-	4	18	2	2	10	-	-	4	6	2	1	-
60	Electrical transformers > 30 tons	3	9	5	12	-	2	-	5	12	2	-	4	-	2	5	3	-	-	2
61	Standby diesel-generator, <100 kW	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	Standby diesel-generator, 100 kW to 1 MW	-	-	-	-	-	8	-	-	-	8	-	-	-	-	-	-	-	-	-
63	Standby diesel-generator, >1 MW	2	-	-	-	-	4	-	-	-	4	-	-	-	-	2	5	-	-	-
64	Fluorescent light fixture	200	250	696	180	-	80	10	200	100	80	30	163	-	36	150	498	30	24	38
65	Incandescent light fixture	1,564	288	1,500	180	-	120	16	200	170	120	30	327	-	258	150	4,060	30	24	258
66	Electrical cable tray, linear foot	27,803	3,512	11,110	5,651	-	1,730	250	10,274	-	1,730	-	2,107	-	1,364	9,206	166,291	-	820	1,364
67	Electrical conduit, linear foot	41,992	7,922	67,220	8,631	781,440	2,471	4,790	13,688	-	2,471	2,060	18,605	1,562,880	8,658	11,905	119,404	2,000	8,500	8,658
69	Mechanical equipment, <300 pound	788	288	1,055	52	-	44	5	31	78	44	8	258	-	360	21	2,388	6	57	360
70	Mechanical equipment, 300-1000 pound	168	312	219	812	-	64	8	274	30	64	-	77	-	14	274	457	21	10	14
71	Mechanical equipment, 1000-10,000 pound	204	60	53	127	-	-	38	59	1,000	-	3	29	-	60	44	516	17	36	60
72	Mechanical equipment, >10,000 pound	68	160	89	238	603	60	26	141	219	60	20	12	1,200	45	103	90	3	78	45

TABLE A
SUMMARY OF SYSTEMS AND STRUCTURES INVENTORIES
(Continued)

Index	System/Structure Inventory Data Point	Allen S. King	Angus Anson	Black Dog	Blue Lake	Grand Meadow	Granite City	Hennepin Island	High Bridge	Inver Hills	Key City	Maplewood	Minnesota Valley	Nobles Wind Farm	Redwing	Riverside	Sherco	Sibley	Wescott	Wilmarth
Station Rating (Mwe)		588	381	538	510	101	72	14	570	360	72	0	64	201	20	830	2400	0	0	20
76	HVAC equipment, <300 pound	108	14	-	16	-	-	-	-	24	-	-	4	-	10	-	328	-	-	10
77	HVAC equipment, 300-1000 pound	-	22	6	-	-	-	-	36	-	-	-	-	-	-	24	107	-	-	-
78	HVAC equipment, 1000-10,000 pound	-	5	-	-	-	-	-	14	-	-	-	2	-	4	10	6	-	-	4
79	HVAC equipment, >10,000 pound	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-
82	HVAC ductwork, pound	119,977	10,000	463,253	-	-	-	8,375	142,100	-	-	-	96,400	-	18,295	28,202	429,440	-	-	18,295
201	Standard reinforced concrete, cubic yard	24,015	6,662	23,828	14,027	18,626	3,806	2,006	18,008	14,800	1,903	770	7,747	37,252	9,138	22,866	89,076	591	11,170	5,248
202	Grade slab concrete, cubic yard	10,800	1,329	6,937	1,176	-	906	-	372	1,384	906	-	676	-	474	1,551	-	-	-	474
206	Heavily rein concrete w/#9 rebar, cubic yard	7,824	1,110	6,204	-	-	-	-	-	-	-	-	3,788	-	1,793	3,035	22,775	-	-	1,793
222	Hollow masonry block wall, cubic yard	-	1,103	614	58	-	-	-	425	-	-	-	-	-	-	2,219	-	-	-	109
224	Solid masonry block wall, cubic yard	3,788	-	6,961	-	-	-	458	-	-	-	-	8,911	-	663	3,011	14,335	-	-	663
229	Backfill of below grade voids, cubic yard	29,218	11,074	13,058	12,493	92,624	2,170	20,000	19,394	6,898	1,308	0	32,816	185,248	17,336	12,325	0	0	0	20,531
230	Excavation of clean material, cubic yard	8,747	-	13,387	-	219,531	-	-	-	-	-	-	7,307	439,061	5,760	18,507	34,560	-	-	3,780
235	Building by volume, cubic foot	5,117,058	229,493	970,141	970,228	-	189,562	-	318,816	247,411	189,562	159,000	164,740	-	321,500	597,793	9,863,100	107,000	430,217	321,500
236	Building metal siding, square foot	217,256	42,789	80,426	19,901	-	37,278	-	108,748	15,564	37,278	-	73,964	-	32,498	93,913	669,467	-	-	22,498
242	Standard asphalt roofing, square foot	47,897	22,500	53,455	-	-	-	9,375	110,000	-	-	-	23,588	-	9,129	119,469	287,266	-	-	9,129
243	Galbestos panels, square foot	-	-	8,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
245	Placement of cofferdam, linear foot	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
248	Lead paint removal from concrete surfaces, square foot	373,064	54,000	-	-	-	-	54,150	-	-	-	-	135,495	-	34,337	-	-	-	-	34,337
253	Overhead cranes/monorails < 10 ton capacity, each	14	3	2	-	-	-	-	-	-	-	-	-	-	1	-	136	-	-	1
255	Overhead cranes/monorails >10 - 50 ton capacity, each	6	2	-	1	-	-	1	5	-	-	-	2	-	2	7	21	-	1	2
258	Gantry cranes > 50 ton capacity, each	1	-	1	1	-	-	-	1	-	-	-	-	-	-	5	6	-	-	-
260	Structural steel, pounds	24,541,699	2,731,615	16,388,568	1,748,139	-	310,648	299,854	6,951,323	662,931	310,648	12,000	6,612,141	-	2,429,528	17,879,987	83,653,565	10,000	92,000	2,429,526
262	Steel floor grating, square foot	161,222	16,242	63,391	7,410	-	2,673	900	18,797	-	2,673	-	12,083	-	30,386	56,169	578,333	-	-	30,386
268	Placement of scaffolding in clean areas, square foot	66,680	-	137,779	-	-	-	-	-	-	-	-	19,777	-	13,043	-	210,181	-	-	13,043
270	Landscaping with topsoil, acre	3	4	4	1	45.9	0	2	1.9	2	0	3	1	92	4	3	33	2	6	2
271	Landscaping w/o topsoil, acre	29	4	5	8	3	2	-	4	9	2	3	7	6	3	8	239	2	6	4
272	Chain link fencing, linear foot	3,372	6,800	3,000	2,980	-	995	550	3,144	2,800	995	2,460	3,859	-	8,372	5,016	20,000	3,680	4,100	995
273	Railroad track, linear foot	3,000	-	3,600	-	-	-	-	-	-	-	-	6,664	-	-	-	24,000	-	-	-
274	Asphalt pavement, square foot	226,686	91,000	122,500	78,300	-	12,000	17,650	75,171	51,000	12,000	17,750	38,225	-	-	128,241	801,500	45,625	62,700	52,000
293	Carbon steel plate 3/8 inch thick, square foot	-	8,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
294	Carbon steel plate 1/2 inch thick, square foot	66,630	7,388	42,598	14,776	798,797	75,398	12,441	14,550	261,891	75,398	-	6,959	1,597,594	17,695	78,517	219,533	-	-	17,695
359	Steam drum removal (fossil)	1	3	6	6	-	-	-	6	-	-	-	3	-	2	9	6	-	-	2
360	Water drum removal (fossil)	-	-	-	-	-	-	-	-	-	-	-	4	-	4	-	12	-	-	4
361	Upperflower waterwall headers (fossil)	26	-	33	-	-	-	-	-	-	-	-	14	-	6	27	72	-	-	6
362	Top sup boiler waterwall (8'x8' section), inches cut	138,902	-	128,619	-	-	-	-	-	-	-	-	45,627	-	13,392	128,711	470,566	-	-	13,392
369	Boiler convective superheanter platens	307	-	534	-	-	-	-	-	-	-	-	256	-	116	458	1,344	-	-	116
370	Boiler radiant superheater platens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	156	-	-	-
371	Boiler reheat platens	140	-	270	-	-	-	-	-	-	-	-	-	-	-	90	666	-	-	-
372	Boiler economizer platens	420	-	254	-	-	-	-	-	-	-	-	39	-	-	163	1,344	-	-	-
374	Stationary soot blowers	98	-	96	-	-	-	-	-	-	-	-	21	-	-	32	315	-	-	-
375	Retractable soot blowers	70	-	54	-	-	-	-	-	-	-	-	7	-	16	18	144	-	-	16
376	Process ductwork (8'x8' section), inches cut	757,268	321,019	1,013,359	625,433	-	54,416	-	446,315	307,617	54,416	-	470,306	-	61,481	1,009,280	3,392,767	-	-	61,481
378	Non-asbestos insulated regenerative air preheaters	4	-	12	-	-	-	-	-	-	-	-	8	-	8	4	13	-	-	8
380	Non-asbestos insulated recuperative air preheaters	-	-	-	-	-	-	-	-	-	-	-	4	-	-	8	-	-	-	-
382	Induced, forced, primary draft fans	9	-	12	-	-	-	-	-	-	-	-	4	-	4	-	42	-	-	4
383	Coal car dumpers	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-
384	Conveyors	5,528	-	1,400	-	-	-	-	-	-	-	-	900	-	625	-	5,000	-	-	625
385	Trunafer Towers	100,500	-	80,400	-	-	-	-	-	-	-	-	-	-	-	-	201,000	-	-	-
386	Stacker-reclaimers	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
387	Coal crushers	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-
389	Ball mills	12	-	12	-	-	-	-	-	-	-	-	4	-	-	-	43	-	-	-
390	Coal feeders	120	-	180	-	-	-	-	-	-	-	-	40	-	86	-	1,019	-	-	86

APPENDIX B

UNIT COST FACTOR DEVELOPMENT

APPENDIX B

UNIT COST FACTOR DEVELOPMENT
(Using Minnesota-based labor rates)

Example: Unit Factor for Removal of Heat Exchanger < 3,000 pounds

1. SCOPE

Heat exchangers weighing < 3,000 lb. will be removed in one piece using a crane or small hoist. They will be disconnected from the inlet and outlet piping. The heat exchanger will be sent to the laydown area.

2. CALCULATIONS

Act ID	Activity Description	Activity Duration	Critical Duration
a	Remove insulation	20	(b)
b	Mount pipe cutters	60	60
c	Disconnect inlet and outlet lines	60	60
d	Rig for removal	30	30
e	Unbolt from mounts	30	30
f	Remove, send to packing area	60	60
	Totals (Activity/Critical)	260	240

Duration adjustment(s):	
+ Work break adjustment (8.33 % of productive duration)	20
Total work duration (minutes)	260

***** Total duration = 4.333 hours *****

3. LABOR REQUIRED

Crew	Number	Duration (hr)	Rate ($/hr)	Cost ($)
Laborers	3.0	4.333	51.07	663.86
Craftsmen	2.0	4.333	62.46	541.28
Foreman	1.0	4.333	63.46	274.97
General Foreman	0.25	4.333	64.46	69.83
Fire Watch	0.05	4.333	51.07	11.06
Total labor cost				1,561.00

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
Gas torch consumables 1 @ $18.60/hr x 1 hr {1}	18.60
Subtotal cost of equipment and materials	18.60
Overhead & profit on equipment and materials @ 16.88%	3.14
Total costs, equipment & material	21.74
TOTAL COST Removal of heat exchanger <3000 pound:	**1,582.74**
Total labor cost:	1,561.00
Total equipment/material costs:	21.74
Total craft labor man-hours required per unit:	27.298

5. NOTES AND REFERENCES

- Durations are shown in minutes. The integrated duration accounts for those activities that can be performed in conjunction with other activities, indicated by the alpha designator of the concurrent activity. This results in an overall decrease in the sequenced duration.

- Work difficulty factors were developed in conjunction with the AIF program to standardize decommissioning cost studies and are delineated in the "Guidelines" study (Reference 2, Vol. 1, Chapter 5).

- References for equipment and consumables costs:

    1. R.S. Means (2014) Division 01 54 33, Section 40-6360 Page 698

APPENDIX C

UNIT COST FACTOR LISTING

TABLE C-1

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2014 dollars/Scrap Weights in pounds)

		Unit Cost Factors			Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
2	Piping 0.25 to 2 inches diameter, linear foot	5.89	5.82	0.1	-	4	-	0.5	-	-	-	-
3	Piping >2 to 4 inches diameter, linear foot	8.30	8.19	0.2	-	7	-	0.9	-	-	0.4	-
4	Piping >4 to 8 inches diameter, linear foot	16.02	15.87	0.3	-	22	-	-	-	-	-	-
5	Piping >8 to 14 inches diameter, linear foot	31.14	30.96	0.6	-	57	-	-	-	-	-	-
6	Piping >14 to 20 inches diameter, linear foot	40.54	39.99	0.7	-	-	120	-	-	-	-	-
7	Piping >20 to 36 inches diameter, linear foot	59.63	58.90	1.1	-	-	221	-	-	-	-	-
8	Piping >36 inches diameter, linear foot	70.82	70.10	1.3	-	-	417	-	-	-	-	-
9	Valves <2 inches	114.52	113.81	2.0	-	-	-	-	-	-	-	-
10	Valves >2 to 4 inches	105.57	104.48	1.9	75	-	-	8.8	-	-	4.4	-
11	Valves >4 to 8 inches	160.19	158.73	2.8	510	-	-	-	-	-	-	-
12	Valves >8 to 14 inches	311.41	309.61	5.6	1,066	-	-	-	-	-	-	-
13	Valves >14 to 20 inches	405.35	399.92	7.3	-	-	2,040	-	-	-	-	-
14	Valves >20 to 36 inches	596.28	589.05	10.7	-	-	3,334	-	-	-	-	-
15	Valves >36 inches	708.24	701.01	12.7	-	-	11,535	-	-	-	-	-
24	Pipe hangers for small bore piping, each	37.26	31.83	0.6	-	10	-	-	-	-	-	-
25	Pipe hangers for large bore piping, each	133.34	122.47	2.3	-	50	-	-	-	-	-	-
26	Pump and motor set < 300 pounds	271.27	262.20	4.7	-	-	50	12.5	-	-	-	62.3
27	Pumps, 300-1000 pound pump	746.46	731.96	12.7	293	-	49	48.9	-	-	-	-
28	Pumps, >1000-10,000 pound pump	2,951.17	2,929.43	51.3	2,834	-	472	472.3	-	-	-	-
29	Pumps, >10,000 pound pump	5,711.35	5,646.13	98.9	43,693	-	7,282	7,282.1	-	-	-	-
32	Pump motors, 300-1000 pound pump	311.41	311.41	5.4	-	-	-	-	-	-	-	307.8
33	Pump motors, >1000-10,000 pound pump	1,225.22	1,225.22	21.5	-	-	-	-	-	-	-	3,531.6
34	Pump motors, >10,000 pound pump	2,756.72	2,756.72	48.3	-	-	-	-	-	-	-	42,324.5
37	Turbine-driven pumps > 10,000 pounds	7,645.01	7,572.56	132.7	20,000	-	20,000	-	-	-	-	-
38	Main turbine-generator (pounds per MW(e) input)	179,970.00	178,578.66	3,042.0	-	-	851,500	-	-	-	-	851,500.0
39	Heat exchanger <3000 pound	1,582.74	1,561.00	27.3	-	-	416	623.4	-	-	-	-
40	Heat exchanger >3000 pound	3,989.63	3,902.67	68.3	-	-	5,599	8,397.9	-	-	-	-
41	Feedwater heater/deaerator	11,260.56	11,086.64	194.2	-	-	12,000	18,000.0	-	-	-	-
49	Main condenser (pounds per MW(e) input)	496,136.69	476,317.56	8,243.6	149,400	-	149,400	199,200.0	-	-	-	-
51	Tanks, <300 gallons, filters, and ion exchangers	348.81	337.94	6.0	-	-	401	401.2	-	-	-	-
52	Tanks, 300-3000 gallons	1,097.84	1,076.10	19.1	-	-	2,700	300.0	-	-	-	-
53	Tanks, >3000 gallons, square foot surface	9.17	8.90	0.2	-	21	-	-	-	-	-	-
54	Electrical equipment, <300 pound	146.54	146.54	2.6	-	-	56	-	-	-	2.9	-
55	Electrical equipment, 300-1000 pound	507.02	507.02	8.8	-	-	624	-	-	-	32.8	-

TABLE C-1 (continued)

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2014 dollars/Scrap Weights in pounds)

		Unit Cost Factors			Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
56	Electrical equipment, 1000-10,000 pound	1,014.02	1,014.02	17.6	-	-	2,212	-	-	-	116.4	-
57	Electrical equipment, >10,000 pound	2,391.76	2,391.76	41.0	-	-	19,950	-	-	-	1,050.0	-
59	Electrical transformers < 30 tons	1,661.03	1,661.03	28.4	-	-	11,250	-	-	-	3,750.0	-
60	Electrical transformers > 30 tons	4,783.50	4,783.50	81.9	-	-	375,000	-	-	-	125,000.0	-
61	Standby diesel-generator, <100 kW	1,696.60	1,696.60	29.1	2,340	-	-	-	-	-	-	260.0
62	Standby diesel-generator, 100 kW to 1 MW	3,786.94	3,786.94	64.8	9,450	-	-	-	-	-	-	1,050.0
63	Standby diesel-generator, >1 MW	7,839.73	7,839.73	134.2	47,250	-	-	-	-	-	-	5,250.0
64	Fluorescent light fixture	61.43	61.43	1.1	-	-	-	-	-	-	-	-
65	Incandescent light fixture	30.66	30.66	0.6	-	-	-	-	-	-	-	-
66	Electrical cable tray, linear foot	13.81	13.45	0.2	-	-	-	-	6.6	6.6	-	-
67	Electrical conduit, linear foot	6.04	5.86	0.1	-	-	-	-	3.4	3.4	-	-
69	Mechanical equipment, <300 pound	146.54	146.54	2.6	-	-	127	-	-	-	-	-
70	Mechanical equipment, 300-1000 pound	507.02	507.02	8.8	-	-	641	-	-	-	-	-
71	Mechanical equipment, 1000-10,000 pound	1,014.02	1,014.02	17.6	-	-	4,184	-	-	-	-	-
72	Mechanical equipment, >10,000 pound	2,391.76	2,391.76	41.0	-	-	11,938	-	-	-	-	-
76	HVAC equipment, <300 pound	177.21	177.21	3.1	-	-	184	-	-	-	-	-
77	HVAC equipment, 300-1000 pound	609.22	609.22	10.6	-	-	643	-	-	-	-	-
78	HVAC equipment, 1000-10,000 pound	1,214.16	1,214.16	21.0	-	-	3,813	-	-	-	-	-
79	HVAC equipment, >10,000 pound	2,391.76	2,391.76	41.0	-	-	19,391	-	-	-	-	-
82	HVAC ductwork, pound	0.57	0.57	0.0	-	-	-	-	1.0	-	-	-
201	Standard reinforced concrete, cubic yard	75.03	36.44	0.6	-	183	-	-	-	-	-	-
202	Grade slab concrete, cubic yard	97.90	54.65	1.0	-	183	-	-	-	-	-	-
206	Heavily rein concrete w/#9 rebar, cubic yard	119.10	46.40	0.8	-	730	-	-	-	-	-	-
222	Hollow masonry block wall, cubic yard	113.46	73.48	1.4	-	66	-	-	-	-	-	-
224	Solid masonry block wall, cubic yard	113.46	73.48	1.4	-	66	-	-	-	-	-	-
229	Backfill of below grade voids, cubic yard	33.44	3.67	0.1	-	-	-	-	-	-	-	-
230	Excavation of clean material, cubic yard	3.39	1.31	0.0	-	-	-	-	-	-	-	-
235	Building by volume, cubic foot	0.34	0.18	-	-	-	1	-	-	-	-	-
236	Building metal siding, square foot	1.51	1.07	0.0	-	-	-	-	2.4	-	-	-
242	Standard asphalt roofing, square foot	2.55	2.55	0.1	-	-	-	-	-	-	-	-
243	Galbestos panels, square foot	2.35	1.76	0.0	-	-	-	-	-	-	-	-
245	Placement of cofferdam, linear foot	-	-	-	-	-	-	-	-	-	-	-

TABLE C-1 (continued)

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2014 dollars/Scrap Weights in pounds)

Unit Cost Factors					Scrap Weight							
UCF#	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
248	Lead paint removal from concrete surfaces, square foot	8.91	6.80	0.1	-	-	-	-	-	-	-	-
253	Overhead cranes/monorails < 10 ton capacity, each	701.28	701.28	11.8	-	3,700	-	-	-	-	-	-
255	Overhead cranes/monorails >10 - 50 ton capacity, each	1,683.07	1,683.07	28.3	-	-	298.832	-	-	-	3,018.5	-
258	Gantry cranes > 50 ton capacity, each	29,896.91	29,896.91	511.9	-	-	712,800	-	-	-	7,200.0	-
260	Structural steel, pounds	0.22	0.17	-	-	1	-	-	-	-	-	-
262	Steel floor grating, square foot	5.02	4.64	0.1	-	-	6	-	1.1	-	-	-
268	Placement of scaffolding in clean areas, square foot	15.94	5.42	0.1	-	-	-	-	-	-	-	-
270	Landscaping with topsoil, acre	24,697.24	3,085.72	52.6	-	-	-	-	-	-	-	-
271	Landscaping w/o topsoil, acre	1,242.11	333.10	5.3	-	-	-	-	-	-	-	-
272	Chain link fencing, linear foot	3.76	2.96	0.1	-	-	-	-	10.0	-	-	-
273	Railroad track, linear foot	26.63	12.34	0.2	-	91	-	-	-	-	-	-
274	Asphalt pavement, square foot	0.97	0.65	0.0	-	-	-	-	-	-	-	-
294	Carbon steel plate 1/2 inch thick, square foot	4.21	3.42	0.1	-	-	20	-	-	-	-	-
359	Steam drum removal (fossil)	22,056.71	21,911.77	411.6	-	-	480,000	-	-	-	-	-
360	Water drum removal (fossil)	8,184.40	8,157.23	153.2	-	-	320,000	-	-	-	-	-
361	Upper/lower waterwall headers (fossil)	6,177.23	6,150.06	115.5	-	-	120,000	-	-	-	-	-
362	Top sup boiler waterwall (8'x8' section), inches cut	0.74	0.70	0.0	-	-	11	-	-	-	-	-
369	Boiler convective superheaater platens	1,787.36	1,598.96	29.6	-	-	19,501	-	-	-	-	-
370	Boiler radiant superheater platens	756.13	676.43	12.5	-	-	51,652	-	-	-	-	-
371	Boiler reheat platens	756.13	676.43	12.5	-	-	19.501	-	-	-	-	-
372	Boiler economizer platens	962.37	860.93	15.9	-	-	11,703	-	-	-	-	-
374	Stationary soot blowers	39.04	39.04	0.7	-	-	500	-	-	-	-	50.0
375	Retractable soot blowers	369.01	369.01	6.8	-	-	11.150	-	-	-	-	100.0
376	Process ductwork (8'x8' section), inches cut	0.37	0.34	0.0	-	-	0	-	-	-	-	-
378	Non-asbestos insulated regenerative air preheaters	11,731.57	10,035.87	188.5	-	-	1,376,000	-	-	-	-	-
380	Non-asbestos insulated recuperative air preheaters	6,502.34	5,442.53	101.6	-	-	1,376,000	-	-	-	-	-
382	Induced, forced, primary draft fans	1,765.63	1,722.15	31.9	-	-	30,000	-	-	-	-	3,531.6
383	Coal car dumpers	16,091.87	13,483.11	249.4	-	-	125,000	-	-	-	-	500.0
384	Conveyors	15.04	13.95	0.3	-	-	820	-	-	-	-	-
385	Transfer Towers	0.21	0.15	-	-	-	5	-	-	-	-	-
386	Stacker-reclaimers	161,210.45	161,210.45	3,008.3	-	-	300,000	-	-	-	-	2,000.0
387	Coal crushers	1,070.04	1,059.17	19.3	-	-	36,000	-	-	-	-	250.0
389	Ball mills	1,540.33	1,540.33	28.1	-	-	360,000	-	-	-	-	7,063.1
390	Coal feeders	387.21	376.34	7.1	-	-	1,194	-	-	-	-	-

TABLE C-2

UNIT COST FACTOR LISTING
South Dakota Station
(Costs are in 2014 dollars/Scrap Weights in pounds)

		Unit Cost Factors			Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
2	Piping 0.25 to 2 inches diameter, linear foot	2.53	2.46	0.1	-	4	-	0.5	-	-	-	-
3	Piping >2 to 4 inches diameter, linear foot	3.55	3.44	0.2	-	7	-	0.9	-	-	0.4	-
4	Piping >4 to 8 inches diameter, linear foot	7.11	6.97	0.3	-	22	-	-	-	-	-	-
5	Piping >8 to 14 inches diameter, linear foot	13.45	13.28	0.6	-	57	-	-	-	-	-	-
6	Piping >14 to 20 inches diameter, linear foot	17.96	17.45	0.7	-	-	120	-	-	-	-	-
7	Piping >20 to 36 inches diameter, linear foot	26.09	25.41	1.0	-	-	221	-	-	-	-	-
8	Piping >36 inches diameter, linear foot	31.03	30.35	1.3	-	-	417	-	-	-	-	-
9	Valves <2 inches	50.23	49.56	2.0	-	-	-	-	-	-	-	-
10	Valves >2 to 4 inches	46.43	45.41	1.8	75	-	-	8.8	-	-	4.4	-
11	Valves >4 to 8 inches	71.11	69.74	2.8	510	-	-	-	-	-	-	-
12	Valves >8 to 14 inches	134.50	132.80	5.5	1,066	-	-	-	-	-	-	-
13	Valves >14 to 20 inches	179.58	174.47	7.2	-	-	2,040	-	-	-	-	-
14	Valves >20 to 36 inches	260.93	254.12	10.4	-	-	3,334	-	-	-	-	-
15	Valves >36 inches	310.31	303.50	12.5	-	-	11,535	-	-	-	-	-
24	Pipe hangers for small bore piping, each	18.89	13.78	0.6	-	10	-	-	-	-	-	-
25	Pipe hangers for large bore piping, each	61.15	50.91	2.3	-	50	-	-	-	-	-	-
26	Pump and motor set < 300 pounds	124.75	116.22	4.6	-	-	50	12.5	-	-	-	62.3
27	Pumps, 300-1000 pound pump	342.65	328.99	12.5	293	-	49	48.9	-	-	-	-
28	Pumps, >1000-10,000 pound pump	1,330.17	1,309.70	50.5	2,834	-	472	472.3	-	-	-	-
29	Pumps, >10,000 pound pump	2,587.58	2,526.17	97.4	43,693	-	7,282	7,282.1	-	-	-	-
32	Pump motors, 300-1000 pound pump	140.66	140.66	5.3	-	-	-	-	-	-	-	307.8
33	Pump motors, >1000-10,000 pound pump	550.02	550.02	21.2	-	-	-	-	-	-	-	3,531.6
34	Pump motors, >10,000 pound pump	1,235.67	1,235.67	47.6	-	-	-	-	-	-	-	42,324.5
38	Main turbine-generator (pounds per MW(e) input)	83,070.00	81,759.82	2,995.2	-	-	851,500	-	-	-	-	851,500.0
39	Heat exchanger <3000 pound	720.80	700.33	26.9	-	-	416	623.4	-	-	-	-
40	Heat exchanger >3000 pound	1,832.61	1,750.72	67.2	-	-	5,599	8,397.9	-	-	-	-
41	Feedwater heater/deaerator	5,122.92	4,959.15	191.2	-	-	12,000	18,000.0	-	-	-	-
49	Main condenser (pounds per MW(e) input)	233,827.36	215,173.52	8,116.8	149,400	-	149,400	199,200.0	-	-	-	-
51	Tanks, <300 gallons, filters, and ion exchangers	159.02	148.78	5.9	-	-	401	401.2	-	-	-	-
52	Tanks, 300-3000 gallons	496.28	475.81	18.8	-	-	2,700	300.0	-	-	-	-
53	Tanks, >3000 gallons, square foot surface	4.25	3.99	0.2	-	21	-	-	-	-	-	-
54	Electrical equipment, <300 pound	65.93	65.93	2.6	-	-	56	-	-	-	2.9	-
55	Electrical equipment, 300-1000 pound	228.36	228.36	8.6	-	-	624	-	-	-	32.8	-
56	Electrical equipment, 1000-10,000 pound	456.61	456.61	17.3	-	-	2,212	-	-	-	116.4	-
57	Electrical equipment, >10,000 pound	1,093.11	1,093.11	40.3	-	-	19,950	-	-	-	1,050.0	-

TABLE C-2 (continued)

UNIT COST FACTOR LISTING
South Dakota Station
(Costs are in 2014 dollars/Scrap Weights in pounds)

Unit Cost Factors					Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
59	Electrical transformers < 30 tons	758.76	758.76	28.0	-	-	11,250	-	-	-	3,750.0	-
60	Electrical transformers > 30 tons	2,186.33	2,186.33	80.7	-	-	375,000	-	-	-	125,000.0	-
61	Standby diesel-generator, <100 kW	772.98	772.98	28.5	2,340	-	-	-	-	-	-	260.0
64	Fluorescent light fixture	25.98	25.98	1.1	-	-	-	-	-	-	-	-
65	Incandescent light fixture	13.35	13.35	0.6	-	-	-	-	-	-	-	-
66	Electrical cable tray, linear foot	6.29	5.95	0.2	-	-	-	-	6.6	6.6	-	-
67	Electrical conduit, linear foot	2.80	2.63	0.1	-	-	-	-	3.4	3.4	-	-
69	Mechanical equipment, <300 pound	65.93	65.93	2.6	-	-	127	-	-	-	-	-
70	Mechanical equipment, 300-1000 pound	228.36	228.36	8.6	-	-	641	-	-	-	-	-
71	Mechanical equipment, 1000-10,000 pound	456.61	456.61	17.3	-	-	4,184	-	-	-	-	-
72	Mechanical equipment, >10,000 pound	1,093.11	1,093.11	40.3	-	-	11,938	-	-	-	-	-
76	HVAC equipment, <300 pound	78.15	78.15	3.1	-	-	184	-	-	-	-	-
77	HVAC equipment, 300-1000 pound	273.14	273.14	10.3	-	-	643	-	-	-	-	-
78	HVAC equipment, 1000-10,000 pound	548.35	548.35	20.7	-	-	3,813	-	-	-	-	-
82	HVAC ductwork, pound	0.25	0.25	0.0	-	-	-	-	1.0	-	-	-
201	Standard reinforced concrete, cubic yard	55.23	16.52	0.6	-	183	-	-	-	-	-	-
202	Grade slab concrete, cubic yard	68.16	24.78	1.0	-	183	-	-	-	-	-	-
206	Heavily rein concrete w/#9 rebar, cubic yard	94.27	21.34	0.8	-	730	-	-	-	-	-	-
222	Hollow masonry block wall, cubic yard	67.59	29.94	1.4	-	66	-	-	-	-	-	-
229	Backfill of below grade voids, cubic yard	29.80	1.76	0.1	-	-	-	-	-	-	-	-
235	Building by volume, cubic foot	0.23	0.09	-	-	-	1	-	-	-	-	-
236	Building metal siding, square foot	0.85	0.44	0.0	-	-	-	-	2.4	-	-	-
242	Standard asphalt roofing, square foot	1.11	1.11	0.1	-	-	-	-	-	-	-	-
248	Lead paint removal from concrete surfaces, square foot	4.59	2.75	0.1	-	-	-	-	-	-	-	-
253	Overhead cranes/monorails < 10 ton capacity, each	324.82	324.82	11.6	-	3,700	-	-	-	-	-	-
255	Overhead cranes/monorails >10 - 50 ton capacity, each	779.88	779.88	27.9	-	-	298,832	-	-	-	3,018.5	-
260	Structural steel, pounds	0.13	0.08	-	-	1	-	-	-	-	-	-
262	Steel floor grating, square foot	2.63	2.28	0.1	-	-	6	-	1.1	-	-	-
270	Landscaping with topsoil, acre	21,783.43	1,429.85	52.6	-	-	-	-	-	-	-	-
271	Landscaping w/o topsoil, acre	1,018.04	161.96	5.3	-	-	-	-	-	-	-	-
272	Chain link fencing, linear foot	2.05	1.29	0.1	-	-	-	-	10.0	-	-	-
274	Asphalt pavement, square foot	0.61	0.30	0.0	-	-	-	-	-	-	-	-
293	Carbon steel plate 3/8 inch thick, square foot	2.17	1.46	0.1	-	-	15	-	-	-	-	-
294	Carbon steel plate 1/2 inch thick, square foot	2.24	1.50	0.1	-	-	20	-	-	-	-	-
359	Steam drum removal (fossil)	9,347.41	9,210.92	405.3	-	-	480,000	-	-	-	-	-
376	Process ductwork (8'x8' section), inches cut	0.17	0.14	0.0	-	-	0	-	-	-	-	-

DOCKET NO. E,G002/D-17-147

INITIAL COMMENTS OF THE OAG

ATTACHMENT B

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

Xcel Energy
Docket No.: E,G002/D-17-147
Response To: Office of the Attorney General Information Request No. 3
Requestor: Ryan P. Barlow
Date Received: March 1, 2017

Question:
For all responses show amounts for Total Company and the Minnesota retail jurisdiction unless indicated otherwise. Total Company is meant to include costs incurred for both regulated and non-regulated operations and should be separately totaled.

Reference: Removal Update, pages 9 – 11 and TLG Services, Inc. Dismantling Cost Study Table 5.2c, Table 5.2j, Table 5.2l dated May 2015 filed in docket 15-46.

Provide the following details for removal costs incurred for Black Dog Units 3 and 4, Minnesota Valley, and Key City; separately by plant in the same format as the TLG Services, Inc. Tables 5.2c/ 5.2j / 5.2l.

1) Costs incurred by month since the beginning of dismantling work
2) Total removal costs incurred to-date
3) Removal work and associated costs remaining to be incurred as of today
4) Indicate on report which activities are associated with coal yard remediation
5) Indicate if Xcel projects any costs to exceed the current depreciation reserve balances
6) Explain how Xcel intends to cover any shortfalls, if it is projected

Provide this information in a live Excel spreadsheet with all formulas intact.

Response:
Cost estimates are provided at total Company. The effect that these estimates have on the depreciation expense is then jurisdictionalized in the rate process. The Minnesota retail jurisdiction was assigned 73.4886% in the most recent Minnesota rate case.

For the purpose of this data request, the Company has attempted to assign its costs to the categories used by TLG Services in its Dismantling Cost Study. However, the Company does not maintain its removal records using the same categorizations as the tables TLG Services provides with their study, which is not intended to be a line item engineering plan for actual removal work. For instance, while some asbestos removal could be directly assigned, much of it was included in the overall cost to remove different pieces of equipment. In addition, the common and station costs are allocated by the Company to each unit, whereas actual costs may or may not align with this allocation. Consequently, the Company's ability to align its costs with the TLG study categories is limited.

1) See Attachment A, tab OAG003-Table 1, for the Excel spreadsheet showing costs incurred by month and year for the Steam Black Dog facility on rows 1-73. The Key City and Minnesota Valley facilities have not performed any dismantling activities since the submittal of the 2015 dismantling study prepared by TLG Services.
2) See Attachment A, tab OAG003-Table 1, for the Excel spreadsheet showing total costs incurred to date for the Steam Black Dog facility on rows 75-98. The Key City and Minnesota Valley facilities have not performed any dismantling activities since the submittal of the 2015 dismantling study prepared by TLG Services.
3) See Attachment A, tab OAG003-Table 2, for the Exel spreadsheet showing costs remaining to be incurred for the Steam Black Dog facility. At present, the Company believes the costs to retire Key City and Minnesota Valley will not be greater than the TLG Services cost estimate, and that the TLG cost estimate should continue to be considered the best estimate available.
4) There is always a possibility that costs will be higher or lower than the estimate provided by the consultant. They are estimating things that will occur years into the future. It is within reason that certain locations will come in above estimate, and that others will come in below.
5) In the past if the Company has been either under recovered or overrecovered, we have used reserve reallocation to adjust for such shortage or overage.

Preparer: Courtney Young
Title: Financial Consultant
Department: Capital Asset Accounting
Telephone: 612-330-5897
Date: March 13, 2017

Year	Spend Category	January	February	March	April	May	June	July	August	September	October	November	December	Annual Total
Black Dog														
2017	Characterization / Temporary Services	990												
2017	Worker Access	-												
2017	Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	-												
2017	Asbestos Remediation	-												
2017	Equipment Removal	-												
2017	Boiler(s)	184,107												
2017	Structures Demolition	-												
2017	Backfill / Grade / Landscaping / Well Closure	-												
2017	Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds	-												
2017	Utility Management / Oversight	75,623												
2017	Demolition Contractor Management / Supervisory / Safety Staff	-												
2017	Security	-												
2017	Property Taxes	-												
2017	Shared Heavy Equipment / Operating Engineers	-												
2017	Small Tool Allowance	-												
2017	Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)	-												
2017	Permits	-												
2017	Demolition Contractors Insurance	-												
2017	Demolition Contractors Fee	-												
2017	Contingency	-												
2017	Scrap Credit	(29,040)												
2017	Coal Yard	159,278												
2017	**2017 Total Costs**	**390,959**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Black Dog														
2016	Characterization / Temporary Services	979	3,916	979	1,113	979	979	979	979	990	990	990	1,075	14,948.37
2016	Worker Access	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Asbestos Remediation	-	-	-	-	-	-	-	34,763	(17,381)	-	-	-	17,381.38
2016	Equipment Removal	7,496	-	398	17,799	191	318	68,961	-	-	-	-	-	95,163.05
2016	Boiler(s)	425,263	242,141	243,726	165,953	233,205	289,670	305,935	324,359	328,002	331,877	276,489	324,580	3,491,199.96
2016	Structures Demolition	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Backfill / Grade / Landscaping / Well Closure	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Utility Management / Oversight	81,637	70,910	108,118	52,992	64,621	105,032	115,688	131,161	102,982	133,160	105,418	67,979	1,139,698.16
2016	Demolition Contractor Management / Supervisory / Safety Staff	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Security	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Property Taxes	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Shared Heavy Equipment / Operating Engineers	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Small Tool Allowance	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Permits	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Demolition Contractors Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Demolition Contractors Fee	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Contingency	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	Scrap Credit	-	-	(23,164)	(4,088)	(22,325)	(9,556)	-	(7,840)	(7,042)	(20,772)	(25,262)	(5,377)	(125,425.35)
2016	Coal Yard	96,929	183,747	193,014	240,495	231,557	(9,447)	555,056	131,760	128,394	662,270	1,282,664	1,894,801	5,591,240.33
2016	**2016 Total Costs**	**612,304**	**500,715**	**523,072**	**474,263**	**508,229**	**376,997**	**1,046,618**	**615,182**	**535,944**	**1,107,525**	**1,640,300**	**2,283,058**	**10,224,206**

Forecast Period

Black Dog													
2015 Characterization / Temporary Services	2,006	1,247	2,830	1,031	916	916	2,144	916	1,042	979	(1,958)	979	13,046.77
2015 Worker Access	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	5,233	9,299	2,716	21,808	69,676	24,471	(28,492)	7,801	3,388	29,460	22,137	8,664	176,159.53
2015 Asbestos Remediation	-	-	15,000	19,300	(21,755)	-	-	-	-	26,687	-	(16,190)	23,042.40
2015 Equipment Removal	-	-	-	10,818	127,779	342,351	353,732	471,327	249,702	137,552	91,370	57,630	1,842,259.19
2015 Boiler(s)	-	-	-	-	-	-	53	96,697	127,049	517,630	609,234	485,795	1,836,457.38
2015 Structures Demolition	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Backfill / Grade / Landscaping / Well Closure	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Utility Management / Oversight	66,900	72,425	68,459	97,104	166,325	150,097	163,901	161,765	163,196	191,459	120,675	96,649	1,518,955.36
2015 Demolition Contractor Management / Supervisory / Safety Staff	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Security	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Property Taxes	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Shared Heavy Equipment / Operating Engineers	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Small Tool Allowance	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Permits	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Demolition Contractors Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Demolition Contractors Fee	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Contingency	-	-	-	-	-	-	-	-	-	-	-	-	-
2015 Scrap Credit	-	-	-	-	-	-	(31,059)	(46,185)	(30,796)	(64,636)	(14,672)	(1,703)	(189,050.74)
2015 Coal Yard	65,077	88,218	72,840	91,221	360,858	369,966	644,476	783,443	784,581	1,213,634	163,520	413,583	5,051,418.56
2015 2015 Total Costs	**139,216**	**171,188**	**161,845**	**241,282**	**703,799**	**887,801**	**1,104,754**	**1,475,763**	**1,298,162**	**2,052,765**	**990,305**	**1,045,407**	**10,272,288**

Black Dog

Total	Characterization / Temporary Services	3,975	5,163	3,809	2,144	1,895	1,895	3,123	1,895	2,032	1,969	(968)	2,054	28,984.98
Total	Worker Access	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	5,233	9,299	2,716	21,808	69,676	24,471	(28,492)	7,801	3,388	29,460	22,137	8,664	176,159.53
Total	Asbestos Remediation	-	-	15,000	19,300	(21,755)	-	-	34,763	(17,381)	26,687	-	(16,190)	40,423.78
Total	Equipment Removal	7,496	-	398	28,616	127,970	342,669	422,693	471,327	249,702	137,552	91,370	57,630	1,937,422.24
Total	Boiler(s)	609,370	242,141	243,726	165,953	233,205	289,670	305,988	421,056	455,051	849,507	885,723	810,374	5,511,764.60
Total	Structures Demolition	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Backfill / Grade / Landscaping / Well Closure	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Utility Management / Oversight	224,160	143,335	176,577	150,096	230,946	255,129	279,589	292,926	266,178	324,619	226,093	164,629	2,734,276.81
Total	Demolition Contractor Management / Supervisory / Safety Staff	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Security	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Property Taxes	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Shared Heavy Equipment / Operating Engineers	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Small Tool Allowance	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Permits	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Demolition Contractors Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Demolition Contractors Fee	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Contingency	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	Scrap Credit	(29,040)	-	(23,164)	(4,088)	(22,325)	(9,556)	(31,059)	(54,025)	(37,838)	(85,407)	(39,934)	(7,080)	(343,515.59)
Total	Coal Yard	321,284	271,965	265,854	331,716	592,416	360,520	1,199,532	915,203	912,975	1,875,904	1,446,184	2,308,385	10,801,936.58
Total	**Total Costs**	**1,142,478**	**671,903**	**684,916**	**715,546**	**1,212,028**	**1,264,798**	**2,151,372**	**2,090,945**	**1,834,106**	**3,160,291**	**2,630,605**	**3,328,465**	**20,887,453**

	Spend Category	2017 - Feb thru Dec	2018	2019	2020	2021	2022	2023	Fcst Total
Black Dog									
	Characterization / Temporary Services	13,750	15,000.00	15,000.00	15,000.00	-	-	-	58,750
	Worker Access	-	-	-	-	-	-	-	-
	Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	-	-	-	-	-	-	-	-
	Asbestos Remediation	50,000	50,000.00	50,000.00	-	-	-	-	150,000
	Equipment Removal	800,000	300,000.00	3,530,000.00	2,000,000.00	-	-	-	6,630,000
	Boiler(s)	595,000	-	2,200,000.00	7,300,000.00	-	-	-	10,095,000
	Structures Demolition	-	3,800,000.00	3,400,000.00	-	-	-	-	7,200,000
	Backfill / Grade / Landscaping / Well Closure	-	-	-	-	-	-	-	-
	Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds	-	-	-	-	-	-	-	-
	Utility Management / Oversight	647,083	1,110,000.00	1,160,000.00	1,060,000.00	157,000.00	104,000.00	99,000.00	4,337,083
	Demolition Contractor Management / Supervisory / Safety Staff	-	-	-	-	-	-	-	-
	Security	-	-	-	-	-	-	-	-
	Property Taxes	-	-	-	-	-	-	-	-
	Shared Heavy Equipment / Operating Engineers	-	-	-	-	-	-	-	-
	Small Tool Allowance	-	-	-	-	-	-	-	-
	Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)	-	-	-	-	-	-	-	-
	Permits	-	-	-	-	-	-	-	-
	Demolition Contractors Insurance	-	-	-	-	-	-	-	-
	Demolition Contractors Fee	-	-	-	-	-	-	-	-
	Contingency	368,092	453,691.10	2,093,505.10	2,223,217.47	159,300.00	136,200.00	144,500.00	5,578,506
	Scrap Credit	(40,000)	-	-	(1,500,000.00)	-	-	-	(1,540,000)
	Coal Yard	2,042,262	3,709,700.00	3,275,815.00	4,551,105.00	424,000.00	400,000.00	240,000.00	14,642,882
	Total Costs by Year	**4,476,188**	**9,438,391**	**15,724,320**	**15,649,322**	**740,300**	**640,200**	**483,500**	**47,152,221**

DOCKET NO. E,G002/D-17-147

INITIAL COMMENTS OF THE OAG

ATTACHMENT C

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

Xcel Energy
Docket No.: E,G002/D-17-147
Response To: Office of the Attorney General Information Request No. 7
Requestor: Ryan P. Barlow
Date Received: March 23, 2017

Question:

For all responses, show amounts for Total Company and the Minnesota retail jurisdiction. Total Company is meant to include costs incurred for both regulated and non-regulated operations and should be separately totaled.

Provide this information in a live Excel spreadsheet with all formulas intact.

Reference: Company response to OAG IR 3

1. The Company explained "while some asbestos removal could be directly assigned, much of it was included in the overall cost to remove different pieces of equipment."

    a. Separately identify the different pieces of equipment in the Black Dog facility which the Company does track removal costs for, including information on which unit the piece of equipment belongs to.

    b. Provide the removal costs for each piece of equipment.

2. Describe the allocation process the Company uses to allocate the Black Dog facility common and station costs to each unit. Provide the allocation amounts that Company used for each TLG Services, Inc. study category in the 2010 study, as well as the 2015 study.

3. Confirm which TLG Services, Inc. study category are included under the Company's "common and station cost" definition.

4. Explain the process used by the Company to ensure actual removal work/costs are reconciled to, or are managed against the cost estimates shown in the TLG Services, Inc. studies. Provide any other information that will assist in understanding the accuracy of the cost estimates provided by TLG Services, Inc.

Response:

1. The Company provides the following:
    a. Please see Attachment A for a list of the pieces of equipment included in the equipment removal category. The boilers also were incorporated into this response but should be compared against the boiler(s) category.
    b. Please see the "Total Estimate" column on Attachment A.
2. In 2015, the common costs were allocated to the operating units at the ratio of the units specifically identified costs compared to the total costs for which specific identification was possible. In 2010, the common costs were allocated to steam and other production based on plant balance, and then to individual units by generating capacity. This method was abandoned in 2015 due to the functional class shift of Unit 2 to other production from steam production. See Table 1 below for the allocating percentages used in each study.

Table 1

	Unit 2	Unit 3	Unit 4	Unit 5
2015 Study	30.6469%	26.4579%	35.3903%	7.5049%
2010 Study	13.5851%	14.9713%	23.5660%	47.8776%

3. The Company allocates all costs that appear under the "Common" and "Station" cost headings on the 5.2 tables provided by TLG services. The Company also allocates the "Contingency" costs as no unit specific information is provided for these.
4. The Company does not manage against the cost estimates provided TLG services when performing removal activities as this is not the intended purpose of the study. The study makes this clear in section 1 Introduction, subsection 1.1 Objective of Study, on page 1 of the section.

> The objective of this dismantling cost study prepared by TLG Services is to present an estimate of the costs to dismantle Xcel Energy's fossil-fueled and wind farm generating electrical generating facilities, plus their gas production and storage facilities, in Minnesota and South Dakota. *This study is not intended to be a dismantling plan for each of the stations, but a cost estimate prepared to support current financial planning for future dismantling.*[Emphasis Added]

The objective of these studies is reasonableness in total; and specifically comparable detail information it is not expected to be provided for or managed to when actual work is done.

Preparer:	Nick Hanson
Title:	Senior Accounting/Financial Analyst
Department:	Capital Asset Accounting
Telephone:	612-330-7850
Date:	April 4, 2017

Label	Unit	Corresponding Category	Total Estimate
Turbine and Associated Electrical	3	Equipment Removal	$3,530,000
Turbine and Associated Electrical	4	Equipment Removal	$1,937,422
Generator Step Up Transformer	3	Equipment Removal	$170,000
Balance of plant equipment		Equipment Removal	$2,930,000
Boiler	2	Boiler(s)	$3,600,000
Boiler	3	Boiler(s)	$5,900,000
Boiler	4	Boiler(s)	$6,106,765

DOCKET NO. E,G002/D-17-147

INITIAL COMMENTS OF THE OAG

ATTACHMENT D

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

Xcel Energy
Docket No.: E,G002/D-17-147
Response To: Office of the Attorney General Information Request No. 4
Requestor: Ryan P. Barlow
Date Received: March 1, 2017

Question:

For all responses show amounts for Total Company and the Minnesota retail jurisdiction unless indicated otherwise. Total Company is meant to include costs incurred for both regulated and non-regulated operations and should be separately totaled.

Reference: Removal Update for Key City, page 11

1) Indicate which parts have been taken from the Key City plant for use in the Granite City plant, including the date part was used, and the market cost for that part.

2) Indicate which parts Xcel intends to take from the Key City plant for use in the Granite City plant in the future, including the projected date part will be used, and the market cost for that part.

3) Explain whether removal costs will increase due to the passage of time (e.g. costs cited by TLG Services, Inc. in the May 2015 study will increase in the next TLG Services, Inc. study).

    a. Indicate which costs will increase, and by how much.

    b. Determine how much these costs have historically increased from the previous four TLG Services, Inc. dismantling studies. Provide these TLG Services, Inc. dismantling studies.

Provide this information in a live Excel spreadsheet with all formulas intact.

Response:

Cost estimates are provided at total Company. The effect that these estimates have on the depreciation expense is then jurisdictionalized in the rate process. Generally, the production costs are assigned approximately 74 % to Minnesota retail.

1) Transfers among facilities within a FERC account are done at the retirement units level or higher, which is the level at which assets are tracked in our Continuing Property Record. The Company does not track minor items (*i.e.*, those that do not rise to the level of retirement unit) in its plant records. Instead, the costs of minor items that are capitalized are assigned to the retirement unit to which the minor item relates. At this time, no retirement units have been transferred from the Key City facility for use at the Granite City facility. Asset values are recorded (down to the retirement unit level) using historical cost at the point of purchase, net of accumulated reserve. Thus, any transfer within a FERC account from one location to another would be recorded at this amount. The Company does not track the market value of these components.

2) Parts will be transferred to Granite City on an as-needed basis. That is, as components fail the Company will replace them with parts available at the Key City facility to the extent it makes economic sense to do so. We do not currently have a forecast of what components will need to be transferred.

3) The Company contracts with an engineering firm every five years to perform a comprehensive dismantling study on all electric generating plants. The studies, which were filed with the Minnesota Public Utilities Commission in 2010 and 2015, were performed by TLG Services, Inc. (TLG). The main purpose of the Dismantling Study was to estimate the present-day costs for retiring and demolishing the facilities, also known as final removals of existing facilities. We provided a complete list of the assumptions used in the cost estimates with the Dismantling Study.

    a) The Company does not opine on whether costs will increase or decrease as there are numerous variables such as market forces, inflation/deflation, labor costs, scrap credits, changes in technology, etc. that may impact the estimate. These factors are all evaluated when preparing these studies. Thus, the final studies are the best estimates of dismantling at each point in time. The next dismantling study will be filed in 2020.

b) The 2015 and 2010 TLG Dismantling Studies have been included as Attachments A and B, respectively, to this request. There are no dismantling studies prior to 2010 performed by TLG. Table 5.1 within the studies provides a summary of dismantling costs by each generating plant at the total Company level. Currently, the Company does not have any estimate for the removal at Key City beyond the TLG Services estimates used for depreciation recovery. The TLG Services study for the Key City plant after scrap credits in the 2010 filing was $3.3 million (in 2009 dollars) and $4.1 million in the 2015 study (in 2014 dollars). The largest driver of increased costs between the 2010 and 2015 studies for Key City was a determination that the Company would have to remove certain foundations deeper than previously anticipated.

Preparer:	Courtney Young
Title:	Financial Consultant
Department:	Capital Asset Accounting
Telephone:	612-330-5897
Date:	March 13, 2017

Document X01-1617-010, Rev. 1

DISMANTLING COST STUDY

for

Allen S. King Unit 1
Angus Anson Units 1-4
Black Dog Units 2-5
Blue Lake Units 1-4, 7 and 8
Grand Meadow Wind Farm
Granite City Units 1-4
Hennepin Island
High Bridge Units 1-3
Inver Hills Units 1- 6
Key City Units 1-4
Maplewood Gas Plant
Minnesota Valley 1-3
Nobles Wind Farm
Red Wing 1 & 2
Riverside Units 7, 8, 9 and 10
Sherburne County Units 1-3
Sibley Gas Plant
Wescott Gas Plant
Wilmarth 1 & 2

Stations

prepared for

Xcel Energy

prepared by

TLG Services, Inc.
An Entergy Company
148 New Milford Road East
Bridgewater, CT

September 2015

APPROVALS

Project Engineer	Benjamin J. Stochmal	9/2/15
	Benjamin J. Stochmal	**Date**
Project Manager	Francis W. Seymore	9/2/15
	Francis. W. Seymore	**Date**
Technical Manager	Geoffrey M. Griffiths	9/2/2015
	Geoffrey M. Griffiths	**Date**

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APPENDICES

REVISION LOG

Rev. No.	CRA No.	Date	Item Revised	Reason for Revision
1		09/02/2015	Summary of Decommissioning Costs table, Table 5.1, Table 5.2p	Revised cost for ash pond removal at Sherburne County Station

ACRONYMS / DEFINITIONS

- AIF Atomic Industrial Forum
- CT Combustion Turbine
- CCT Combined Cycle Turbine
- DOC Decommissioning Operations Contractor
- DOE Department of Energy
- HRSG Heat Recovery Steam Generator
- Mw Megawatt
- MWe Megawatt (electric)
- NESP National Environmental Studies Project
- NG Natural Gas
- NRC Nuclear Regulatory Commission
- OSHA Occupational Safety & Health Administration
- RDF Refuse Derived Fuel
- TLG TLG Services, Inc.

EXECUTIVE SUMMARY

This report, prepared by TLG Services, Inc. (TLG), provides estimated costs for the complete dismantling of the following electric generating stations, gas storage and production plants operated by Xcel Energy, which either owns or has a share in ownership in each of these facilities:

Generating Stations Located In Minnesota:

- Allen S. King
- Black Dog
- Blue Lake
- Grand Meadow Wind Farm
- Granite City
- Hennepin Island
- High Bridge
- Inver Hills
- Key City
- Minnesota Valley
- Nobles Wind Farm
- Red Wing
- Riverside
- Sherburne County (Sherco)
- Wilmarth

Generating Station Located In South Dakota:

- Angus Anson

Gas production and storage plants (all located in Minnesota):

- Maplewood
- Sibley
- Wescott

The dismantling estimate includes the cost of removing the equipment and structures for each of the above-referenced facilities and limited restoration of the sites. The electrical switchyards are assumed to remain in place and are not included in the estimate.

The scope of the dismantling estimate includes the following significant work activities and labor, equipment, material, and waste disposal cost elements:

- Preparation of the units for safe dismantling

- Abatement of asbestos containing materials prior to dismantling (where applicable)
- Removal and disposition of all installed equipment
- Demolition and disposition of subsurface utilities and buildings and foundations
- Removal of below grade foundations (Minnesota facilities only)
- Coal yard and ash pond remediation (Sherburne County, King, and Minnesota Valley)
- Limited site restoration (grading and seeding for drainage and erosion control)
- Demolition contractor's on-site management, engineering, safety, and administrative staff
- Demolition contractor's expenses, including profit, insurance, permits, and fees
- Owner's on-site management, oversight, and security staff
- A cost credit associated with the disposition of scrap metals
- Cost contingency

The general approach in assembling the estimate was to develop an inventory of equipment and structures designated to be removed for each facility. This inventory was established using site walk-downs (including discussions with the Operations & Maintenance staff), station-provided equipment databases, and plant drawings. This inventory accounted for similarities between facilities.

The abatement, removal, demolition and restoration activity costs are estimated by applying unit factors (developed for each inventory item) against the inventory. Costs for project management, shared equipment and consumables, and similar types of costs are estimated on a period-dependent basis (i.e., the magnitude of the expense depends, in part, on the duration of the project and the types of activities taking place). The potential value of scrap from materials generated in dismantling the plant components and building structural steel is included as a credit in the dismantling cost estimate. Contingency is provided within this estimate to account for unpredictable project events.

OSHA states that demolition involves additional hazards due to unknown factors which make demolition work particularly dangerous. OSHA states that the hazards of demolition work can be controlled and eliminated with the proper planning, the right personal protective equipment, necessary training, and compliance with OSHA standards. This cost estimate is intended to provide sufficient monies to allow Xcel management to perform the project using these principles and standards.

The dismantling costs, expressed in thousands of 2014 dollars, are provided in the following table.

SUMMARY OF DISMANTLING COSTS

(All costs are in thousands of 2014 dollars)

Station	Unit	MWe rating	Type	Fuel	In Service	Station Cost
Electric Generation Facilities						
Allen S. King	1	588	Steam	Coal	1968	56,202
Angus Anson	1		Steam	N/A	1966	10,179
	2	106	CT	NG/Oil	1994	
	3	110	CT	NG/Oil	1994	
	4	165	CT	NG/Oil	2005	
Black Dog	2	98	Steam	Coal/NG	1952	48,458
	3	108	Steam	Coal/NG	1955	
	4	170	Steam	Coal/NG	1960	
	5	162	CT	Coal/NG	2002	
Blue Lake	1	45	CT	NG/Oil	1974	13,716
	2	45	CT	NG/Oil	1974	
	3	45	CT	NG/Oil	1974	
	4	45	CT	NG/Oil	1974	
	7	165	CT	NG/Oil	2005	
	8	165	CT	NG/Oil	2005	
Grand Meadow	1-67	101	Wind	Wind	2008	22,189
Granite City	1	18	CT	NG/Oil	1969	4,423
	2	18	CT	NG/Oil	1969	
	3	18	CT	NG/Oil	1969	
	4	18	CT	NG/Oil	1969	
Hennepin Island	1-5	14	Hydro	Water	1882	6,133
High Bridge	1	160	CT	NG/Oil	2008	13,364
	2	160	CT	NG/Oil	2008	
	3	250	Steam	(note 1)	2008	
Inver Hills	1	60	CT	NG/Oil	1972	10,721
	2	60	CT	NG/Oil	1972	
	3	60	CT	NG/Oil	1972	
	4	60	CT	NG/Oil	1972	
	5	60	CT	NG/Oil	1972	
	6	60	CT	NG/Oil	1972	

SUMMARY OF DISMANTLING COSTS
(continued)

(All costs are in thousands of 2014 dollars)

Station	Unit	MWe rating	Type	Fuel	In Service	Station Cost
Key City	1	18	CT	NG/Oil	1970	4,096
	2	18	CT	NG/Oil	1970	
	3	18	CT	NG/Oil	1970	
	4	18	CT	NG/Oil	1970	
Minnesota Valley	1	10	Steam	Coal	1949	22,063
	2	10	Steam	Coal	1949	
	3	44	Steam	Coal	1953	
Nobles	1-134	201	Wind	Wind	2011	30,794
Red Wing	1	10	Steam	RDF	1949	16,183
	2	10	Steam	RDF	1949	
Riverside	7	165	CCT	(note 2)	1964	34,399
	8	231	Steam	Coal	2009	
	9	173	CT	NG/Oil	2009	
	10	173	CT	NG/Oil	2009	
Sherco	1	750	Steam	Coal	1976	134,433
	2	750	Steam	Coal	1977	
	3	900	Steam	Coal	1987	
Wilmarth	1	10	Steam	RDF	1948	14,195
	2	10	Steam	RDF	1951	
Gas Production/Storage Facilities						
Maplewood					1957	4,563
Sibley					1953	4,135
Wescott					1962	11,419
Fleet Totals		**6,741**				**$461,665**

NOTES:
1 Unit 3 receives steam from Units 1 and 2 HRSGs
2 Unit 7 receives steam from Units 9 and 10 HRSGs

1. INTRODUCTION

1.1 OBJECTIVE OF STUDY

The objective of this dismantling cost study prepared by TLG Services is to present an estimate of the costs to dismantle Xcel Energy's fossil-fueled and wind farm generating electrical generating facilities, plus their gas production and storage facilities, in Minnesota and South Dakota. This study is not intended to be a dismantling plan for each of the stations, but a cost estimate prepared to support current financial planning for future dismantling.

1.2 FACILITY DESCRIPTIONS

Electric Generation Facilities

Allen S. King is a single unit coal fired generating facility with a cyclone-fired boiler. It has a generating capacity of 588 MWe while burning low sulfur Wyoming coal. The plant is located in Oak Park Heights, Minn., on the St. Croix River. The unit was installed in 1968. From 2004 to 2007 the unit was completely refurbished as part of an emissions reduction project.

Angus Anson is a three unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. Units 1 and 2 were placed in service in 1994. Unit 3 was placed in service in 2005. The station generating capacity is 381 megawatts. Unit 1, 2 and 3 are rated at 106, 110 and 165 MWe, respectively. The station is located in Sioux Falls, South Dakota adjacent to the decommissioned Pathfinder nuclear facility. The existing Pathfinder facility holds the remnants of the test nuclear power plant (minus the reactor) built in 1965.

Black Dog is a coal and gas fired generating station located on the Minnesota River just south of the Twin Cities. Unit 5, which is a natural gas fired combined cycle combustion gas turbine, replaced the original Unit 1 boiler and steam turbine. The exhaust heat from Unit 5 gas turbine generates steam in the HRSG and powers the original Unit 2 steam turbine that was installed in the 1950's. Units 3 and 4 were dual fuel boilers with steam turbines, using coal as a primary fuel and natural gas for back up. Unit 2, 3, 4 and 5 are rated a 98, 108, 170, and 162 MWe, respectively. Units 2, 3 and 4 were installed during the 1950's. Unit 5 was placed in service in 2002. Units 3 and 4 were retired in April, 2015. The station generating capacity is currently 260 MWe, the generating

equipment assumed in place for this estimate had a combined capacity of 538 MWe.

Blue Lake is a six unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 510 megawatts. Units 1-4 are rated at 45 MWe each. Units 7 and 8 are rated at 165 MWe each. The station is located in Shakopee, Minnesota along the Minnesota River. Units 1-4 were placed in service in 1974. Units 7 and 8 were placed in service in 2005.

Grand Meadow is a 67 unit wind turbine complex located in a stretch of farm fields six miles long and four miles wide. The farm is spread out over roughly 10,000 acres southeast of Interstate 90 in Grand Meadow, Clayton, and Dexter Townships, Mower County, Minnesota. Each wind turbine / generator set has a rated capacity of 1.5 MWe, for a complex total of 100.5 MWe. The units were placed in service in 2008.

Granite City is a four unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 72 megawatts with each of the four units rated at 18 MWe. The station is located in St. Cloud, Minnesota. The units were installed in 1970.

Hennepin Island is a hydroelectric power plant located on the Mississippi River in Minneapolis MN, on the west side of Hennepin Island. The station consists of five turbine-generator sets, and has a combined generating capacity is 13.9 megawatts. The plant was installed in 1882; it was last refurbished in 1954.

High Bridge is a three unit facility consisting of two combined cycle combustion gas turbines and one steam turbine. The combustion turbines are each direct coupled to a 160 MWe electric generator. The exhaust gas of each combustion turbine is ducted through its own HRSG. The steam from the HRSG is piped to a 250 MWe steam turbine. The station has a net dependable capacity of 570 MWe. The station was placed in service in 2008. It is located in downtown St. Paul, Minnesota, on the Mississippi River.

Inver Hills is a six unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 360 megawatts. Units 1-6 are rated at 60 MWe each. The station is located in Inver Grove Heights, Minnesota. The units were placed in service in 1972.

Key City was a four unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity was 72 megawatts with Units 1-4 at 18 MWe each. The station is located in Mankato, Minnesota. The units were installed in 1970, and retired in March of 2015.

Minnesota Valley is a three unit facility abandoned in place. The station consists of two 10 MWe and one 46 MWe coal fired units. The station is located in Chippewa County, Granite Falls, Minnesota. The two 10 MWe units were installed in the late 1940's. The third unit was installed in 1953. The station was retired from service in 2003.

Nobles is a 134 unit wind turbine complex located in the Buffalo Ridge area of Minnesota. The wind farm is spread out over roughly 42 square miles in Nobles County, Minnesota, in Olney, Dewald, Larkin, and Summit Lake townships. Each wind turbine / generator set has a rated capacity of 1.5 MWe, for a complex total of 201 MWe. The units were placed in service in 2011.

Red Wing is a two unit generating facility that burns processed municipal solid waste, referred to as refuse-derived fuel (RDF). The station employs a combination duct scrubber with a baghouse to effectively cut emissions from burning RDF. The scrubber treats flue gas with a water spray and dry lime. The baghouse traps particulate by forcing gas streams through large filter bags. The generating capacity of each unit is 10 MWe. The station is located in Red Wing, Minnesota. The units were installed in the early 1950's (coal fired units) and later modified to burn RDF.

Riverside is a three unit facility consisting of two combined cycle combustion gas turbine generators (Units 9 and 10) and one steam turbine (refurbished Unit 7 steam turbine). The combustion turbines are each direct coupled to a 173 MWe electric generator. The exhaust gas of each combustion turbine is ducted through its own HRSG. The steam from the HRSG is piped to the Unit 7 165 MWe steam turbine. Abandoned in place, and included in this estimate, are the retired Units 6, 7 and 8 boilers, and the Unit 8 steam turbine with all its associated piping and system components. The three operational units went into service in 2009. The station is located northeast of Minneapolis on the Mississippi River.

Sherburne County (Sherco) is a three unit 2,400 MWe coal-fired facility. The station is located in Becker, Minnesota, 45 miles northeast of the Twin Cities, on the Mississippi River. Units 1, 2 and 3 have a net dependable capacity of 750, 750 and 900 MWe each, respectively. The units were installed in 1976, 1977, and 1987.

Wilmarth is an electric generating facility that burns RDF. The station employs a combination duct scrubber with a baghouse to effectively cut emissions from burning RDF. The scrubber treats flue gas with a water spray and dry lime. The baghouse traps particulate by forcing gas streams through large filter bags. The generating capacity of Unit 1 and 2 is 10 MWe each. The station is located in Mankato, Minnesota. The units were installed in the early 1950's and modified in 1987 to burn RDF.

Gas Production/Storage Facilities

Maplewood is a propane storage facility with an effective propane storage capacity of 1.355 million gallons. The plant, located in Maplewood, Minnesota, was placed in-service in 1957.

Sibley is a propane storage facility used to supplement natural gas supplies during peak demand periods, with an effective propane storage capacity of 1.2 million gallons. The plant, located in Mendota Heights, Minnesota, was placed in service in 1953.

Wescott is a liquefied natural gas and propane peak-shaving plant. The facility collects and stores propane and natural gas for future supply to the local propane and natural gas distribution systems during cold winter periods when regional natural gas and propane supplies may not meet the increased demand. The facility is located in Inver Grove Heights, Minnesota, and was completed in 2000.

1.3 SCOPE

The scope of the dismantling estimate includes the following significant cost elements:

- Preparation for safe dismantling;
  - Hazardous materials characterization for such items as ACM (asbestos-containing materials), lead, mercury, PCBs, hydrocarbons in soil, etc.
  - Isolation of the units in preparation for safe dismantling (e.g. ensuring systems are de-energized, fuel and chemical storage tanks are drained and cleaned, etc. (where applicable))
- Abatement of ACM prior to dismantling (where applicable)

- Labor, equipment, and material costs associated with the removal and disposition of all installed equipment
- Labor, equipment, and material costs associated with the demolition and disposition of buildings and foundations
- Demolition contractor's on-site management, engineering, safety, and administrative staff
- Demolition contractor's expenses, including insurance, permits, and fees.
- Owner's on-site management, oversight, and security staff
- A cost credit associated with the disposition of scrap metals
- Cost contingency
- Ongoing environmental monitoring of the facilities after the completion of the dismantling and demolition

Costs are provided for each generating station or facility, identified by significant cost element. The cost per station includes the costs for dismantling the generating unit and the common station facilities. Costs are provided in 2014 dollars.

1.4 GENERAL APPROACH

The general approach in assembling the estimate was to develop an inventory of equipment and structures designated to be removed for each facility. This inventory was established using site walk-downs (including discussions with the Operations & Maintenance staff), station-provided equipment databases, and plant drawings. This inventory accounted for similarities between facilities.

The abatement, removal, demolition and restoration activity costs are estimated by applying unit factors (developed for each inventory item) against the inventory. Costs for project management, shared equipment and consumables, and similar types of costs are estimated on a period-dependent basis (i.e., the magnitude of the expense depends, in part, on the duration of the project and the types of activities taking place). The potential value of scrap from materials generated in dismantling the plant components and building structural steel is included as a credit in the dismantling cost estimate. Contingency is provided within this estimate to account for unpredictable project events.

OSHA states that demolition involves additional hazards due to unknown factors which make demolition work particularly dangerous. OSHA states that the hazards of demolition work can be controlled and eliminated with the

proper planning, the right personal protective equipment, necessary training, and compliance with OSHA standards. The cost estimate is intended to provide sufficient monies to allow Xcel management to perform the project using these principles and standards.

Limited site landscaping is included, which covers grading and seeding for drainage and erosion control.

Section 2 of this report identifies the activities and sequence of activities necessary to dismantle a generating station. Section 3 provides the specific bases for the estimate. Section 4 discusses scrap metal and associated credits to the dismantling costs. Section 5 provides the results. Appendices, noted throughout this report, provide additional information important to understanding this estimate.

2. DISMANTLING OPERATIONS

The estimate for dismantling the stations is based on the complete removal of the units and common station facilities (except where noted). The following sections describe the project organization, basic activities, and special equipment necessary for accomplishing the dismantling project.

The actual dismantling program begins once the station owner has decided to dismantle the site, either immediately following final shutdown, or after a period of storage following final shutdown. The dismantling program has been organized into three distinct periods: Period 1 - Engineering/Planning and Asbestos and Other Hazardous Material Abatement (if necessary); Period 2 - Dismantling Operations; and Period 3 - Site Restoration. This section summarizes the activities performed under each Period of the program.

For the purposes of this estimate it is assumed that once the decision to dismantle has been made and a project start date established, the work in each of these periods will be completed successively (no delay between periods). This report does not attempt to describe all of the activities necessary to dismantle a station, but identifies representative activities appropriate to this type of project.

2.1 PRE-SHUTDOWN ACTIVITIES

The estimates include a planning staff for a year prior to final shutdown to plan for the dismantling program. A staff of seven full-time equivalent personnel is included in this estimate; smaller stations will have a reduced staffing amount.

2.2 POST-SHUTDOWN PLANT STAFF TRANSITION ACTIVITIES

The estimate is based on each station being shut down and placed into a post-shutdown configuration by the plant staff. The length of time that the facility is in this configuration is indeterminate and the costs for maintaining the facility in this configuration is not included within the scope of this dismantling effort. The activities to be completed post-shutdown, but prior to station dismantling, include:

- Removal of consumables and supplies not needed in the post-shutdown configuration
- Removal of residual fuels (including oil/coal)
- Removal of acids and caustics; flushing and cleaning of storage tanks

- Disposition of surplus bulk chemicals and gas storage containers
- Removal of miscellaneous hazardous wastes and combustible materials
- Installation of any appropriate physical barriers (sealing circulating water system) and/or security barriers

The estimate does not account for an extended period of time between final shutdown of the unit(s) and onset of the dismantling program. As such, the plant operations and maintenance staff would be expected to perform the following activities in the interval of time between final plant shutdown, and the onset of the dismantling program.

- If the unit is to be maintained in a condition where lighting, electricity, heating, water, sanitary, and similar services are to remain active, reconfigure these systems to minimize maintenance requirements
- Maintenance of the facility (maintaining roofs and windows, drain systems, and electrical systems to preclude creating hazardous working conditions in the future)

2.3 DISMANTLING ENGINEERING / PLANNING AND ASBESTOS ABATEMENT

When the decision is made to begin physical dismantling of a station, Xcel Energy will begin field dismantling activities, beginning with engineering and planning, and removal of asbestos and other hazardous materials from the station.

2.3.1 Engineering and Planning

A preliminary planning phase of the program begins once it is has been determined that a station will be dismantled and the project has been authorized to proceed. During this phase, the owner assembles its dismantling management organization, makes appropriate decisions regarding the extent of dismantling and the approach to managing the activities, and accomplishes those site preparation activities necessary to transition from a plant shutdown configuration to site dismantling. For purposes of this estimate it is assumed that the intent is to dismantle the entire station as a single project. Costs incurred during this preliminary phase of the program are included in the dismantling costs presented in this study.

Xcel Energy prepares the stations for dismantling by performing the following activities:

- Prepare specifications that identify and describe the objectives and major work activities to be accomplished (establishing the final site configuration)
- Assemble plant documentation that may be relevant to dismantling (drawings, hazardous material reports, environmental studies, etc.)
- Select an asbestos abatement contractor (if required) and Dismantling Contractor
- Assemble and mobilize the management and oversight team responsible for the project
- Documenting hazardous materials location and inventory

2.3.2 Asbestos / Hazardous Material Abatement (as applicable)

The asbestos abatement contractor prepares for this work by thoroughly understanding the scope of the asbestos remediation work and obtaining the permits necessary to initiate the work. Abatement of asbestos is considered an important prerequisite to dismantling the station's systems and structures. The method by which asbestos is abated is strictly controlled by federal and/or state regulations and includes the following requirements:

- Work will be done inside enclosures designed to capture any asbestos-containing particles. With the exception of removal of small quantities of asbestos in local areas, it would be expected that most work will be done in large enclosures (containment tents). The enclosures will have a filtered exhaust and be maintained under negative air pressure (air will leak into the enclosure rather than leak out).
- The air outside of the enclosures will be monitored to ensure barriers are effective.
- Workers, while working inside enclosures, will wear respiratory protective equipment as well as protective clothing.
- All materials removed from the enclosure will be packaged in accordance with regulations (minimum double-bag), and will be removed via a materials handling access area.
- Workers will enter and exit the enclosures through a personnel decontamination chamber in a controlled manner (ensuring asbestos contamination does not spread beyond the containment).

- After the asbestos abatement is complete, the effectiveness of the process will be established via regulatory-specified processes (generally verifying that there is no asbestos containing material capable of becoming airborne).
- Asbestos containing materials will be disposed of at a properly licensed disposal facility.
- After ensuring that all asbestos has been removed, the enclosures will be taken down in accordance with regulatory requirements and disposed of at a licensed facility.
- Clean coal-fired boilers by washing down all surfaces interior to the boilers.
- Clean fly-ash handling equipment, e.g., filters and holding tanks.
- De-water ash settling ponds and/or basins.

2.3.3 Dismantling Preparations

The dismantling contractor prepares the station for dismantling by performing the following activities:

- Installing environmental barriers and monitoring equipment
- Reviewing plant drawings and specifications that may be useful for the dismantling project
- Identifying the processes to achieve the final desired station configuration
- Identifying the major work sequence
- Preparing dismantling activity specifications and work orders/forms
- Preparing detailed dismantling procedures
- Preparing a dismantling plan
- Preparing permit application(s) for plant demolition
- Mobilizing site staff
- Configuring temporary services/facilities to support dismantling operations
- Arranging for heavy lift and dismantling equipment, rigging, and tooling
- Hiring and training the labor force

2.4 DISMANTLING OPERATIONS

Dismantling activities are initiated after completing the engineering and planning process, and after asbestos abatement and removal of hazardous materials is complete. The sequence of activities will be determined at the time of dismantling, but typically a sequence would include the following items. Dismantling sequences are presented for each of the Xcel Energy facility types. In all types the station is electrically disconnected from all power sources; the Dismantling Contractor will provide temporary power as needed to support the removal activities.

2.4.1 Steam Plants

- Removing coal yard equipment, including unloading structures, conveyors, transfer towers, and reclaim systems
- Removing above-ground storage tanks
- Removing large equipment from rooftops or at higher elevations
- Removing equipment that must be removed prior to start of boiler structure removal, including fly-ash handling, coal handling, burner fuel supply, scrubbers, air and flue gas ducts, etc.
- Removing electrostatic precipitator and bag houses by cutting casings and connecting gas ducts
- Removing the top of the boiler enclosure to allow access to the platens
- Removing the boiler waterwalls
- Removing steam drum and deaerator by severing all connections and lowering to grade
- Removing boiler structural steel
- Disassembling the turbine/generator and condenser
- Removing all other equipment and components required prior to structures demolition
- Removing the turbine building superstructure and interior floors
- Blasting/dismantling the concrete turbine-generator pedestal(s)
- Removing siding from buildings
- Dismantling steel framing
- Demolishing structural concrete

- Removing the stack(s)
- Removing cooling tower(s) and / or cooling water intake and discharge structures
- Removing all other site structures within the scope of the dismantling program
- Sorting and organizing materials for pickup by the scrap dealer(s)
- Size reducing concrete rubble to remove reinforcing steel
- Removing any temporary services used to support the dismantling effort (lighting / ventilation / electrical / groundwater management)

2.4.2 Combustion Turbines

- Removing above-ground storage tanks
- Removing large equipment from rooftops or at higher elevations
- Disassembling the turbine and generator
- Removing all other equipment and components required prior to building demolition
- Blasting/dismantling the concrete turbine-generator foundation(s)
- Demolishing remaining concrete
- Removing cooling tower(s) and / or cooling water intake and discharge structures (High Bridge only)
- Removing all other site structures within the scope of the dismantling program
- Sorting and organizing materials for pickup by the scrap dealer(s)
- Size reducing concrete rubble to remove reinforcing steel

2.4.3 Internal Combustion Plants

Not applicable for Xcel Energy.

2.4.4 Hydroelectric Plants

- Installing cofferdams at inlet to power channel and discharge channel
- Removing large equipment from rooftops or at higher elevations
- Disassembling and removing the generators

- Disassembling and removing the water turbines
- Removing all other equipment and components required prior to structures demolition
- Removing the powerhouse structure and interior floors
- Blasting/dismantling the concrete turbine-generator foundations
- Dismantling steel framing
- Demolishing brick walls and structural concrete
- Removing all other site structures within the scope of the dismantling program
- Sorting and organizing materials for pickup by the scrap dealer(s)
- Size reducing concrete rubble to remove reinforcing steel

2.4.5 Wind Turbines

- Removing turbine blades from turbine shaft
- Removing turbine-generator housings from towers
- Removing towers from foundations
- Removing all other equipment and components required prior to structures demolition
- Blasting/dismantling the concrete tower foundations
- Excavating and removing all buried electrical cables
- Removing all other site structures within the scope of the dismantling program
- Sorting and organizing materials for pickup by the scrap dealer(s)
- Size reducing concrete rubble to enhance its suitability for backfill

2.4.6 Photovoltaic Plants

Not applicable for Xcel Energy.

2.5 SITE RESTORATION

Site restoration activities are initiated following completion of the dismantling operations. The objective of site restoration in this estimate is to restore the station grounds to a configuration that does not pose a

safety hazard; and plant vegetation for erosion control. As such, landscaping will be limited to grading, placement of top soil, and seeding. Site restoration as used in this estimate is not intended to re-configure the station for redevelopment, e.g. use as a recreational or industrial facility.

A typical site restoration sequence would be:

- Crush all concrete rubble and remove reinforcing steel. Concrete debris will be shipped off site for disposal as construction debris. Reinforcing steel will be recycled
- Backfill below grade voids with clean compactible fill as necessary
- General grading of the station
- Placement of top soil or other suitable surface material necessary to maintain erosion control
- Landscaping to the extent necessary to re-vegetate the station (grass or similar plant materials), and
- Demobilizing personnel and equipment

3. COST ESTIMATE

The basis, methodology, and assumptions for the site-specific cost estimate are described in the following paragraphs.

3.1 BASIS OF ESTIMATE

Inventory of Materials to be Removed

The inventory is an essential element of the estimate, since dismantling costs are determined by applying unit cost factors against the corresponding inventory quantities. For each of these estimates a site-specific inventory of materials to be removed was developed using a combination of methods. The inventory used in developing the estimate for each station is provided in Appendix A.

Comparable Boiler / Turbine Unit Information Available to TLG Where TLG had previously developed inventory information for a boiler and turbine of similar size, fuel type and vintage, referred to as "reference unit", this information was used to represent the boiler / turbine systems inventory for the comparable Xcel Energy unit. In the same manner, non-steam power facilities were also used as reference units for other, similar Xcel Energy facilities. The inventory was adjusted to reflect the difference between the rating of the Xcel Energy reference unit and the rating of the comparable unit.

There are expected differences in other facilities, even if the power generating equipment are similar between comparable units. These include systems and structures associated with cooling water intake and discharge, fuel handling, exhaust gas, maintenance buildings and shops, pollution-control, and the quantity and extent of asbestos containing material (if applicable). For these systems and structures TLG developed the inventory by conducting a walk-down of the station, and extracting information from station-specific drawings and photos.

Comparable Plant Information Not Available to TLG Where the Xcel Energy unit(s) had no comparable match in the TLG database, the site specific inventory was developed "from scratch", by completing a physical walk-down of each such unit, discussions with the stations' Operations & Maintenance staff, and extracting data from station-specific maintenance databases (lists of equipment), drawings, and photos.

Economic Cost Drivers

In developing an estimate, the cost of labor, equipment and material, credit for scrap, and similar costs will influence the results of the estimate. The basis for the significant cost drivers are:

1. Craft labor rates are based on existing contracts with craft labor contractors. These rates were provided by Xcel Energy (Ref. 1).
2. Utility labor rates are based on current labor costs for positions likely to be employed during the dismantling project. These rates were provided by Xcel Energy (Ref. 2).
3. Material and equipment costs for conventional demolition and/or construction activities, Contractors Insurance, Small Tools Allowance, Permit / Fees, and Contractor's Fee are based on R.S. Means Construction Cost Data (Ref. 3).
4. Scrap metal prices are based on published indices (Ref. 4).
5. Contingency, contractor fee, contractor insurance, environmental sampling, and permits & fees are based upon R.S. Means Construction Cost Data.
6. Costs in this estimate are in 2014 dollars.
7. Property taxes (or payments in lieu of taxes) are not included within the estimate.
8. The estimate to dismantle the stations does not address credit associated with the residual value of the land.

Project Organization

For the purposes of this study, the dismantling project for each station is assumed to be managed by Xcel Energy's Project Director, who would have the primary responsibility for dismantling the station. A Dismantling Contractor, experienced in dismantling similar facilities, would be hired as the prime contractor for the removal of plant components and site facilities. The Dismantling Contractor's Project Manager would report to the Project Director. The Dismantling Contractor would manage and supervise the dismantling activities of the station and be responsible for completing the work in an expeditious and safe manner. Contractor personnel would manage and direct the labor force in accordance with approved procedures and in accordance with a health and safety program. The owner's staff would maintain and/or provide the engineering, safety, and environmental compliance oversight, and the security services necessary to support dismantling operations. Figures 3.1 and

3.2 identify typical organizations for the plant/utility staff and the associated contractor personnel during the dismantling phase of the project. The smaller facilities included within this estimate would have a commensurately smaller project organization (Angus Anson, Blue Lake, Grand Meadow, Granite City, Inver Hills, and Key City).

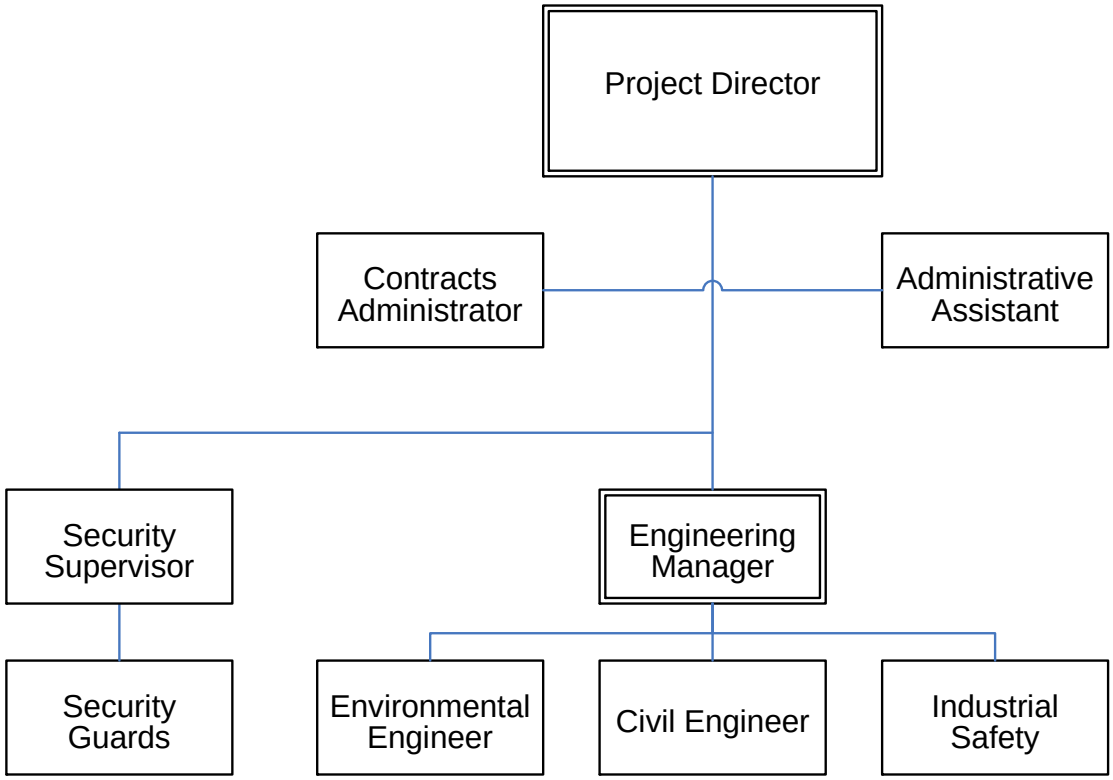
3.2 METHODOLOGY

The methodology used to develop the cost estimate follows the basic approach presented in the AIF/NESP-036, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates" (Ref. 5) and the US DOE "Decommissioning Handbook" (Ref. 6). These publications utilize a unit factor method for estimating decommissioning activity costs to simplify the estimating calculations. Unit cost factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/in) are developed from the labor cost information from R. S. Means. The activity-dependent costs are estimated using item quantities (cubic yards, tons, inches, etc.) developed from plant drawings and inventory documents. The unit factors used in this study reflect the latest available information on worker productivity in plant dismantling. A sample unit cost factor is provided in Appendix B. A list of unit cost factors is provided in Appendix C.

An activity duration critical path is developed to determine the total dismantling program schedule. This program schedule is then used to determine the period-dependent costs for program management, administration, field engineering, equipment rental, quality assurance, and security. TLG estimated typical salary and hourly rates for personnel associated with period-dependent costs. The costs for conventional demolition of structures, materials, backfill, landscaping, and equipment rental are obtained from R.S. Means. Examples of such unit factor development are presented in AIF/NESP-036.

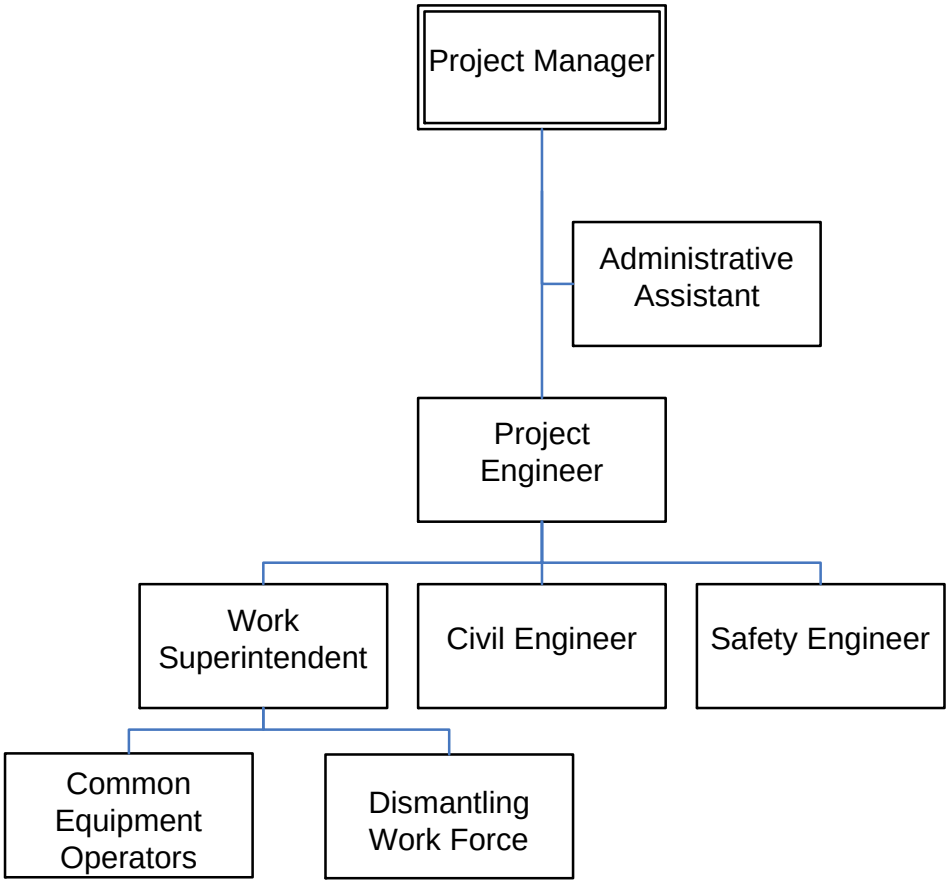
The unit cost factor method provides a demonstrable basis for establishing reliable cost estimates. The detail of activities for labor costs, equipment and consumables costs provide assurance that cost elements have not been omitted. Detailed unit cost factors, coupled with the site-specific inventory of piping, components and structures provide confidence in the cost estimates.

FIGURE 3.1
DISMANTLING PROJECT ORGANIZATION
UTILITY STAFF



For a large station such as Sherburne County, this represents a full-time equivalent staffing level of six personnel. This value is reduced for smaller stations.

FIGURE 3.2
DISMANTLING PROJECT ORGANIZATION
DECOMMISSIONING CONTRACTOR STAFF



For a large station such as Sherburne County, this represents a full-time equivalent staffing level of 11.5 personnel. This value is reduced for smaller stations.

The activity-dependent and period-dependent costs are combined with applicable collateral costs to yield the direct decommissioning cost. A contingency is then applied. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook" (Ref. 7) as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this estimate are based on ideal conditions; therefore, a contingency factor has been applied.

Examples of items that could occur but have not otherwise been accounted for in this estimate include: labor work stoppages, bad weather delays, equipment/tool breakage, changes in the anticipated plant shutdown conditions, etc. These types of unforeseeable events are discussed in the AIF/NESP-036 study. Guidelines are also provided for applying contingency.

3.3 ASSUMPTIONS

The following assumptions were used in developing the dismantling estimate.

Pre-requisite Activities

1. Dismantling of the station will not commence until all units are retired (cost estimate is not based on independent dismantling of units while adjacent units are operating).
2. The arrangements of the unit facilities as they exist in 2014 based upon walk-downs conducted by TLG, and databases and drawings provided by owner.
3. The dismantling process will be an engineered process with substantial consideration for occupational (worker) safety.
4. The demolition will be performed by a Dismantling Contractor who is responsible to provide adequate staff and equipment to complete the dismantling in a safe manner.
5. Site security costs to restrict access to the demolition project by unauthorized personnel are included.
6. The estimates are based on industrial safety and environmental regulations effective in 2014.
7. All power to the structures will be disconnected prior to beginning removal activities ("Cold and Dark"). The Decommissioning Contractor

will provide for temporary power as needed to support dismantling activities.

8. Ash ponds will be dewatered and closed after shutdown.

9. On-site fuel inventories will be used and/or removed prior to start of dismantling.

9. Silos, precipitators, hoppers, tanks, etc., will be emptied by operations and maintenance staff after shutdown.

10. Acids, caustics, and similar hazardous materials will be removed by operations and maintenance staff after shutdown.

11. Consumables, such as ion exchange materials and filters, will also be removed by operations and maintenance staff after shutdown.

12. Stores, spare parts, gas storage containers, laboratory equipment, office furniture, etc., will be removed by the owner after shutdown.

13. Oils used in station transformers are PCB-free. Lubricating and transformer oils are drained and removed by operations and maintenance staff after shutdown.

14. Asbestos (if present) will be removed prior to the start of dismantling. Asbestos insulation and PACM (presumed asbestos containing materials) will be disposed of at licensed facilities. Quantities of asbestos are based on owner-provided information where available. Where such information was not available, the quantities of asbestos were estimated.

15. Prior to initiating dismantling, essentially all live circuits will have been de-energized (to preclude creating an industrial hazard). If required, temporary services systems (air, water, electrical, fire water, etc.) will be used to support dismantling operations and will remain in service throughout the project until no longer required.

<u>Economic Assumptions</u>

16. Post-shutdown "dormancy" costs (i.e., security and maintenance on any of the units retired prematurely) are not included in the study.

17. Escalation/inflation of the costs over the remaining operating life is not included.

18 An allowance of 2% of craft labor costs is used for small tools.

19. A 12.5% fee is added to the Demolition Contractor's cost to account for its overhead and profit.
20. A 25% contingency is applied to asbestos remediation activities.
21. A 15% contingency is applied to all remaining dismantling-related costs.
22. An allowance has been included for post-dismantling environmental monitoring costs (where applicable).
23. A credit for scrap metal cost recovery is included in the estimates. Retired plant equipment is assumed to have no value as salvage (sold for re-use).

Physical Work Assumptions

24. The costs for disposition (if required) of contaminated soil (e.g., PCBs, hydrocarbons, lead, asbestos, mercury, acids or caustics) are outside the scope of this estimate.
25. Large equipment and components will be removed prior to structures demolition.
26. An environmental hazards crew will be maintained throughout the demolition period to address such items as lead paint and asbestos that was inaccessible during the asbestos remediation period (where applicable).
27. Turbine pedestals and powerhouse building foundations will be removed by controlled blasting and back-filled to grade.
28. Structures and foundations will be removed to a depth of three feet below grade, with any resulting voids back-filled to grade level.
29. Chimney stacks will be blasted to the ground and broken into rubble, the steel liners cut and removed, and the foundations control-blasted to break the concrete in place so that groundwater drainage is provided.
30. The dismantling of the electrical equipment terminates at the switch yard boundary. The switch yard is left intact.
31. Concrete rubble generated during dismantling will be crushed, reinforcing steel removed, and the concrete disposed of offsite as construction debris.
32. The site will be graded; however, no effort was included in this estimate to restore the original contour of the land. Ground cover will be established for erosion control.

33. Roads, parking lots, etc., are removed after the facility is dismantled (with the exception of the immediate area around the switchyard).

Scheduling Assumptions

34. All work is performed during an eight-hour workday, five days per week, with no overtime.
35. Multiple crews work parallel activities to the maximum extent possible, consistent with efficiency (adequate access for cutting, removal, and laydown space) and with industrial safety appropriate for demolition of heavy components and structures.
36. Scheduling was calculated without constraints on availability of labor, equipment, or materials.

3.4 STATION-SPECIFIC NOTES

3.4.1 Allen S. King

- All currently operational coal handling equipment and the abandoned-in-place coal barge unloader facility with the twenty-two dolphin-type barge piers are included in the estimate.
- A cofferdam will be installed to allow removal of the condenser cooling water discharge structure and the discharge structure from the cooling tower.
- The boiler and precipitator will be cleaned prior to dismantling.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.
- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM).
- The soil beneath the area of the coal pile will be removed to a depth of five feet; the soil will be disposed of offsite as hazardous material.
- The ash pond will be backfilled with clean fill prior to placement of the closure cap.

3.4.2 Angus Anson

- The Pathfinder Unit 1 building has been included in this estimate.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.
- Concrete will be removed to three feet below grade.
- Four large oil storage tanks are included in the estimate.

3.4.3 Black Dog

- The abandoned-in-place Unit 2 boiler and chimney, and the original Unit 3 chimney are included in the estimate.
- All currently operational coal handling equipment e.g. conveyors, rail car unloader, transfer towers, stacker conveyor etc. are included in the estimate.
- A cofferdam will be installed to remove the intake condenser cooling water structure.

3.4.4 Blue Lake

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- Two large oil storage tanks are included in the estimate. Cleaning of these tanks is included.

3.4.5 Grand Meadow Wind Farm

- All underground power and control cables will be excavated and removed.
- Tower foundations are completely removed.
- All access roads surfaces will be excavated and removed. The excavated areas will be back-filled with soil.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.6 Granite City

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- Two large oil storage tanks are included in the estimate. Cleaning of these tanks is included.

3.4.7 Hennepin Island

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- The estimate does not include dam or earthworks.
- Inlet channel to turbines will be backfilled.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.

3.4.8 High Bridge

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- A cofferdam will be installed to remove the river intake and discharge structure.

3.4.9 Inver Hills

- The oil storage facilities which include 3-ten million gallon oil storage tanks are included in this estimate. Cleaning of these tanks is included.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.10 Key City

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- Two large oil storage tanks are included in the estimate. Cleaning of these tanks is included.

3.4.11 Maplewood Gas Plant

- Facility includes multiple liquefied natural gas storage tanks.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.12 Minnesota Valley

- All three of the abandoned in-place units are included in the estimate.

- The asbestos quantities were calculated considering unit three to be all asbestos and Units 1 and 2 to only have small amounts on the partially dismantled boilers.
- A cofferdam will be installed to remove the river intake and discharge structure.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- The boiler and precipitator will be cleaned prior to dismantling.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.
- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM).
- The soil beneath the area of the coal pile will be removed to a depth of five feet; the soil will be disposed of offsite as hazardous material.
- The ash pond will be backfilled with clean fill prior to placement of the closure cap.

3.4.13 Nobles Wind Farm

- All underground power and control cables will be excavated and removed.
- Tower foundations are completely removed.
- All access roads surfaces will be excavated and removed. The excavated areas will be back-filled with soil.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.14 Red Wing

- The RDF unloading facility and the conveyor transport system are included in the estimate.
- A cofferdam will be installed to remove the cooling water intake and discharge structure.
- The barge unloading facility in not included in the estimate.
- The boiler and precipitator will be cleaned prior to dismantling.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.

- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM).

3.4.15 Riverside

- Included in this estimate are the following abandoned-in-place facilities and equipment:
    - Unit 6, 7 and 8 building structure
    - Unit 6 and 7 boilers
    - Unit 8 boiler, turbine and associated equipment
- Cofferdams will be installed to remove the four cooling water intake and discharge structures.
- Includes barge unloading dock and concrete piles.
- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM).

3.4.16 Sherburne County

- All coal handling facilities e.g. coal barn, rail car dumper building, coal yard control and maintenance facility, earthen storage berms, conveyor systems, transfer towers etc. are included in this estimate.
- All warehouse/storage type buildings on the site are included in the estimate.
- A cofferdam will be installed to remove the cooling water intake and discharge structure.
- The boiler and precipitator/baghouse will be cleaned prior to dismantling.
- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM) – Units 1 and 2 only.
- The soil beneath the area of the coal pile will be removed to a depth of five feet; the soil will be disposed of on site in the ash pond.
- The ash pond will be backfilled with coal yard soil prior to placement of the closure cap.
- Some of the planning for Sherburne County includes a unit shutdown with the other units remaining in operation for a number of years. In this event, the costs in Table 5.2p, for the shutdown unit only, should be increased by some fraction to allow for constraints on demolition activities on the shutdown with the other units operational. Based

upon discussions with Xcel Energy personnel, an increase of 20% can be used for planning purposes.

3.4.17 Sibley Gas Plant

- Facility includes multiple liquefied natural gas storage tanks.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.18 Wescott Gas Plant

- Facility includes two large insulated liquefied natural gas storage tanks, and two large propane storage tank.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.19 Wilmarth

- The RDF bulk storage facility is not included in the estimate. Only the transport section of the facility with conveyor systems and transfer towers.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- The boiler and precipitator will be cleaned prior to dismantling.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.
- Rockbestos-insulated electrical cabling and other ACM in cable trays (all cable trays & cabling disposed of as ACM).

4. SCRAP METAL CREDITS

The dismantling of a typical fossil plant occurs after a lengthy plant operating life. The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Xcel Energy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that buyers prefer equipment stripped down to very specific requirements before they would consider purchase. This can require expensive work to remove the equipment from its installed location, which is inconsistent with the rapid dismantling approach assumed in this estimate. Since placing a salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall cost of dismantling, this analysis does not attempt to quantify the value that an owner may realize based upon those efforts.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property is removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts are made available for alternative use.

The materials used in the equipment and buildings are suitable for recycle as scrap metals. As such, an estimated value of the scrap metal credit has been developed and applied to each station's cost estimate. The value of scrap was estimated using current market values extracted from published sources and applying this value to the estimated quantities of materials generated from the dismantling project. There were four basic types of metals used in the scrap estimates; carbon steel (the most common material used at the station), copper, stainless steel (high alloy steel) and aluminum. The scrap credit, in addition to considering the quantity and types of materials, also considered the cost of handling and transporting these materials to a major scrap processing location in the Twin Cities area where scrap is used or sold. The value of the scrap is reduced by the transportation costs.

The basis for scrap metal value is summarized in Table 4.1. A summary of the basis for the scrap credit is provided in Tables 4.2 which details the scrap quantities by material type from each unit, and Table 4.3 lists the dollar value of these quantities.

TABLE 4.1
BASIS FOR SCRAP METAL VALUE
(2014 dollars)

Type of Material	Scrap Category [1]	Market Value [2]	Units	Transport Cost [3]	Scrap Metal Credit [4] (per ton)
Carbon Steel	Cast Iron	269.76	Per Ton	41.10	228.67
	No. 1	337.21	Per Ton	41.10	296.11
	Mixed Scrap	269.77	Per Ton	41.10	228.67
	Galvanized	70.24	Per Ton	41.10	0.00
Stainless Steel	SS-1	1.03	Per Pound	0.02	2,015.97
Copper	Insulated Cable	1.75	Per Pound	0.02	3,448.92
	No. 2 Copper	2.79	Per Pound	0.02	5,543.60
	Copper-Nickel	5.12	Per Pound	0.02	10,203.41
	Large Motor	0.42	Per Pound	0.02	796.51
Non-Ferrous	Aluminum	0.33	Per Pound	0.02	613.31

Note 1: Scrap categories are consistent with information provided in Recycler's World

Note 2: The market value for scrap metal used in this estimate is based on Recycler's World U.S. Scrap Metal Index Spot Market Prices. Values shown represent the average over a 5-year period from January 1, 2010 to December 31, 2014.

Note 3: The estimated cost for handling and transporting the materials to a major scrap processing center in the Twin Cities area is $41.10 / ton or $0.021 / pound.

Note 4: The scrap metal credit reflects the market value of scrap adjusted for handling and transport cost to local scrap metal recycler.

TABLE 4.2
QUANTITY OF SCRAP METALS BY STATION
(pounds)

	Carbon Steel			Stainless Steel	Galvanized	Copper			Copper		
Station Name	**Cast Iron**	**No. 1**	**Mixed Scrap**	**SS-1**	**Steel**	**Insul Cbl**	**No. 2 Cu**	**Large Mtr**	**Nickel**	**Aluminum**	**Total**
Allen S . King	2,976,846	41,253,822	53,751,220	231,075	1,010,675	157,197	590,394	1,816,821	515,763	-	102,303,814
Angus Anson	944,532	7,869,287	10,367,485	366,129	262,382	62,845	555,614	235,889	90,000	-	20,754,163
Black Dog	2,434,233	30,461,484	52,799,508	990,598	1,025,647	270,288	459,962	2,588,984	365,615	-	91,396,320
Blue Lake	562,895	7,151,454	16,794,779	471,749	151,311	66,137	534,704	167,052	-	-	25,900,081
Grand Meadow	-	3,819,000	25,238,012	-	-	-	398,519	-	-	1,562,880	31,018,411
Granite City	415,622	1,347,785	3,827,752	14,999	123,454	19,672	117,956	37,557	-	-	5,904,796
Hennepin Island	-	696,327	1,821,010	1,204	32,320	17,700	44,413	-	-	-	2,612,973
High Bridge	844,602	11,853,600	18,671,353	312,326	572,357	113,539	661,690	1,016,734	-	-	34,046,202
Inver Hills	203,824	4,123,874	17,462,898	911,580	66,005	-	537,241	6,408	-	-	23,311,831
Key City	415,622	1,000,333	3,795,209	14,999	123,454	19,672	107,108	37,557	-	-	5,513,953
Maplewood	55,689	2,277,558	514,983	109,319	31,504	6,904	16,564	374	-	-	3,012,895
Minnesota Valley	638,559	13,635,046	21,078,078	554,769	397,131	68,843	241,331	1,395,489	294,202	-	38,303,448
Nobles Wind Farm	-	7,638,000	50,476,023	-	-	-	797,039	-	-	3,125,760	62,036,822
Redwing	269,371	5,792,041	7,537,990	459,747	242,290	29,016	21,797	235,896	34,301	-	14,622,450
Riverside	717,166	26,334,947	48,412,618	275,384	437,669	61,010	596,359	1,432,370	-	-	78,267,523
Sherco	4,008,245	133,744,558	185,765,812	2,132,542	3,718,089	836,673	893,799	5,411,303	-	103	336,511,124
Sibley	53,710	1,828,422	373,174	103,107	43,503	6,703	13,829	7,250	-	-	2,429,699
Wescott	55,399	10,536,504	1,806,381	233,361	74,887	33,887	12,231	2,591	-	1,826,475	14,581,717
Wilmarth	303,646	5,170,263	7,265,649	153,131	168,520	29,016	21,797	235,896	80,000	-	13,427,919
Total	**14,899,962**	**316,534,305**	**527,759,936**	**7,336,019**	**8,481,199**	**1,799,103**	**6,622,348**	**14,628,171**	**1,379,881**	**6,515,217**	**905,956,140**

TABLE 4.3
SCRAP METAL CREDITS BY STATION
(thousands of 2014 dollars)

	Carbon Steel			Stainless Steel	Galvanized	Copper			Copper		
Station Name	**Cast Iron**	**No. 1**	**Mixed Scrap**	**SS-1**	**Steel**	**Insul Cbl**	**No. 2 Cu**	**Large Mtr**	**Nickel**	**Aluminum**	**Total**
Allen S . King	$ 340	$ 6,108	$ 6,146	$ 233	$ 0	$ 271	$ 1,636	$ 724	$ 2,631	$ -	$ 18,089
Angus Anson	$ 108	$ 1,165	$ 1,185	$ 369	$ 0	$ 108	$ 1,540	$ 94	$ 459	$ -	$ 5,029
Black Dog	$ 278	$ 4,510	$ 6,037	$ 999	$ 0	$ 466	$ 1,275	$ 1,031	$ 1,865	$ -	$ 16,461
Blue Lake	$ 64	$ 1,059	$ 1,920	$ 476	$ 0	$ 114	$ 1,482	$ 67	$ -	$ -	$ 5,182
Grand Meadow	$ -	$ 565	$ 2,886	$ -	$ -	$ -	$ 1,105	$ -	$ -	$ 479	$ 5,035
Granite City	$ 48	$ 200	$ 438	$ 15	$ 0	$ 34	$ 327	$ 15	$ -	$ -	$ 1,076
Hennepin Island	$ -	$ 103	$ 208	$ 1	$ 0	$ 31	$ 123	$ -	$ -	$ -	$ 466
High Bridge	$ 97	$ 1,755	$ 2,135	$ 315	$ 0	$ 196	$ 1,834	$ 405	$ -	$ -	$ 6,736
Inver Hills	$ 23	$ 611	$ 1,997	$ 919	$ 0	$ -	$ 1,489	$ 3	$ -	$ -	$ 5,041
Key City	$ 48	$ 148	$ 434	$ 15	$ 0	$ 34	$ 297	$ 15	$ -	$ -	$ 990
Maplewood	$ 6	$ 337	$ 59	$ 110	$ 0	$ 12	$ 46	$ 0	$ -	$ -	$ 571
Minnesota Valley	$ 73	$ 2,019	$ 2,410	$ 559	$ 0	$ 119	$ 669	$ 556	$ 1,501	$ -	$ 7,905
Nobles Wind Farm	$ -	$ 1,131	$ 5,771	$ -	$ -	$ -	$ 2,209	$ -	$ -	$ 959	$ 10,070
Redwing	$ 31	$ 858	$ 862	$ 463	$ 0	$ 50	$ 60	$ 94	$ 175	$ -	$ 2,593
Riverside	$ 82	$ 3,899	$ 5,535	$ 278	$ 0	$ 105	$ 1,653	$ 570	$ -	$ -	$ 12,123
Sherco	$ 458	$ 19,802	$ 21,240	$ 2,150	$ 0	$ 1,443	$ 2,477	$ 2,155	$ -	$ 0	$ 49,724
Sibley	$ 6	$ 271	$ 43	$ 104	$ 0	$ 12	$ 38	$ 3	$ -	$ -	$ 476
Wescott	$ 6	$ 1,560	$ 207	$ 235	$ 0	$ 58	$ 34	$ 1	$ -	$ 560	$ 2,662
Wilmarth	$ 35	$ 765	$ 831	$ 154	$ 0	$ 50	$ 60	$ 94	$ 408	$ -	$ 2,398
Total	**$ 1,704**	**$ 46,864**	**$ 60,341**	**$ 7,395**	**$ 0**	**$ 3,102**	**$ 18,356**	**$ 5,826**	**$ 7,040**	**$ 1,998**	**$ 152,626**

5. RESULTS

An estimate for dismantling each of the Xcel Energy fossil-fuel and wind farm generating stations in Minnesota and South Dakota was developed by applying the system and structures inventories against the associated unit cost factors and accounting for program support costs. A summary of each station's major cost categories is presented in Table 5.1. Breakdowns of the major cost categories by unit and common facilities are provided in Tables 5.2a through s. Note that columns may not total due to rounding.

The following is an explanation of the contents of each line item in these tables:

Station Unit Rating (MWe) – This is the nominal electrical rating of each unit at the station. In Table 5.1 this represents the sum of all units on site.

Characterization / Temporary Services – The cost associated with performing a hazardous materials survey of the site prior to beginning field activities. Includes costs associated with de-energizing systems and isolation of the electrical systems in the buildings scheduled for dismantling. Costs for installing temporary services to support the dismantling are also included.

Worker Access – The cost associated with providing safe access to areas of the station being dismantled.

Pre-Demolition Cleaning (Boiler / Precipitator / Tanks) – The cost associated with cleaning coal-fired boilers and precipitators / baghouses, and associated flue-gas emission control systems. This line item also includes costs to clean acid and caustic storage tanks.

Asbestos / Lead Paint Remediation– The cost associated with remediating asbestos from the station prior to initiating dismantling activities. It should be noted that dismantling can proceed much more efficiently if asbestos containing materials have been removed. This line item also includes lead paint abatement from concrete surfaces in the buildings.

Equipment Removal – The cost associated with removing all station equipment (piping, valves, heat exchangers, tanks, electrical equipment, etc.).

Boiler(s) – The cost associated with removing the boiler.

Structures Demolition – The cost associated with demolishing the buildings and concrete foundations (to three feet below grade).

Backfill / Grade / Landscaping / Well Closure – The cost associated with backfilling below grade voids, and grading and landscaping the grounds to preclude erosion of soils. This line item also includes costs to seal groundwater monitoring wells.

Coal Yard Closure – The cost associated with removal and disposal of soil waste beneath the footprint of the coal field, and backfilling the void.

Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds / Ash Pond Dewatering – The cost associated with closure of the ponds on site, including placement of a cap on the pond(s) after backfilling.

Utility Management / Oversight – The staff directly assigned to manage the dismantling project, including planning, execution, oversight, and restoration.

Demolition Contractor Mgmt. / Super. / Safety Staff – The contractor's staff assigned to manage, engineer, and supervise the dismantling project, including site safety personnel.

Security – Personnel assigned to control access to the dismantling site.

Property Taxes – Not included in this estimate.

The following six items, grouped as Project Expenses, are calculated on a station basis, but are apportioned among the generating units on site by a ratio of the craft labor hours for each generating unit.

> *Shared Heavy Equipment / Operating Engineers* – The cost for renting / operating equipment in general use throughout the dismantling project (cranes, trucks, forklifts, front-end loaders, etc.).
>
> *Small Tool Allowance* – The cost for procuring small tools; this is consistent with R.S. Means 2014 Item 01 54 39.70-0100.
>
> *Utilities Allowance (Office Equip & Supplies / Telephone, Electric etc.)* – The cost for procuring utility services and office supplies in support of the field office for the utility management and demolition contractor staffs.
>
> *Permits* – The cost of obtaining permits; this is consistent with R.S. Means 2014 Item 01 41 26.50.

Demolition Contractors Insurance – The cost of the demolition contractors insurance; the value is consistent with the R.S. Means 2014 Item 01 31 13.30, lines 0020, 0200, and 0600.

Demolition Contractors Fee – A fee applied to contractor activities; this represents the Contractors overhead and profit payment for the project and is consistent with R.S. Means 2014 Item 01 31 13.80 lines 0350, 0400 and 0450.

Contingency – The cost to cover expenses for unforeseen events that are likely to occur. The estimate assumes 25% [consistent with TLG's experience for similarly highly regulated activities in the nuclear industry) for the asbestos remediation work, and 15% for all other project activities, consistent with the R.S. Means 2014 Item 01 21 16.50 lines 0050 and 0100.

Scrap Credit – A credit to the project for the recovery of scrap metals. This corresponds to value shown in Table 4.3.

The following is an explanation of the contents of each column in the 5.2 Tables:

Unit – Costs directly attributed to the physical work associated with dismantling a generating unit.

Common – Costs directly attributed to the physical work associated with dismantling facilities shared by more than one unit.

Station – Costs associated with supporting the physical dismantling work for a station.

Station Total – The summation of all Unit columns, plus Common and Station columns.

This study provides an estimate for dismantling under current requirements, based on present-day costs and available technology. As inputs to the cost model change over time, such as labor rates, equipment costs, scrap metal value, etc., this cost estimate should be reviewed and updated to reflect these changes.

TABLE 5.1
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities (Costs)	*Allen S . King*	*Angus Anson*	*Black Dog*	*Blue Lake*	*Grand Meadow*	*Granite City*	*Hennepin Island*	*High Bridge*	*Inver Hills*	*Key city*	*Maplewood*	*Minnesota Valley*	*Nobles Wind Farm*	*Redwing*	*Riverside*	*Sherco*	*Sibley*	*Wescott*	*Wilmarth*	*Fleet Totals*
Station Rating (MWe)	588	381	538	510	101	72	14	570	360	72	0	64	201.0	20	830	2400	0	0	20	6741
Characterization / Temporary Services	310,861	267,194	796,583	295,861	253,600	212,861	211,861	408,861	235,194	212,861	113,431	464,722	284,061	419,722	918,583	1,005,583	113,431	201,861	420,000	7,147,133
Scaffolding / Worker Access	536,770	-	1,109,121	-	-	-	-	-	-	-	-	159,201	-	104,997	-	1,691,955	-	-	104,997	3,707,041
Asbestos / Lead Paint Remediation	3,899,121	128,672	5,752,025	-	-	-	131,195	-	-	-	-	3,374,329	-	1,402,685	2,996,105	4,730,768	-	-	1,402,685	23,817,585
Equipment Removal	8,149,644	4,819,480	8,243,133	5,082,832	1,510,171	750,276	272,182	3,940,502	3,878,294	750,276	1,172,429	2,501,705	3,020,341	1,740,926	3,627,608	26,097,184	972,121	5,176,749	1,495,966	83,201,821
Boiler(s)	3,047,244	-	4,359,237	-	-	-	-	-	-	-	-	1,019,305	-	460,726	2,344,537	11,403,411	-	-	736,735	23,371,195
Structures Demolition	12,359,547	1,832,319	7,113,517	2,638,766	4,760,405	894,248	1,585,150	4,263,507	2,601,870	751,462	114,455	4,544,261	9,520,809	2,466,813	9,362,586	34,509,486	82,946	1,006,271	2,010,809	102,419,229
Backfill / Grade / Landscaping / Well Closure	3,536,523	1,168,248	2,711,115	1,437,390	6,348,648	357,297	797,889	1,654,627	1,245,629	229,004	147,923	1,571,641	12,709,304	1,051,803	2,347,747	9,439,558	151,177	927,486	769,206	48,602,215
Coal Yard Closure	9,402,791	-	-	-	-	-	-	-	-	-	-	1,875,000	-	-	-	7,250,000	-	-	-	18,527,791
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds / Ash Por	2,496,967	-	3,315,000	-	-	-	-	-	-	-	-	-	-	2,208,615	-	20,446,338	-	-	1,310,464	29,777,384
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	1,080,300	320,000	1,080,900	160,000	-	160,000	-	-	582,500	160,000	-	500,900	-	515,600	526,800	3,243,150	-	-	515,600	8,845,750
Utility Management / Oversight	2,916,915	907,029	3,465,413	1,520,797	2,041,297	757,105	763,130	1,561,889	1,297,074	752,268	836,153	1,903,079	1,185,115	1,075,850	3,360,001	3,723,229	807,886	974,737	1,075,850	30,924,819
Demolition Contractor Mgmt / Super. / Safety Staff	3,274,705	777,319	4,595,219	1,381,178	2,519,614	439,332	376,197	1,471,055	891,851	428,430	483,054	1,936,531	1,404,229	997,570	4,233,101	5,421,101	441,690	929,958	997,570	32,999,700
Security	686,045	173,645	898,515	174,772	303,314	103,736	135,307	184,920	119,522	101,481	170,262	262,722	303,314	240,171	854,997	1,003,469	156,731	205,216	240,171	6,318,309
Property Taxes	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	3,321,555	931,723	4,767,615	1,508,421	2,766,361	519,346	705,581	1,607,732	967,728	506,043	911,769	2,084,313	1,696,617	1,253,672	4,339,134	5,732,502	831,954	1,117,958	1,253,672	36,823,697
Small Tool Allowance	631,257	158,781	589,083	185,560	253,456	40,756	56,428	199,813	155,683	35,335	29,196	263,629	507,153	143,879	384,032	1,764,947	24,625	142,710	129,728	5,696,052
Utilities Allowance	52,019	29,891	68,129	30,086	52,213	17,857	23,292	31,832	20,575	17,469	29,309	45,225	52,213	41,343	64,829	76,087	26,980	35,326	41,343	756,020
Permits	651,241	130,420	556,258	159,001	230,806	42,400	51,997	169,724	132,242	38,636	37,520	254,260	364,934	160,104	389,313	1,660,151	33,062	119,229	139,860	5,321,158
Demolition Contractors Insurance	1,532,403	306,886	1,308,904	374,138	543,098	99,769	122,352	399,369	311,171	90,912	88,285	598,285	858,708	376,734	916,074	3,906,418	77,795	280,552	329,097	12,520,950
Demolition Contractors Fee	6,376,031	1,261,702	5,221,327	1,484,007	2,089,845	386,851	494,741	1,584,496	1,266,361	349,000	330,540	2,407,097	3,626,768	1,543,452	3,527,169	16,619,692	289,261	1,126,018	1,332,520	51,316,877
Sub-Total	64,261,940	13,213,309	55,951,093	16,432,808	23,672,826	4,781,835	5,727,302	17,478,328	13,705,692	4,423,177	4,464,327	25,766,207	35,533,566	16,204,663	40,192,617	159,725,030	4,009,660	12,244,072	14,306,272	532,094,724
Contingency	10,029,203	1,994,864	8,967,866	2,464,921	3,550,924	717,275	872,215	2,621,749	2,055,854	663,476	669,649	4,202,364	5,330,035	2,570,968	6,328,503	24,431,831	601,449	1,836,611	2,286,209	82,195,967
Project Total (before scrap credit)	74,291,143	15,208,173	64,918,959	18,897,730	27,223,750	5,499,110	6,599,517	20,100,078	15,761,546	5,086,653	5,133,975	29,968,571	40,863,601	18,775,631	46,521,121	184,156,861	4,611,109	14,080,683	16,592,482	614,290,692
Scrap Credit	(18,089,125)	(5,029,021)	(16,460,995)	(5,181,586)	(5,034,891)	(1,075,661)	(466,139)	(6,735,948)	(5,041,021)	(990,431)	(570,610)	(7,905,236)	(10,069,782)	(2,593,006)	(12,122,503)	(49,724,362)	(476,224)	(2,661,541)	(2,397,811)	(152,625,894)
Project Total	56,202,018	10,179,152	48,457,964	13,716,144	22,188,859	4,423,449	6,133,379	13,364,130	10,720,525	4,096,222	4,563,365	22,063,335	30,793,819	16,182,625	34,398,617	134,432,499	4,134,885	11,419,141	14,194,671	461,664,798

TABLE 5.2a

ALLEN S. KING STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Common	Station	Station Total
Allen S . King Unit Rating (MWe)	588	588		
Characterization / Temporary Services	134,000	-	176,861	310,861
Worker Access	536,770	-		536,770
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	1,000,300	80,000		1,080,300
Asbestos / Lead Paint Remediation	3,899,121	-		3,899,121
Equipment Removal	6,718,423	1,431,220		8,149,644
Boiler(s)	3,047,244	-		3,047,244
Structures Demolition	9,927,726	2,431,822		12,359,547
Backfill / Grade / Landscaping / Well Closure	2,511,069	925,454	100,000	3,536,523
Coal Yard Closure		9,402,791		9,402,791
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds		2,496,967		2,496,967
Utility Management / Oversight			2,916,915	2,916,915
Demolition Contractor Management / Supervisory / Safety Staff			3,274,705	3,274,705
Security			686,045	686,045
Property Taxes	-	-	-	0
Project Expenses				
Shared Heavy Equipment / Operating Engineers			3,321,555	3,321,555
Small Tool Allowance	535,487	95,770	n/a	631,257
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)			52,019	52,019
Permits			651,241	651,241
Demolition Contractors Insurance			1,532,403	1,532,403
Demolition Contractors Fee			6,376,031	6,376,031
Sub-Total				64,261,940
Contingency				10,029,203
Project Total (before scrap credit)				74,291,143
Scrap Credit	(16,349,511)	(1,739,614)	-	(18,089,125)
Project Total				56,202,018

TABLE 5.2b

ANGUS ANSON STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Common	Station	Station Total
Angus Anson Unit Rating (MWe)	0	106	110	165	381		
Characterization / Temporary Services	25,000	20,333	20,667	24,333	-	176,861	267,194
Pre-Demolition Cleaning (Tanks)	-	-	-	-	320,000		320,000
Lead Paint Remediation	128,672	-	-	-	-		128,672
Equipment Removal	2,259,688	505,332	507,846	1,255,090	291,524		4,819,480
Structures Demolition	1,102,072	166,515	169,628	332,919	61,186		1,832,319
Backfill / Grade / Landscaping / Well Closure	226,806	70,677	111,262	475,490	184,013	100,000	1,168,248
Utility Management / Oversight						907,029	907,029
Demolition Contractor Management / Supervisory / Safety Staff						777,319	777,319
Security						173,645	173,645
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						931,723	931,723
Small Tool Allowance	74,845	15,257	16,188	41,757	10,734	n/a	158,781
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						29,891	29,891
Permits						130,420	130,420
Demolition Contractors Insurance						306,886	306,886
Demolition Contractors Fee						1,261,702	1,261,702
Sub-Total							13,213,309
Contingency							1,994,864
Project Total (before scrap credit)							15,208,173
Scrap Credit	(2,024,367)	(754,277)	(765,087)	(1,367,322)	(117,968)	-	(5,029,021)
Project Total							10,179,152

TABLE 5.2c

BLACK DOG STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 2	Unit 3	Unit 4	Unit 5	Common	Station	Station Total
Black Dog Unit Rating (MWe)	98	108	170	162	538		
Characterization / Temporary Services	59,000	61,000	74,000	72,000	-	530,583	796,583
Worker Access	329,423	345,822	433,876	-	-		1,109,121
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	333,633	333,633	333,633	-	80,000		1,080,900
Asbestos Remediation	1,886,017	1,898,180	1,962,994	-	4,833		5,752,025
Equipment Removal	1,961,219	1,963,405	2,380,890	1,168,331	769,288		8,243,133
Boiler(s)	1,550,318	1,244,399	1,415,698	148,822	-		4,359,237
Structures Demolition	952,825	1,412,127	2,054,476	1,220,545	1,473,544		7,113,517
Backfill / Grade / Landscaping / Well Closure	410,734	431,181	755,977	191,102	822,121	100,000	2,711,115
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds					3,315,000		3,315,000
Utility Management / Oversight						3,465,413	3,465,413
Demolition Contractor Management / Supervisory / Safety Staff						4,595,219	4,595,219
Security						898,515	898,515
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						4,767,615	4,767,615
Small Tool Allowance	142,991	147,122	181,558	56,016	61,396	n/a	589,083
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						68,129	68,129
Permits						556,258	556,258
Demolition Contractors Insurance						1,308,904	1,308,904
Demolition Contractors Fee						5,221,327	5,221,327
Sub-Total							55,951,093
Contingency							8,967,866
Project Total (before scrap credit)							64,918,959
Scrap Credit	(3,562,849)	(4,328,957)	(5,885,729)	(1,861,776)	(821,684)	-	(16,460,995)
Project Total							48,457,964

TABLE 5.2d

BLUE LAKE STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

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
Pre-Demolition Cleaning (Tanks)	-	-	-	-	-	-	160,000		160,000
Equipment Removal	486,837	486,837	486,837	486,837	1,258,778	1,258,778	617,926		5,082,832
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
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

TABLE 5.2e

GRAND MEADOW STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit, each (typ. of 67)	Common	Station	Station Total
Grand Meadow Unit Rating (MWe)	1.5	100.5		
Characterization / Temporary Services	800	-	200,000	253,600
Equipment Removal	22,540	-		1,510,171
Structures Demolition	71,051	-		4,760,405
Backfill / Grade / Landscaping	29,932	4,343,212	-	6,348,648
Utility Management / Oversight			2,041,297	2,041,297
Demolition Contractor Management / Supervisory / Safety Staff			2,519,614	2,519,614
Security			303,314	303,314
Property Taxes	-	-	-	0
Project Expenses				
Shared Heavy Equipment / Operating Engineers			2,766,361	2,766,361
Small Tool Allowance	2,486	86,864	n/a	253,456
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)			52,213	52,213
Permits			230,806	230,806
Demolition Contractors Insurance			543,098	543,098
Demolition Contractors Fee			2,089,845	2,089,845
Sub-Total				23,672,826
Contingency				3,550,924
Project Total (before scrap credit)				27,223,750
Scrap Credit	(51,830)	(1,562,263)	-	(5,034,891)
Project Total				22,188,859

TABLE 5.2f

GRANITE CITY STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Common	Station	Station Total
Granite City Unit Rating (MWe)	18	18	18	18	72		
Characterization / Temporary Services	9,000	9,000	9,000	9,000	-	176,861	212,861
Pre-Demolition Cleaning (Tanks)	-	-	-	-	160,000		160,000
Equipment Removal	187,569	187,569	187,569	187,569	-		750,276
Structures Demolition	138,680	138,680	138,680	138,680	339,530		894,248
Backfill / Grade / Landscaping	77,363	77,363	77,363	77,363	47,847	-	357,297
Utility Management / Oversight						757,105	757,105
Demolition Contractor Management / Supervisory / Safety Staff						439,332	439,332
Security						103,736	103,736
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						519,346	519,346
Small Tool Allowance	8,252	8,252	8,252	8,252	7,748	n/a	40,756
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						17,857	17,857
Permits						42,400	42,400
Demolition Contractors Insurance						99,769	99,769
Demolition Contractors Fee						386,851	386,851
Sub-Total							4,781,835
Contingency							717,275
Project Total (before scrap credit)							5,499,110
Scrap Credit	(223,217)	(223,217)	(223,217)	(223,217)	(182,793)	-	(1,075,661)
Project Total							4,423,449

TABLE 5.2g

HENNEPIN ISLAND STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1-5	Station	Station Total
Hennepin Island Unit Rating (MWe)	14		
Characterization / Temporary Services	35,000	176,861	211,861
Lead Paint Remediation	131,195		131,195
Equipment Removal	272,182		272,182
Structures Demolition	1,585,150		1,585,150
Grade / Landscaping	797,889	-	797,889
Utility Management / Oversight		763,130	763,130
Demolition Contractor Management / Supervisory / Safety Sta		376,197	376,197
Security		135,307	135,307
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		705,581	705,581
Small Tool Allowance	56,428	n/a	56,428
Utilities Allowance (Office Equip & supplies / Telephone, Elec		23,292	23,292
Permits		51,997	51,997
Demolition Contractors Insurance		122,352	122,352
Demolition Contractors Fee		494,741	494,741
Sub-Total			5,727,302
Contingency			872,215
Project Total (before scrap credit)			6,599,517
Scrap Credit	(466,139)	-	(466,139)
Project Total			6,133,379

TABLE 5.2h

HIGH BRIDGE STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Common	Station	Station Total
High Bridge Unit Rating (MWe)	160	160	250	570		
Characterization / Temporary Services	72,000	72,000	88,000	-	176,861	408,861
Equipment Removal	1,191,232	1,191,232	1,244,020	314,018		3,940,502
Structures Demolition	1,016,413	1,016,413	1,702,241	528,440		4,263,507
Backfill / Grade / Landscaping / Well Closure	309,658	309,658	754,653	180,659	100,000	1,654,627
Utility Management / Oversight					1,561,889	1,561,889
Demolition Contractor Management / Supervisory / Safety Staff					1,471,055	1,471,055
Security					184,920	184,920
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers					1,607,732	1,607,732
Small Tool Allowance	51,786	51,786	75,778	20,462	n/a	199,813
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					31,832	31,832
Permits					169,724	169,724
Demolition Contractors Insurance					399,369	399,369
Demolition Contractors Fee					1,584,496	1,584,496
Sub-Total						17,478,328
Contingency						2,621,749
Project Total (before scrap credit)						20,100,078
Scrap Credit	(1,997,606)	(1,997,606)	(2,575,061)	(165,674)	-	(6,735,948)
Project Total						13,364,130

TABLE 5.2i

INVER HILLS STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Common	Station	Station Total
Inver Hills Unit Rating (MWe)	60	60	60	60	60	60	360		
Characterization / Temporary Services	8,333	8,333	8,333	8,333	8,333	8,333	8,333	176,861	235,194
Pre-Demolition Cleaning (Tanks)	-	-	-	-	-	-	582,500		582,500
Equipment Removal	598,620	598,620	598,620	598,620	598,620	598,620	286,573		3,878,294
Structures Demolition	226,898	226,898	226,898	226,898	226,898	226,898	1,240,483		2,601,870
Backfill / Grade / Landscaping	177,312	177,312	177,312	177,312	177,312	177,312	181,756	-	1,245,629
Utility Management / Oversight								1,297,074	1,297,074
Demolition Contractor Management / Supervisory / Safety Staff								891,851	891,851
Security								119,522	119,522
Property Taxes	-	-	-	-	-	-	-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers								967,728	967,728
Small Tool Allowance	20,223	20,223	20,223	20,223	20,223	20,223	34,343	n/a	155,683
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								20,575	20,575
Permits								132,242	132,242
Demolition Contractors Insurance								311,171	311,171
Demolition Contractors Fee								1,266,361	1,266,361
Sub-Total									13,705,692
Contingency									2,055,854
Project Total (before scrap credit)									15,761,546
Scrap Credit	(718,958)	(718,958)	(718,958)	(718,958)	(718,958)	(718,958)	(727,272)	-	(5,041,021)
Project Total									10,720,525

TABLE 5.2j

KEY CITY STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Common	Station	Station Total
Key City Unit Rating (MWe)	18	18	18	18	72		
Characterization / Temporary Services	9,000	9,000	9,000	9,000	-	176,861	212,861
Pre-Demolition Cleaning (Tanks)	-	-	-	-	160,000		160,000
Equipment Removal	187,569	187,569	187,569	187,569	-		750,276
Structures Demolition	104,981	104,981	104,981	104,981	331,538		751,462
Backfill / Grade / Landscaping	47,274	47,274	47,274	47,274	39,908	-	229,004
Utility Management / Oversight						752,268	752,268
Demolition Contractor Management / Supervisory / Safety Staff						428,430	428,430
Security						101,481	101,481
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						506,043	506,043
Small Tool Allowance	6,976	6,976	6,976	6,976	7,429	n/a	35,335
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						17,469	17,469
Permits						38,636	38,636
Demolition Contractors Insurance						90,912	90,912
Demolition Contractors Fee						349,000	349,000
Sub-Total							4,423,177
Contingency							663,476
Project Total (before scrap credit)							5,086,653
Scrap Credit	(202,629)	(202,629)	(202,629)	(202,629)	(179,914)	-	(990,431)
Project Total							4,096,222

TABLE 5.2k

MAPLEWOOD GAS PLANT
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Station	Station Total
Maplewood Unit Rating (MWe)	0		
Characterization / Temporary Services	25,000	88,431	113,431
Equipment Removal	1,172,429		1,172,429
Structures Demolition	114,455		114,455
Grade / Landscaping	147,923	-	147,923
Utility Management / Oversight		836,153	836,153
Demolition Contractor Management / Supervisory / Safety Staff		483,054	483,054
Security		170,262	170,262
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		911,769	911,769
Small Tool Allowance	29,196	n/a	29,196
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)		29,309	29,309
Permits		37,520	37,520
Demolition Contractors Insurance		88,285	88,285
Demolition Contractors Fee		330,540	330,540
Sub-Total			4,464,327
Contingency			669,649
Project Total (before scrap credit)			5,133,975
Scrap Credit	(570,610)	-	(570,610)
Project Total			4,563,365

TABLE 5.2l

MINNESOTA VALLEY STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Common	Station	Station Total
Minnesota Valley Unit Rating (MWe)	10	10	44	64		
Characterization / Temporary Services	33,000	33,000	45,000		353,722	464,722
Worker Access	-	-	159,201	-		159,201
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	166,967	166,967	166,967	-		500,900
Asbestos / Lead Paint Remediation	111,145	111,145	3,152,039	-		3,374,329
Equipment Removal	304,032	304,032	1,847,506	46,137		2,501,705
Boiler(s)	218,193	218,193	582,920	-		1,019,305
Structures Demolition	1,064,150	1,064,150	2,083,452	332,510		4,544,261
Backfill / Grade / Landscaping / Well Closure	393,366	393,366	376,342	308,567	100,000	1,571,641
Coal Yard Closure				1,875,000		1,875,000
Utility Management / Oversight					1,903,079	1,903,079
Demolition Contractor Management / Supervisory / Safety Staff					1,936,531	1,936,531
Security					262,722	262,722
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers					2,084,313	2,084,313
Small Tool Allowance	42,478	42,478	164,929	13,744	n/a	263,629
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					45,225	45,225
Permits					254,260	254,260
Demolition Contractors Insurance					598,285	598,285
Demolition Contractors Fee					2,407,097	2,407,097
Sub-Total						25,766,207
Contingency						4,202,364
Project Total (before scrap credit)						29,968,571
Scrap Credit	(1,769,960)	(1,769,960)	(4,162,973)	(202,342)	-	(7,905,236)
Project Total						22,063,335

TABLE 5.2m

NOBLES STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit, each (typ. of 134)	Common	Station	Station Total
Nobles Wind Farm Unit Rating (MWe)	1.5	201		
Characterization / Temporary Services	800	-	176,861	284,061
Equipment Removal	22,540	-		3,020,341
Structures Demolition	71,051	-		9,520,809
Backfill / Grade / Landscaping	29,932	8,698,432	-	12,709,304
Utility Management / Oversight			1,185,115	1,185,115
Demolition Contractor Management / Supervisory / Safety Staff			1,404,229	1,404,229
Security			303,314	303,314
Property Taxes	-	-	-	0
Project Expenses				
Shared Heavy Equipment / Operating Engineers			1,696,617	1,696,617
Small Tool Allowance	2,486	173,969	n/a	507,153
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)			52,213	52,213
Permits			364,934	364,934
Demolition Contractors Insurance			858,708	858,708
Demolition Contractors Fee			3,626,768	3,626,768
Sub-Total				35,533,566
Contingency				5,330,035
Project Total (before scrap credit)				40,863,601
Scrap Credit	(51,830)	(3,124,525)	-	(10,069,782)
Project Total				30,793,819

TABLE 5.2n

RED WING STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Common	Station	Station Total
Redwing Unit Rating (MWe)	10	10	20		
Characterization / Temporary Services	33,000	33,000	-	353,722	419,722
Worker Access	52,498	52,498	-		104,997
Pre-Demolition Cleaning (Boiler / Precipitator /	257,800	257,800	-		515,600
Asbestos / Lead Paint Remediation	701,342	701,342	-		1,402,685
Equipment Removal	668,601	668,601	403,725		1,740,926
Boiler(s)	230,363	230,363	-		460,726
Structures Demolition	728,965	728,965	1,008,883		2,466,813
Backfill / Grade / Landscaping / Well Closure	217,741	217,741	516,322	100,000	1,051,803
Ash Landfills / Ash Ponds & Landfills Inculding Evaporation Ponds			2,208,615		2,208,615
Utility Management / Oversight				1,075,850	1,075,850
Demolition Contractor Management / Supervisory / Safety Staff				997,570	997,570
Security				240,171	240,171
Property Taxes	-	-	-	-	0
Project Expenses					
Shared Heavy Equipment / Operating Engineers				1,253,672	1,253,672
Small Tool Allowance	52,650	52,650	38,579	n/a	143,879
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)				41,343	41,343
Permits				160,104	160,104
Demolition Contractors Insurance				376,734	376,734
Demolition Contractors Fee				1,543,452	1,543,452
Sub-Total					16,204,663
Contingency					2,570,968
Project Total (before scrap credit)					18,775,631
Scrap Credit	(956,453)	(956,453)	(680,100)	-	(2,593,006)
Project Total					16,182,625

TABLE 5.2o

RIVERSIDE STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 6 Boiler	Unit 7 Boiler	Unit 7 Turbine	Unit 8	Unit 9	Unit 10	Commom	Station	Station Total
Riverside Unit Rating (MWe)	44	44	165	231	173	173	830		
Characterization / Temporary Services	45,000	45,000	73,000	85,000	70,000	70,000	-	530,583	918,583
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	170,600	170,600	-	170,600	-	-	15,000		526,800
Asbestos Remediation	968,955	968,955	-	1,058,195	-	-	-		2,996,105
Equipment Removal	-	-	850,207	407,541	1,177,091	1,177,091	15,679		3,627,608
Boiler(s)	769,377	769,377	-	805,783	-	-	-		2,344,537
Structures Demolition	1,049,977	1,049,977	545,313	2,639,702	872,956	872,956	2,331,705		9,362,586
Backfill / Grade / Landscaping / Well Closure	183,305	183,305	341,701	547,510	233,241	233,241	525,442	100,000	2,347,747
Utility Management / Oversight								3,360,001	3,360,001
Demolition Contractor Management / Supervisory / Safety Staff								4,233,101	4,233,101
Security								854,997	854,997
Property Taxes			-		-		-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers								4,339,134	4,339,134
Small Tool Allowance	60,332	60,332	36,204	110,875	29,416	29,416	57,457	n/a	384,032
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								64,829	64,829
Permits								389,313	389,313
Demolition Contractors Insurance								916,074	916,074
Demolition Contractors Fee								3,527,169	3,527,169
Sub-Total									40,192,617
Contingency									6,328,503
Project Total (before scrap credit)									46,521,121
Scrap Credit	(1,747,647)	(1,747,647)	(1,579,572)	(3,512,820)	(1,662,032)	(1,662,032)	(210,754)	-	(12,122,503)
Project Total									34,398,617

TABLE 5.2p

SHERBURNE COUNTY STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

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	4,872,060	4,872,060	5,607,769	4,004,077		19,355,966
Boiler(s)	3,673,167	3,673,167	4,057,077	-		11,403,411
Turbine Generator & Condensor	527,108	527,108	593,427			1,647,644
Exhaust Gas Treatment Equipment and Structures	3,730,433	3,730,433	4,183,087			11,643,954
Structures Demolition	7,021,259	7,021,259	7,620,758	6,295,832		27,959,107
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 Pounds & Landfills Including Evaporation Ponds / Ash Pond D	1,860,375	1,860,375	1,900,589	14,825,000		20,446,338
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	1,081,050	1,081,050	1,081,050	-		3,243,150
Utility Management / Oversight	1,039,934	1,039,934	1,162,483	480,878		3,723,229
Demolition Contractor Management / Supervisory / Safety Staff	1,514,166	1,514,166	1,692,600	700,169		5,421,101
Security	280,279	280,279	313,307	129,604		1,003,469
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers	1,601,144	1,601,144	1,789,826	740,388		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					1,660,151	1,660,151
Demolition Contractors Insurance					3,906,418	3,906,418
Demolition Contractors Fee					16,619,692	16,619,692
Sub-Total						159,725,030
Contingency (excluding activities currently under contract)						24,431,831
Project Total (before scrap credit)						184,156,861
Scrap Credit	(14,316,845)	(14,316,845)	(17,311,622)	(3,779,051)	-	(49,724,362)
Project Total						134,432,499

TABLE 5.2q

SIBLEY GAS PLANT
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Station	Station Total
Sibley Unit Rating (MWe)	0		
Characterization / Temporary Services	25,000	88,431	113,431
Equipment Removal	972,121		972,121
Structures Demolition	82,946		82,946
Grade / Landscaping	151,177	-	151,177
Utility Management / Oversight		807,886	807,886
Demolition Contractor Management / Supervisory / Safety Staff		441,690	441,690
Security		156,731	156,731
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		831,954	831,954
Small Tool Allowance	24,625	n/a	24,625
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)		26,980	26,980
Permits		33,062	33,062
Demolition Contractors Insurance		77,795	77,795
Demolition Contractors Fee		289,261	289,261
Sub-Total			4,009,660
Contingency			601,449
Project Total (before scrap credit)			4,611,109
Scrap Credit	(476,224)	-	(476,224)
Project Total			4,134,885

TABLE 5.2r

WESCOTT GAS PLANT
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Station	Station Total
Wescott Unit Rating (MWe)	0		
Characterization / Temporary Services	25,000	176,861	201,861
Equipment Removal	5,176,749		5,176,749
Structures Demolition	1,006,271		1,006,271
Grade / Landscaping	927,486	-	927,486
Utility Management / Oversight		974,737	974,737
Demolition Contractor Management / Supervisory / Safety Staff		929,958	929,958
Security		205,216	205,216
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		1,117,958	1,117,958
Small Tool Allowance	142,710	n/a	142,710
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)		35,326	35,326
Permits		119,229	119,229
Demolition Contractors Insurance		280,552	280,552
Demolition Contractors Fee		1,126,018	1,126,018
Sub-Total			12,244,072
Contingency			1,836,611
Project Total (before scrap credit)			14,080,683
Scrap Credit	(2,661,541)	-	(2,661,541)
Project Total			11,419,141

TABLE 5.2s

WILMARTH STATION
SUMMARY OF ACTIVITY COSTS
(2014 Dollars)

Activities	Unit 1	Unit 2	Common	Station	Station Total
Wilmarth Unit Rating (MWe)	10	10	20		
Characterization / Temporary Services	33,000	33,000	-	354,000	420,000
Worker Access	52,498	52,498	-		104,997
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	257,800	257,800	-		515,600
Asbestos / Lead Paint Remediation	701,342	701,342	-		1,402,685
Equipment Removal	668,601	668,601	158,764		1,495,966
Boiler(s)	368,367	368,367	-		736,735
Structures Demolition	640,708	640,708	729,394		2,010,809
Backfill / Grade / Landscaping / Well Closure	218,876	218,876	231,454	100,000	769,206
Ash Landfills			1,310,464		1,310,464
Utility Management / Oversight				1,075,850	1,075,850
Demolition Contractor Management / Supervisory / Safety Staff				997,570	997,570
Security				240,171	240,171
Property Taxes	-	-	-	-	0
Project Expenses					
Shared Heavy Equipment / Operating Engineers				1,253,672	1,253,672
Small Tool Allowance	53,668	53,668	22,392	n/a	129,728
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)				41,343	41,343
Permits				139,860	139,860
Demolition Contractors Insurance				329,097	329,097
Demolition Contractors Fee				1,332,520	1,332,520
Sub-Total					14,306,272
Contingency					2,286,209
Project Total (before scrap credit)					16,592,482
Scrap Credit	(1,076,944)	(1,076,944)	(243,922)	-	(2,397,811)
Project Total					14,194,671

6. REFERENCES

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APPENDIX A
SUMMARY OF STATION SYSTEM AND STRUCTURES INVENTORIES

TABLE A
SUMMARY OF STATION SYSTEMS AND STRUCTURES INVENTORIES

Index	System/Structure Inventory Data Point	Allen S . King	Angus Anson	Black Dog	Blue Lake	Grand Meadow	Granite City	Hennepin Island	High Bridge	Inver Hills	Key City	Maplewood	Minnesota Valley	Nobles Wind Farm	Redwing	Riverside	Sherco	Sibley	Wescott	Wilmarth
Station Rating (Mwe)		588	381	538	510	101	72	14	570	360	72	0	64	201	20	830	2400	0	0	20
2	Piping 0.25 to 2 inches diameter, linear foot	79,850	31,521	10,719	20,178	-	1,501	-	24,690	3,268	1,501	-	492	-	4,919	24,046	233,790	-	-	4,919
3	Piping >2 to 4 inches diameter, linear foot	53,123	31,014	55,395	13,452	-	1,001	-	16,460	2,579	1,001	2,195	12,745	-	3,279	16,031	157,111	2,110	-	3,279
4	Piping >4 to 8 inches diameter, linear foot	35,133	14,009	36,265	10,357	-	3,138	-	11,173	9,964	3,138	1,120	6,427	-	2,186	10,687	103,907	520	7,935	2,186
5	Piping >8 to 14 inches diameter, linear foot	30,662	8,006	24,552	6,229	-	445	-	8,015	1,348	445	330	4,978	-	1,457	7,125	89,271	385	2,385	1,457
6	Piping >14 to 20 inches diameter, linear foot	7,208	2,614	9,315	4,259	-	148	-	5,377	1,139	148	90	2,484	-	794	4,750	26,401	75	20	794
7	Piping >20 to 36 inches diameter, linear foot	9,734	1,886	5,418	2,419	-	-	-	3,971	-	-	70	1,803	-	289	3,716	37,053	16	-	289
8	Piping >36 inches diameter, linear foot	5,335	898	4,186	1,796	-	-	-	2,420	-	-	-	17	-	173	2,126	15,991	-	60	173
9	Valves <2 inches	1,373	1,308	99	144	-	108	-	-	216	108	-	54	-	540	1,418	4,118	-	-	540
10	Valves >2 to 4 inches	935	1,660	2,633	672	-	72	-	698	174	72	330	402	-	360	698	2,805	346	-	360
11	Valves >4 to 8 inches	610	592	1,226	464	-	80	-	381	264	80	78	207	-	240	369	1,830	47	136	240
12	Valves >8 to 14 inches	1,519	272	771	142	-	24	-	159	62	24	44	134	-	120	123	1,115	54	35	120
13	Valves >14 to 20 inches	158	84	132	48	-	-	-	78	-	-	2	29	-	50	66	587	-	4	50
14	Valves >20 to 36 inches	128	22	36	24	-	-	-	36	-	-	-	14	-	16	36	476	-	-	16
15	Valves >36 inches	56	6	27	12	-	-	-	26	-	-	-	1	-	14	18	104	-	-	14
24	Pipe hangers for small bore piping, each	5,018	3,641	4,375	1,449	-	81	-	1,742	246	81	88	847	-	909	1,742	14,975	84	-	909
25	Pipe hangers for large bore piping, each	3,351	1,243	2,156	1,089	-	121	-	1,249	511	121	64	401	-	543	1,237	9,618	40	416	543
26	Pump and motor set < 300 pounds	77	17	89	72	-	16	-	13	108	16	6	32	-	38	13	507	3	7	38
27	Pumps, 300-1000 pound pump	23	16	15	12	-	-	-	13	-	-	-	4	-	8	13	73	-	7	8
28	Pumps, >1000-10,000 pound pump	14	5	21	-	-	-	-	2	-	-	-	4	-	11	2	44	-	-	11
29	Pumps, >10,000 pound pump	13	5	17	4	-	-	-	8	-	-	-	5	-	8	4	9	-	-	8
32	Pump motors, 300-1000 pound pump	23	32	15	12	-	-	-	13	-	-	-	4	-	8	13	28	-	7	8
33	Pump motors, >1000-10,000 pound pump	13	5	21	-	-	-	-	3	-	-	-	4	-	11	3	68	2	-	11
34	Pump motors, >10,000 pound pump	13	5	17	4	-	-	-	8	-	-	-	5	-	4	4	18	-	-	4
37	Turbine-driven pumps > 10,000 pounds	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-
38	Main turbine-generator (pounds per MW(e) input)	1	1	3	-	-	-	-	1	-	-	-	3	-	2	2	3	-	-	2
39	Heat exchanger <3000 pound	16	12	41	101	-	-	-	6	210	-	-	15	-	12	6	60	-	-	12
40	Heat exchanger >3000 pound	-	27	14	48	-	-	-	5	96	-	-	7	-	14	5	21	-	-	14
41	Feedwater heater/deaerator	9	6	29	2	-	-	-	2	-	-	-	7	-	12	2	31	-	-	12
49	Main condenser (pounds per MW(e) input)	1	1	3	-	-	-	-	1	-	-	-	3	-	2	1	3	-	-	2
51	Tanks, <300 gallons, filters, and ion exchangers	38	33	59	20	-	16	3	10	34	16	5	39	-	12	10	66	28	33	12
52	Tanks, 300-3000 gallons	12	32	33	4	-	12	-	11	8	12	6	7	-	2	6	132	9	14	2
53	Tanks, >3000 gallons, square foot surface	27,566	75,184	14,482	62,690	-	2,847	-	23,259	7,069	2,847	101,764	87,790	-	33,585	1,859	162,458	81,889	489,542	6,871
54	Electrical equipment, <300 pound	742	686	1,207	647	-	420	54	150	846	420	21	232	-	322	128	6,686	36	-	322
55	Electrical equipment, 300-1000 pound	144	296	501	350	-	40	16	289	184	40	17	53	-	18	280	936	13	21	18
56	Electrical equipment, 1000-10,000 pound	122	190	148	280	67	80	25	207	175	80	7	39	134	56	201	122	2	41	56
57	Electrical equipment, >10,000 pound	19	99	10	128	-	28	36	16	168	28	5	4	-	16	16	30	3	-	16
59	Electrical transformers < 30 tons	3	13	31	14	-	2	-	4	18	2	2	10	-	-	4	6	2	1	-
60	Electrical transformers > 30 tons	3	9	5	12	-	2	-	5	12	2	-	4	-	2	5	3	-	-	2
61	Standby diesel-generator, <100 kW	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	Standby diesel-generator, 100 kW to 1 MW	-	-	-	-	-	8	-	-	-	8	-	-	-	-	-	-	-	-	-
63	Standby diesel-generator, >1 MW	2	-	-	-	-	4	-	-	-	4	-	-	-	-	2	5	-	-	-
64	Fluorescent light fixture	200	250	696	180	-	80	10	200	100	80	30	163	-	38	150	498	30	24	38
65	Incandescent light fixture	1,564	288	1,500	180	-	120	16	200	170	120	30	327	-	258	150	4,060	30	24	258
66	Electrical cable tray, linear foot	27,803	5,512	11,110	5,651	-	1,730	250	10,276	-	1,730	-	2,107	-	1,364	9,206	166,291	-	820	1,364
67	Electrical conduit, linear foot	41,992	7,922	67,220	8,631	781,440	2,471	4,790	13,688	-	2,471	2,060	18,605	1,562,880	8,658	11,905	119,404	2,000	8,500	8,658
69	Mechanical equipment, <300 pound	788	288	1,055	52	-	44	5	31	78	44	8	258	-	360	21	2,388	6	57	360
70	Mechanical equipment, 300-1000 pound	198	312	219	812	-	64	8	274	30	64	-	77	-	14	274	457	21	10	14
71	Mechanical equipment, 1000-10,000 pound	204	60	53	127	-	-	38	59	1,000	-	3	29	-	60	44	516	17	36	60
72	Mechanical equipment, >10,000 pound	68	160	89	238	603	60	26	141	219	60	20	12	1,206	45	103	90	8	78	45

TABLE A
SUMMARY OF SYSTEMS AND STRUCTURES INVENTORIES
(Continued)

Index	System/Structure Inventory Data Point	Allen S . King	Angus Anson	Black Dog	Blue Lake	Grand Meadow	Granite City	Hennepin Island	High Bridge	Inver Hills	Key City	Maplewood	Minnesota Valley	Nobles Wind Farm	Redwing	Riverside	Sherco	Sibley	Wescott	Wilmarth
Station Rating (Mwe)		588	381	538	510	101	72	14	570	360	72	0	64	201	20	830	2400	0	0	20
76	HVAC equipment, <300 pound	108	14	-	16	-	-	-	-	24	-	-	4	-	10	-	328	-	-	10
77	HVAC equipment, 300-1000 pound	-	22	6	-	-	-	-	36	-	-	-	-	-	-	24	107	-	-	-
78	HVAC equipment, 1000-10,000 pound	-	5	-	-	-	-	-	14	-	-	-	2	-	4	10	6	-	-	4
79	HVAC equipment, >10,000 pound	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-
82	HVAC ductwork, pound	119,977	10,000	463,253	-	-	-	8,175	142,100	-	-	-	96,406	-	18,295	38,202	439,440	-	-	18,295
201	Standard reinforced concrete, cubic yard	24,015	6,662	23,828	14,027	18,626	3,806	2,006	18,008	14,800	1,903	770	7,747	37,252	9,138	23,366	89,076	591	11,170	5,248
202	Grade slab concrete, cubic yard	10,800	1,329	6,937	1,176	-	906	-	372	1,384	906	-	676	-	474	3,551	-	-	-	474
206	Heavily rein concrete w/#9 rebar, cubic yard	7,824	1,110	6,204	-	-	-	-	-	-	-	-	3,788	-	1,793	3,035	22,775	-	-	1,793
222	Hollow masonry block wall, cubic yard	-	1,103	614	58	-	-	-	425	-	-	-	-	-	-	2,219	-	-	-	109
224	Solid masonry block wall, cubic yard	3,788	-	6,981	-	-	-	458	-	-	-	-	8,911	-	663	3,011	14,335	-	-	663
229	Backfill of below grade voids, cubic yard	29,218	11,074	13,058	12,493	92,624	2,170	20,000	19,394	6,898	1,308	0	32,816	185,248	17,556	12,325	0	0	0	20,531
230	Excavation of clean material, cubic yard	8,747	-	13,387	-	219,531	-	-	-	-	-	-	7,307	439,061	5,760	18,507	34,560	-	-	5,760
235	Building by volume, cubic foot	5,117,058	229,493	970,141	970,228	-	189,562	-	318,816	247,411	189,562	159,000	164,740	-	321,500	597,793	9,863,100	107,000	430,217	321,500
236	Building metal siding, square foot	217,256	42,789	80,426	19,901	-	37,278	-	108,748	15,564	37,278	-	73,964	-	32,498	93,913	669,467	-	-	32,498
242	Standard asphalt roofing, square foot	47,897	22,500	53,455	-	-	-	9,375	110,000	-	-	-	23,588	-	9,129	119,469	237,266	-	-	9,129
243	Galbestos panels, square foot	-	-	8,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
245	Placement of cofferdam, linear foot	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
248	Lead paint removal from concrete surfaces, square foot	373,064	54,000	-	-	-	-	54,150	-	-	-	-	135,495	-	54,337	-	-	-	-	54,337
253	Overhead cranes/monorails < 10 ton capacity, each	14	5	2	-	-	-	-	-	-	-	-	-	-	1	-	136	-	-	1
255	Overhead cranes/monorails >10 - 50 ton capacity, each	6	2	-	4	-	-	1	5	-	-	-	2	-	2	7	21	-	1	2
258	Gantry cranes > 50 ton capacity, each	1	-	1	1	-	-	-	1	-	-	-	-	-	-	5	6	-	-	-
260	Structural steel, pounds	24,541,699	2,731,615	16,388,568	1,748,139	-	310,648	299,854	6,981,323	662,931	310,648	12,000	6,612,141	-	2,429,526	17,879,987	83,653,565	10,000	92,000	2,429,526
262	Steel floor grating, square foot	161,222	16,242	62,591	7,410	-	2,673	900	18,797	-	2,673	-	12,083	-	30,386	56,169	578,353	-	-	30,386
268	Placement of scaffolding in clean areas, square foot	66,680	-	137,779	-	-	-	-	-	-	-	-	19,777	-	13,043	-	210,181	-	-	13,043
270	Landscaping with topsoil, acre	3	4	4	1	45.9	0	2	1.9	2	0	3	1	92	4	3	33	2	6	2
271	Landscaping w/o topsoil, acre	29	4	5	8	3	2	-	4	9	2	3	7	6	3	8	239	2	6	4
272	Chain link fencing, linear foot	3,372	6,800	3,000	2,880	-	995	550	3,144	2,800	995	2,460	3,859	-	8,372	5,016	20,000	3,680	4,100	995
273	Railroad track, linear foot	3,000	-	3,600	-	-	-	-	-	-	-	-	6,664	-	-	-	24,000	-	-	-
274	Asphalt pavement, square foot	220,880	91,000	122,500	78,300	-	12,000	17,650	75,171	51,000	12,000	17,750	38,225	-	-	128,241	801,500	45,625	62,700	52,000
293	Carbon steel plate 3/8 inch thick, square foot	-	8,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
294	Carbon steel plate 1/2 inch thick, square foot	66,630	7,388	42,598	14,776	798,797	75,398	12,441	14,550	261,891	75,398	-	6,959	1,597,594	17,695	78,517	219,533	-	-	17,695
359	Steam drum removal (fossil)	1	3	6	6	-	-	-	6	-	-	-	3	-	2	9	6	-	-	2
360	Water drum removal (fossil)	-	-	-	-	-	-	-	-	-	-	-	4	-	4	-	12	-	-	4
361	Upper/lower waterwall headers (fossil)	26	-	33	-	-	-	-	-	-	-	-	14	-	6	27	72	-	-	6
362	Top sup boiler waterwall (8'x8' section), inches cut	138,902	-	128,619	-	-	-	-	-	-	-	-	45,627	-	13,392	128,711	470,566	-	-	13,392
369	Boiler convective superheaater platens	307	-	534	-	-	-	-	-	-	-	-	256	-	116	459	1,344	-	-	116
370	Boiler radiant superheater platens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	156	-	-	-
371	Boiler reheat platens	140	-	270	-	-	-	-	-	-	-	-	-	-	-	90	666	-	-	-
372	Boiler economizer platens	420	-	254	-	-	-	-	-	-	-	-	39	-	-	163	1,344	-	-	-
374	Stationary soot blowers	98	-	96	-	-	-	-	-	-	-	-	21	-	-	32	315	-	-	-
375	Retractable soot blowers	70	-	54	-	-	-	-	-	-	-	-	7	-	16	18	144	-	-	16
376	Process ductwork (8'x8' section), inches cut	757,268	321,019	1,013,359	625,433	-	54,416	-	446,315	307,617	54,416	-	470,306	-	61,481	1,009,280	3,392,767	-	-	61,481
378	Non-asbestos insulated regenerative air preheaters	4	-	12	-	-	-	-	-	-	-	-	8	-	8	4	13	-	-	8
380	Non-asbestos insulated recuperative air preheaters	-	-	-	-	-	-	-	-	-	-	-	4	-	-	8	-	-	-	-
382	Induced, forced, primary draft fans	9	-	12	-	-	-	-	-	-	-	-	4	-	4	-	42	-	-	4
383	Coal car dumpers	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-
384	Conveyors	5,528	-	1,400	-	-	-	-	-	-	-	-	900	-	625	-	5,000	-	-	625
385	Transfer Towers	100,500	-	80,400	-	-	-	-	-	-	-	-	-	-	-	-	201,000	-	-	-
386	Stacker-reclaimers	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
387	Coal crushers	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
389	Ball mills	12	-	12	-	-	-	-	-	-	-	-	4	-	-	-	43	-	-	-
390	Coal feeders	120	-	180	-	-	-	-	-	-	-	-	40	-	86	-	1,019	-	-	86

APPENDIX B

UNIT COST FACTOR DEVELOPMENT

APPENDIX B

UNIT COST FACTOR DEVELOPMENT
(Using Minnesota-based labor rates)

Example: Unit Factor for Removal of Heat Exchanger < 3,000 pounds

1. SCOPE

Heat exchangers weighing < 3,000 lb. will be removed in one piece using a crane or small hoist. They will be disconnected from the inlet and outlet piping. The heat exchanger will be sent to the laydown area.

2. CALCULATIONS

Act ID	Activity Description	Activity Duration	Critical Duration
a	Remove insulation	20	(b)
b	Mount pipe cutters	60	60
c	Disconnect inlet and outlet lines	60	60
d	Rig for removal	30	30
e	Unbolt from mounts	30	30
f	Remove, send to packing area	60	60
	Totals (Activity/Critical)	260	240

Duration adjustment(s):	
+ Work break adjustment (8.33 % of productive duration)	20
Total work duration (minutes)	260

***** Total duration = 4.333 hours *****

3. LABOR REQUIRED

Crew	Number	Duration (hr)	Rate ($/hr)	Cost ($)
Laborers	3.0	4.333	51.07	663.86
Craftsmen	2.0	4.333	62.46	541.28
Foreman	1.0	4.333	63.46	274.97
General Foreman	0.25	4.333	64.46	69.83
Fire Watch	0.05	4.333	51.07	11.06
Total labor cost				1,561.00

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
Gas torch consumables 1 @ $18.60/hr x 1 hr {1}	18.60
Subtotal cost of equipment and materials	18.60
Overhead & profit on equipment and materials @ 16.88%	3.14
Total costs, equipment & material	21.74
TOTAL COST Removal of heat exchanger <3000 pound:	**1,582.74**
Total labor cost:	1,561.00
Total equipment/material costs:	21.74
Total craft labor man-hours required per unit:	27.298

5. NOTES AND REFERENCES

- Durations are shown in minutes. The integrated duration accounts for those activities that can be performed in conjunction with other activities, indicated by the alpha designator of the concurrent activity. This results in an overall decrease in the sequenced duration.

- Work difficulty factors were developed in conjunction with the AIF program to standardize decommissioning cost studies and are delineated in the "Guidelines" study (Reference 2, Vol. 1, Chapter 5).

- References for equipment and consumables costs:

    1. R.S. Means (2014) Division 01 54 33, Section 40-6360 Page 698

APPENDIX C

UNIT COST FACTOR LISTING

TABLE C-1

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2014 dollars/Scrap Weights in pounds)

		Unit Cost Factors			Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
2	Piping 0.25 to 2 inches diameter, linear foot	5.89	5.82	0.1	-	4	-	0.5	-	-	-	-
3	Piping >2 to 4 inches diameter, linear foot	8.30	8.19	0.2	-	7	-	0.9	-	-	0.4	-
4	Piping >4 to 8 inches diameter, linear foot	16.02	15.87	0.3	-	22	-	-	-	-	-	-
5	Piping >8 to 14 inches diameter, linear foot	31.14	30.96	0.6	-	57	-	-	-	-	-	-
6	Piping >14 to 20 inches diameter, linear foot	40.54	39.99	0.7	-	-	120	-	-	-	-	-
7	Piping >20 to 36 inches diameter, linear foot	59.63	58.90	1.1	-	-	221	-	-	-	-	-
8	Piping >36 inches diameter, linear foot	70.82	70.10	1.3	-	-	417	-	-	-	-	-
9	Valves <2 inches	114.52	113.81	2.0	-	-	-	-	-	-	-	-
10	Valves >2 to 4 inches	105.57	104.48	1.9	75	-	-	8.8	-	-	4.4	-
11	Valves >4 to 8 inches	160.19	158.73	2.8	510	-	-	-	-	-	-	-
12	Valves >8 to 14 inches	311.41	309.61	5.6	1,066	-	-	-	-	-	-	-
13	Valves >14 to 20 inches	405.35	399.92	7.3	-	-	2,040	-	-	-	-	-
14	Valves >20 to 36 inches	596.28	589.05	10.7	-	-	3,334	-	-	-	-	-
15	Valves >36 inches	708.24	701.01	12.7	-	-	11,535	-	-	-	-	-
24	Pipe hangers for small bore piping, each	37.26	31.83	0.6	-	10	-	-	-	-	-	-
25	Pipe hangers for large bore piping, each	133.34	122.47	2.3	-	50	-	-	-	-	-	-
26	Pump and motor set < 300 pounds	271.27	262.20	4.7	-	-	50	12.5	-	-	-	62.3
27	Pumps, 300-1000 pound pump	746.46	731.96	12.7	293	-	49	48.9	-	-	-	-
28	Pumps, >1000-10,000 pound pump	2,951.17	2,929.43	51.3	2,834	-	472	472.3	-	-	-	-
29	Pumps, >10,000 pound pump	5,711.35	5,646.13	98.9	43,693	-	7,282	7,282.1	-	-	-	-
32	Pump motors, 300-1000 pound pump	311.41	311.41	5.4	-	-	-	-	-	-	-	307.8
33	Pump motors, >1000-10,000 pound pump	1,225.22	1,225.22	21.5	-	-	-	-	-	-	-	3,531.6
34	Pump motors, >10,000 pound pump	2,756.72	2,756.72	48.3	-	-	-	-	-	-	-	42,324.5
37	Turbine-driven pumps > 10,000 pounds	7,645.01	7,572.56	132.7	20,000	-	20,000	-	-	-	-	-
38	Main turbine-generator (pounds per MW(e) input)	179,970.00	178,578.66	3,042.0	-	-	851,500	-	-	-	-	851,500.0
39	Heat exchanger <3000 pound	1,582.74	1,561.00	27.3	-	-	416	623.4	-	-	-	-
40	Heat exchanger >3000 pound	3,989.63	3,902.67	68.3	-	-	5,599	8,397.9	-	-	-	-
41	Feedwater heater/deaerator	11,260.56	11,086.64	194.2	-	-	12,000	18,000.0	-	-	-	-
49	Main condenser (pounds per MW(e) input)	496,136.69	476,317.56	8,243.6	149,400	-	149,400	199,200.0	-	-	-	-
51	Tanks, <300 gallons, filters, and ion exchangers	348.81	337.94	6.0	-	-	401	401.2	-	-	-	-
52	Tanks, 300-3000 gallons	1,097.84	1,076.10	19.1	-	-	2,700	300.0	-	-	-	-
53	Tanks, >3000 gallons, square foot surface	9.17	8.90	0.2	-	21	-	-	-	-	-	-
54	Electrical equipment, <300 pound	146.54	146.54	2.6	-	-	56	-	-	-	2.9	-
55	Electrical equipment, 300-1000 pound	507.02	507.02	8.8	-	-	624	-	-	-	32.8	-

TABLE C-1 (continued)

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2014 dollars/Scrap Weights in pounds)

		Unit Cost Factors			Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
56	Electrical equipment, 1000-10,000 pound	1,014.02	1,014.02	17.6	-	-	2,212	-	-	-	116.4	-
57	Electrical equipment, >10,000 pound	2,391.76	2,391.76	41.0	-	-	19,950	-	-	-	1,050.0	-
59	Electrical transformers < 30 tons	1,661.03	1,661.03	28.4	-	-	11,250	-	-	-	3,750.0	-
60	Electrical transformers > 30 tons	4,783.50	4,783.50	81.9	-	-	375,000	-	-	-	125,000.0	-
61	Standby diesel-generator, <100 kW	1,696.60	1,696.60	29.1	2,340	-	-	-	-	-	-	260.0
62	Standby diesel-generator, 100 kW to 1 MW	3,786.94	3,786.94	64.8	9,450	-	-	-	-	-	-	1,050.0
63	Standby diesel-generator, >1 MW	7,839.73	7,839.73	134.2	47,250	-	-	-	-	-	-	5,250.0
64	Fluorescent light fixture	61.43	61.43	1.1	-	-	-	-	-	-	-	-
65	Incandescent light fixture	30.66	30.66	0.6	-	-	-	-	-	-	-	-
66	Electrical cable tray, linear foot	13.81	13.45	0.2	-	-	-	-	6.6	6.6	-	-
67	Electrical conduit, linear foot	6.04	5.86	0.1	-	-	-	-	3.4	3.4	-	-
69	Mechanical equipment, <300 pound	146.54	146.54	2.6	-	-	127	-	-	-	-	-
70	Mechanical equipment, 300-1000 pound	507.02	507.02	8.8	-	-	641	-	-	-	-	-
71	Mechanical equipment, 1000-10,000 pound	1,014.02	1,014.02	17.6	-	-	4,184	-	-	-	-	-
72	Mechanical equipment, >10,000 pound	2,391.76	2,391.76	41.0	-	-	11,938	-	-	-	-	-
76	HVAC equipment, <300 pound	177.21	177.21	3.1	-	-	184	-	-	-	-	-
77	HVAC equipment, 300-1000 pound	609.22	609.22	10.6	-	-	643	-	-	-	-	-
78	HVAC equipment, 1000-10,000 pound	1,214.16	1,214.16	21.0	-	-	3,813	-	-	-	-	-
79	HVAC equipment, >10,000 pound	2,391.76	2,391.76	41.0	-	-	19,391	-	-	-	-	-
82	HVAC ductwork, pound	0.57	0.57	0.0	-	-	-	-	1.0	-	-	-
201	Standard reinforced concrete, cubic yard	75.03	36.44	0.6	-	183	-	-	-	-	-	-
202	Grade slab concrete, cubic yard	97.90	54.65	1.0	-	183	-	-	-	-	-	-
206	Heavily rein concrete w/#9 rebar, cubic yard	119.10	46.40	0.8	-	730	-	-	-	-	-	-
222	Hollow masonry block wall, cubic yard	113.46	73.48	1.4	-	66	-	-	-	-	-	-
224	Solid masonry block wall, cubic yard	113.46	73.48	1.4	-	66	-	-	-	-	-	-
229	Backfill of below grade voids, cubic yard	33.44	3.67	0.1	-	-	-	-	-	-	-	-
230	Excavation of clean material, cubic yard	3.39	1.31	0.0	-	-	-	-	-	-	-	-
235	Building by volume, cubic foot	0.34	0.18	-	-	-	1	-	-	-	-	-
236	Building metal siding, square foot	1.51	1.07	0.0	-	-	-	-	2.4	-	-	-
242	Standard asphalt roofing, square foot	2.55	2.55	0.1	-	-	-	-	-	-	-	-
243	Galbestos panels, square foot	2.35	1.76	0.0	-	-	-	-	-	-	-	-
245	Placement of cofferdam, linear foot	-	-	-	-	-	-	-	-	-	-	-

TABLE C-1 (continued)

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2014 dollars/Scrap Weights in pounds)

		Unit Cost Factors			Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
248	Lead paint removal from concrete surfaces, square foot	8.91	6.80	0.1	-	-	-	-	-	-	-	-
253	Overhead cranes/monorails < 10 ton capacity, each	701.28	701.28	11.8	-	3,700	-	-	-	-	-	-
255	Overhead cranes/monorails >10 - 50 ton capacity, each	1,683.07	1,683.07	28.3	-	-	298,832	-	-	-	3,018.5	-
258	Gantry cranes > 50 ton capacity, each	29,896.91	29,896.91	511.9	-	-	712,800	-	-	-	7,200.0	-
260	Structural steel, pounds	0.22	0.17	-	-	1	-	-	-	-	-	-
262	Steel floor grating, square foot	5.02	4.64	0.1	-	-	6	-	1.1	-	-	-
268	Placement of scaffolding in clean areas, square foot	15.94	5.42	0.1	-	-	-	-	-	-	-	-
270	Landscaping with topsoil, acre	24,697.24	3,085.72	52.6	-	-	-	-	-	-	-	-
271	Landscaping w/o topsoil, acre	1,242.11	333.10	5.3	-	-	-	-	-	-	-	-
272	Chain link fencing, linear foot	3.76	2.96	0.1	-	-	-	-	10.0	-	-	-
273	Railroad track, linear foot	26.63	12.34	0.2	-	91	-	-	-	-	-	-
274	Asphalt pavement, square foot	0.97	0.65	0.0	-	-	-	-	-	-	-	-
294	Carbon steel plate 1/2 inch thick, square foot	4.21	3.42	0.1	-	-	20	-	-	-	-	-
359	Steam drum removal (fossil)	22,056.71	21,911.77	411.6	-	-	480,000	-	-	-	-	-
360	Water drum removal (fossil)	8,184.40	8,157.23	153.2	-	-	320,000	-	-	-	-	-
361	Upper/lower waterwall headers (fossil)	6,177.23	6,150.06	115.5	-	-	120,000	-	-	-	-	-
362	Top sup boiler waterwall (8'x8' section), inches cut	0.74	0.70	0.0	-	-	11	-	-	-	-	-
369	Boiler convective superheaater platens	1,787.36	1,598.96	29.6	-	-	19,501	-	-	-	-	-
370	Boiler radiant superheater platens	756.13	676.43	12.5	-	-	51,652	-	-	-	-	-
371	Boiler reheat platens	756.13	676.43	12.5	-	-	19,501	-	-	-	-	-
372	Boiler economizer platens	962.37	860.93	15.9	-	-	11,703	-	-	-	-	-
374	Stationary soot blowers	39.04	39.04	0.7	-	-	500	-	-	-	-	50.0
375	Retractable soot blowers	369.01	369.01	6.8	-	-	11,150	-	-	-	-	100.0
376	Process ductwork (8'x8' section), inches cut	0.37	0.34	0.0	-	-	0	-	-	-	-	-
378	Non-asbestos insulated regenerative air preheaters	11,731.57	10,035.87	188.5	-	-	1,376,000	-	-	-	-	-
380	Non-asbestos insulated recuperative air preheaters	6,502.34	5,442.53	101.6	-	-	1,376,000	-	-	-	-	-
382	Induced, forced, primary draft fans	1,765.63	1,722.15	31.9	-	-	30,000	-	-	-	-	3,531.6
383	Coal car dumpers	16,091.87	13,483.11	249.4	-	-	125,000	-	-	-	-	500.0
384	Conveyors	15.04	13.95	0.3	-	-	820	-	-	-	-	-
385	Transfer Towers	0.21	0.15	-	-	-	5	-	-	-	-	-
386	Stacker-reclaimers	161,210.45	161,210.45	3,008.3	-	-	300,000	-	-	-	-	2,000.0
387	Coal crushers	1,070.04	1,059.17	19.3	-	-	36,000	-	-	-	-	250.0
389	Ball mills	1,540.33	1,540.33	28.1	-	-	360,000	-	-	-	-	7,063.1
390	Coal feeders	387.21	376.34	7.1	-	-	1,194	-	-	-	-	-

TABLE C-2

UNIT COST FACTOR LISTING
South Dakota Station
(Costs are in 2014 dollars/Scrap Weights in pounds)

		Unit Cost Factors			Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
2	Piping 0.25 to 2 inches diameter, linear foot	2.53	2.46	0.1	-	4	-	0.5	-	-	-	-
3	Piping >2 to 4 inches diameter, linear foot	3.55	3.44	0.2	-	7	-	0.9	-	-	0.4	-
4	Piping >4 to 8 inches diameter, linear foot	7.11	6.97	0.3	-	22	-	-	-	-	-	-
5	Piping >8 to 14 inches diameter, linear foot	13.45	13.28	0.6	-	57	-	-	-	-	-	-
6	Piping >14 to 20 inches diameter, linear foot	17.96	17.45	0.7	-	-	120	-	-	-	-	-
7	Piping >20 to 36 inches diameter, linear foot	26.09	25.41	1.0	-	-	221	-	-	-	-	-
8	Piping >36 inches diameter, linear foot	31.03	30.35	1.3	-	-	417	-	-	-	-	-
9	Valves <2 inches	50.23	49.56	2.0	-	-	-	-	-	-	-	-
10	Valves >2 to 4 inches	46.43	45.41	1.8	75	-	-	8.8	-	-	4.4	-
11	Valves >4 to 8 inches	71.11	69.74	2.8	510	-	-	-	-	-	-	-
12	Valves >8 to 14 inches	134.50	132.80	5.5	1,066	-	-	-	-	-	-	-
13	Valves >14 to 20 inches	179.58	174.47	7.2	-	-	2,040	-	-	-	-	-
14	Valves >20 to 36 inches	260.93	254.12	10.4	-	-	3,334	-	-	-	-	-
15	Valves >36 inches	310.31	303.50	12.5	-	-	11,535	-	-	-	-	-
24	Pipe hangers for small bore piping, each	18.89	13.78	0.6	-	10	-	-	-	-	-	-
25	Pipe hangers for large bore piping, each	61.15	50.91	2.3	-	50	-	-	-	-	-	-
26	Pump and motor set < 300 pounds	124.75	116.22	4.6	-	-	50	12.5	-	-	-	62.3
27	Pumps, 300-1000 pound pump	342.65	328.99	12.5	293	-	49	48.9	-	-	-	-
28	Pumps, >1000-10,000 pound pump	1,330.17	1,309.70	50.5	2,834	-	472	472.3	-	-	-	-
29	Pumps, >10,000 pound pump	2,587.58	2,526.17	97.4	43,693	-	7,282	7,282.1	-	-	-	-
32	Pump motors, 300-1000 pound pump	140.66	140.66	5.3	-	-	-	-	-	-	-	307.8
33	Pump motors, >1000-10,000 pound pump	550.02	550.02	21.2	-	-	-	-	-	-	-	3,531.6
34	Pump motors, >10,000 pound pump	1,235.67	1,235.67	47.6	-	-	-	-	-	-	-	42,324.5
38	Main turbine-generator (pounds per MW(e) input)	83,070.00	81,759.82	2,995.2	-	-	851,500	-	-	-	-	851,500.0
39	Heat exchanger <3000 pound	720.80	700.33	26.9	-	-	416	623.4	-	-	-	-
40	Heat exchanger >3000 pound	1,832.61	1,750.72	67.2	-	-	5,599	8,397.9	-	-	-	-
41	Feedwater heater/deaerator	5,122.92	4,959.15	191.2	-	-	12,000	18,000.0	-	-	-	-
49	Main condenser (pounds per MW(e) input)	233,827.36	215,173.52	8,116.8	149,400	-	149,400	199,200.0	-	-	-	-
51	Tanks, <300 gallons, filters, and ion exchangers	159.02	148.78	5.9	-	-	401	401.2	-	-	-	-
52	Tanks, 300-3000 gallons	496.28	475.81	18.8	-	-	2,700	300.0	-	-	-	-
53	Tanks, >3000 gallons, square foot surface	4.25	3.99	0.2	-	21	-	-	-	-	-	-
54	Electrical equipment, <300 pound	65.93	65.93	2.6	-	-	56	-	-	-	2.9	-
55	Electrical equipment, 300-1000 pound	228.36	228.36	8.6	-	-	624	-	-	-	32.8	-
56	Electrical equipment, 1000-10,000 pound	456.61	456.61	17.3	-	-	2,212	-	-	-	116.4	-
57	Electrical equipment, >10,000 pound	1,093.11	1,093.11	40.3	-	-	19,950	-	-	-	1,050.0	-

TABLE C-2 (continued)

UNIT COST FACTOR LISTING
South Dakota Station
(Costs are in 2014 dollars/Scrap Weights in pounds)

		Unit Cost Factors			Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
59	Electrical transformers < 30 tons	758.76	758.76	28.0	-	-	11,250	-	-	-	3,750.0	-
60	Electrical transformers > 30 tons	2,186.33	2,186.33	80.7	-	-	375,000	-	-	-	125,000.0	-
61	Standby diesel-generator, <100 kW	772.98	772.98	28.5	2,340	-	-	-	-	-	-	260.0
64	Fluorescent light fixture	25.98	25.98	1.1	-	-	-	-	-	-	-	-
65	Incandescent light fixture	13.35	13.35	0.6	-	-	-	-	-	-	-	-
66	Electrical cable tray, linear foot	6.29	5.95	0.2	-	-	-	-	6.6	6.6	-	-
67	Electrical conduit, linear foot	2.80	2.63	0.1	-	-	-	-	3.4	3.4	-	-
69	Mechanical equipment, <300 pound	65.93	65.93	2.6	-	-	127	-	-	-	-	-
70	Mechanical equipment, 300-1000 pound	228.36	228.36	8.6	-	-	641	-	-	-	-	-
71	Mechanical equipment, 1000-10,000 pound	456.61	456.61	17.3	-	-	4,184	-	-	-	-	-
72	Mechanical equipment, >10,000 pound	1,093.11	1,093.11	40.3	-	-	11,938	-	-	-	-	-
76	HVAC equipment, <300 pound	78.15	78.15	3.1	-	-	184	-	-	-	-	-
77	HVAC equipment, 300-1000 pound	273.14	273.14	10.3	-	-	643	-	-	-	-	-
78	HVAC equipment, 1000-10,000 pound	548.35	548.35	20.7	-	-	3,813	-	-	-	-	-
82	HVAC ductwork, pound	0.25	0.25	0.0	-	-	-	-	1.0	-	-	-
201	Standard reinforced concrete, cubic yard	55.23	16.52	0.6	-	183	-	-	-	-	-	-
202	Grade slab concrete, cubic yard	68.16	24.78	1.0	-	183	-	-	-	-	-	-
206	Heavily rein concrete w/#9 rebar, cubic yard	94.27	21.34	0.8	-	730	-	-	-	-	-	-
222	Hollow masonry block wall, cubic yard	67.59	29.94	1.4	-	66	-	-	-	-	-	-
229	Backfill of below grade voids, cubic yard	29.80	1.76	0.1	-	-	-	-	-	-	-	-
235	Building by volume, cubic foot	0.23	0.09	-	-	-	1	-	-	-	-	-
236	Building metal siding, square foot	0.85	0.44	0.0	-	-	-	-	2.4	-	-	-
242	Standard asphalt roofing, square foot	1.11	1.11	0.1	-	-	-	-	-	-	-	-
248	Lead paint removal from concrete surfaces, square foot	4.59	2.75	0.1	-	-	-	-	-	-	-	-
253	Overhead cranes/monorails < 10 ton capacity, each	324.82	324.82	11.6	-	3,700	-	-	-	-	-	-
255	Overhead cranes/monorails >10 - 50 ton capacity, each	779.88	779.88	27.9	-	-	298,832	-	-	-	3,018.5	-
260	Structural steel, pounds	0.13	0.08	-	-	1	-	-	-	-	-	-
262	Steel floor grating, square foot	2.63	2.28	0.1	-	-	6	-	1.1	-	-	-
270	Landscaping with topsoil, acre	21,783.43	1,429.85	52.6	-	-	-	-	-	-	-	-
271	Landscaping w/o topsoil, acre	1,018.04	161.96	5.3	-	-	-	-	-	-	-	-
272	Chain link fencing, linear foot	2.05	1.29	0.1	-	-	-	-	10.0	-	-	-
274	Asphalt pavement, square foot	0.61	0.30	0.0	-	-	-	-	-	-	-	-
293	Carbon steel plate 3/8 inch thick, square foot	2.17	1.46	0.1	-	-	15	-	-	-	-	-
294	Carbon steel plate 1/2 inch thick, square foot	2.24	1.50	0.1	-	-	20	-	-	-	-	-
359	Steam drum removal (fossil)	9,347.41	9,210.92	405.3	-	-	480,000	-	-	-	-	-
376	Process ductwork (8'x8' section), inches cut	0.17	0.14	0.0	-	-	0	-	-	-	-	-

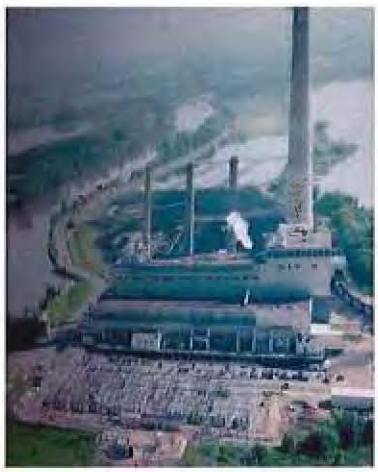
Document X01-1617-002, Rev. 0

DISMANTLING COST STUDY

for

Allen S. King Unit 1
Angus Anson Units 1-3
Black Dog Units 2-5
Blue Lake Units 1-4, 7 and 8
Grand Meadow Wind Farm
Granite City Units 1-4
High Bridge Units 1-3
Inver Hills Units 1- 6
Key City Units 1-4
Minnesota Valley 1-3
Red Wing 1 & 2
Riverside Units 7, 8, 9 and 10
Sherburne County Units 1-3
Wilmarth 1 & 2

Generating Stations



prepared for

Xcel Energy

prepared by

TLG Services, Inc.
An Entergy Company
148 New Milford Road East
Bridgewater, CT

February 2010

APPROVALS

Project Engineer	**Benjamin J. Stochmal**	2/4/10 **Date**
Project Manager	**Francis. W. Seymore**	2/4/10 **Date**
Technical Manager	**Geoffrey M. Griffiths**	2/4/10 **Date**

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Rev. No.	CRA No.	Date	Item Revised	Reason for Revision
0		02/05/2010		Original Issue

EXECUTIVE SUMMARY

This report, prepared by TLG Services, Inc. (TLG), provides estimated costs for the complete dismantling of the following electric generating stations, owned and operated by Xcel Energy:

Stations Located In Minnesota:

- Allen S. King
- Black Dog
- Blue Lake
- Grand Meadow Wind Farm
- Granite City
- High Bridge
- Inver Hills
- Key City
- Minnesota Valley
- Red Wing
- Riverside
- Sherburne County (Sherco)
- Wilmarth

Station Located In South Dakota:

- Angus Anson

Xcel Energy either owns or has a share in ownership in each of these stations. All of the stations are located in Minnesota or South Dakota.

The dismantling estimate includes the cost of removing the power generating equipment such as boilers, turbine generators, fuel handling equipment, system equipment, and structures for each of the above-referenced stations. The electrical switchyards are assumed to remain in place and are not included in the estimate.

The scope of the dismantling estimate includes the following significant cost elements:

- Isolation of the units in preparation for safe dismantling (ensuring systems are de-energized to ensure a safe dismantling environment)
- Abatement of asbestos containing materials prior to dismantling (where applicable)
- Labor, equipment, and material costs associated with the removal and disposition of all installed equipment

- Labor, equipment, and material costs associated with the demolition and disposition of buildings and foundations (to a depth of 3 feet below grade)
- Removal of all subsurface utilities and below grade foundations (Grand Meadow Wind Farm only)
- Demolition contractor's on-site management, engineering, safety, and administrative staff
- Demolition contractor's expenses, including profit, insurance, permits, and fees
- Owner's on-site management, oversight, and security staff
- A cost credit associated with the disposition of scrap metals
- Cost contingency
- Ongoing environmental monitoring after the completion of the dismantling and demolition (where applicable)

The general approach in assembling the estimate was to develop a site-specific cost for each generating unit located at the station, based on a unit-specific equipment and building materials inventory. The inventory of components designated to be removed as part of the dismantling program was established using site walk-downs (including discussions with the Operations & Maintenance staff), station-provided equipment databases, and plant drawings. A similar estimate was developed for dismantling systems and structures common to multiple generating units.

This cost estimate is prepared by applying unit cost factors (developed for each inventory item from prior dismantling experience or similar related experience) against the station specific inventory. Costs for project management, shared equipment and consumables, and similar types of costs are estimated on a period-dependent basis (i.e., the magnitude of the expense depends, in part, on the duration of the project and the types of activities taking place). While equipment salvage is not included, the potential value of scrap from materials generated in dismantling the boilers, plant components, and building structural steel is included as a credit in the dismantling cost estimate. Contingency is provided within this estimate to account for unpredictable project events.

This estimate includes the costs to remove all structures on the site to a nominal level of three feet below grade. Concerns for worker safety reinforce the need for a controlled approach. The cost estimates reflect demolition by controlled/engineered dismantling.

Limited site landscaping includes grading and seeding for drainage and erosion control.

The total dismantling costs, expressed in thousands of 2009 dollars, are provided at the end of this section.

SUMMARY OF DISMANTLING COSTS
(All costs are in thousands of 2009 dollars)

Station	Unit	MWe rating	Fuel	In Service	Station Cost
Allen S. King	1	588	Coal	1968	33,401
Angus Anson	1	106	Natural Gas/Oil	1994	5,239
	2	110	Natural Gas/Oil	1994	
	3	165	Natural Gas/Oil	2005	
Black Dog	2	98	Coal/Natural Gas	1987	37,280
	3	108	Coal/Natural Gas	1955	
	4	170	Coal/Natural Gas	1960	
	5	162	Coal/Natural Gas	2002	
Blue Lake	1	45	Natural Gas/Oil	1974	10,115
	2	45	Natural Gas/Oil	1974	
	3	45	Natural Gas/Oil	1974	
	4	45	Natural Gas/Oil	1974	
	7	165	Natural Gas/Oil	2005	
	8	165	Natural Gas/Oil	2005	
Grand Meadow	1-67	101	Wind	2008	17,146
Granite City	1	18	Natural Gas/Oil	1969	3,319
	2	18	Natural Gas/Oil	1969	
	3	18	Natural Gas/Oil	1969	
	4	18	Natural Gas/Oil	1969	
High Bridge	1	160	Natural Gas/Oil	2008	11,536
	2	160	Natural Gas/Oil	2008	
	3	250	(note 1)	2008	
Inver Hills	1	60	Natural Gas/Oil	1972	7,944
	2	60	Natural Gas/Oil	1972	
	3	60	Natural Gas/Oil	1972	
	4	60	Natural Gas/Oil	1972	
	5	60	Natural Gas/Oil	1972	
	6	60	Natural Gas/Oil	1972	

SUMMARY OF DISMANTLING COSTS
(continued)

(All costs are in thousands of 2009 dollars)

Station	Unit	MWe rating	Fuel	In Service	Station Cost
Key City	1	18	Natural Gas/Oil	1970	3,319
	2	18	Natural Gas/Oil	1970	
	3	18	Natural Gas/Oil	1970	
	4	18	Natural Gas/Oil	1970	
Minnesota Valley	1	10	Coal	1949	13,875
	2	10	Coal	1949	
	3	44	Coal	1953	
Red Wing	1	10	Refuse Derived Fuel	1949	10,392
	2	10	Refuse Derived Fuel	1949	
Riverside	7	165	(note 2)	1964	29,820
	8	231	Coal	2009	
	9	173	Natural Gas/Oil	2009	
	10	173	Natural Gas/Oil	2009	
Sherco	1	750	Coal	1976	84,093
	2	750	Coal	1977	
	3	900	Coal	1987	
Wilmarth	1	10	Refuse Derived Fuel	1948	9,373
	2	10	Refuse Derived Fuel	1951	
Fleet Totals		**6,438**			**$276,851**

NOTES:
1 Unit 3 receives steam from Units 1 and 2 HRSGs
2 Unit 7 receives steam from Units 9 and 10 HRSGs

1. INTRODUCTION

1.1 OBJECTIVE OF STUDY

The objective of this dismantling cost study prepared by TLG Services is to present an estimate of the costs to dismantle Xcel Energy's fossil-fuel and wind farm generating stations in Minnesota and South Dakota. This study is not intended to be a dismantling plan for each of the stations, but a cost estimate prepared to support current financial planning for future dismantling.

1.2 STATION DESCRIPTIONS

Allen S. King is a single unit coal fired generating facility with a cyclone-fired boiler. It has a generating capacity of 588 MWe while burning low sulfur Wyoming coal. The plant is located in Oak Park Heights, Minn., on the St. Croix River. The unit was installed in 1968. From 2004 to 2007 the unit was completely refurbished as part of an Emissions Reduction Project.

Angus Anson is a three unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 381 megawatts. Unit 1, 2 and 3 are rated at 106,110 and 165 MWe, respectively. The station is located in Sioux Falls, South Dakota adjacent to the decommissioned Pathfinder nuclear facility. Units 1 and 2 were placed in service in 1994. Unit 3 was placed in service in 2005.

Black Dog is a coal and gas fired generating station located on the Minnesota River just south of the Twin Cities. Unit 5, which is a natural gas fired combined cycle combustion gas turbine, replaced the original Unit 1 boiler and steam turbine. The exhaust heat from Unit 5 gas turbine generates steam in the HRSG (heat recovery steam generator) and powers the original Unit 2 steam turbine that was installed in the 1950's. Units 3 and 4 are dual fuel boilers with steam turbines. They use coal as a primary fuel and natural gas for back up. The station generating capacity is 538 megawatts. Unit 2, 3, 4 and 5 are rated a 98, 108, 170, and 162 MWe, respectively. Units 2, 3 and 4 were installed during the 1950's. Unit 5 was placed in service in 2002.

Blue Lake is a six unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 510 megawatts. Units 1-4 are rated at 45 MWe each. Units 7 and 8 are rated at 165 MWe each. The station is located in Shakopee, Minnesota along the Minnesota

River. Units 1-4 were placed in service in 1974. Units 7 and 8 were placed in service in 2005.

Grand Meadow is a 67 unit wind turbine complex located in a stretch of farm fields six miles long and four miles wide. The farm is spread out over roughly 10,000 acres southeast of Interstate 90 in Grand Meadow, Clayton, and Dexter Townships, Mower County, Minnesota. Each wind turbine / generator set has a rated capacity of 1.5 MWe, for a complex total of 100.5 MWe. The units were placed in service in 2008.

Granite City is a four unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 72 megawatts with each of the four units rated at 18 MWe. The station is located in St. Cloud, Minnesota. The units were installed in 1970.

High Bridge is a three unit facility consisting of two combined cycle combustion gas turbines and one steam turbine. The combustion turbines are each direct coupled to a 160 MWe electric generator. The exhaust gas of each combustion turbine is ducted through its own HRSG. The steam from the HRSG is piped to a 250 MWe steam turbine. The station has a net dependable capacity of 570 MWe. The station was placed in service in 2008. It is located in downtown St. Paul, Minnesota, on the Mississippi River.

Inver Hills is a six unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 360 megawatts. Units 1-6 are rated at 60 MWe each. The station is located in Inver Grove Heights, Minnesota. The units were placed in service in 1972.

Key City is a four unit simple cycle combustion gas turbine peaking facility, capable of firing on oil or natural gas. The station generating capacity is 72 megawatts with Units 1-4 at 18 MWe each. The station is located in Mankato, Minnesota. The units were installed in 1970.

Minnesota Valley is a three unit facility abandoned in place. The station consists of two 10 MWe and one 46 MWe coal fired units. The station is located in Chippewa County, Granite Falls, Minnesota. The two 10 MWe units were installed in the late 1940's. The third unit was installed in 1953. The station was retired from service in 2003.

Red Wing is a two unit generating facility that burns processed municipal solid waste, referred to as refuse-derived fuel (RDF). The station employs a combination duct scrubber with a baghouse to effectively cut emissions from

burning RDF. The scrubber treats flue gas with a water spray and dry lime. The baghouse traps particulate by forcing gas streams through large filter bags. The generating capacity of each unit is 10 MWe. The station is located in Red Wing, Minnesota. The units were installed in the early 1950's (coal fired units) and later modified to burn RDF.

Riverside is a three unit facility consisting of two combined cycle combustion gas turbine generators (Units 9 and 10) and one steam turbine (refurbished Unit 7 steam turbine). The combustion turbines are each direct coupled to a 173 MWe electric generator. The exhaust gas of each combustion turbine is ducted through its own HRSG. The steam from the HRSG is piped to the Unit 7 165 MWe steam turbine. Abandoned in place, and included in this estimate, are the retired Units 6, 7 and 8 boilers, and the Unit 8 steam turbine with all its associated piping and system components. The three operational units went into service in 2009. The station is located northeast of Minneapolis on the Mississippi River

Sherburne County (Sherco) is a three unit 2,400 MWe coal-fired facility. The station is located in Becker, Minnesota, 45 miles northeast of the Twin Cities, on the Mississippi River. Units 1, 2 and 3 have a net dependable capacity of 750, 750 and 900 MWe each, respectively. The units were installed between 1976 and 1987.

Wilmarth is an electric generating facility that burns RDF. The station employs a combination duct scrubber with a baghouse to effectively cut emissions from burning RDF. The scrubber treats flue gas with a water spray and dry lime. The baghouse traps particulate by forcing gas streams through large filter bags. The generating capacity of Unit 1 and 2 is 10 MWe each. The station is located in Mankato, Minnesota. The units was installed in the early 1950's and modified in 1987 to burn RDF.

1.3 SCOPE

The scope of the dismantling estimate includes the following significant cost elements:

- Preparation for safe dismantling; including hazardous materials characterization for such items as ACM (asbestos-containing materials), lead, mercury, PCBs, hydrocarbons in soil, etc. Isolation of the units in preparation for safe dismantling (e.g. ensuring systems are de-energized, fuel and chemical storage tanks are drained and cleaned, etc. (where applicable).

- Abatement of ACM prior to dismantling (where applicable)
- Labor, equipment, and material costs associated with the removal and disposition of all installed equipment
- Labor, equipment, and material costs associated with the demolition and disposition of buildings and foundations
- Demolition contractor's on-site management, engineering, safety, and administrative staff
- Demolition contractor's expenses, including insurance, permits, and fees.
- Owner's on-site management, oversight, and security staff
- A cost credit associated with the disposition of scrap metals
- Cost contingency
- Ongoing environmental monitoring of the facilities after the completion of the dismantling and demolition

Costs are provided for each station, identified by significant cost element. The cost per station includes the costs for dismantling the generating unit and the common station facilities. Costs are provided in 2009 dollars.

1.4 GENERAL APPROACH

The general approach in assembling the estimate was to develop a site-specific cost for each generating unit located at the station, based on a unit-specific equipment and building materials inventory. The inventory of components designated to be removed as part of the dismantling program was established using site walk-downs (including discussions with the Operations & Maintenance staff), station-provided equipment databases, and plant drawings. A similar estimate was developed for dismantling systems and structures common to all units on site.

This cost estimate was prepared by applying unit cost factors (developed for each inventory item from prior dismantling experience or similar related experience) against the station specific inventory. Costs for project management, shared equipment and consumables, and similar types of costs are estimated on a period-dependent basis (i.e., the magnitude of the expense depends, in part, on the duration of the project and the types of activities taking place). While equipment salvage is not included, the potential value of scrap from materials generated in dismantling the boilers, plant components, and building structural steel is included as a credit in the dismantling cost estimate.

Contingency is provided within this estimate to account for unpredictable project events.

This estimate includes the costs to remove all structures on the site to a nominal level of three feet below grade. Concerns for worker safety reinforce the need for a controlled approach. The cost estimates reflect demolition by controlled/engineered dismantling.

Limited site landscaping includes grading and seeding for drainage and erosion control.

Section 2 of this report identifies the activities and sequence of activities necessary to dismantle a generating station. Section 3 provides the specific bases for the estimate. Section 4 discusses scrap metal and associated credits to the dismantling costs. Section 5 provides the results. Appendices, noted throughout this report, provide additional information important to understanding this estimate.

2.0 DISMANTLING OPERATIONS

The estimate for dismantling the stations is based on the complete removal of the units and common station facilities (except where noted). The following sections describe the project organization, basic activities, and special equipment necessary for accomplishing the dismantling project.

2.1 PROJECT ORGANIZATION

For the purposes of this study, the dismantling project for each station is assumed to be managed by Xcel Energy's Project Director, who would have the primary responsibility for dismantling the station. A Dismantling Contractor, experienced in dismantling similar facilities, would be hired as the prime contractor for the removal of plant components and site facilities. The Dismantling Contractor's Project Manager would report to the Project Director. The Dismantling Contractor would manage and supervise the dismantling activities of the station and be responsible for completing the work in an expeditious and safe manner. Contractor personnel would manage and direct the labor force in accordance with approved procedures and in accordance with a health and safety program. The owner's staff would maintain and/or provide the engineering, safety, and environmental compliance oversight, and the security services necessary to support dismantling operations. Figures 2.1 and 2.2 identify typical organizations for the plant/utility staff and the associated contractor personnel during the dismantling phase of the project. The smaller facilities included within this estimate would have a commensurately smaller project organization (Angus Anson, Blue Lake, Grand Meadow, Granite City, Inver Hills, Key City).

2.2 POST-SHUTDOWN ACTIVITIES

The estimate is based on each station being shut down and placed into a post-shutdown configuration by the plant staff. The length of time that the facility is in this configuration is indeterminate and the costs for maintaining the facility in this configuration is not included within the scope of this dismantling effort. The activities to be completed post-shutdown, but prior to station dismantling, include:

- Removal of consumables and supplies not needed in the post-shutdown configuration
- Removal of residual fuels (including oil/coal)

- Removal of acids and caustics; flushing and cleaning of storage tanks
- Cleaning of fly-ash handling equipment, e.g., filters and holding tanks
- Removal of hazardous waste and combustible materials
- If the unit is to be maintained in a condition where lighting, electricity, heating, water, sanitary, and similar services are to remain active, reconfigure these systems to minimize maintenance requirements
- Disposition of surplus bulk chemicals and gas storage containers
- Completion of a hazardous materials survey of the station
- De-watering and removal of residual ash from settling ponds and/or basins
- Installation of any appropriate physical barriers (sealing circulating water system) and/or security barriers
- Maintenance of the facility (maintaining roofs and windows, drain systems, and electrical systems to preclude creating hazardous working conditions in the future)

Except for the hazardous materials survey, costs to conduct these activities have not been included in this estimate. The plant operations and maintenance staff would be expected to perform these activities in the interval of time between final plant shutdown, and the onset of the dismantling program.

2.3 DISMANTLING PROGRAM

The actual dismantling program begins once the station owner has decided to dismantle the site, either immediately following final shutdown, or after a period of storage following final shutdown. The dismantling program has been organized into three distinct periods: Period 1 - Engineering/Planning and Asbestos and Other Hazardous Material Abatement (if necessary); Period 2 - Dismantling Operations; and Period 3 - Site Restoration. This section summarizes the activities performed under each Period of the program.

For the purposes of this estimate it is assumed that once the decision to dismantle has been made and a project start date established, the work in each of these periods will be completed successively (no delay between periods). This report does not attempt to describe all of the activities necessary to dismantle a station, but identifies representative activities appropriate to this type of project.

2.3.1 Period 1- Engineering/Planning and Asbestos Abatement

Engineering/Planning:

A preliminary planning phase of the program begins once it is has been determined that a station will be dismantled and the project has been authorized to proceed. During this phase, the owner assembles its dismantling management organization, makes appropriate decisions regarding the extent of dismantling and the approach to managing the activities, and accomplishes those site preparation activities necessary to transition from a plant shutdown configuration to site dismantling. For purposes of this estimate it is assumed that the intent is to dismantle the entire station as a single project. Costs incurred during this preliminary phase of the program are included in the dismantling costs presented in this study.

The Owner prepares the stations for dismantling by performing the following activities:

- Prepare specifications that identify and describe the objectives and major work activities to be accomplished (establishing the final site configuration)
- Assemble plant documentation that may be relevant to dismantling (drawings, hazardous material reports, environmental studies, etc.)
- Select an asbestos abatement contractor (if required) and Dismantling Contractor
- Assemble and mobilize the management and oversight team responsible for the project

Asbestos Abatement (if applicable)

The asbestos abatement contractor prepares for this work by thoroughly understanding the scope of the asbestos remediation work and obtaining the permits necessary to initiate the work. Abatement of asbestos is considered an important prerequisite to dismantling the station's systems and structures. The method by which asbestos is abated is strictly controlled by federal and/or state regulations and includes the following requirements:

- Work will be done inside enclosures designed to capture any asbestos-containing particles. With the exception of removal of small quantities of asbestos in local areas, it would be expected that most work will be

done in large enclosures (containment tents). The enclosures will have a filtered exhaust and be maintained under negative air pressure (air will leak into the enclosure rather than leak out).

- The air outside of the enclosures will be monitored to ensure barriers are effective.
- Workers, while working inside enclosures, will wear respiratory protective equipment as well as protective clothing.
- All materials removed from the enclosure will be packaged in accordance with regulations (minimum double-bag), and will be removed via a materials handling access area.
- Workers will enter and exit the enclosures through a personnel decontamination chamber in a controlled manner (ensuring asbestos contamination does not spread beyond the containment).
- After the asbestos abatement is complete, the effectiveness of the process will be established via regulatory-specified processes (generally verifying that there is no asbestos containing material capable of becoming airborne).
- Asbestos containing materials will be disposed of at a properly licensed disposal facility.
- After ensuring that all asbestos has been removed, the enclosures will be taken down in accordance with regulatory requirements and disposed of at a licensed facility.

Dismantling Preparations

The dismantling contractor prepares the station for dismantling by performing the following activities:

- Installing environmental barriers and monitoring equipment
- Reviewing plant drawings and specifications that may be useful for the dismantling project
- Identifying the processes to achieve the final desired station configuration
- Identifying the major work sequence
- Preparing dismantling activity specifications and work orders/forms
- Preparing detailed dismantling procedures

- Preparing a dismantling plan
- Preparing permit application(s) for plant demolition
- Mobilizing site staff
- Configuring temporary services/facilities to support dismantling operations
- Arranging for heavy lift and dismantling equipment, rigging, and tooling
- Hiring and training the labor force

2.3.2 Period 2 - Dismantling Operations

Dismantling activities are initiated after completing the engineering and planning process, and after asbestos abatement is complete. The sequence of activities will be determined at the time of dismantling, but typically a sequence would include the following items (not all activities will be required for each station, particularly those with Combustion Gas Turbines and the Wind Farm):

- Removing coal yard equipment, including unloading structures, conveyors, transfer towers, and reclaim systems
- Removing above-ground storage tanks
- Removing large equipment from rooftops or at higher elevations
- Removing equipment that must be removed prior to start of boiler structure removal, including fly-ash handling, coal handling, burner fuel supply, scrubbers, air and flue gas ducts, etc.
- Removing electrostatic precipitator and bag houses by cutting casings and connecting gas ducts
- Removing the top of the boiler enclosure to allow access to the platens
- Removing the boiler waterwalls
- Removing steam drum and deaerator by severing all connections and lowering to grade
- Removing boiler structural steel
- Disassembling the turbine/generator and condenser
- Removing all other equipment and components required prior to structures demolition

- Removing the turbine building superstructure and interior floors
- Blasting/dismantling the concrete turbine-generator pedestal(s)
- Removing siding from buildings
- Dismantling steel framing
- Demolishing structural concrete
- Removing the stack(s)
- Removing cooling tower(s) and / or cooling water intake and discharge structures
- Removing all other site structures within the scope of the dismantling program
- Sorting and organizing materials for pickup by the scrap dealer(s)
- Size reducing concrete rubble to enhance its suitability for backfill
- Removing any temporary services used to support the dismantling effort (lighting / ventilation / electrical / groundwater management)

2.3.3 Period 3 - Site Restoration

Site restoration activities are initiated following completion of the dismantling operations. The objective of site restoration in this estimate is to restore the station grounds to a configuration that does not pose a safety hazard; and plant vegetation for erosion control. As such, landscaping will be limited to grading, placement of top soil, and seeding. Site restoration as used in this estimate is not intended to re-configure the station for redevelopment, e.g. use as a recreational or industrial facility.

A typical site restoration sequence would be:

- Backfill below grade voids with recycled concrete rubble (reinforcing steel removed from concrete) or with additional fill, if necessary
- General grading of the station
- Placement of top soil or other suitable surface material necessary to maintain erosion control
- Landscaping to the extent necessary to re-vegetate the station (grass or similar plant materials), and
- Demobilizing personnel and equipment

FIGURE 2.1
DISMANTLING PROJECT ORGANIZATION
UTILITY STAFF

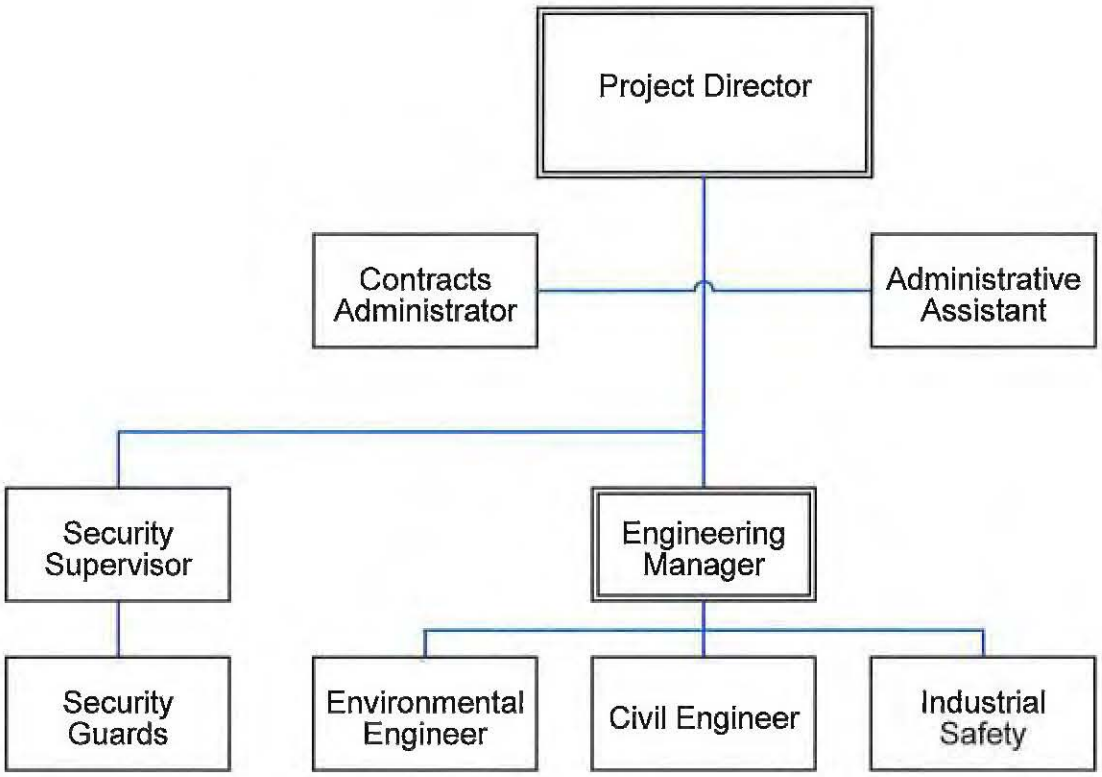
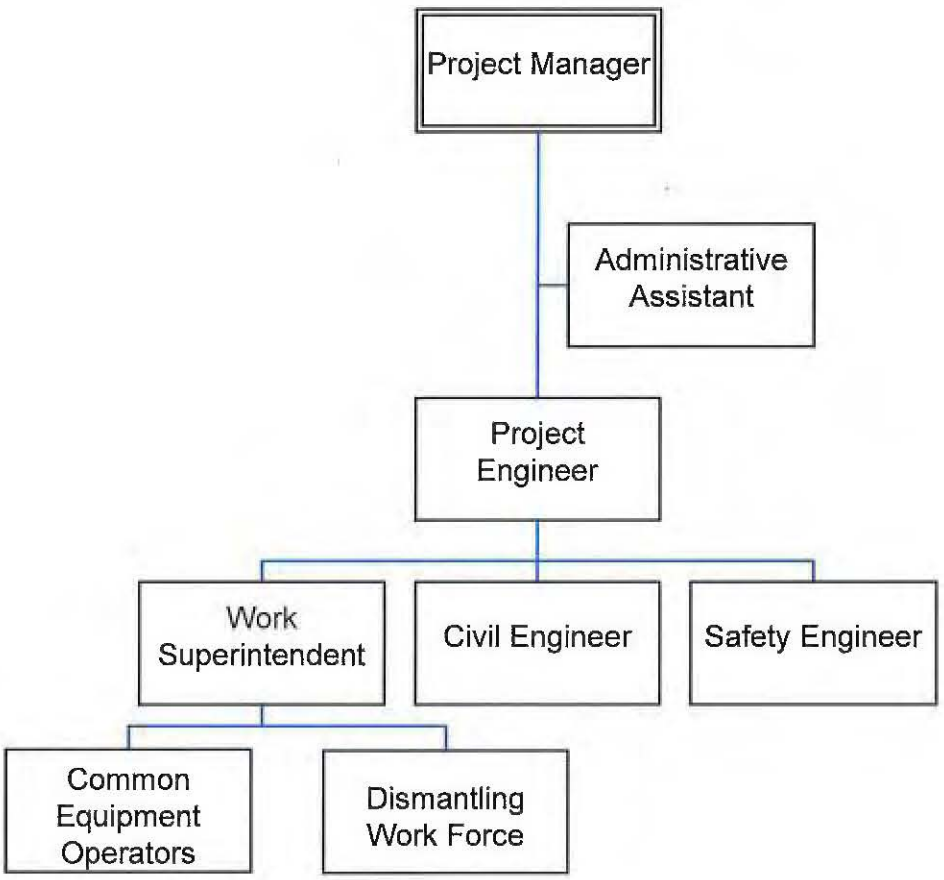


FIGURE 2.2
DISMANTLING PROJECT ORGANIZATION
DECOMMISSIONING CONTRACTOR STAFF



3.0 COST ESTIMATE

The basis, methodology, and assumptions for the site-specific cost estimate are described in the following paragraphs.

3.1 BASIS OF ESTIMATE

Inventory of Materials to be Removed

The inventory is an essential element of the estimate, since dismantling costs are determined by applying unit cost factors against the corresponding inventory quantities. For each of these estimates a site-specific inventory of materials to be removed was developed using a combination of methods. The inventory used in developing the estimate for each station is provided in Appendix A.

Comparable Boiler / Turbine Unit Information Available to TLG Where TLG had previously developed inventory information for a boiler and turbine of similar size, fuel type and vintage, referred to as "reference unit", this information was used to represent the boiler / turbine systems inventory for the comparable Xcel Energy unit. The inventory was adjusted to reflect the difference between the rating of the Xcel Energy unit boiler / turbine and the rating of the reference unit.

There are expected differences in other facilities, even if the boiler and turbine are similar between comparable units. These include systems and structures associated with cooling water intake and discharge, fuel handling, exhaust gas, maintenance buildings and shops, pollution-control, and the quantity and extent of asbestos containing material (if applicable). For these systems and structures TLG developed the inventory by conducting a walk-down of the station, and extracting information from station-specific drawings and photos.

Comparable Plant Information Not Available to TLG Where the Xcel Energy unit(s) had no comparable match in the TLG database, the site specific inventory was developed "from scratch", by completing a physical walk-down of each such unit, discussions with the stations' Operations & Maintenance staff, and extracting data from station-specific maintenance databases (lists of equipment), drawings, and photos.

Economic Cost Drivers

In developing an estimate, the cost of labor, equipment and material, credit for scrap, and similar costs will influence the results of the estimate. The basis for the significant cost drivers are:

1. Craft labor rates are based on existing contracts with craft labor contractors. These rates were provided by Xcel Energy (Ref. 1).
2. Utility labor rates are based on current labor costs for positions likely to be employed during the dismantling project. These rates were provided by Xcel Energy (Ref. 2).
3. Material and equipment costs for conventional demolition and/or construction activities, Contractors Insurance, Small Tools Allowance, Permit / Fees, and Contractor's Fee are based on R.S. Means Construction Cost Data (Ref. 3).
4. Scrap metal prices are based on published indices (Ref. 4).
5. Contingency, contractor fee, contractor insurance, environmental sampling, and permits & fees are based upon R.S. Means Construction Cost Data.
6. Costs in this estimate are in 2009 dollars.
7. Property taxes (or payments in lieu of taxes) are not included within the estimate.
8. The estimate to dismantle the stations does not address credit associated with the residual value of the land.

3.2 METHODOLOGY

The methodology used to develop the cost estimate follows the basic approach presented in the AIF/NESP-036, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates" (Ref. 5) and the US DOE "Decommissioning Handbook" (Ref. 6). These publications utilize a unit factor method for estimating decommissioning activity costs to simplify the estimating calculations. Unit cost factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/in) are developed from the labor cost information from R. S. Means. The activity-dependent costs are estimated using item quantities (cubic yards, tons, inches, etc.) developed from plant drawings and inventory documents. The unit factors used in this study reflect the latest available information on worker productivity in plant dismantling. A sample unit cost factor is provided in Appendix B. A list of unit cost factors is provided in Appendix C.

An activity duration critical path is developed to determine the total dismantling program schedule. This program schedule is then used to determine the period-dependent costs for program management, administration, field engineering, equipment rental, quality assurance, and security. TLG estimated typical salary and hourly rates for personnel associated with period-dependent costs. The costs for conventional demolition of structures, materials, backfill, landscaping, and equipment rental are obtained from R.S. Means. Examples of such unit factor development are presented in AIF/NESP-036.

The unit cost factor method provides a demonstrable basis for establishing reliable cost estimates. The detail of activities for labor costs, equipment and consumables costs provide assurance that cost elements have not been omitted. Detailed unit cost factors, coupled with the site-specific inventory of piping, components and structures provide confidence in the cost estimates.

The activity-dependent and period-dependent costs are combined with applicable collateral costs to yield the direct decommissioning cost. A contingency is then applied. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook" (Ref. 7) as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this estimate are based on ideal conditions; therefore, a contingency factor has been applied.

Examples of items that could occur but have not otherwise been accounted for in this estimate include: labor work stoppages, bad weather delays, equipment/tool breakage, changes in the anticipated plant shutdown conditions, etc. These types of unforeseeable events are discussed in the AIF/NESP-036 study. Guidelines are also provided for applying contingency.

3.3 ASSUMPTIONS

The following assumptions were used in developing the dismantling estimate.

Pre-requisite Activities

1. Dismantling of the station will not commence until all units are retired (cost estimate is not based on independent dismantling of units while adjacent units are operating).

2. The arrangements of the unit facilities as they exist in 2009 based upon walk-downs conducted by TLG, and databases and drawings provided by owner.
3. The dismantling process will be an engineered process with substantial consideration for industrial (worker) safety.
4. The demolition will be performed by a Dismantling Contractor who is responsible to provide adequate staff and equipment to complete the dismantling in a safe manner.
5. Site security costs to restrict access to the demolition project by unauthorized personnel are included.
6. The estimates are based on industrial safety and environmental regulations effective in 2009.
7. Ash ponds will be dewatered and closed after shutdown by the stations' owner.
8. On-site fuel inventories will be used and/or removed prior to start of dismantling.
9. Silos, precipitators, hoppers, tanks, etc., will be emptied by operations and maintenance staff after shutdown.
10. Acids, caustics, and similar hazardous materials will be removed by operations and maintenance staff after shutdown.
11. Consumables, such as ion exchange materials and filters, will also be removed by operations and maintenance staff after shutdown.
12. Stores, spare parts, gas storage containers, laboratory equipment, office furniture, etc., will be removed by the owner after shutdown.
13. Oils used in station transformers are PCB-free. Lubricating and transformer oils are drained and removed by operations and maintenance staff after shutdown.
14. Asbestos (if present) will be removed prior to the start of dismantling. Asbestos insulation and PACM (presumed asbestos containing materials) will be disposed of at licensed facilities. Quantities of asbestos are based on owner-provided information where available. Where such information was not available, the quantities of asbestos were estimated.
15. Prior to initiating dismantling, essentially all live circuits will have been de-energized (to preclude creating an industrial hazard). If required, temporary services systems (air, water, electrical, fire water, etc.) will be

used to support dismantling operations and will remain in service throughout the project until no longer required.

Economic Assumptions

16. Post-shutdown "dormancy" costs (i.e., security and maintenance on any of the units retired prematurely) are not included in the study.
17. Escalation/inflation of the costs over the remaining operating life is not included.
18. A 12.5% fee is added to the Demolition Contractor's cost to account for its overhead and profit.
19. A 25% contingency is applied to asbestos remediation activities.
20. A 15% contingency is applied to all remaining dismantling-related costs.
21. An allowance has been included for post-dismantling environmental monitoring costs (where applicable)
22. A credit for scrap metal cost recovery is included in the estimates. Retired plant equipment is assumed to have no value as salvage (sold for re-use).

Physical Work Assumptions

23. The costs for disposition (if required) of contaminated soil (e.g., PCBs, hydrocarbons, lead, asbestos, mercury, acids or caustics) are outside the scope of this estimate.
24. Large equipment and components will be removed prior to structures demolition.
25. An environmental hazards crew will be maintained throughout the demolition period to address such items as lead paint and asbestos that was inaccessible during the asbestos remediation period (where applicable).
26. Turbine pedestals and powerhouse building foundations will be removed by controlled blasting and back-filled to grade.
27. Structures and foundations will be removed to a depth of three feet below grade, with any resulting voids back-filled to grade level.
28. Chimney stacks will be blasted to the ground and broken into rubble, the steel liners cut and removed, and the foundations control-blasted to break the concrete in place so that groundwater drainage is provided.

29. The dismantling of the electrical equipment terminates at the switch yard boundary. The switch yard is left intact.
30. Concrete rubble generated during dismantling will be used as fill where needed.
31. The site will be graded; however, no effort was included in this estimate to restore the original contour of the land. Ground cover will be established for erosion control.
32. Roads, parking lots, etc., are removed after the facility is dismantled (with the exception of the immediate area around the switchyard).

Scheduling Assumptions

33. All work is performed during an eight-hour workday, five days per week, with no overtime.
34. Multiple crews work parallel activities to the maximum extent possible, consistent with efficiency (adequate access for cutting, removal, and laydown space) and with industrial safety appropriate for demolition of heavy components and structures.
35. Scheduling was calculated without constraints on availability of labor, equipment, or materials.

3.4 STATION-SPECIFIC NOTES

3.4.1 Allen S. King

- All currently operational coal handling equipment, and the abandoned in place coal barge unloader facility with the twenty-two dolphin type barge piers are included in the estimate.
- A cofferdam will be installed to allow removal of the condenser cooling water discharge structure and the discharge structure from the cooling tower.

3.4.2 Angus Anson

- The control room, administration offices and maintenance facilities housed in the Pathfinder Plant are not included in the estimate.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- Two large oil storage tanks are included in the estimate.

3.4.3 Black Dog

- The abandoned-in-place Unit 2 boiler and chimney, and the original Unit 3 chimney are included in the estimate.
- All currently operational coal handling equipment e.g. conveyors, rail car unloader, transfer towers, stacker conveyor etc. are included in the estimate
- A cofferdam will be installed to remove the intake condenser cooling water structure.

3.4.4 Blue Lake

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- Two large oil storage tanks are included in the estimate.

3.4.5 Grand Meadow Wind Farm

- All underground power and control cables will be excavated and removed.
- Tower foundations are completely removed.
- All access roads surfaces will be excavated and removed. The excavated areas will be back-filled with soil.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.6 Granite City

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- Two large oil storage tanks are included in the estimate.

3.4.7 High Bridge

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- A cofferdam will be installed to remove the river intake and discharge structure.

3.4.8 Inver Hills

- The oil storage facilities which include 3-ten million gallon oil storage tanks are included in this estimate.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.9 Key City

- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.
- Two large oil storage tanks are included in the estimate.

3.4.10 Minnesota Valley

- All three of the abandoned in place units are included in the estimate.
- The asbestos quantities were calculated considering unit three to be all asbestos and Units 1 and 2 to only have small amounts on the partially dismantled boilers.
- A cofferdam will be installed to remove the river intake and discharge structure.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

3.4.11 Red Wing

- The RDF unloading facility and the conveyor transport system are included in the estimate.
- A cofferdam will be installed to remove the cooling water intake and discharge structure.
- The barge unloading facility in not included in the estimate.

3.4.12 Riverside

- Included in this estimate are the following abandoned in place facilities and equipment:
    - Unit 6, 7 and 8 building structure.
    - Unit 6 and 7 boilers

- Unit 8 boiler, turbine and associated equipment

- Cofferdams will be installed to remove the four cooling water intake and discharge structures.

3.4.13 Sherburne County

- All coal handling facilities e.g. coal barn, rail car dumper building, coal yard control and maintenance facility, earthen storage berms, conveyor systems, transfer towers etc. are included in this estimate.
- All warehouse/storage type buildings on the site are included in the estimate.
- A cofferdam will be installed to remove the cooling water intake and discharge structure.

3.4.14 Wilmarth

- The RDF bulk storage facility is not included in the estimate. Only the transport section of the facility with conveyor systems and transfer towers.
- There is a reduced decommissioning management and contractor staff due to the smaller size of this facility.

4.0 SCRAP METAL CREDITS

The dismantling of a typical fossil plant occurs after a lengthy plant operating life. The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Xcel Energy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that buyers prefer equipment stripped down to very specific requirements before they would consider purchase. This can require expensive work to remove the equipment from its installed location, which is inconsistent with the rapid dismantling approach assumed in this estimate. Since placing a salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall cost of dismantling, this analysis does not attempt to quantify the value that an owner may realize based upon those efforts.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property is removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts are made available for alternative use.

The materials used in the equipment and buildings are suitable for recycle as scrap metals. As such, an estimated value of the scrap metal credit has been developed and applied to each station's cost estimate. The value of scrap was estimated using current market values extracted from published sources and applying this value to the estimated quantities of materials generated from the dismantling project. There were four basic types of metals used in the scrap estimates; carbon steel (the most common material used at the station), copper, stainless steel (high alloy steel) and aluminum. The scrap credit, in addition to considering the quantity and types of materials, also considered the cost of handling and transporting these materials to a major scrap processing location in the Twin Cities area where scrap is used or sold. The value of the scrap is reduced by the transportation costs.

The basis for scrap metal value is summarized in Table 4.1. A summary of the basis for the scrap credit is provided in Tables 4.2 which details the scrap quantities by material type from each unit, and Table 4.3 lists the dollar value of these quantities.

TABLE 4.1
BASIS FOR SCRAP METAL VALUE
(2009 dollars)

Type of Material	Scrap Category [1]	Market Value [2]	Units	Transport Cost [3]	Scrap Metal Credit [4] (per ton)
Carbon Steel	Cast Iron	224.00	Per Ton	37.14	186.86
	No. 1	280.00	Per Ton	37.14	242.86
	Mixed Scrap	224.00	Per Ton	37.14	186.86
	Galvanized	56.00	Per Ton	37.14	18.86
Stainless Steel	SS-1	1.07	Per Pound	0.02	2,102.86
Copper	Insulated Cable	1.47	Per Pound	0.02	2,902.86
	No. 2 Copper	2.34	Per Pound	0.02	4,642.86
	Copper-Nickel	5.03	Per Pound	0.02	10,022.86
	Large Motor	0.35	Per Pound	0.02	662.86
Non-Ferrous	Aluminum	0.30	Per Pound	0.02	562.86

Note 1: Scrap categories are consistent with information provided in Recycler's World

Note 2: The market value for scrap metal used in this estimate is based on Recycler's World U.S. Scrap Metal Index Spot Market Prices (October 29, 2009).

Note 3: The estimated cost for handling and transporting the materials to a major scrap processing center in the Twin Cities area is $ 37.14 / ton or $0.018 / pound.

Note 4: The scrap metal credit reflects the market value of scrap adjusted for handling and transport cost to local scrap metal recycler.

TABLE 4.2
QUANTITY OF SCRAP METALS BY STATION
(pounds)

Station Name	Carbon Steel			Stainless Steel	Galvanized	Copper			Copper		
	Cast Iron	No. 1	Mixed Scrap	SS-1	Steel	Insul Cbl	No. 2 Cu	Large Mtr	Nickel	Aluminum	Total
Allen S. King	2,880,765	38,053,144	63,317,912	486,000	1,177,279	323,802	504,315	1,806,321	531,325	-	109,080,861
Angus Anson	277,176	2,491,905	7,967,002	582,280	95,345	39,562	449,708	86,724	-	-	11,989,703
Black Dog	2,434,233	26,199,328	52,586,654	876,020	1,025,647	270,288	750,714	2,591,567	266,264	-	87,000,714
Blue Lake	562,895	4,330,526	17,158,390	1,116,834	151,311	66,137	487,509	167,052	-	-	24,040,654
Grand Meadow	-	3,819,000	25,238,012	-	-	-	398,519	-	-	1,562,880	31,018,411
Granite City	415,622	941,747	3,857,045	44,291	123,454	19,672	117,956	37,557	-	-	5,557,344
High Bridge	844,602	9,997,839	18,406,483	551,661	572,357	113,539	633,164	1,016,734	-	-	32,136,381
Inver Hills	203,824	2,657,966	17,562,247	911,580	66,005	-	523,234	6,408	-	-	21,931,263
Key City	415,622	941,747	3,857,045	44,291	123,454	19,672	117,956	37,557	-	-	5,557,344
Minnesota Valley	638,559	9,986,690	22,491,124	1,041,334	398,029	69,741	557,138	1,395,489	292,722	-	36,870,826
Red Wing	269,371	4,295,858	5,893,649	450,383	251,269	37,995	104,217	235,896	34,301	-	11,572,939
Riverside	622,666	24,239,240	49,739,760	294,509	472,834	96,175	766,986	1,421,870	-	-	77,654,039
Sherco	3,767,319	120,191,550	188,517,998	3,749,288	4,376,539	1,495,123	701,745	5,385,053	-	-	328,184,616
Wilmarth	303,646	3,592,824	5,653,044	175,503	177,499	37,995	104,217	235,896	80,000	-	10,360,624
Total	**13,636,301**	**251,739,362**	**482,246,363**	**10,323,976**	**9,011,023**	**2,589,700**	**6,217,378**	**14,424,124**	**1,204,612**	**1,562,880**	**792,955,719**

TABLE 4.3
SCRAP METAL CREDITS BY STATION
(thousands of 2009 dollars)

Station Name	Carbon Steel			Stainless Steel	Galvanized	Copper			Copper		
	Cast Iron	No. 1	Mixed Scrap	SS-1	Steel	Insul Cbl	No. 2 Cu	Large Mtr	Nickel	Aluminum	Total
Allen S. King	269	4,621	5,916	511	11	470	1,171	599	2,663	-	16,230
Angus Anson	26	303	744	612	1	57	1,044	29	-	-	2,816
Black Dog	227	3,181	4,913	921	10	392	1,743	859	1,334	-	13,581
Blue Lake	53	526	1,603	1,174	1	96	1,132	55	-	-	4,640
Grand Meadow	-	464	2,358	-	-	-	925	-	-	440	4,187
Granite City	39	114	360	47	1	29	274	12	-	-	876
High Bridge	79	1,214	1,720	580	5	165	1,470	337	-	-	5,570
Inver Hills	19	323	1,641	958	1	-	1,215	2	-	-	4,158
Key City	39	114	360	47	1	29	274	12	-	-	876
Minnesota Valley	60	1,213	2,101	1,095	4	101	1,293	463	1,467	-	7,796
Red Wing	25	522	551	474	2	55	242	78	172	-	2,121
Riverside	58	2,943	4,647	310	4	140	1,781	471	-	-	10,354
Sherco	352	14,595	17,613	3,942	41	2,170	1,629	1,785	-	-	42,127
Wilmarth	28	436	528	185	2	55	242	78	401	-	1,955
Total	**1,274**	**30,569**	**45,056**	**10,855**	**85**	**3,759**	**14,433**	**4,781**	**6,037**	**440**	**117,288**

5.0 RESULTS

An estimate for dismantling each of the Xcel Energy fossil-fuel and wind farm generating stations in Minnesota and South Dakota was developed by applying the system and structures inventories against the associated unit cost factors and accounting for program support costs. A summary of each station's major cost categories is presented in Table 5.1. Breakdowns of the major cost categories by unit and common facilities are provided in Tables 5.2a through n.

The following is an explanation of the contents of each line item in these tables:

Station Unit Rating (MWe) – This is the nominal electrical rating of each unit at the station. In Table 5.1 this represents the sum of all units on site.

Demolition Preparations / Temporary Services – The cost associated with ensuring that all energized systems have been isolated from the buildings scheduled for dismantling and the cost for installing temporary services to support the dismantling.

Scaffolding / Worker Access – The cost associated with providing safe access to areas of the station being dismantled.

Asbestos Remediation – The cost associated with remediating asbestos from the station prior to initiating dismantling activities. It should be noted that dismantling can proceed much more efficiently if asbestos containing materials have been removed.

Equipment Removal – The cost associated with removing all station equipment (piping, valves, heat exchangers, tanks, electrical equipment, etc.).

Boiler(s) – The cost associated with removing the boiler.

Structures Demolition – The cost associated with demolishing the buildings and concrete foundations (to three feet below grade, Grand Meadow removes all below-grade materials).

Backfill / Grade / Landscaping – The cost associated with backfilling below grade voids, and grading and landscaping the grounds to preclude erosion of soils.

Ongoing Environmental Monitoring (quarterly for 5 years) – The cost associated with monitoring the environment around the station after the completion of dismantling activities.

Utility Management / Oversight – The staff directly assigned to manage the dismantling project, including planning, execution, oversight, and restoration.

Demolition Contractor Staff – The contractor's staff assigned to manage, engineer, and supervise the dismantling project.

Security – Personnel assigned to control access to the dismantling site.

Property Taxes – Not included in this estimate.

Shared Heavy Equipment / Operating Engineers – The cost for renting / operating equipment in general use throughout the dismantling project (cranes, trucks, forklifts, front-end loaders, etc.).

Small Tool Allowance – The cost for procuring small tools.

Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.) – The cost for procuring utility services and office supplies.

Permits – The cost of obtaining permits.

Demolition Contractors Insurance – The cost of the demolition contractors insurance.

Demolition Contractors Fee – A fee applied to contractor activities.

Contingency – The cost to cover expenses for unforeseen events that are likely to occur.

Scrap Credit – A credit to the project for the recovery of scrap metals.

Unit (Table 5.2) – Costs directly attributed to the physical work associated with dismantling a generating unit.

Common (Table 5.2) – Costs directly attributed to the physical work associated with dismantling facilities shared by more than one unit.

Station (Table 5.2) – Costs associated with supporting the physical dismantling work for a station.

This study provides an estimate for dismantling under current requirements, based on present-day costs and available technology. As inputs to the cost model change over time, such as labor rates, equipment costs, scrap metal value, etc., this cost estimate should be reviewed and updated to reflect these changes.

TABLE 5.1
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Allen S. King*	*Angus Anson*	*Black Dog*	*Blue Lake*	*Grand Meadow*	*Granite City*	*High Bridge*	*Inver Hills*	*Key City*	*Minnesota Valley*	*Red Wing*	*Riverside*	*Sherco*	*Wilmarth*	*Fleet Totals*
Station Rating (MWe)	588	381	538	510	101	72	570	360	72	64	20	830	2400	20	6526
Characterization / Temporary Services	288,529	226,000	742,588	277,000	246,900	199,000	382,000	212,000	199,000	434,058	392,000	864,586	930,588	392,000	5,786,250
Scaffolding / Worker Access	485,260	-	1,002,686	-	-	-	-	-	-	143,924	94,921	-	1,529,590	94,921	3,351,303
Asbestos Remediation	1,912,000	-	4,401,048	-	-	-	-	-	-	2,479,459	952,166	2,198,041	500,000	952,166	13,394,881
Equipment Removal	7,845,455	2,249,884	7,380,138	4,611,978	1,384,950	683,539	3,851,236	3,526,080	683,539	2,275,070	1,592,706	3,191,079	24,960,190	1,372,321	65,608,167
Boiler(s)	2,780,446	-	3,642,778	-	-	-	-	-	-	1,202,936	668,289	2,106,526	10,368,708	668,289	21,437,973
Structures Demolition	13,430,200	1,034,374	8,001,928	2,125,132	5,492,448	876,319	4,120,099	2,472,565	876,319	3,415,043	2,084,796	9,559,475	36,343,325	1,577,403	91,409,426
Backfill / Grade / Landscaping	1,615,937	379,986	1,263,789	514,958	4,807,655	94,400	657,302	309,076	94,400	1,208,795	650,373	1,039,161	4,350,066	534,594	17,520,502
Ongoing environ. monitoring (quarterly for 5 years)	381,000	90,000	169,000	172,000	-	68,000	130,000	192,000	68,000	167,000	149,000	196,000	1,543,000	119,000	3,444,000
Utility Management / Oversight	1,850,502	418,168	2,351,455	758,703	729,333	282,879	814,172	570,961	282,879	1,114,430	569,605	2,359,092	2,612,451	569,605	15,284,235
Demolition Contractor Mgmt / Super. / Safety Staff	2,726,504	671,982	3,810,997	1,163,312	1,310,808	394,231	1,271,715	796,407	394,231	1,603,026	840,171	3,702,417	4,558,283	840,171	24,084,257
Security	909,671	229,176	1,181,565	229,176	433,217	140,463	248,397	164,120	140,463	344,503	313,454	1,181,565	1,329,261	313,454	7,158,482
Property Taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Expenses															
Shared Heavy Equipment / Operating Engineers	2,882,232	795,020	4,109,756	1,290,425	1,576,138	455,403	1,413,744	873,037	455,403	1,773,542	1,051,838	3,960,496	4,993,999	1,051,838	26,682,871
Small Tool Allowance	352,429	46,578	324,305	92,926	146,649	21,116	110,583	79,447	21,116	135,403	76,341	230,854	981,148	65,796	2,684,689
Utilities Allowance	43,073	24,636	55,947	24,636	46,569	15,099	26,702	17,642	15,099	37,033	33,695	55,947	62,940	33,695	492,714
Permits	347,431	55,185	349,050	102,724	150,121	28,071	119,534	84,783	28,071	148,753	85,863	271,046	911,218	77,022	2,758,970
Demolition Contractors Insurance	1,015,870	161,357	1,020,604	300,359	438,947	82,078	349,803	247,900	82,078	434,946	251,059	792,525	2,664,357	225,208	8,067,091
Demolition Contractors Fee	4,124,857	621,627	4,036,827	1,167,518	1,786,297	306,878	1,378,888	977,816	306,878	1,711,120	991,756	3,033,717	11,074,516	880,657	32,399,355
Sub-Total	42,991,394	7,003,972	43,844,460	12,830,856	18,550,033	3,647,478	14,874,276	10,523,833	3,647,478	18,629,041	10,798,034	34,742,530	109,713,641	9,768,142	341,565,166
Contingency	6,639,909	1,050,596	7,016,774	1,924,628	2,782,505	547,122	2,231,141	1,578,575	547,122	3,042,302	1,714,922	5,431,184	16,507,046	1,560,438	52,574,263
Project Total (before scrap credit)	49,631,303	8,054,568	50,861,233	14,755,485	21,332,538	4,194,599	17,105,417	12,102,408	4,194,599	21,671,343	12,512,955	40,173,713	126,220,687	11,328,580	394,139,430
Scrap Credit	(16,229,903)	(2,816,102)	(13,581,052)	(4,640,332)	(4,186,705)	(876,111)	(5,569,713)	(4,158,500)	(876,111)	(7,796,379)	(2,120,531)	(10,354,193)	(42,127,350)	(1,955,191)	(117,288,172)
Project Total	33,401,400	5,238,466	37,280,182	10,115,153	17,145,833	3,318,488	11,535,704	7,943,909	3,318,488	13,874,965	10,392,425	29,819,520	84,093,338	9,373,389	276,851,257

TABLE 5.2a
ALLEN S. KING STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 1*	*Common*	*Station*	*Station Total*
Allen S. King Unit Rating (MWe)	588	588		
Characterization / Temporary Services	125,000	-	163,529	288,529
Scaffolding / Worker Access	485,260	-		485,260
Asbestos Remediation	1,912,000	-		1,912,000
Equipment Removal	6,366,713	1,478,741		7,845,455
Boiler(s)	2,780,446	-		2,780,446
Structures Demolition	10,252,849	3,177,351		13,430,200
Backfill / Grade / Landscaping	1,045,614	570,323	-	1,615,937
Ongoing environmental monitoring (quarterly for 5 years)			381,000	381,000
Utility Management / Oversight			1,850,502	1,850,502
Demolition Contractor Management / Supervisory / Safety Staff			2,726,504	2,726,504
Security			909,671	909,671
Property Taxes	-	-	-	0
Project Expenses				
Shared Heavy Equipment / Operating Engineers			2,882,232	2,882,232
Small Tool Allowance	287,099	65,330	n/a	352,429
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)			43,073	43,073
Permits			347,431	347,431
Demolition Contractors Insurance			1,015,870	1,015,870
Demolition Contractors Fee			4,124,857	4,124,857
Sub-Total				42,991,394
Contingency (excluding activities currently under contract)				6,639,909
Project Total (before scrap credit)				49,631,303
Scrap Credit	(13,660,586)	(2,569,317)	-	(16,229,903)
Project Total				33,401,400

TABLE 5.2b

ANGUS ANSON STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 1*	*Unit 2*	*Unit 3*	*Common*	*Station*	*Station Total*
Angus Anson Unit Rating (MWe)	106	110	165	381		
Characterization / Temporary Services	19,333	19,667	23,000	-	164,000	226,000
Scaffolding / Worker Access	-	-	-	-		0
Asbestos Remediation	-	-	-	-		0
Equipment Removal	459,737	462,011	1,065,168	262,969		2,249,884
Boiler(s)	-	-	-	-		0
Structures Demolition	219,815	223,924	484,447	106,188		1,034,374
Backfill / Grade / Landscaping	51,590	52,554	134,156	141,686	-	379,986
Ongoing environmental monitoring (quarterly for 5 years)					90,000	90,000
Utility Management / Oversight					418,168	418,168
Demolition Contractor Management / Supervisory / Safety Staff					671,982	671,982
Security					229,176	229,176
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers					795,020	795,020
Small Tool Allowance	9,381	9,477	21,335	6,386	n/a	46,578
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					24,636	24,636
Permits					55,185	55,185
Demolition Contractors Insurance					161,357	161,357
Demolition Contractors Fee					621,627	621,627
Sub-Total						7,003,972
Contingency (excluding activities currently under contract)						1,050,596
Project Total (before scrap credit)						8,054,568
Scrap Credit	(648,857)	(664,360)	(1,120,910)	(381,974)	-	(2,816,102)
Project Total						5,238,466

TABLE 5.2c
BLACK DOG STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 2*	*Unit 3*	*Unit 4*	*Unit 5*	*Common*	*Station*	*Station Total*
Black Dog Unit Rating (MWe)	98	108	170	162	538		
Characterization / Temporary Services	56,000	58,000	70,000	68,000	-	490,588	742,588
Scaffolding / Worker Access	297,811	312,636	392,240	-	-		1,002,686
Asbestos Remediation	1,440,691	1,447,589	1,483,051	-	29,718		4,401,048
Equipment Removal	1,721,353	1,781,820	2,120,662	1,059,660	696,643		7,380,138
Boiler(s)	1,099,468	1,129,038	1,289,321	-	124,950		3,642,778
Structures Demolition	1,448,283	1,520,380	2,354,422	1,008,181	1,670,663		8,001,928
Backfill / Grade / Landscaping	180,971	189,980	304,366	146,767	441,705	-	1,263,789
Ongoing environmental monitoring (quarterly for 5 years)						169,000	169,000
Utility Management / Oversight						2,351,455	2,351,455
Demolition Contractor Management / Supervisory / Safety Staff						3,810,997	3,810,997
Security						1,181,565	1,181,565
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						4,109,756	4,109,756
Small Tool Allowance	78,057	80,493	100,176	28,533	37,046	n/a	324,305
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						55,947	55,947
Permits						349,050	349,050
Demolition Contractors Insurance						1,020,604	1,020,604
Demolition Contractors Fee						4,036,827	4,036,827
Sub-Total							43,844,460
Contingency (excluding activities currently under contract)							7,016,774
Project Total (before scrap credit)							50,861,233
Scrap Credit	(2,858,720)	(3,604,561)	(4,683,026)	(1,653,540)	(783,205)	-	(13,581,052)
Project Total							37,280,182

TABLE 5.2d

BLUE LAKE STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*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	11,000	11,000	11,000	11,000	34,500	34,500	-	164,000	277,000
Scaffolding / Worker Access	-	-	-	-	-	-	-		0
Asbestos Remediation	-	-	-	-	-	-	-		0
Equipment Removal	443,684	443,684	443,684	443,684	1,140,421	1,140,421	556,400		4,611,978
Boiler(s)	-	-	-	-	-	-	-		0
Structures Demolition	222,763	195,339	195,339	195,339	413,137	413,137	490,078		2,125,132
Backfill / Grade / Landscaping	24,098	24,098	24,098	24,098	137,628	137,628	143,320	-	514,968
Ongoing environmental monitoring (quarterly for 5 years)								172,000	172,000
Utility Management / Oversight								758,703	758,703
Demolition Contractor Management / Supervisory / Safety Staff								1,163,312	1,163,312
Security								229,176	229,176
Property Taxes	-	-	-	-	-	-	-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers								1,290,425	1,290,425
Small Tool Allowance	8,769	8,427	8,427	8,427	22,002	22,002	14,872	n/a	92,926
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								24,636	24,636
Permits								102,724	102,724
Demolition Contractors Insurance								300,359	300,359
Demolition Contractors Fee								1,167,518	1,167,518
Sub-Total									12,830,856
Contingency (excluding activities currently under contract)									1,924,628
Project Total (before scrap credit)									14,755,485
Scrap Credit	(517,334)	(448,015)	(448,015)	(448,015)	(972,416)	(972,416)	(834,121)	-	(4,640,332)
Project Total									10,115,153

TABLE 5.2e

GRAND MEADOW STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit, each (typ. of 67)*	*Common*	*Station*	*Station Total*
Grand Meadow Unit Rating (MWe)	1.5	101		
Characterization / Temporary Services	700	-	200,000	246,900
Scaffolding / Worker Access	-	-		0
Asbestos Remediation	-	-		0
Equipment Removal	20,671	-		1,384,950
Boiler(s)	-	-		0
Structures Demolition	81,977	-		5,492,448
Backfill / Grade / Landscaping	20,334	3,445,282	-	4,807,655
Ongoing environmental monitoring (quarterly for 5 years)			0	0
Utility Management / Oversight			729,333	729,333
Demolition Contractor Management / Supervisory / Safety Staff			1,310,808	1,310,808
Security			433,217	433,217
Property Taxes	-	-	-	0
Project Expenses				
Shared Heavy Equipment / Operating Engineers			1,576,138	1,576,138
Small Tool Allowance	1,546	43,066	n/a	146,649
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)			46,569	46,569
Permits			150,121	150,121
Demolition Contractors Insurance			438,947	438,947
Demolition Contractors Fee			1,786,297	1,786,297
Sub-Total				18,550,033
Contingency (excluding activities currently under contract)				2,782,505
Project Total (before scrap credit)				21,332,538
Scrap Credit	(42,386)	(1,346,870)	-	(4,186,705)
Project Total				17,145,833

TABLE 5.2f

GRANITE CITY STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 1*	*Unit 2*	*Unit 3*	*Unit 4*	*Common*	*Station*	*Station Total*
Granite City Unit Rating (MWe)	18	18	18	18	72		
Characterization / Temporary Services	8,750	8,750	8,750	8,750	-	164,000	199,000
Scaffolding / Worker Access	-	-	-	-	-		0
Asbestos Remediation	-	-	-	-	-		0
Equipment Removal	170,885	170,885	170,885	170,885	-		683,539
Boiler(s)	-	-	-	-	-		0
Structures Demolition	143,165	143,165	143,165	143,165	303,660		876,319
Backfill / Grade / Landscaping	14,755	14,755	14,755	14,755	35,381	-	94,400
Ongoing environmental monitoring (quarterly for 5 years)						68,000	68,000
Utility Management / Oversight						282,879	282,879
Demolition Contractor Management / Supervisory / Safety Staff						394,231	394,231
Security						140,463	140,463
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						455,403	455,403
Small Tool Allowance	4,219	4,219	4,219	4,219	4,238	n/a	21,116
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						15,099	15,099
Permits						28,071	28,071
Demolition Contractors Insurance						82,078	82,078
Demolition Contractors Fee						306,878	306,878
Sub-Total							3,647,478
Contingency (excluding activities currently under contract)							547,122
Project Total (before scrap credit)							4,194,599
Scrap Credit	(182,248)	(182,248)	(182,248)	(182,248)	(147,121)	-	(876,111)
Project Total							3,318,488

TABLE 5.2g

HIGH BRIDGE STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 1*	*Unit 2*	*Unit 3*	*Common*	*Station*	*Station Total*
High Bridge Unit Rating (MWe)	160	160	250	570		
Characterization / Temporary Services	68,000	68,000	82,000	-	164,000	382,000
Scaffolding / Worker Access	-	-	-	-		0
Asbestos Remediation	-	-	-	-		0
Equipment Removal	1,078,991	1,078,991	1,409,278	283,977		3,851,236
Boiler(s)	-	-	-	-		0
Structures Demolition	986,487	986,487	1,990,417	156,708		4,120,099
Backfill / Grade / Landscaping	149,146	149,146	226,390	132,621	-	657,302
Ongoing environmental monitoring (quarterly for 5 years)					130,000	130,000
Utility Management / Oversight					814,172	814,172
Demolition Contractor Management / Supervisory / Safety Staff					1,271,715	1,271,715
Security					248,397	248,397
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers					1,413,744	1,413,744
Small Tool Allowance	28,533	28,533	46,351	7,166	n/a	110,583
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					26,702	26,702
Permits					119,634	119,634
Demolition Contractors Insurance					349,803	349,803
Demolition Contractors Fee					1,378,888	1,378,888
Sub-Total						14,874,276
Contingency (excluding activities currently under contract)						2,231,141
Project Total (before scrap credit)						17,105,417
Scrap Credit	(1,571,791)	(1,571,791)	(2,099,101)	(327,030)	-	(5,569,713)
Project Total						11,535,704

TABLE 5.2h
INVER HILLS STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 1*	*Unit 2*	*Unit 3*	*Unit 4*	*Unit 5*	*Unit 6*	*Common*	*Station*	*Station Total*
Inver Hills Unit Rating (MWe)	60	60	60	60	60	60	360		
Characterization / Temporary Services	8,000	8,000	8,000	8,000	8,000	8,000	-	164,000	212,000
Scaffolding / Worker Access	-	-	-	-	-	-	-		0
Asbestos Remediation	-	-	-	-	-	-	-		0
Equipment Removal	545,454	545,454	545,454	545,454	545,454	545,454	253,355		3,526,080
Boiler(s)	-	-	-	-	-	-	-		0
Structures Demolition	223,780	223,780	223,780	223,780	223,780	223,780	1,129,885		2,472,565
Backfill / Grade / Landscaping	31,639	31,639	31,639	31,639	31,639	31,639	119,240	-	309,076
Ongoing environmental monitoring (quarterly for 5 years)								192,000	192,000
Utility Management / Oversight								570,961	570,961
Demolition Contractor Management / Supervisory / Safety Staff								796,407	796,407
Security								164,120	164,120
Property Taxes	-	-	-	-	-	-	-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers								873,037	873,037
Small Tool Allowance	10,111	10,111	10,111	10,111	10,111	10,111	18,761	n/a	79,447
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								17,642	17,642
Permits								84,783	84,783
Demolition Contractors Insurance								247,900	247,900
Demolition Contractors Fee								977,816	977,816
Sub-Total									10,523,833
Contingency (excluding activities currently under contract)									1,578,575
Project Total (before scrap credit)									12,102,408
Scrap Credit	(595,723)	(595,723)	(595,723)	(595,723)	(595,723)	(595,723)	(584,161)	-	(4,158,500)
Project Total									7,943,909

TABLE 5.2i

KEY CITY STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 1*	*Unit 2*	*Unit 3*	*Unit 4*	*Common*	*Station*	*Station Total*
Key City Unit Rating (MWe)	18	18	18	18	72		
Characterization / Temporary Services	8,750	8,750	8,750	8,750	-	164,000	199,000
Scaffolding / Worker Access	-	-	-	-	-		0
Asbestos Remediation	-	-	-	-	-		0
Equipment Removal	170,885	170,885	170,885	170,885	-		683,539
Boiler(s)	-	-	-	-	-		0
Structures Demolition	143,165	143,165	143,165	143,165	303,660		876,319
Backfill / Grade / Landscaping	14,755	14,755	14,755	14,755	35,381	-	94,400
Ongoing environmental monitoring (quarterly for 5 years)						68,000	68,000
Utility Management / Oversight						282,879	282,879
Demolition Contractor Management / Supervisory / Safety Staff						394,231	394,231
Security						140,463	140,463
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						455,403	455,403
Small Tool Allowance	4,219	4,219	4,219	4,219	4,238	n/a	21,116
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						15,099	15,099
Permits						28,071	28,071
Demolition Contractors Insurance						82,078	82,078
Demolition Contractors Fee						306,878	306,878
Sub-Total							3,647,478
Contingency (excluding activities currently under contract)							547,122
Project Total (before scrap credit)							4,194,599
Scrap Credit	(182,248)	(182,248)	(182,248)	(182,248)	(147,121)	-	(876,111)
Project Total							3,318,488

TABLE 5.2j

MINNESOTA VALLEY STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 1*	*Unit 2*	*Unit 3*	*Common*	*Station*	*Station Total*
Minnesota Valley Unit Rating (MWe)	10	10	44	64		
Characterization / Temporary Services	32,000	32,000	43,000		327,058	434,058
Scaffolding / Worker Access	-	-	143,924	-		143,924
Asbestos Remediation	-	-	2,479,459	-		2,479,459
Equipment Removal	275,306	275,306	1,682,717	41,741		2,275,070
Boiler(s)	191,441	191,441	820,054	-		1,202,936
Structures Demolition	839,635	839,635	1,400,245	335,528		3,415,043
Backfill / Grade / Landscaping	274,091	274,091	413,189	247,424	-	1,208,795
Ongoing environmental monitoring (quarterly for 5 years)					167,000	167,000
Utility Management / Oversight					1,114,430	1,114,430
Demolition Contractor Management / Supervisory / Safety Staff					1,603,026	1,603,026
Security					344,503	344,503
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers					1,773,542	1,773,542
Small Tool Allowance	20,156	20,156	87,282	7,809	n/a	135,403
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					37,033	37,033
Permits					148,753	148,753
Demolition Contractors Insurance					434,946	434,946
Demolition Contractors Fee					1,711,120	1,711,120
Sub-Total						18,629,041
Contingency (excluding activities currently under contract)						3,042,302
Project Total (before scrap credit)						21,671,343
Scrap Credit	(1,626,412)	(1,626,412)	(4,377,526)	(166,030)	-	(7,796,379)
Project Total						13,874,965

TABLE 5.2k

RED WING STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 1*	*Unit 2*	*Common*	*Station*	*Station Total*
Red Wing Unit Rating (MWe)	10	10	20		
Characterization / Temporary Services	32,000	32,000	-	328,000	392,000
Scaffolding / Worker Access	47,461	47,461	-		94,921
Asbestos Remediation	476,083	476,083	-		952,166
Equipment Removal	613,929	613,929	364,849		1,592,706
Boiler(s)	334,145	334,145	-		668,289
Structures Demolition	393,348	393,348	1,298,100		2,084,796
Backfill / Grade / Landscaping	201,210	201,210	247,952	-	650,373
Ongoing environmental monitoring (quarterly for 5 years)				149,000	149,000
Utility Management / Oversight				569,605	569,605
Demolition Contractor Management / Supervisory / Safety Staff				840,171	840,171
Security				313,454	313,454
Property Taxes	-	-	-	-	0
Project Expenses					
Shared Heavy Equipment / Operating Engineers				1,051,838	1,051,838
Small Tool Allowance	26,227	26,227	23,886	n/a	76,341
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)				33,695	33,695
Permits				85,863	85,863
Demolition Contractors Insurance				251,059	251,059
Demolition Contractors Fee				991,756	991,756
Sub-Total					10,798,034
Contingency (excluding activities currently under contract)					1,714,922
Project Total (before scrap credit)					12,512,955
Scrap Credit	(741,538)	(741,538)	(637,455)	-	(2,120,531)
Project Total					10,392,425

TABLE 5.2I

RIVERSIDE STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 6 Boiler*	*Unit 7 Boiler*	*Unit 7 Turbine*	*Unit 8*	*Unit 9*	*Unit 10*	*Common*	*Station*	*Station Total*
Riverside Unit Rating (MWe)	44	44	165	231	173	173	830		
Characterization / Temporary Services	43,000	43,000	69,000	79,000	70,000	70,000	-	490,588	864,588
Scaffolding / Worker Access	-	-	-	-	-	-	-		0
Asbestos Remediation	707,639	707,639	-	782,763	-	-	-		2,198,041
Equipment Removal	-	-	767,840	224,211	1,099,514	1,099,514	-		3,191,079
Boiler(s)	699,076	699,076	-	708,374	-	-	-		2,106,526
Structures Demolition	1,071,259	1,071,259	599,125	2,901,075	902,350	902,350	2,112,057		9,559,475
Backfill / Grade / Landscaping	57,169	57,169	151,147	170,755	150,256	150,256	302,410	-	1,039,161
Ongoing environmental monitoring (quarterly for 5 years)								196,000	196,000
Utility Management / Oversight								2,359,092	2,359,092
Demolition Contractor Management / Supervisory / Safety Staff								3,702,417	3,702,417
Security								1,181,565	1,181,565
Property Taxes	-	-	-	-	-	-	-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers								3,960,496	3,960,496
Small Tool Allowance	32,227	32,227	19,839	60,827	27,777	27,777	30,181	n/a	230,854
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								55,947	55,947
Permits								271,046	271,046
Demolition Contractors Insurance								792,525	792,525
Demolition Contractors Fee								3,033,717	3,033,717
Sub-Total									34,742,530
Contingency (excluding activities currently under contract)									5,431,184
Project Total (before scrap credit)									40,173,713
Scrap Credit	(1,396,257)	(1,396,257)	(1,168,270)	(2,929,460)	(1,681,798)	(1,681,798)	(100,335)	-	(10,354,193)
Project Total									29,819,520

TABLE 5.2m

SHERBURNE COUNTY STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 1*	*Unit 2*	*Unit 3*	*Common*	*Station*	*Station Total*
Sherco Unit Rating (MWe)	750	750	900	2,400		
Characterization / Temporary Services	142,000	142,000	156,000	-	490,588	930,588
Scaffolding / Worker Access	494,142	494,142	541,306	-		1,529,590
Asbestos Remediation	-	-	-	500,000		500,000
Equipment Removal	7,065,591	7,065,591	7,358,207	3,470,802		24,960,190
Boiler(s)	3,340,536	3,340,536	3,687,636	-		10,368,708
Structures Demolition	9,325,532	9,325,532	10,207,507	7,484,754		36,343,325
Backfill / Grade / Landscaping	470,825	470,825	515,763	2,892,652	-	4,350,066
Ongoing environmental monitoring (quarterly for 5 years)					1,543,000	1,543,000
Utility Management / Oversight					2,612,451	2,612,451
Demolition Contractor Management / Supervisory / Safety Staff					4,558,283	4,558,283
Security					1,329,261	1,329,261
Project Expenses						
Shared Heavy Equipment / Operating Engineers					4,993,999	4,993,999
Small Tool Allowance	260,483	260,483	280,830	179,353	n/a	981,148
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					62,940	62,940
Permits					911,218	911,218
Demolition Contractors Insurance					2,664,357	2,664,357
Demolition Contractors Fee					11,074,516	11,074,516
Sub-Total						109,713,641
Contingency (excluding activities currently under contract)						16,507,046
Project Total (before scrap credit)						126,220,687
Scrap Credit	(12,112,401)	(12,369,521)	(13,800,033)	(3,845,395)	-	(42,127,350)
Project Total						84,093,338

TABLE 5.2n

WILMARTH STATION
SUMMARY OF ACTIVITY COSTS
(2009 Dollars)

Activities (Costs)	*Unit 1*	*Unit 2*	*Common*	*Station*	*Station Total*
Wilmarth Unit Rating (MWe)	10	10	20		
Characterization / Temporary Services	32,000	32,000	-	328,000	392,000
Scaffolding / Worker Access	47,461	47,461	-		94,921
Asbestos Remediation	476,083	476,083	-		952,166
Equipment Removal	613,929	613,929	144,464		1,372,321
Boiler(s)	334,145	334,145	-		668,289
Structures Demolition	393,348	393,348	790,707		1,577,403
Backfill / Grade / Landscaping	202,209	202,209	130,176	-	534,594
Ongoing environmental monitoring (quarterly for 5 years)				119,000	119,000
Utility Management / Oversight				569,605	569,605
Demolition Contractor Management / Supervisory / Safety Staff				840,171	840,171
Security				313,454	313,454
Property Taxes	-	-	-	-	0
Project Expenses					
Shared Heavy Equipment / Operating Engineers				1,051,838	1,051,838
Small Tool Allowance	26,240	26,240	13,317	n/a	65,796
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)				33,695	33,695
Permits				77,022	77,022
Demolition Contractors Insurance				225,208	225,208
Demolition Contractors Fee				880,657	880,657
Sub-Total					9,768,142
Contingency (excluding activities currently under contract)					1,560,438
Project Total (before scrap credit)					11,328,580
Scrap Credit	(859,250)	(859,250)	(236,692)	-	(1,955,191)
Project Total					9,373,389

6.0 REFERENCES

1. E-mail dated September 11, 2009 from Roger Schuessel of Xcel Energy to Ben Stochmal at TLG Services; subject "Special Construction Labor Rates".
2. E-mail dated October 16, 2009 from Brandon Kirschner of Xcel Energy to Fran Seymore at TLG Services; subject "Professional Staffing Information".
3. "Building Construction Cost Data 2009," Robert Snow Means Company, Inc., Kingston, Massachusetts.
4. Recycler's World, Iron and Steel Recycling Section and Scrap Copper Recycling Section, U.S. Scrap Metal Index, Spot Prices October 29, 2009.
5. T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986.
6. W.J. Manion and T.S. LaGuardia, "Decommissioning Handbook," U.S. Department of Energy, DOE/EV/10128-1, November 1980.
7. AACE International, Skills and Knowledge of Cost Engineering, 4th Edition, 1999.

APPENDIX A
SUMMARY OF STATION SYSTEM AND STRUCTURES INVENTORIES

TABLE A
SUMMARY OF STATION SYSTEMS AND STRUCTURES INVENTORIES

Index	System/Structure Inventory Data Point	Allen S. King	Angus Anson	Black Dog	Blue Lake	Grand Meadow	Granite City	High Bridge	Inver Hills	Key City	Minnesota Valley	Red Wing	Riverside	Sherco	Wilmarth
Station Rating (Mwe)		588	381	538	510	101	72	570	360	72	64	20	830	2400	20
2	Piping 0.25 to 2 inches diameter, linear foot	79,850	13,521	10,719	20,178	-	1,501	24,690	3,268	1,501	492	4,919	24,046	233,790	4,919
3	Piping >2 to 4 inches diameter, linear foot	52,700	9,014	55,395	13,452	-	1,001	16,460	2,579	1,001	12,745	3,279	16,031	155,860	3,279
4	Piping >4 to 8 inches diameter, linear foot	35,133	6,009	36,265	10,357	-	3,138	11,173	9,964	3,138	6,427	2,186	10,687	103,907	2,186
5	Piping >8 to 14 inches diameter, linear foot	30,662	4,006	24,552	6,229	-	445	8,015	1,348	445	4,978	1,457	7,125	89,271	1,457
6	Piping >14 to 20 inches diameter, linear foot	7,208	1,814	9,315	4,259	-	148	5,377	1,139	148	2,484	794	4,750	26,401	794
7	Piping >20 to 36 inches diameter, linear foot	9,734	1,486	5,418	2,419	-	-	3,971	-	-	1,803	289	3,716	37,053	289
8	Piping >36 inches diameter, linear foot	5,335	898	4,186	1,796	-	-	2,420	-	-	17	173	2,126	15,991	173
9	Valves <2 inches	1,373	108	99	144	-	108	-	216	108	54	540	-	4,118	540
10	Valves >2 to 4 inches	915	360	2,633	672	-	72	698	174	72	402	360	698	2,745	360
11	Valves >4 to 8 inches	610	192	1,226	464	-	80	381	264	80	207	240	369	1,830	240
12	Valves >8 to 14 inches	1,519	72	771	142	-	24	159	82	24	134	120	123	1,115	120
13	Valves >14 to 20 inches	158	44	132	48	-	-	78	-	-	29	50	66	587	50
14	Valves >20 to 36 inches	128	12	36	24	-	-	36	-	-	14	16	36	476	16
15	Valves >36 inches	56	6	27	12	-	-	26	-	-	1	14	18	104	14
24	Pipe hangers for small bore piping, each	5,018	941	4,375	1,449	-	81	1,742	246	81	847	909	1,742	14,959	909
25	Pipe hangers for large bore piping, each	3,351	595	2,156	1,089	-	121	1,249	511	121	401	543	1,237	9,618	543
26	Pump and motor set < 300 pounds	77	2	89	72	-	16	13	108	16	32	38	13	507	38
27	Pumps, 300-1000 pound pump	23	6	15	12	-	-	13	-	-	4	8	13	73	8
28	Pumps, >1000-10,000 pound pump	14	-	21	-	-	-	2	-	-	4	11	2	44	11
29	Pumps, >10,000 pound pump	13	2	17	4	-	-	8	-	-	5	8	4	9	8
32	Pump motors, 300-1000 pound pump	23	22	15	12	-	-	13	-	-	4	8	13	28	8
33	Pump motors, >1000-10,000 pound pump	13	-	21	-	-	-	3	-	-	4	11	3	68	11
34	Pump motors, >10,000 pound pump	13	2	17	4	-	-	8	-	-	5	4	4	18	4
37	Turbine-driven pumps > 10,000 pounds	1	-	-	-	-	-	-	-	-	-	-	-	6	-
38	Main turbine-generator (pounds per MW(e) input)	1	-	3	-	-	-	1	-	-	3	2	2	3	2
39	Heat exchanger <3000 pound	16	2	41	101	-	-	6	210	-	15	12	6	60	12
40	Heat exchanger >3000 pound	-	22	14	48	-	-	5	96	-	7	14	5	21	14
41	Feedwater heater/deaerator	9	1	25	2	-	-	2	-	-	7	12	2	31	12
49	Main condenser (pounds per MW(e) input)	1	-	3	-	-	-	1	-	-	3	2	1	3	2
51	Tanks, <300 gallons, filters, and ion exchangers	38	18	59	20	-	16	10	34	16	39	12	10	66	12
52	Tanks, 300-3000 gallons	12	22	33	4	-	12	11	8	12	7	2	8	132	2
53	Tanks, >3000 gallons, square foot surface	24,827	32,772	14,482	62,690	-	2,847	23,259	7,069	2,847	87,790	33,585	1,859	157,274	6,871
54	Electrical equipment, <300 pound	740	486	1,207	647	-	420	150	846	420	232	322	128	6,680	322
55	Electrical equipment, 300-1000 pound	143	196	501	350	-	40	289	184	40	53	18	280	933	18
56	Electrical equipment, 1000-10,000 pound	122	140	148	280	67	80	207	175	80	39	56	201	122	56
57	Electrical equipment, >10,000 pound	19	74	10	128	-	28	16	168	28	4	16	16	30	16
59	Electrical transformers < 30 tons	3	3	31	14	-	2	4	18	2	10	-	4	6	-
60	Electrical transformers > 30 tons	3	4	5	12	-	2	5	12	2	4	2	5	3	2
61	Standby diesel-generator, <100 kW	-	-	1	-	-	-	-	-	-	-	-	-	-	-
62	Standby diesel-generator, 100 kW to 1 MW	-	-	-	-	-	8	-	-	8	-	-	-	-	-
63	Standby diesel-generator, >1 MW	-	-	-	-	-	4	-	-	4	-	-	-	-	-
64	Fluorescent light fixture	-	50	696	180	-	80	200	-	80	183	38	150	-	38
65	Incandescent light fixture	1,564	188	1,500	180	-	120	200	170	120	327	258	150	4,060	258
66	Electrical cable tray, linear foot	27,803	4,012	6,834	5,651	-	1,730	10,276	-	1,730	1,122	1,364	8,545	166,291	1,364
67	Electrical conduit, linear foot	41,992	3,922	67,220	8,631	781,440	2,471	13,688	-	2,471	18,605	8,658	11,905	119,404	8,658
69	Mechanical equipment, <300 pound	786	138	1,055	52	-	44	31	78	44	258	360	21	2,331	360
70	Mechanical equipment, 300-1000 pound	196	212	219	812	-	64	274	30	64	77	14	274	451	14
71	Mechanical equipment, 1000-10,000 pound	204	10	53	127	-	-	59	1,000	-	29	60	44	516	60
72	Mechanical equipment, >10,000 pound	104	135	89	238	603	60	141	219	60	12	45	103	90	45

TABLE A
SUMMARY OF SYSTEMS AND STRUCTURES INVENTORIES
(Continued)

Index	System/Structure Inventory Data Point	Allen S. King	Angus Anson	Black Dog	Blue Lake	Grand Meadow	Granite City	High Bridge	Inver Hills	Key City	Minnesota Valley	Red Wing	Riverside	Sherco	Wilmarth
Station Rating (Mwe)		588	381	538	510	101	72	570	360	72	64	20	830	2400	20
76	HVAC equipment, <300 pound	108	4	-	16	-	-	-	24	-	4	10	-	328	10
77	HVAC equipment, 300-1000 pound	-	12	6	-	-	-	36	-	-	-	-	24	107	-
78	HVAC equipment, 1000-10,000 pound	-	-	-	-	-	-	14	-	-	2	4	10	6	4
79	HVAC equipment, >10,000 pound	-	-	-	-	-	-	-	-	-	-	-	-	15	-
82	HVAC ductwork, pound	119,977	-	463,253	-	-	-	142,100	-	-	96,406	18,295	38,202	439,440	18,295
201	Standard reinforced concrete, cubic yard	22,692	2,662	17,108	8,366	18,626	1,903	10,465	7,567	1,903	4,294	6,487	15,771	83,961	2,597
202	Grade slab concrete, cubic yard	10,800	1,329	6,937	1,175	-	906	372	1,384	906	676	474	3,551	-	474
205	Heavily rein concrete w/#9 rebar, cubic yard	3,869	-	2,456	-	-	-	-	-	-	988	489	2,117	10,087	489
222	Hollow masonry block wall, cubic yard	-	103	614	58	-	-	425	-	-	-	-	2,219	-	109
224	Solid masonry block wall, cubic yard	3,788	-	6,981	-	-	-	-	-	-	8,911	663	3,011	14,335	663
229	Backfill of below grade voids, cubic yard	19,324	7,074	13,058	8,510	92,624	267	12,625	-	267	27,979	14,581	12,325	-	14,581
230	Excavation of clean material, cubic yard	-	-	-	-	219,531	-	-	-	-	-	-	-	-	-
235	Building by volume, cubic foot	5,117,058	113,993	970,141	970,228	-	189,562	318,816	247,411	189,562	164,740	321,500	597,793	7,784,100	321,500
236	Building metal siding, square foot	217,256	12,789	80,426	19,901	-	37,278	108,748	15,564	37,278	73,964	32,498	93,913	669,467	32,498
242	Standard asphalt roofing, square foot	47,897	-	53,455	-	-	-	110,000	-	-	23,588	9,129	119,469	237,266	9,129
243	Galbestos panels, square foot	-	-	8,000	-	-	-	-	-	-	-	-	-	-	-
245	Placement of cofferdam, linear foot	200	-	-	-	-	-	-	-	-	-	-	-	-	-
253	Overhead cranes/monorails < 10 ton capacity, each	14	-	2	-	-	-	-	-	-	-	1	-	136	1
255	Overhead cranes/monorails >10 - 50 ton capacity, each	6	-	-	4	-	-	5	-	-	2	2	7	21	2
258	Gantry cranes > 50 ton capacity, each	1	-	1	1	-	-	1	-	-	-	-	5	6	-
260	Structural steel, pounds	25,041,699	1,231,615	16,388,568	1,748,139	-	310,648	6,981,323	662,931	310,648	6,612,141	2,429,526	17,879,987	83,653,565	2,429,526
262	Steel floor grating, square foot	161,222	6,242	62,581	7,410	-	2,673	18,797	-	2,673	12,083	30,386	56,169	578,353	30,386
268	Placement of scaffolding in clean areas, square foot	86,680	-	137,779	-	-	-	-	-	-	19,777	13,043	-	210,181	13,043
270	Landscaping with topsoil, acre	3	3	4	1	46	0.5	2	2	0.5	1	4	3	33	2
271	Landscaping w/o topsoil, acre	29	-	5	8	3	2	4	9	2	7	3	8	239	4
272	Chain link fencing, linear foot	3,372	1,600	3,000	2,880	-	995	3,144	2,800	995	3,859	8,372	5,016	20,000	995
273	Railroad track, linear foot	3,000	-	3,600	-	-	-	-	-	-	6,664	-	-	24,000	-
274	Asphalt pavement, square foot	220,880	52,000	122,500	78,300	-	12,000	75,171	51,000	12,000	38,225	-	128,241	801,500	52,000
294	Carbon steel plate 1/2 inch thick, square foot	66,630	7,388	42,598	14,776	798,797	75,398	14,550	261,891	75,398	8,959	17,695	78,517	219,533	17,695
359	Steam drum removal (fossil)	1	3	6	6	-	-	6	-	-	3	2	9	6	2
360	Water drum removal (fossil)	-	-	-	-	-	-	-	-	-	4	4	-	12	4
361	Upper/lower waterwall headers (fossil)	26	-	33	-	-	-	-	-	-	14	6	27	72	6
362	Top sup boiler waterwall (8'x8' section), inches cut	136,902	-	128,619	-	-	-	-	-	-	45,627	13,392	128,711	470,566	13,392
369	Boiler convective superheaater platens	307	-	534	-	-	-	-	-	-	256	116	459	1,344	116
370	Boiler radiant superheater platens	-	-	-	-	-	-	-	-	-	-	-	-	156	-
371	Boiler reheat platens	140	-	270	-	-	-	-	-	-	-	-	90	666	-
372	Boiler economizer platens	420	-	254	-	-	-	-	-	-	39	-	163	1,344	-
374	Stationary soot blowers	98	-	96	-	-	-	-	-	-	21	-	32	315	-
375	Retractable soot blowers	70	-	54	-	-	-	-	-	-	7	16	18	144	16
376	Process ductwork (8'x8' section), inches cut	757,268	321,019	1,013,359	625,433	-	54,416	446,315	307,617	54,416	470,306	61,481	1,009,280	3,392,767	61,481
378	Non-asbestos insulated regenerative air preheaters	4	-	12	-	-	-	-	-	-	8	8	4	13	8
380	Non-asbestos insulated recuperative air preheaters	-	-	-	-	-	-	-	-	-	4	-	8	-	-
382	Induced, forced, primary draft fans	9	-	12	-	-	-	-	-	-	4	4	-	42	4
383	Coal car dumpers	1	-	2	-	-	-	-	-	-	-	-	-	4	-
384	Conveyors	16,700	-	1,400	-	-	-	-	-	-	900	625	-	5,000	625
385	Transfer Towers	3	-	80,400	-	-	-	-	-	-	-	-	-	201,000	-
386	Stacker-reclaimers	1	-	2	-	-	-	-	-	-	-	-	-	2	-
387	Coal crushers	-	-	4	-	-	-	-	-	-	-	-	-	-	-
389	Ball mills	12	-	12	-	-	-	-	-	-	4	-	-	43	-
390	Coal feeders	120	-	180	-	-	-	-	-	-	40	86	-	1,019	86

APPENDIX B

UNIT COST FACTOR DEVELOPMENT

APPENDIX B

UNIT COST FACTOR DEVELOPMENT
(Using Minnesota-based labor rates)

Example: Unit Factor for Removal of Heat Exchanger < 3,000 pounds

1. SCOPE

Heat exchangers weighing < 3,000 lb. will be removed in one piece using a crane or small hoist. They will be disconnected from the inlet and outlet piping. The heat exchanger will be sent to the laydown area.

2. CALCULATIONS

Act ID	Activity Description	Activity Duration	Critical Duration
a	Remove insulation	20	(b)
b	Mount pipe cutters	60	60
c	Disconnect inlet and outlet lines	60	60
d	Rig for removal	30	30
e	Unbolt from mounts	30	30
f	Remove, send to packing area	60	60
	Totals (Activity/Critical)	260	240

Duration adjustment(s):	
+ Work break adjustment (8.33 % of productive duration)	20
Total work duration (minutes)	260

***** Total duration = 4.333 hr *****

3. LABOR REQUIRED

Crew	Number	Duration (hr)	Rate ($/hr)	Cost
Laborers	3.0	4.333	$46.12	$599.51
Craftsmen	2.0	4.333	$56.78	$492.06
Foreman	1.0	4.333	$59.78	$259.03
General Foreman	0.25	4.333	$62.78	$ 68.01
Fire Watch	0.05	4.333	$46.12	$ 9.99
Total labor cost				$1,428.60

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
Gas torch consumables 1 @ $9.00/hr x 1 hr {1}	9.00
Subtotal cost of equipment and materials	9.00
Overhead & profit on equipment and materials @ 16.50%	1.49
Total costs, equipment & material	$10.49
TOTAL COST Removal of heat exchanger <3000 pound:	**$1,439.09**
Total labor cost:	$1,428.60
Total equipment/material costs:	$10.49
Total craft labor man-hours required per unit:	27.298

5. NOTES AND REFERENCES

- Durations are shown in minutes. The integrated duration accounts for those activities that can be performed in conjunction with other activities, indicated by the alpha designator of the concurrent activity. This results in an overall decrease in the sequenced duration.

- Work difficulty factors were developed in conjunction with the AIF program to standardize decommissioning cost studies and are delineated in the "Guidelines" study (Reference 2, Vol. 1, Chapter 5).

- References for equipment and consumables costs:

    1. R.S. Means (2009) Division 01 54 33, Section 40-6360 Page 658

APPENDIX C

UNIT COST FACTOR LISTING

TABLE C-1

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2009 dollars/Scrap Weights in pounds)

		Unit Cost Factors			Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
2	Piping 0.25 to 2 inches diameter, linear foot	5.33	5.30	0.1	-	4	-	0.5	-	-	-	-
3	Piping >2 to 4 inches diameter, linear foot	7.55	7.50	0.2	-	7	-	0.9	-	-	0.4	-
4	Piping >4 to 8 inches diameter, linear foot	14.57	14.50	0.3	-	22	-	-	-	-	-	-
5	Piping >8 to 14 inches diameter, linear foot	28.31	28.22	0.6	-	57	-	-	-	-	-	-
6	Piping >14 to 20 inches diameter, linear foot	36.71	36.45	0.7	-	-	120	-	-	-	-	-
7	Piping >20 to 36 inches diameter, linear foot	54.04	53.69	1.1	-	-	221	-	-	-	-	-
8	Piping >36 inches diameter, linear foot	64.25	63.90	1.3	-	-	417	-	-	-	-	-
9	Valves <2 inches	104.34	103.99	2.0	-	-	-	-	-	-	-	-
10	Valves >2 to 4 inches	96.93	96.41	1.9	75	-	-	8.8	-	-	4.4	-
11	Valves >4 to 8 inches	145.72	145.02	2.8	510	-	-	-	-	-	-	-
12	Valves >8 to 14 inches	283.10	282.23	5.6	1,066	-	-	-	-	-	-	-
13	Valves >14 to 20 inches	367.15	364.53	7.3	-	-	2,040	-	-	-	-	-
14	Valves >20 to 36 inches	540.43	536.93	10.7	-	-	3,334	-	-	-	-	-
15	Valves >36 inches	642.49	638.99	12.7	-	-	11,535	-	-	-	-	-
24	Pipe hangers for small bore piping, each	31.76	29.14	0.6	-	10	-	-	-	-	-	-
25	Pipe hangers for large bore piping, each	116.73	111.49	2.3	-	50	-	-	-	-	-	-
26	Pump and motor set < 300 pounds	243.91	239.54	4.7	-	-	50	12.5	-	-	-	62.3
27	Pumps, 300-1000 pound pump	674.95	667.96	12.7	293	-	49	48.9	-	-	-	-
28	Pumps, >1000-10,000 pound pump	2,685.26	2,674.77	51.3	2,834	-	472	472.3	-	-	-	-
29	Pumps, >10,000 pound pump	5,186.77	5,155.31	98.9	43,693	-	7,282	7,282.1	-	-	-	-
32	Pump motors, 300-1000 pound pump	284.20	284.20	5.4	-	-	-	-	-	-	-	307.8
33	Pump motors, >1000-10,000 pound pump	1,118.77	1,118.77	21.5	-	-	-	-	-	-	-	3,531.6
34	Pump motors, >10,000 pound pump	2,517.23	2,517.23	48.3	-	-	-	-	-	-	-	42,324.5
37	Turbine-driven pumps > 10,000 pounds	6,949.20	6,914.25	132.7	20,000	-	20,000	-	-	-	-	-
38	Main turbine-generator (pounds per MW(e) input)	163,776.69	163,105.64	3,042.0	-	-	851,500	-	-	-	-	851,500.0
39	Heat exchanger <3000 pound	1,439.09	1,428.60	27.3	-	-	416	623.4	-	-	-	-
40	Heat exchanger >3000 pound	3,613.59	3,571.65	68.3	-	-	5,599	8,397.9	-	-	-	-
41	Feedwater heater/deaerator	10,206.74	10,122.86	194.2	-	-	12,000	18,000.0	-	-	-	-
49	Main condenser (pounds per MW(e) input)	454,544.47	434,452.41	8,243.6	149,400	-	149,400	199,200.0	-	-	-	-
51	Tanks, <300 gallons, filters, and ion exchangers	313.98	308.74	6.0	-	-	401	401.2	-	-	-	-
52	Tanks, 300-3000 gallons	993.63	983.14	19.1	-	-	2,700	300.0	-	-	-	-
53	Tanks, >3000 gallons, square foot surface	8.25	8.12	0.2	-	-	10	10.3	-	-	-	-

TABLE C-1 (continued)

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2009 dollars/Scrap Weights in pounds)

Unit Cost Factors					Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
54	Electrical equipment, <300 pound	133.91	133.91	2.6	-	-	56	-	-	-	2.9	-
55	Electrical equipment, 300-1000 pound	462.72	462.72	8.8	-	-	624	-	-	-	32.8	-
56	Electrical equipment, 1000-10,000 pound	925.44	925.44	17.6	-	-	2,212	-	-	-	116.4	-
57	Electrical equipment, >10,000 pound	2,193.94	2,193.94	41.0	-	-	19,950	-	-	-	1,050.0	-
59	Electrical transformers < 30 tons	1,523.66	1,523.66	28.4	-	-	11,250	-	-	-	3,750.0	-
60	Electrical transformers > 30 tons	4,387.89	4,387.89	81.9	-	-	375,000	-	-	-	125,000.0	-
61	Standby diesel-generator, <100 kW	1,556.29	1,556.29	29.1	2,340	-	-	-	-	-	-	260.0
62	Standby diesel-generator, 100 kW to 1 MW	3,473.74	3,473.74	64.8	9,450	-	-	-	-	-	-	1,050.0
63	Standby diesel-generator, >1 MW	7,191.36	7,191.36	134.2	47,250	-	-	-	-	-	-	5,250.0
64	Fluorescent light fixture	55.92	55.92	1.1	-	-	-	-	-	-	-	-
65	Incandescent light fixture	27.90	27.90	0.6	-	-	-	-	-	-	-	-
66	Electrical cable tray, linear foot	12.46	12.29	0.2	-	-	-	-	6.6	6.6	-	-
67	Electrical conduit, linear foot	5.44	5.35	0.1	-	-	-	-	3.4	3.4	-	-
69	Mechanical equipment, <300 pound	133.91	133.91	2.6	-	-	127	-	-	-	-	-
70	Mechanical equipment, 300-1000 pound	462.72	462.72	8.8	-	-	641	-	-	-	-	-
71	Mechanical equipment, 1000-10,000 pound	925.44	925.44	17.6	-	-	4,184	-	-	-	-	-
72	Mechanical equipment, >10,000 pound	2,193.94	2,193.94	41.0	-	-	11,938	-	-	-	-	-
76	HVAC equipment, <300 pound	133.91	133.91	2.6	-	-	184	-	-	-	-	-
77	HVAC equipment, 300-1000 pound	462.72	462.72	8.8	-	-	643	-	-	-	-	-
78	HVAC equipment, 1000-10,000 pound	925.44	925.44	17.6	-	-	3,813	-	-	-	-	-
79	HVAC equipment, >10,000 pound	2,193.94	2,193.94	41.0	-	-	19,391	-	-	-	-	-
82	HVAC ductwork, pound	0.53	0.53	0.0	-	-	-	-	1.0	-	-	-
201	Standard reinforced concrete, cubic yard	133.20	93.76	1.8	-	183	-	-	-	-	-	-
202	Grade slab concrete, cubic yard	179.21	137.69	2.6	-	183	-	-	-	-	-	-
206	Heavily rein concrete w/#9 rebar, cubic yard	229.61	127.97	2.4	-	730	-	-	-	-	-	-
222	Hollow masonry block wall, cubic yard	98.86	66.36	1.4	-	66	-	-	-	-	-	-
224	Solid masonry block wall, cubic yard	98.86	66.36	1.4	-	66	-	-	-	-	-	-
229	Backfill of below grade voids, cubic yard	24.53	3.34	0.1	-	-	-	-	-	-	-	-
230	Excavation of clean material, cubic yard	2.72	1.07	0.0	-	-	-	-	-	-	-	-
235	Building by volume, cubic foot	0.29	0.17	-	-	-	1	-	-	-	-	-
236	Building metal siding, square foot	1.18	0.97	0.0	-	-	-	-	2.4	-	-	-

TABLE C-1 (continued)

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2009 dollars/Scrap Weights in pounds)

Unit Cost Factors					Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
242	Standard asphalt roofing, square foot	2.34	2.34	0.1	-	-	-	-	-	-	-	-
243	Galbestos panels, square foot	2.15	1.61	0.0	-	-	-	-	-	-	-	-
245	Placement of cofferdam, linear foot	-	-	-	-	-	-	-	-	-	-	-
253	Overhead cranes/monorails < 10 ton capacity, each	641.60	641.60	11.8	-	3,700	-	-	-	-	-	-
255	Overhead cranes/monorails >10 - 50 ton capacity, each	1,539.86	1,539.86	28.3	-	-	298,832	-	-	-	3,018.5	-
258	Gantry cranes > 50 ton capacity, each	27,424.31	27,424.31	511.9	-	-	712,800	-	-	-	7,200.0	-
260	Structural steel, pounds	0.21	0.16	-	-	1	-	-	-	-	-	-
262	Steel floor grating, square foot	4.46	4.28	0.1	-	-	6	-	1.1	-	-	-
268	Placement of scaffolding in clean areas, square foot	15.52	4.53	0.1	-	-	-	-	-	-	-	-
270	Landscaping with topsoil, acre	22,449.42	2,799.75	52.6	-	-	-	-	-	-	-	-
271	Landscaping w/o topsoil, acre	1,099.65	302.81	5.3	-	-	-	-	-	-	-	-
272	Chain link fencing, linear foot	3.29	2.68	0.1	-	-	-	-	10.0	-	-	-
273	Railroad track, linear foot	22.59	11.28	0.2	-	91	-	-	-	-	-	-
274	Asphalt pavement, square foot	0.85	0.60	0.0	-	-	-	-	-	-	-	-
294	Carbon steel plate 1/2 inch thick, square foot	3.77	3.11	0.1	-	-	20	-	-	-	-	-
359	Steam drum removal (fossil)	20,062.95	19,993.05	411.6	-	-	480,000	-	-	-	-	-
360	Water drum removal (fossil)	7,456.04	7,442.93	153.2	-	-	320,000	-	-	-	-	-
361	Upper/lower waterwall headers (fossil)	5,624.63	5,611.52	115.5	-	-	120,000	-	-	-	-	-
362	Top sup boiler waterwall (8'x8' section), inches cut	0.66	0.65	0.0	-	-	11	-	-	-	-	-
369	Boiler convective superheaater platens	1,555.19	1,464.33	29.6	-	-	19,501	-	-	-	-	-
370	Boiler radiant superheater platens	657.91	619.48	12.5	-	-	51,652	-	-	-	-	-
371	Boiler reheat platens	657.91	619.48	12.5	-	-	19,501	-	-	-	-	-
372	Boiler economizer platens	837.36	788.44	15.9	-	-	11,703	-	-	-	-	-
374	Stationary soot blowers	35.75	35.75	0.7	-	-	500	-	-	-	-	50.0
375	Retractable soot blowers	337.93	337.93	6.8	-	-	11,150	-	-	-	-	100.0
376	Process ductwork (8'x8' section), inches cut	0.33	0.31	0.0	-	-	0	-	-	-	-	-
378	Non-asbestos insulated regenerative air preheaters	9,974.90	9,157.07	188.5	-	-	1,376,000	-	-	-	-	-
380	Non-asbestos insulated recuperative air preheaters	5,484.85	4,973.71	101.6	-	-	1,376,000	-	-	-	-	-
382	Induced, forced, primary draft fans	1,598.12	1,577.15	31.9	-	-	30,000	-	-	-	-	3,531.6
383	Coal car dumpers	13,606.06	12,347.86	249.4	-	-	125,000	-	-	-	-	500.0
384	Conveyors	13.30	12.78	0.3	-	-	820	-	-	-	-	-
385	Transfer Towers	0.18	0.13	-	-	-	5	-	-	-	-	-
386	Stacker-reclaimers	147,324.00	147,324.00	3,008.3	-	-	300,000	-	-	-	-	2,000.0
387	Coal crushers	978.19	972.95	19.3	-	-	36,000	-	-	-	-	250.0
389	Ball mills	1,414.94	1,414.94	28.1	-	-	360,000	-	-	-	-	7,063.1
390	Coal feeders	348.63	343.39	7.1	-	-	1,194	-	-	-	-	-

TABLE C-2

UNIT COST FACTOR LISTING
South Dakota Station
(Costs are in 2009 dollars/Scrap Weights in pounds)

Unit Cost Factors					Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
2	Piping 0.25 to 2 inches diameter, linear foot	5.33	5.30	0.1	-	4	-	0.5	-	-	-	-
3	Piping >2 to 4 inches diameter, linear foot	7.55	7.50	0.2	-	7	-	0.9	-	-	0.4	-
4	Piping >4 to 8 inches diameter, linear foot	14.57	14.50	0.3	-	22	-	-	-	-	-	-
5	Piping >8 to 14 inches diameter, linear foot	28.31	28.22	0.6	-	57	-	-	-	-	-	-
6	Piping >14 to 20 inches diameter, linear foot	36.71	36.45	0.7	-	-	120	-	-	-	-	-
7	Piping >20 to 36 inches diameter, linear foot	54.03	53.69	1.1	-	-	221	-	-	-	-	-
8	Piping >36 inches diameter, linear foot	64.24	63.90	1.3	-	-	417	-	-	-	-	-
9	Valves <2 inches	104.33	103.99	2.0	-	-	-	-	-	-	-	-
10	Valves >2 to 4 inches	96.92	96.41	1.9	75	-	-	8.8	-	-	4.4	-
11	Valves >4 to 8 inches	145.70	145.02	2.8	510	-	-	-	-	-	-	-
12	Valves >8 to 14 inches	283.09	282.23	5.6	1,066	-	-	-	-	-	-	-
13	Valves >14 to 20 inches	367.10	364.53	7.3	-	-	2,040	-	-	-	-	-
14	Valves >20 to 36 inches	540.35	536.93	10.7	-	-	3,334	-	-	-	-	-
15	Valves >36 inches	642.41	638.99	12.7	-	-	11,535	-	-	-	-	-
24	Pipe hangers for small bore piping, each	31.71	29.14	0.6	-	10	-	-	-	-	-	-
25	Pipe hangers for large bore piping, each	116.62	111.49	2.3	-	50	-	-	-	-	-	-
26	Pump and motor set < 300 pounds	243.82	239.54	4.7	-	-	50	12.5	-	-	-	62.3
27	Pumps, 300-1000 pound pump	674.80	667.96	12.7	293	-	49	48.9	-	-	-	-
29	Pumps, >10,000 pound pump	5,186.09	5,155.31	98.9	43,693	-	7,282	7,282.1	-	-	-	-
32	Pump motors, 300-1000 pound pump	284.20	284.20	5.4	-	-	-	-	-	-	-	307.8
34	Pump motors, >10,000 pound pump	2,517.23	2,517.23	48.3	-	-	-	-	-	-	-	42,324.5
39	Heat exchanger <3000 pound	1,438.86	1,428.60	27.3	-	-	416	623.4	-	-	-	-
40	Heat exchanger >3000 pound	3,612.69	3,571.65	68.3	-	-	5,599	8,397.9	-	-	-	-
41	Feedwater heater/deaerator	10,204.94	10,122.86	194.2	-	-	12,000	18,000.0	-	-	-	-
51	Tanks, <300 gallons, filters, and ion exchangers	313.87	308.74	6.0	-	-	401	401.2	-	-	-	-
52	Tanks, 300-3000 gallons	993.40	983.14	19.1	-	-	2,700	300.0	-	-	-	-
53	Tanks, >3000 gallons, square foot surface	8.25	8.12	0.2	-	-	10	10.3	-	-	-	-

TABLE C-2 (continued)

UNIT COST FACTOR LISTING
South Dakota Station
(Costs are in 2009 dollars/Scrap Weights in pounds)

Unit Cost Factors					Scrap Weight							
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Cast Iron	Carbon Steel No. 1	Mixed Scrap	SS-1	Galv. Steel.	Insul Cable	No. 2 Copper	Large Motor
54	Electrical equipment, <300 pound	133.91	133.91	2.6	-	-	56	-	-	-	2.9	-
55	Electrical equipment, 300-1000 pound	462.72	462.72	8.8	-	-	624	-	-	-	32.8	-
56	Electrical equipment, 1000-10,000 pound	925.44	925.44	17.6	-	-	2,212	-	-	-	116.4	-
57	Electrical equipment, >10,000 pound	2,193.94	2,193.94	41.0	-	-	19,950	-	-	-	1,050.0	-
59	Electrical transformers < 30 tons	1,523.66	1,523.66	28.4	-	-	11,250	-	-	-	3,750.0	-
60	Electrical transformers > 30 tons	4,387.89	4,387.89	81.9	-	-	375,000	-	-	-	125,000.0	-
64	Fluorescent light fixture	55.92	55.92	1.1	-	-	-	-	-	-	-	-
65	Incandescent light fixture	27.90	27.90	0.6	-	-	-	-	-	-	-	-
66	Electrical cable tray, linear foot	12.46	12.29	0.2	-	-	-	-	6.6	6.6	-	-
67	Electrical conduit, linear foot	5.44	5.35	0.1	-	-	-	-	3.4	3.4	-	-
69	Mechanical equipment, <300 pound	133.91	133.91	2.6	-	-	127	-	-	-	-	-
70	Mechanical equipment, 300-1000 pound	462.72	462.72	8.8	-	-	641	-	-	-	-	-
71	Mechanical equipment, 1000-10,000 pound	925.44	925.44	17.6	-	-	4,184	-	-	-	-	-
72	Mechanical equipment, >10,000 pound	2,193.94	2,193.94	41.0	-	-	11,938	-	-	-	-	-
76	HVAC equipment, <300 pound	133.91	133.91	2.6	-	-	184	-	-	-	-	-
77	HVAC equipment, 300-1000 pound	462.72	462.72	8.8	-	-	643	-	-	-	-	-
201	Standard reinforced concrete, cubic yard	132.36	93.76	1.8	-	183	-	-	-	-	-	-
202	Grade slab concrete, cubic yard	178.32	137.69	2.6	-	183	-	-	-	-	-	-
222	Hollow masonry block wall, cubic yard	98.17	66.36	1.4	-	66	-	-	-	-	-	-
229	Backfill of below grade voids, cubic yard	24.07	3.34	0.1	-	-	-	-	-	-	-	-
235	Building by volume, cubic foot	0.29	0.17	-	-	-	1	-	-	-	-	-
236	Building metal siding, square foot	1.17	0.97	0.0	-	-	-	-	2.4	-	-	-
260	Structural steel, pounds	0.21	0.16	-	-	1	-	-	-	-	-	-
262	Steel floor grating, square foot	4.45	4.28	0.1	-	-	6	-	1.1	-	-	-
270	Landscaping with topsoil, acre	22,027.75	2,799.75	52.6	-	-	-	-	-	-	-	-
272	Chain link fencing, linear foot	3.28	2.68	0.1	-	-	-	-	10.0	-	-	-
274	Asphalt pavement, square foot	0.84	0.60	0.0	-	-	-	-	-	-	-	-
294	Carbon steel plate 1/2 inch thick, square foot	3.75	3.11	0.1	-	-	20	-	-	-	-	-
359	Steam drum removal (fossil)	20,061.45	19,993.05	411.6	-	-	480,000	-	-	-	-	-
376	Process ductwork (8'x8' section), inches cut	0.32	0.31	0.0	-	-	0	-	-	-	-	-

STATE OF MINNESOTA

OFFICE OF THE ATTORNEY GENERAL

LORI SWANSON
ATTORNEY GENERAL

SUITE 1400
445 MINNESOTA STREET
ST. PAUL, MN 55101-2131
TELEPHONE: (651) 296-7575

August 18, 2017

Mr. Daniel Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
St. Paul, MN 55101-2147

RE: *In the Matter of Xcel's 2017 Annual Review of Remaining Lives*
Docket No. E,G002/D-17-147

Dear Mr. Wolf:

Enclosed and e-filed in the above-referenced matter please find Comments of the Office of the Attorney General – Residential Utilities and Antitrust Division

By copy of this letter all parties have been served. An affidavit of service is also enclosed.

Sincerely,

s/ Joseph C. Meyer

JOSEPH C. MEYER
Assistant Attorney General

(651) 757-1433 (Voice)
(651) 296-9663 (Fax)

Enclosures

cc: Service List

AFFIDAVIT OF SERVICE

RE: *In the Matter of Xcel's 2017 Annual Review of Remaining Lives*
Docket No. E,G002/D-17-147

STATE OF MINNESOTA)
) ss.
COUNTY OF RAMSEY)

I, JUDY SIGAL, hereby state that on the 18th day of August, 2017, I e-filed with eDockets **Comments of the Attorney General – Residential Utilities and Antitrust Division** and served the same upon all parties listed on the attached service list by e-mail, and/or United States Mail with postage prepaid, and deposited the same in a U.S. Post Office mail receptacle in the City of St. Paul, Minnesota.

s/ Judy Sigal
JUDY SIGAL

Subscribed and sworn to before me
this 18th day of August, 2017.

s/ Patricia Jotblad
Notary Public
My Commission expires: January 31, 2020.

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Julia	Anderson	Julia.Anderson@ag.state.mn.us	Office of the Attorney General-DOC	1800 BRM Tower 445 Minnesota St St. Paul, MN 551012134	Electronic Service	Yes	OFF_SL_17-147_D-17-147
Christopher	Anderson	canderson@allete.com	Minnesota Power	30 W Superior St Duluth, MN 558022191	Electronic Service	No	OFF_SL_17-147_D-17-147
James J.	Bertrand	james.bertrand@stinson.com	Stinson Leonard Street LLP	150 South Fifth Street, Suite 2300 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_17-147_D-17-147
Carl	Cronin	Regulatory.records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	No	OFF_SL_17-147_D-17-147
Ian	Dobson	Residential.Utilities@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012130	Electronic Service	Yes	OFF_SL_17-147_D-17-147
Emma	Fazio	emma.fazio@stoel.com	Stoel Rives LLP	33 South Sixth Street Suite 4200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_17-147_D-17-147
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce	85 7th Place E Ste 280 Saint Paul, MN 551012198	Electronic Service	No	OFF_SL_17-147_D-17-147
Todd J.	Guerrero	todd.guerrero@kutakrock.com	Kutak Rock LLP	Suite 1750 220 South Sixth Street Minneapolis, MN 554021425	Electronic Service	No	OFF_SL_17-147_D-17-147
Sandra	Hofstetter	sHofstetter@mnchamber.com	MN Chamber of Commerce	7261 County Road H Fremont, WI 54940-9317	Electronic Service	No	OFF_SL_17-147_D-17-147
Michael	Hoppe	il23@mtn.org	Local Union 23, I.B.E.W.	932 Payne Avenue St. Paul, MN 55130	Electronic Service	No	OFF_SL_17-147_D-17-147

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Alan	Jenkins	aj@jenkinsatlaw.com	Jenkins at Law	2265 Roswell Road Suite 100 Marietta, GA 30062	Electronic Service	No	OFF_SL_17-147_D-17-147
Richard	Johnson	Rick.Johnson@lawmoss.com	Moss & Barnett	150 S. 5th Street Suite 1200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_17-147_D-17-147
Mark J.	Kaufman	mkaufman@ibewlocal949.org	IBEW Local Union 949	12908 Nicollet Avenue South Burnsville, MN 55337	Electronic Service	No	OFF_SL_17-147_D-17-147
Thomas	Koehler	TGK@IBEW160.org	Local Union #160, IBEW	2909 Anthony Ln St Anthony Village, MN 55418-3238	Electronic Service	No	OFF_SL_17-147_D-17-147
Michael	Krikava	mkrikava@briggs.com	Briggs And Morgan, P.A.	2200 IDS Center 80 S 8th St Minneapolis, MN 55402	Electronic Service	No	OFF_SL_17-147_D-17-147
Douglas	Larson	dlarson@dakotaelectric.com	Dakota Electric Association	4300 220th St W Farmington, MN 55024	Electronic Service	No	OFF_SL_17-147_D-17-147
Ryan	Long	ryan.j.long@xcelenergy.com	Xcel Energy	414 Nicollet Mall 401 8th Floor Minneapolis, MN 55401	Electronic Service	No	OFF_SL_17-147_D-17-147
Pam	Marshall	pam@energycents.org	Energy CENTS Coalition	823 7th St E St. Paul, MN 55106	Electronic Service	No	OFF_SL_17-147_D-17-147
Andrew	Moratzka	andrew.moratzka@stoel.com	Stoel Rives LLP	33 South Sixth St Ste 4200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_17-147_D-17-147
David	Niles	david.niles@avantenergy.com	Minnesota Municipal Power Agency	220 South Sixth Street Suite 1300 Minneapolis, Minnesota 55402	Electronic Service	No	OFF_SL_17-147_D-17-147

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Richard	Savelkoul	rsavelkoul@martinsquires.com	Martin & Squires, P.A.	332 Minnesota Street Ste W2750 St. Paul, MN 55101	Electronic Service	No	OFF_SL_17-147_D-17-147
Ken	Smith	ken.smith@districtenergy.com	District Energy St. Paul Inc.	76 W Kellogg Blvd St. Paul, MN 55102	Electronic Service	No	OFF_SL_17-147_D-17-147
Byron E.	Starns	byron.starns@stinson.com	Stinson Leonard Street LLP	150 South 5th Street Suite 2300 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_17-147_D-17-147
James M.	Strommen	jstrommen@kennedy-graven.com	Kennedy & Graven, Chartered	470 U.S. Bank Plaza 200 South Sixth Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_17-147_D-17-147
Eric	Swanson	eswanson@winthrop.com	Winthrop & Weinstine	225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629	Electronic Service	No	OFF_SL_17-147_D-17-147
Lisa	Veith	lisa.veith@ci.stpaul.mn.us	City of St. Paul	400 City Hall and Courthouse 15 West Kellogg Blvd. St. Paul, MN 55102	Electronic Service	No	OFF_SL_17-147_D-17-147
Daniel P	Wolf	dan.wolf@state.mn.us	Public Utilities Commission	121 7th Place East Suite 350 St. Paul, MN 551012147	Electronic Service	Yes	OFF_SL_17-147_D-17-147