Document X01-1776-001, Rev. 0

DISMANTLING COST STUDY

for

Allen S. King Unit 1
Angus Anson Units 1-4
Black Dog Units 2, 3, 5 and 6
Blue Lake Units 1-4, 7 and 8
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 Units 1-3
Red Wing Units 1 & 2
Riverside Units 7, 8, 9 and 10
Sherburne County Units 1-3
Sibley Gas Plant
Wescott Gas Plant
Wilmarth Units 1 & 2
Stations

Blazing Star I Wind Farm
Border Winds Project
Courtenay Wind Farm
Foxtail Wind Farm
Grand Meadow Wind Farm
Lake Benton II Wind Farm
Nobles Wind Farm
Pleasant Valley Wind Farm

prepared for

Xcel Energy

prepared by

TLG Services, Inc.
An Entergy Company

148 New Milford Road East
Bridgewater, CT

April 2020

APPROVALS

Project Engineer	Benjamin J. Stochmal	4/1/20 Date
Project Engineer	Timothy A. Arnold	4/1/2020 Date
Project Manager	Roderick Knight	4/1/2020 Date
Technical Manager	Francis. W. Seymore	4/1/2020 Date

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

SECTION **PAGE**

TABLE OF CONTENTS
(continued)

SECTION **PAGE**

TABLES

TABLE OF CONTENTS
(continued)

SECTION **PAGE**

TABLES
(continued)

FIGURES

APPENDICES

REVISION LOG

Rev. No.	CRA No.	Date	Item Revised	Reason for Revision
0		04/01/2020		Final Issue

ACRONYMS / DEFINITIONS

- AIF Atomic Industrial Forum
- CT Combustion Turbine
- CCGT Combined Cycle Gas Turbine
- DOC Decommissioning Operations Contractor
- DOE Department of Energy
- HRSG Heat Recovery Steam Generator
- LS Lump Sum
- Mtr Motor
- MV Medium Voltage
- Mw Megawatt
- MWe Megawatt (electric) – 2020 Net Max. Capacity (NMC) Rating
- NESP National Environmental Studies Project
- NG Natural Gas
- OSHA Occupational Safety & Health Administration
- PCB Polychlorinated Biphenyl
- RDF Refuse Derived Fuel
- TLG TLG Services, Inc.
- WTG Wind Turbine Generator

EXECUTIVE SUMMARY

This report, prepared by TLG Services, Inc. (TLG), provides estimated costs for the complete dismantling, unless otherwise specified, of the following electric generating stations, wind farms, gas storage and production plants operated by Xcel Energy (Xcel), 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
- Granite City
- Hennepin Island
- High Bridge
- Inver Hills
- Key City
- Minnesota Valley
- Red Wing
- Riverside
- Sherburne County
- Wilmarth

Generating Station Located in South Dakota:
- Angus Anson

Gas production and storage plants (all located in Minnesota):
- Maplewood
- Sibley
- Wescott

Wind Farms Located in Minnesota:
- Blazing Star I Wind Farm
- Grand Meadow Wind Farm
- Lake Benton II Wind Farm
- Nobles Wind Farm
- Pleasant Valley Wind Farm

Wind Farms Located in North Dakota:
- Border Winds Project
- Courtenay Wind Farm
- Foxtail Wind Farm

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 (except where noted)
- Demolition and disposition of subsurface utilities and buildings and foundations (except where noted)
- Removal of below grade foundations (except where noted)
- 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
- Xcel'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 cost 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 further 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 2019 dollars, are provided in the following table.

SUMMARY OF DISMANTLING COSTS

(All costs are in thousands of 2019 dollars)

Station	Unit	MWe rating	Type	Fuel	In Service	Station Cost
Electric Generation Facilities –Fossil and Hydro						
Allen S. King	1	511	Steam	Coal	1968	65,755
Angus Anson	1		Steam	N/A	1966	12,727
	2	109	CT	NG/Oil	1994	
	3	109	CT	NG/Oil	1994	
	4	168	CT	NG/Oil	2005	
Black Dog	2	117	Steam	(note 1)	1952	48,729
(Unit 3 Retired)	3	108	Steam	Coal/NG	1955	
	5	181	CCGT	NG	2002	
	6	228	CT	NG	2018	
Blue Lake	1	50	CT	NG/Oil	1974	16,670
	2	50	CT	NG/Oil	1974	
	3	46	CT	NG/Oil	1974	
	4	48	CT	NG/Oil	1974	
	7	174	CT	NG/Oil	2005	
	8	177	CT	NG/Oil	2005	
Granite City	1	18	CT	NG/Oil	1969	4,885
(All Units Retired)	2	18	CT	NG/Oil	1969	
	3	18	CT	NG/Oil	1969	
	4	18	CT	NG/Oil	1969	
Hennepin Island	1-5	13.9	Hydro	Water	1882	6,352
High Bridge	1	185	CCGT	NG/Oil	2008	16,983
	2	185	CCGT	NG/Oil	2008	
	3	236	Steam	(note 2)	2008	
Inver Hills	1	62	CT	NG/Oil	1972	11,777
	2	62	CT	NG/Oil	1972	
	3	62	CT	NG/Oil	1972	
	4	62	CT	NG/Oil	1972	
	5	61	CT	NG/Oil	1972	
	6	62	CT	NG/Oil	1972	

SUMMARY OF DISMANTLING COSTS
(continued)
(All costs are in thousands of 2019 dollars)

Station	Unit	MWe rating	Type	Fuel	In Service	Station Cost
Electric Generation Facilities -Fossil						
Key City	1	18	CT	NG/Oil	1970	4,530
(All Units Retired)	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	22,508
(All Units Retired)	2	10	Steam	Coal	1949	
	3	44	Steam	Coal	1953	
Red Wing	1	9	Steam	RDF	1949	15,549
	2	9	Steam	RDF	1949	
Riverside	7	160	Steam	(note 3)	1964	40,725
(Unit 8 Retired)	8	231	Steam	Coal	2009	
	9	171	CT	NG/Oil	2009	
	10	171	CT	NG/Oil	2009	
Sherburne County	1	680	Steam	Coal	1976	168,356
	2	682	Steam	Coal	1977	
	3	876	Steam	Coal	1987	
Wilmarth	1	9	Steam	RDF	1948	15,903
	2	9	Steam	RDF	1951	
Gas Production/Storage Facilities						
Maplewood					1957	5,113
Sibley					1953	4,589
Wescott					1972	11,242
Fleet Totals		**6,439**				**$472,396**

NOTES:
1 Unit 2 receives steam from Units 5 HRSG
2 Unit 3 receives steam from Units 1 and 2 HRSGs
3 Unit 7 receives steam from Units 9 and 10 HRSGs

SUMMARY OF DISMANTLING COSTS
Wind Farms (Complete Removal)
(All costs are in thousands of 2019 dollars)

Station	Units	MWe rating	Type	Wind Farm Cost
Electric Generation Facilities -WTG				
Blazing Star I	100	200	Wind Turbine Generator	34,766
Border Winds	75	148	Wind Turbine Generator	30,974
Courtenay	100	190	Wind Turbine Generator	36,313
Foxtail	75	150	Wind Turbine Generator	27,558
Grand Meadow	67	99	Wind Turbine Generator	25,036
Lake Benton II	44	99	Wind Turbine Generator	16,829
Nobles	134	197	Wind Turbine Generator	43,589
Pleasant Valley	100	196	Wind Turbine Generator	38,738
Fleet Totals		**1,279**		**$253,804**

SUMMARY OF DISMANTLING COSTS
Wind Farms (Removal to 48 inches below grade)
(All costs are in thousands of 2019 dollars)

Station	Units	MWe rating	Type	Wind Farm Cost
Electric Generation Facilities -WTG				
Blazing Star I	100	200	Wind Turbine Generator	28,362
Border Winds	75	148	Wind Turbine Generator	25,046
Courtenay	100	190	Wind Turbine Generator	29,087
Foxtail	75	150	Wind Turbine Generator	22,288
Grand Meadow	67	99	Wind Turbine Generator	21,697
Lake Benton II	44	99	Wind Turbine Generator	14,197
Nobles	134	197	Wind Turbine Generator	35,955
Pleasant Valley	100	196	Wind Turbine Generator	31,505
Fleet Totals		**1,279**		**$208,138**

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, South Dakota, and North 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 511 MWe while burning low sulfur Wyoming coal. The plant is located in Oak Park Heights, Minnesota, 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 386 megawatts. Unit 1, 2, and 3 are rated at 109, 109, and 168 MWe, respectively. The station is located in Sioux Falls, South Dakota adjacent to the decommissioned Pathfinder nuclear facility. The remaining Pathfinder facility features holds the non-nuclear remnants of the test nuclear power plant (minus the reactor) built in 1965.

Black Dog generating station is 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. The Unit 2 boiler has been abandoned in place. The boiler chimney has been removed. Units 3 is abandoned in place and Unit 4 was mostly removed to make room for a new simple cycle combustion gas turbine, Unit 6. The Unit 4 primary precipitator, air heater, forced draft, induced draft and gas recirculation fans, deaerator and storage tank, and one feed-water heater remain in place. The coal yard facilities have been removed as well as the boiler chimneys.

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 545 megawatts. Units 1-4 are rated at 50 MWe, 50 MWe, 46 MWe, 48 MWe, respectively. Units 7 and 8 are rated at 174 MWe and 177 MWe. 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.

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 was 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. The station was retired from service in June 2019.

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 Mw. The plant was installed in 1882; it was last refurbished in 2010.

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 185 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 236 MWe steam turbine. The station has a net dependable capacity of 606 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 371 megawatts. Units 1-4 and 6 are rated at 62 MWe each. Unit 5 is rated at 61 MWe. 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 44 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 2013. All coal yard facilities have been removed.

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 9 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 171 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 7 160 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 is a three-unit 2,238 MWe coal-fired facility. The station is located in Becker, Minnesota, 45 miles northwest of the Twin Cities, on the Mississippi River. Units 1, 2 and 3 have a net dependable capacity of 680, 682, and 876 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 9 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 peak-shaving plant. The facility collects and stores natural gas for future supply to the local natural gas distribution systems during cold winter periods when regional natural gas supplies may not meet the increased demand. The facility is located in Inver Grove Heights, Minnesota, and was completed in 1972.

Wind Farms

Blazing Star I is a 100-unit wind turbine complex located on privately owned farmland in Lincoln County in southwestern Minnesota. The wind farm is composed of 10, 2.0 MWe V-110 and 90, 2.0 MWe V-120 Vestas wind turbines for a complex total of 200 MWe. The units are expected to be placed into full service in 2020.

Border Winds Project is a 75-unit wind turbine complex located on privately owned farmland in Rolla, North Dakota. The wind farm is composed of 75, 2.0 Mwe (nominal) V-100-2.0 Vestas wind turbines for a complex total of 148 MWe. The units were placed into service in 2015.

Courtenay is a 100-unit wind turbine complex located on privately owned farmland in Jamestown, North Dakota. The wind farm is composed of 100, 2.0 MWe (nominal) V-100-2.0 Vestas wind turbines for a complex total of 190 MWe. The units were placed into service in 2016.

Foxtail is a 75-unit wind turbine complex located on privately owned farmland in Kulm, North Dakota. The wind farm is composed of 7, 2.0 MWe V-110 and 68, 2.0 MWe V-120 Vestas wind turbines for a complex total of 150 MWe. The units were placed into service in 2019.

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 in Mower County, Minnesota. Each GE 1.5-77 wind turbine / generator set has a rated capacity of 1.5 Mwe (nominal) for a complex total of 99 MWe. The units were placed in service in 2008.

Lake Benton II is a 44-unit wind turbine complex located on privately owned farmland in Ruthton, Minnesota. The wind farm is composed of 5, 2.1 Mwe (nominal) GE 2.1-116 and 39, 2.3 Mwe (nominal) GE 2.3-116 General Electric

wind turbines for a complex total of 99 MWe. The units were placed into service in 2019.

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 GE 1.5-77 wind turbine / generator set has a rated capacity of 1.5 Mwe (nominal) for a complex total of 197 MWe. The units were placed in service in 2011.

Pleasant Valley is a 100-unit wind turbine complex located on privately owned farmland in Dexter, Minnesota. The wind farm is composed of 100, 2.0 (nominal) MWe V-100-2.0 Vestas wind turbines for a complex total of 196 MWe. The units were placed into service in 2015.

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.
- Xcel's on-site management, oversight, and security staff
- A cost credit associated with the disposition of scrap metals
- Cost contingency

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 2019 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 cost 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 further 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 (if required), 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 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

2.4.4 Wind Turbines (complete removal)

- 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

2.4.5 Wind Turbines (removal to 48" below grade)

- 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
- Removing the concrete tower foundation pedestal to 48" below grade
- Buried electrical cables below 48" left in place
- 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

2.5 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 (Reference in Section 6)

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 labor costs for positions likely to be employed during the dismantling project. The 2014 rates were escalated to 2019 values, per Xcel Energy approval, using U.S. Department of Labor's Bureau of Labor Statistics, Consumer Price Index Series ID:CUUR0000SAS (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 a five-year average of 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 2019 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 Xcel 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 e.g. Angus Anson, Blue Lake, and Grand Meadow.

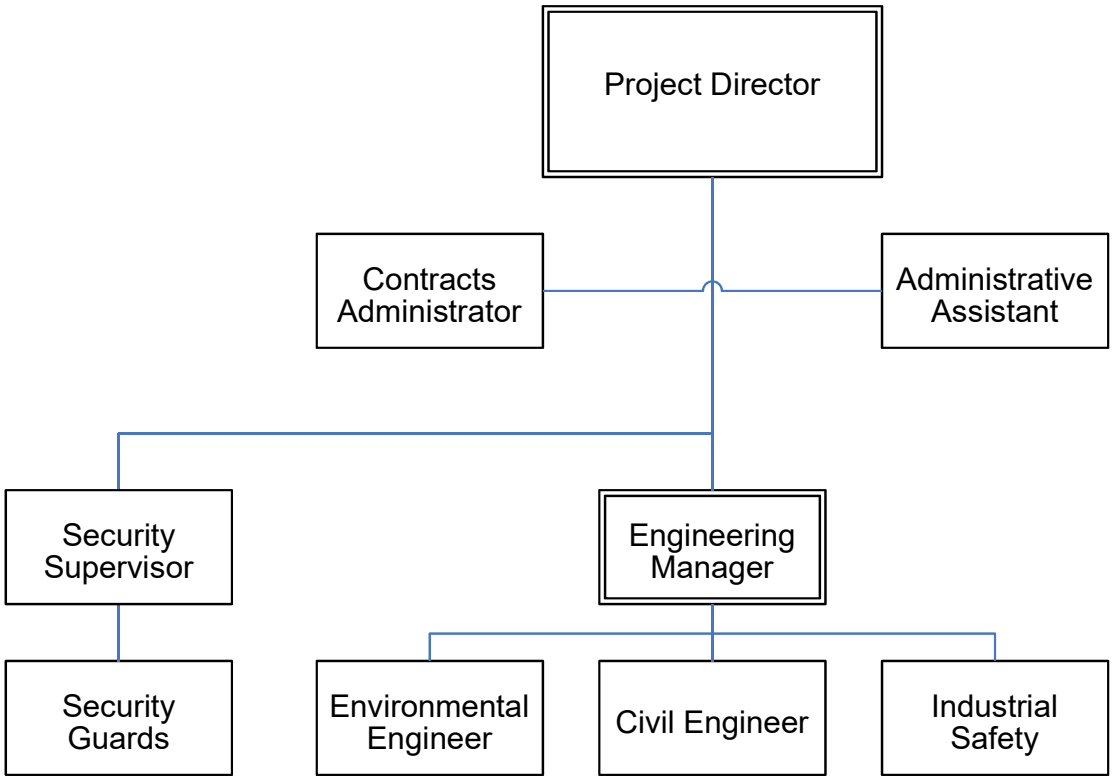
3.2 METHODOLOGY

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 cost 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 escalated 2014 Xcel Energy 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 cost factor development are presented in AIF/NESP-036.

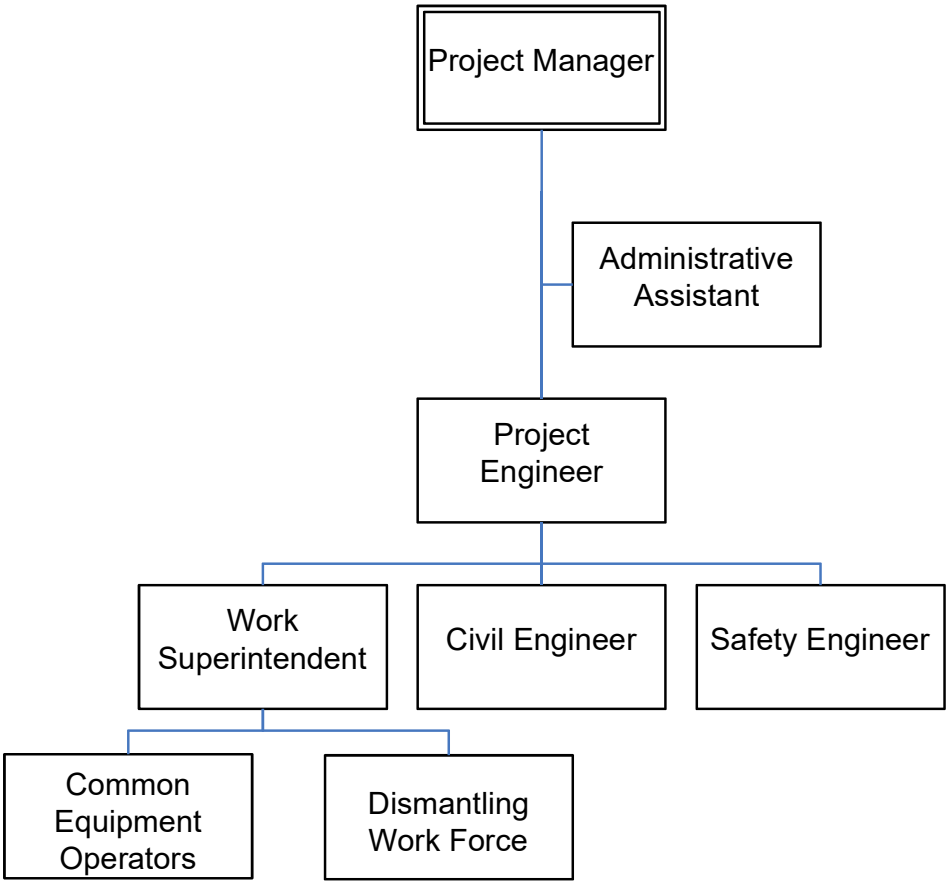
The unit cost factor method provides a demonstrable basis for establishing reliable cost estimates. The detail of activities for labor costs, equipment and consumables costs provide assurance that cost elements have not been omitted. Detailed unit cost factors, coupled with the site-specific inventory 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 2019 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 2019.
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. End of life water inventory management in regulated ponds will be addressed in accordance with federal and state rules and closed in place after shutdown.
9. On-site fuel inventories will be used and/or removed prior to start of dismantling.
10. Silos, precipitators, hoppers, tanks, etc., will be emptied by operations and maintenance staff after shutdown.
11. Acids, caustics, and similar hazardous materials will be removed by operations and maintenance staff after shutdown.
12. Consumables, such as ion exchange materials and filters, will also be removed by operations and maintenance staff after shutdown.
13. Stores, spare parts, gas storage containers, laboratory equipment, office furniture, etc., will be removed by the owner after shutdown.
14. Oils used in station transformers may contain PCBs. Lubricating and transformer oils are drained and removed by operations and maintenance staff after shutdown. If any PCB contaminated oil is encountered, it will be removed and disposed of properly.
15. 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.
16. 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

17. Post-shutdown "dormancy" costs (i.e., security and maintenance on any of the units retired prematurely) are not included in the study.
18. Escalation/inflation of the costs over the remaining operating life is not included.
19. An allowance of 2% of craft labor costs is used for small tools.
20. A 12.5% fee is added to the Demolition Contractor's cost to account for its overhead and profit.
21. A 25% contingency is applied to asbestos remediation activities.

22. A 15% contingency is applied to all remaining dismantling-related costs.
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 demolition equipment and back-filled to grade.
28. Structures and foundations will be removed with any resulting voids back-filled to grade level. An additional scenario is provided for the wind farms where the equipment and structures are removed only to a depth of 48 inches.
29. Chimney stacks will be blasted to the ground and broken into rubble, the steel liners cut and removed, and the foundations removed.
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 will be removed (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 solid waste.
- 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 only be removed to three feet below grade.
- Two large oil storage tanks are included in the estimate. One tank is currently in service. The other tank has been cleaned and remains on stand-by.

3.4.3 Black Dog

- The abandoned-in-place Unit 2 boiler is included in the estimate.
- All chimneys from the coal burning operation have been removed.
- All operational coal handling equipment external to the building e.g. conveyors, rail car unloader, transfer towers, stacker conveyor etc. have been removed. Coal conveyors inside the plant have been abandoned in place but not yet removed.
- 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. One tank is currently in service. The other tank has been cleaned and remains on stand-by.

3.4.5 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. The tanks have been cleaned.

3.4.6 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 removal, or ongoing maintenance.
- Inlet channel to turbines will be backfilled.
- Lead paint on concrete surfaces will be removed prior to demolition of the concrete structures.

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

- Gas supply lines will be cut and capped at the source.
- 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. The tanks have been cleaned.

3.4.10 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.

3.4.11 Minnesota Valley

- All three of the abandoned in-place units are included in the estimate.
- The asbestos quantities were calculated considering Unit 3 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 will be removed (all cable trays & cabling disposed of as ACM).
- All coal yard facilities have been removed and the ash ponds have been closed.

3.4.12 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 will be removed (all cable trays & cabling disposed of as ACM).
- The ash landfills will be closed in place by capping with a synthetic liner, placing cover over the cap, and seeding.

3.4.13 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 will be removed (all cable trays & cabling disposed of as ACM).

3.4.14 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 will be removed (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.
- The Unit 3 dry ash landfill will be closed and capped in accordance with Minnesota's solid waste permit requirements and applicable federal coal combustion residual rules.
- 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 5.1n, 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.
- The ash landfills will be closed in place by capping with a synthetic liner, placing cover over the cap, and seeding.
- Two large settling tanks are included in the estimate.

3.4.15 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.

3.4.16 Wescott Gas Plant

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

3.4.17 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 is included.
- 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 will be removed (all cable trays & cabling disposed of as ACM).
- The ash landfills will be closed in place by capping with a synthetic liner, placing cover over the cap, and seeding.

3.4.18 Wind Farms – Blazing Star I, Border Winds, Courtenay, Foxtail, Grand Meadow, Lake Benton II, Nobles, Pleasant Valley

- 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.

3.4.19 Wind Farms (Removal to 48-inch depth) – Blazing Star I, Border Winds, Courtenay, Foxtail, Grand Meadow, Lake Benton II, Nobles, Pleasant Valley

- All underground power and control cables will be excavated and removed to a depth of 48 inches below grade.
- Tower foundations pedestals will be removed to 48 inches below grade.
- 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.

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 a five-year average of 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 4.1a
BASIS FOR SCRAP METAL VALUE
(2019 dollars)

Fossil Stations

Type of Material	Scrap Category [1]	Market Value [2]	Units	Transport Cost [3]	Scrap Metal Credit [4] (per ton)
Carbon Steel	Cast Iron	202.40	Per Ton	46.85	155.56
	No. 1	253.01	Per Ton	46.85	206.16
	Mixed Scrap	202.40	Per Ton	46.85	155.56
	Galvanized	55.66	Per Ton	46.85	8.81
Stainless Steel	SS-1	0.77	Per Pound	0.02	1,490.20
Copper	Insulated Cable	1.32	Per Pound	0.02	2,586.11
	No. 2 Copper	2.11	Per Pound	0.02	4,168.50
	Copper-Nickel	3.20	Per Pound	0.02	6,355.94
	Large Motor	0.32	Per Pound	0.02	585.41
Non-Ferrous	Aluminum	0.29	Per Pound	0.02	532.27

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, 2015 to December 31, 2019 (See Section 6, reference 4).

Note 3: The estimated cost for handling and transporting the materials to a major scrap processing center in the Twin Cities area is $46.85 / ton or $0.023 / 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 4.1b
BASIS FOR SCRAP METAL VALUE
(2019 dollars)

Wind Farms

Type of Material	Scrap Category [1]	Market Value [2]	Units	Scrap Metal Credit [3] (per ton)
Carbon Steel	Cast Iron	202.40	Per Ton	202.40
	No. 1	253.01	Per Ton	253.01
	Mixed Scrap	202.40	Per Ton	202.40
	Galvanized	55.66	Per Ton	55.66
Stainless Steel	SS-1	0.77	Per Pound	1,537.05
Copper	Insulated Cable	1.32	Per Pound	2,632.95
	No. 2 Copper	2.11	Per Pound	4,215.35
	Copper-Nickel	3.20	Per Pound	6,402.79
	Large Motor	0.32	Per Pound	632.26
Non-Ferrous	Aluminum	0.29	Per Pound	579.12

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, 2015 to December 31, 2019 (See Section 6, Reference 4).

Note 3: The scrap metal credit reflects the market value of scrap cost to local scrap metal recycler. Scrap from the wind farms does not include transportation costs; the transport of the scrap from wind farms is separately accounted for in the cost tables *within "Item 1b. Haul Off of Materials (Trucking / Rail).".*

TABLE 4.2a
QUANTITY OF SCRAP METALS BY STATION
(pounds)

Fossil Stations

	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	1,643,294	27,421,437	35,094,140	770,520	691,748	203,840	500,072	1,777,520	221,615	-	68,324,186
Blue Lake	562,895	7,151,454	16,794,779	471,749	151,311	66,137	534,704	167,052	-	-	25,900,081
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	4,050,420	12,115,948	911,580	66,005	-	537,241	6,408	-	-	17,891,426
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	12,944,074	20,225,105	554,769	397,131	68,843	241,236	1,395,489	294,202	-	36,759,408
Red Wing	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
Sherburne County	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	47,236	7,963,162	1,606,330	189,165	68,387	33,887	16,236	2,591	-	1,398,204	11,325,198
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	**14,100,859**	**298,699,489**	**427,940,558**	**7,071,745**	**8,140,800**	**1,732,655**	**5,470,810**	**13,816,706**	**1,235,881**	**1,398,307**	**779,607,809**

TABLE 4.2b
QUANTITY OF SCRAP METALS BY STATION
(pounds)

Wind Farms (Complete Removal)

	Carbon Steel		Copper			
Station Name	**No. 1**	**Mixed Scrap**	**No. 2 Cu**	**Large Mtr**	**Aluminum**	**Total**
Blazing Star I	5,913,057	43,858,999	534,453	6,015,842	2,085,396	58,407,747
Border Winds Project	4,404,257	23,658,643	400,839	3,819,509	1,564,047	33,847,295
Courtenay	5,906,025	35,509,601	534,453	5,092,678	2,085,396	49,128,153
Foxtail	5,655,813	32,880,310	400,839	4,514,897	1,564,047	45,015,907
Grand Meadow	3,862,624	33,764,540	358,083	5,302,782	1,397,215	44,685,245
Lake Benton II	3,244,453	22,905,242	261,714	3,326,828	1,026,369	30,764,606
Nobles	10,771,870	51,911,086	716,166	10,639,600	2,794,431	76,833,154
Pleasant Valley	6,238,545	37,955,390	534,453	5,092,678	2,085,396	51,906,462
Total (Complete Removal)	**45,996,644**	**282,443,812**	**3,741,000**	**43,804,815**	**14,602,298**	**390,588,569**

TABLE 4.2c
QUANTITY OF SCRAP METALS BY STATION
(pounds)

Wind Farms (Down to 48 inches below grade)

	Carbon Steel		Copper			
Station Name	**No. 1**	**Mixed Scrap**	**No. 2 Cu**	**Large Mtr**	**Aluminum**	**Total**
Blazing Star I (48 in.)	669,104	43,858,999	11,641	6,015,842	-	50,555,586
Border Winds Project (48 in.)	485,434	23,658,643	8,731	3,819,509	-	27,972,316
Courtenay (48 in.)	662,072	35,509,601	11,641	5,092,678	-	41,275,992
Foxtail (48 in.)	610,801	32,880,310	8,731	4,514,897	-	38,014,739
Grand Meadow (48 in.)	561,512	33,764,540	7,799	5,302,782	-	39,636,634
Lake Benton II (48 in.)	385,519	22,905,242	5,122	3,326,828	-	26,622,712
Nobles (48 in.)	1,306,946	51,911,086	15,599	10,639,600	-	63,873,231
Pleasant Valley (48 in.)	658,709	37,955,390	11,641	5,092,678	-	43,718,418
Total (Down 48 inch Removal)	**5,340,099**	**282,443,812**	**80,903**	**43,804,815**	**-**	**331,669,629**

TABLE 4.3a
SCRAP METAL CREDITS BY STATION
(thousands of 2019 dollars)

Fossil Stations

	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	$ 232	$ 4,252	$ 4,181	$ 172	$ 4	$ 203	$ 1,231	$ 532	$ 1,639	$ -	$ 12,446
Angus Anson	$ 73	$ 811	$ 806	$ 273	$ 1	$ 81	$ 1,158	$ 69	$ 286	$ -	$ 3,559
Black Dog	$ 128	$ 2,827	$ 2,730	$ 574	$ 3	$ 264	$ 1,042	$ 520	$ 704	$ -	$ 8,792
Blue Lake	$ 44	$ 737	$ 1,306	$ 352	$ 1	$ 86	$ 1,114	$ 49	$ -	$ -	$ 3,688
Granite City	$ 32	$ 139	$ 298	$ 11	$ 1	$ 25	$ 246	$ 11	$ -	$ -	$ 763
Hennepin Island	$ -	$ 72	$ 142	$ 1	$ 0	$ 23	$ 93	$ -	$ -	$ -	$ 330
High Bridge	$ 66	$ 1,222	$ 1,452	$ 233	$ 3	$ 147	$ 1,379	$ 298	$ -	$ -	$ 4,799
Inver Hills	$ 16	$ 418	$ 942	$ 679	$ 0	$ -	$ 1,120	$ 2	$ -	$ -	$ 3,177
Key City	$ 32	$ 103	$ 295	$ 11	$ 1	$ 25	$ 223	$ 11	$ -	$ -	$ 702
Maplewood	$ 4	$ 235	$ 40	$ 81	$ 0	$ 9	$ 35	$ 0	$ -	$ -	$ 404
Minnesota Valley	$ 50	$ 1,334	$ 1,573	$ 413	$ 2	$ 89	$ 503	$ 408	$ 935	$ -	$ 5,307
Red Wing	$ 21	$ 597	$ 586	$ 343	$ 1	$ 38	$ 45	$ 69	$ 109	$ -	$ 1,809
Riverside	$ 56	$ 2,715	$ 3,766	$ 205	$ 2	$ 79	$ 1,243	$ 419	$ -	$ -	$ 8,484
Sherburne County	$ 312	$ 13,786	$ 14,449	$ 1,589	$ 16	$ 1,082	$ 1,863	$ 1,584	$ -	$ 0	$ 34,681
Sibley	$ 4	$ 188	$ 29	$ 77	$ 0	$ 9	$ 29	$ 2	$ -	$ -	$ 338
Wescott	$ 4	$ 821	$ 125	$ 141	$ 0	$ 44	$ 34	$ 1	$ -	$ 372	$ 1,541
Wilmarth	$ 24	$ 533	$ 565	$ 114	$ 1	$ 38	$ 45	$ 69	$ 254	$ -	$ 1,643
$											
Total	**$ 1,097**	**$ 30,790**	**$ 33,285**	**$ 5,269**	**$ 36**	**$ 2,240**	**$ 11,403**	**$ 4,044**	**$ 3,928**	**$ 372**	**$ 92,464**

TABLE 4.3b
SCRAP METAL CREDITS BY STATION
(thousands of 2019 dollars)

Wind Farms (Complete Removal)

	Carbon Steel		Copper			
Station Name	**No. 1**	**Mixed Scrap**	**No. 2 Cu**	**Large Mtr**	**Aluminum**	**Total**
Blazing Star I	$ 748	$ 4,439	$ 1,126	$ 1,902	$ 604	$ 8,819
Border Winds Project	$ 557	$ 2,394	$ 845	$ 1,207	$ 453	$ 5,457
Courtenay	$ 747	$ 3,594	$ 1,126	$ 1,610	$ 604	$ 7,681
Foxtail	$ 715	$ 3,327	$ 845	$ 1,427	$ 453	$ 6,768
Grand Meadow	$ 489	$ 3,417	$ 755	$ 1,676	$ 405	$ 6,741
Lake Benton II	$ 410	$ 2,318	$ 552	$ 1,052	$ 297	$ 4,629
Nobles	$ 1,363	$ 5,253	$ 1,509	$ 3,363	$ 809	$ 12,298
Pleasant Valley	$ 789	$ 3,841	$ 1,126	$ 1,610	$ 604	$ 7,971
Total (Complete Removal)	**$ 5,819**	**$ 28,583**	**$ 7,885**	**$ 13,848**	**$ 4,228**	**$ 60,363**

TABLE 4.3c
SCRAP METAL CREDITS BY STATION
(thousands of 2019 dollars)

Wind Farms (Down to 48 inches below grade)

	Carbon Steel		Copper			
Station Name	**No. 1**	**Mixed Scrap**	**No. 2 Cu**	**Large Mtr**	**Aluminum**	**Total**
Blazing Star I (48 in.)	$ 85	$ 4,439	$ 25	$ 1,902	$ -	$ 6,449
Border Winds Project (48 in.)	$ 61	$ 2,394	$ 18	$ 1,207	$ -	$ 3,682
Courtenay (48 in.)	$ 84	$ 3,594	$ 25	$ 1,610	$ -	$ 5,312
Foxtail (48 in.)	$ 77	$ 3,327	$ 18	$ 1,427	$ -	$ 4,850
Grand Meadow (48 in.)	$ 71	$ 3,417	$ 16	$ 1,676	$ -	$ 5,181
Lake Benton II (48 in.)	$ 49	$ 2,318	$ 11	$ 1,052	$ -	$ 3,429
Nobles (48 in.)	$ 165	$ 5,253	$ 33	$ 3,363	$ -	$ 8,815
Pleasant Valley (48 in.)	$ 83	$ 3,841	$ 25	$ 1,610	$ -	$ 5,559
Total (Down 48 inch Removal)	**$ 676**	**$ 28,583**	**$ 171**	**$ 13,848**	**$ -**	**$ 43,277**

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 for the fossil stations, and in Table 5.2 for the wind farms.

5.1 FOSSIL STATIONS

Breakdowns of the major cost categories by unit and common facilities are provided in Tables 5.1a through 5.1q. 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.

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 to a depth of 5 feet, 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 2019 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 2019 Item 01 41 26.50.

Demolition Contractors Insurance – The cost of the demolition contractors insurance; the value is consistent with the R.S. Means 2019 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 2019 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 2019 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 4.3a through 4.3c.

The following is an explanation of the contents of each column in the 5.1 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 – FOSSIL STATIONS
(2019 Dollars)

Activities (Costs)	Allen S . King	Angus Anson	Black Dog	Blue Lake	Granite City	Hennepin Island	High Bridge	Inver Hills	Key City	Maplewood	Minnesota Valley	Red Wing	Riverside	Sherburne County	Sibley	Wescott	Wilmarth	Fleet Totals
Station Rating (MWe)	511	386	526	545	0	14	606	371	0	0	0	18	590	2238	0	0	18	5778
Characterization / Temporary Services	351,606	297,606	907,818	330,606	239,606	237,606	456,606	263,439	239,606	125,803	519,212	471,212	1,035,818	1,136,818	125,803	159,404	471,000	7,369,573
Worker Access	630,789	-	793,518	-	-	-	-	-	-	-	187,086	123,388	-	1,988,310	-	-	123,388	3,846,477
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	1,080,300	240,000	-	-	-	-	-	342,500	-	-	500,900	515,600	526,800	3,243,150	-	-	515,600	6,964,850
Asbestos / Lead Paint Remediation	4,284,988	142,847	4,731,083	-	-	146,899	-	-	-	-	3,576,022	1,443,877	3,167,908	5,517,768	-	-	1,443,877	24,455,269
Equipment Removal	9,548,255	5,634,452	7,019,825	5,928,449	874,216	316,678	4,605,839	4,440,318	874,216	1,362,397	2,863,962	2,030,731	4,234,148	30,534,794	1,129,907	4,647,516	1,746,502	87,792,206
Boiler(s)	3,460,641	-	3,167,478	-	-	-	-	-	-	-	1,193,285	540,184	2,693,576	12,984,236	-	-	841,285	24,880,685
Structures Demolition	12,492,666	1,769,185	6,719,654	2,723,261	948,877	1,605,413	4,537,604	1,533,028	802,108	116,305	3,871,934	2,505,253	9,411,897	35,356,935	84,384	763,648	1,999,579	87,241,729
Backfill / Grade / Landscaping / Well Closure	3,697,788	1,133,560	2,767,357	1,529,390	383,922	790,474	1,742,979	1,343,018	243,348	161,005	1,432,771	1,079,539	2,498,203	9,987,445	164,731	756,289	780,770	30,492,588
Coal Yard Closure	10,718,358	-	-	-	-	-	-	-	-	-	-	-	-	8,264,365	-	-	-	18,982,723
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds / Ash Pond Dewatering	950,000	-	3,215,960	-	-	-	-	-	-	-	-	457,152	-	23,923,905	-	-	1,400,239	29,947,256
Utility Management / Oversight	3,027,199	945,676	3,459,078	1,580,835	784,321	778,453	1,618,917	1,333,298	781,800	871,780	1,979,405	1,119,169	3,482,165	3,860,869	839,852	1,003,663	1,119,169	28,585,648
Demolition Contractor Mgmt / Super. / Safety Staff	3,699,644	886,053	4,873,798	1,562,983	488,361	401,322	1,654,047	971,065	482,147	550,634	2,196,028	1,130,906	4,775,533	6,129,664	499,554	1,028,973	1,130,906	32,461,621
Security	776,195	197,940	960,031	197,940	115,679	145,241	208,222	131,103	114,394	194,084	298,195	272,488	965,867	1,135,113	177,374	227,502	272,488	6,389,856
Property Taxes	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	3,194,695	882,518	4,301,582	1,441,364	476,691	622,535	1,526,730	886,484	470,350	863,495	2,010,686	1,209,872	4,169,727	5,525,323	781,061	1,028,362	1,209,872	30,601,346
Small Tool Allowance	683,023	173,521	508,038	206,202	44,900	57,909	220,828	147,564	39,153	33,294	262,821	153,819	406,870	1,936,030	28,080	123,849	138,068	5,163,971
Utilities Allowance	52,508	30,400	64,945	30,400	17,766	22,306	31,979	20,135	17,569	29,807	45,797	41,849	65,339	76,789	27,241	34,940	41,849	651,617
Permits	685,566	139,877	488,388	171,908	43,429	52,514	184,708	124,344	39,606	40,534	233,256	146,292	412,323	1,832,569	35,510	106,787	148,037	4,885,649
Demolition Contractors Insurance	1,613,171	329,137	1,149,202	404,509	102,191	123,569	434,626	292,589	93,195	95,379	548,864	344,233	970,216	4,312,127	83,556	251,276	348,338	11,496,176
Demolition Contractors Fee	6,680,544	1,346,638	4,479,356	1,595,761	391,450	496,988	1,717,737	1,174,177	352,394	353,503	2,155,825	1,382,875	3,699,103	18,327,570	307,534	984,009	1,401,050	46,846,515
Sub-Total	67,627,939	14,149,409	49,607,111	17,703,605	4,911,409	5,797,909	18,940,824	13,003,063	4,549,886	4,798,021	23,876,048	14,968,441	42,515,494	176,073,780	4,284,587	11,116,217	15,132,016	489,055,758
Contingency	10,572,690	2,136,696	7,914,175	2,655,541	736,711	884,376	2,841,124	1,950,459	682,483	719,703	3,939,009	2,389,654	6,694,115	26,962,844	642,688	1,667,433	2,414,190	75,803,891
Project Total (before scrap credit)	78,200,628	16,286,105	57,521,286	20,359,146	5,648,121	6,682,285	21,781,947	14,953,523	5,232,369	5,517,724	27,815,058	17,358,094	49,209,609	203,036,624	4,927,275	12,783,650	17,546,206	564,859,649
Scrap Credit	(12,446,046)	(3,559,337)	(8,791,629)	(3,688,291)	(762,978)	(329,908)	(4,798,599)	(3,176,879)	(702,022)	(404,310)	(5,307,403)	(1,808,929)	(8,484,150)	(34,681,107)	(338,307)	(1,541,232)	(1,642,767)	(92,463,894)
Project Total	65,754,582	12,726,768	48,729,657	16,670,855	4,885,143	6,352,377	16,983,348	11,776,644	4,530,347	5,113,414	22,507,655	15,549,165	40,725,459	168,355,517	4,588,968	11,242,417	15,903,439	472,395,755

TABLE 5.1a

ALLEN S. KING STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Common	Station	Station Total
Allen S . King Unit Rating (MWe)	511			511
Characterization / Temporary Services	150,000	-	201,606	351,606
Worker Access	630,789	-		630,789
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	1,000,300	80,000		1,080,300
Asbestos / Lead Paint Remediation	4,284,988	-		4,284,988
Equipment Removal	7,865,365	1,682,890		9,548,255
Boiler(s)	3,460,641	-		3,460,641
Structures Demolition	10,016,294	2,476,372		12,492,666
Backfill / Grade / Landscaping / Well Closure	2,605,976	977,821	113,991	3,697,788
Coal Yard Closure		10,718,358		10,718,358
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds		950,000		950,000
Utility Management / Oversight			3,027,199	3,027,199
Demolition Contractor Management / Supervisory / Safety Staff			3,699,644	3,699,644
Security			776,195	776,195
Property Taxes	-	-	-	0
Project Expenses				
Shared Heavy Equipment / Operating Engineers			3,194,695	3,194,695
Small Tool Allowance	580,281	102,742	n/a	683,023
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)			52,508	52,508
Permits			685,566	685,566
Demolition Contractors Insurance			1,613,171	1,613,171
Demolition Contractors Fee			6,680,544	6,680,544
Sub-Total				67,627,939
Contingency				10,572,690
Project Total (before scrap credit)				78,200,628
Scrap Credit	(11,244,369)	(1,201,677)	-	(12,446,046)
Project Total				65,754,582

TABLE 5.1b

ANGUS ANSON STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Common	Station	Station Total
Angus Anson Unit Rating (MWe)	0	109	109	168			386
Characterization / Temporary Services	25,000	22,000	22,333	26,667	-	201,606	297,606
Pre-Demolition Cleaning (Tanks)	-	-	-	-	240,000		240,000
Lead Paint Remediation	142,847	-	-	-	-		142,847
Equipment Removal	2,642,304	589,684	592,643	1,471,114	338,707		5,634,452
Structures Demolition	1,044,734	158,683	161,649	343,728	60,391		1,769,185
Backfill / Grade / Landscaping / Well Closure	541,304	74,092	75,477	150,687	192,001	100,000	1,133,560
Utility Management / Oversight						945,676	945,676
Demolition Contractor Management / Supervisory / Safety Staff						886,053	886,053
Security						197,940	197,940
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						882,518	882,518
Small Tool Allowance	87,924	16,889	17,042	39,844	11,822	n/a	173,521
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						30,400	30,400
Permits						139,877	139,877
Demolition Contractors Insurance						329,137	329,137
Demolition Contractors Fee						1,346,638	1,346,638
Sub-Total							14,149,409
Contingency							2,136,696
Project Total (before scrap credit)							16,286,105
Scrap Credit	(1,394,645)	(547,154)	(554,872)	(980,393)	(82,273)	-	(3,559,337)
Project Total							12,726,768

TABLE 5.1c

BLACK DOG STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 2	Unit 3	Unit 5	Unit 6	Common	Station	Station Total
Black Dog Unit Rating (MWe)	117	0	181	228			526
Characterization / Temporary Services	64,000	67,000	79,000	93,000	-	604,818	907,818
Worker Access	387,123	406,395	-	-	-		793,518
Asbestos Remediation	1,956,422	1,969,760	-	800,000	4,902		4,731,083
Equipment Removal	2,289,715	2,297,438	1,366,958	981,902	83,813		7,019,825
Boiler(s)	1,750,299	1,417,179	-	-	-		3,167,478
Structures Demolition	823,953	1,315,352	1,535,212	2,081,747	963,391		6,719,654
Backfill / Grade / Landscaping / Well Closure	438,647	460,484	462,694	435,600	869,932	100,000	2,767,357
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds					3,215,960		3,215,960
Utility Management / Oversight						3,459,078	3,459,078
Demolition Contractor Management / Supervisory / Safety Staff						4,873,798	4,873,798
Security						960,031	960,031
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						4,301,582	4,301,582
Small Tool Allowance	154,203	158,672	68,877	87,845	38,441	n/a	508,038
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						64,945	64,945
Permits						488,388	488,388
Demolition Contractors Insurance						1,149,202	1,149,202
Demolition Contractors Fee						4,479,356	4,479,356
Sub-Total							49,607,111
Contingency							7,914,175
Project Total (before scrap credit)							57,521,286
Scrap Credit	(2,502,344)	(2,983,623)	(1,370,844)	(1,737,309)	(197,508)	-	(8,791,629)
Project Total							48,729,657

TABLE 5.1d

BLUE LAKE STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Unit 7	Unit 8	Common	Station	Station Total
Blue Lake Unit Rating (MWe)	50	50	46	48	174	177			545
Characterization / Temporary Services	12,250	12,250	12,250	12,250	40,000	40,000	-	201,606	330,606
Equipment Removal	566,731	566,731	566,731	566,731	1,472,140	1,472,140	717,247		5,928,449
Structures Demolition	234,043	203,009	203,009	203,009	461,241	461,241	957,708		2,723,261
Backfill / Grade / Landscaping	160,053	160,053	160,053	160,053	265,653	265,653	357,874	-	1,529,390
Utility Management / Oversight								1,580,835	1,580,835
Demolition Contractor Management / Supervisory / Safety Staff								1,562,983	1,562,983
Security								197,940	197,940
Property Taxes	-	-	-	-	-	-	-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers								1,441,364	1,441,364
Small Tool Allowance	19,462	18,841	18,841	18,841	44,781	44,781	40,657	n/a	206,202
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								30,400	30,400
Permits								171,908	171,908
Demolition Contractors Insurance								404,509	404,509
Demolition Contractors Fee								1,595,761	1,595,761
Sub-Total									17,703,605
Contingency (excluding activities currently under contract)									2,655,541
Project Total (before scrap credit)									20,359,146
Scrap Credit	(473,687)	(415,070)	(415,070)	(415,070)	(862,163)	(862,163)	(245,069)	-	(3,688,291)
Project Total									16,670,855

TABLE 5.1e

GRANITE CITY STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Common	Station	Station Total
Granite City Unit Rating (MWe)	0	0	0	0			0
Characterization / Temporary Services	9,500	9,500	9,500	9,500	-	201,606	239,606
Equipment Removal	218,554	218,554	218,554	218,554	-		874,216
Structures Demolition	142,423	142,423	142,423	142,423	379,183		948,877
Backfill / Grade / Landscaping	83,590	83,590	83,590	83,590	49,563	-	383,922
Utility Management / Oversight						784,321	784,321
Demolition Contractor Management / Supervisory / Safety Staff						488,361	488,361
Security						115,679	115,679
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						476,691	476,691
Small Tool Allowance	9,081	9,081	9,081	9,081	8,575	n/a	44,900
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						17,766	17,766
Permits						43,429	43,429
Demolition Contractors Insurance						102,191	102,191
Demolition Contractors Fee						391,450	391,450
Sub-Total							4,911,409
Contingency							736,711
Project Total (before scrap credit)							5,648,121
Scrap Credit	(159,623)	(159,623)	(159,623)	(159,623)	(124,486)	-	(762,978)
Project Total							4,885,143

TABLE 5.1f

HENNEPIN ISLAND STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1-5	Station	Station Total
Hennepin Island Unit Rating (MWe)	14		14
Characterization / Temporary Services	36,000	201,606	237,606
Lead Paint Remediation	146,899		146,899
Equipment Removal	316,678		316,678
Structures Demolition	1,605,413		1,605,413
Grade / Landscaping	790,474	-	790,474
Utility Management / Oversight		778,453	778,453
Demolition Contractor Management / Supervisory / Safety Staff		401,322	401,322
Security		145,241	145,241
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		622,535	622,535
Small Tool Allowance	57,909	n/a	57,909
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)		22,306	22,306
Permits		52,514	52,514
Demolition Contractors Insurance		123,569	123,569
Demolition Contractors Fee		496,988	496,988
Sub-Total			5,797,909
Contingency			884,376
Project Total (before scrap credit)			6,682,285
Scrap Credit	(329,908)	-	(329,908)
Project Total			6,352,377

TABLE 5.1g

HIGH BRIDGE STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 7	Unit 8	Unit 9	Common	Station	Station Total
High Bridge Unit Rating (MWe)	185	185	236			606
Characterization / Temporary Services	79,000	79,000	97,000	-	201,606	456,606
Equipment Removal	1,393,993	1,393,993	1,452,905	364,947		4,605,839
Boiler(s)	-	-	-	-		0
Structures Demolition	1,109,013	1,109,013	1,777,707	541,872		4,537,604
Backfill / Grade / Landscaping / Well Closure	327,086	327,086	801,030	187,777	100,000	1,742,979
Utility Management / Oversight					1,618,917	1,618,917
Demolition Contractor Management / Supervisory / Safety Staff					1,654,047	1,654,047
Security					208,222	208,222
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers					1,526,730	1,526,730
Small Tool Allowance	58,182	58,182	82,573	21,892	n/a	220,828
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					31,979	31,979
Permits					184,708	184,708
Demolition Contractors Insurance					434,626	434,626
Demolition Contractors Fee					1,717,737	1,717,737
Sub-Total						18,940,824
Contingency						2,841,124
Project Total (before scrap credit)						21,781,947
Scrap Credit	(1,418,437)	(1,418,437)	(1,846,014)	(115,711)	-	(4,798,599)
Project Total						16,983,348

TABLE 5.1h

INVER HILLS STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Common	Station	Station Total
Inver Hills Unit Rating (MWe)	62	62	62	62	61	62			371
Characterization / Temporary Services	8,833	8,833	8,833	8,833	8,833	8,833	8,833	201,606	263,439
Pre-Demolition Cleaning (Tanks)	-	-	-	-	-	-	342,500		342,500
Equipment Removal	696,798	696,798	696,798	696,798	696,798	696,798	259,531		4,440,318
Boiler(s)	-	-	-	-	-	-	-		0
Structures Demolition	232,167	232,167	232,167	232,167	232,167	232,167	140,023		1,533,028
Backfill / Grade / Landscaping	192,205	192,205	192,205	192,205	192,205	192,205	189,786	-	1,343,018
Utility Management / Oversight								1,333,298	1,333,298
Demolition Contractor Management / Supervisory / Safety Staff								971,065	971,065
Security								131,103	131,103
Property Taxes	-	-	-	-	-	-	-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers								886,484	886,484
Small Tool Allowance	22,600	22,600	22,600	22,600	22,600	22,600	11,963	n/a	147,564
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								20,135	20,135
Permits								124,344	124,344
Demolition Contractors Insurance								292,589	292,589
Demolition Contractors Fee								1,174,177	1,174,177
Sub-Total									13,003,063
Contingency									1,950,459
Project Total (before scrap credit)									14,953,523
Scrap Credit	(517,223)	(517,223)	(517,223)	(517,223)	(517,223)	(517,223)	(73,541)	-	(3,176,879)
Project Total									11,776,644

TABLE 5.1i

KEY CITY STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Unit 4	Common	Station	Station Total
Key City Unit Rating (MWe)	0	0	0	0			0
Characterization / Temporary Services	9,500	9,500	9,500	9,500	-	201,606	239,606
Equipment Removal	218,554	218,554	218,554	218,554	-		874,216
Structures Demolition	107,785	107,785	107,785	107,785	370,968		802,108
Backfill / Grade / Landscaping	50,591	50,591	50,591	50,591	40,982	-	243,348
Utility Management / Oversight						781,800	781,800
Demolition Contractor Management / Supervisory / Safety Staff						482,147	482,147
Security						114,394	114,394
Property Taxes	-	-	-	-	-	-	0
Project Expenses							
Shared Heavy Equipment / Operating Engineers						470,350	470,350
Small Tool Allowance	7,729	7,729	7,729	7,729	8,239	n/a	39,153
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)						17,569	17,569
Permits						39,606	39,606
Demolition Contractors Insurance						93,195	93,195
Demolition Contractors Fee						352,394	352,394
Sub-Total							4,549,886
Contingency							682,483
Project Total (before scrap credit)							5,232,369
Scrap Credit	(144,885)	(144,885)	(144,885)	(144,885)	(122,482)	-	(702,022)
Project Total							4,530,347

TABLE 5.1j

MAPLEWOOD GAS PLANT
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Station	Station Total
Maplewood Unit Rating (MWe)	0		0
Characterization / Temporary Services	25,000	100,803	125,803
Equipment Removal	1,362,397		1,362,397
Structures Demolition	116,305		116,305
Grade / Landscaping	161,005	-	161,005
Utility Management / Oversight		871,780	871,780
Demolition Contractor Management / Supervisory / Safety Staff		550,634	550,634
Security		194,084	194,084
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		863,495	863,495
Small Tool Allowance	33,294	n/a	33,294
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)		29,807	29,807
Permits		40,534	40,534
Demolition Contractors Insurance		95,379	95,379
Demolition Contractors Fee		353,503	353,503
Sub-Total			4,798,021
Contingency			719,703
Project Total (before scrap credit)			5,517,724
Scrap Credit	(404,310)	-	(404,310)
Project Total			5,113,414

TABLE 5.1k

MINNESOTA VALLEY STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	*Unit 1*	*Unit 2*	*Unit 3*	*Common*	*Station*	*Station Total*
Minnesota Valley Unit Rating (MWe)	0	0	0			0
Characterization / Temporary Services	34,000	34,000	48,000		403,212	519,212
Worker Access	-	-	187,086	-		187,086
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	166,967	166,967	166,967	-		500,900
Asbestos / Lead Paint Remediation	124,640	124,640	3,326,742	-		3,576,022
Equipment Removal	353,302	353,302	2,157,358	-		2,863,962
Boiler(s)	255,835	255,835	681,615	-		1,193,285
Structures Demolition	756,380	756,380	2,059,095	300,078		3,871,934
Backfill / Grade / Landscaping / Well Closure	415,645	415,645	396,692	104,790	100,000	1,432,771
Utility Management / Oversight					1,979,405	1,979,405
Demolition Contractor Management / Supervisory / Safety Staff					2,196,028	2,196,028
Security					298,195	298,195
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers					2,010,686	2,010,686
Small Tool Allowance	38,796	38,796	177,132	8,097	n/a	262,821
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					45,797	45,797
Permits					233,256	233,256
Demolition Contractors Insurance					548,864	548,864
Demolition Contractors Fee					2,155,825	2,155,825
Sub-Total						23,876,048
Contingency						3,939,009
Project Total (before scrap credit)						27,815,058
Scrap Credit	(1,232,488)	(1,232,488)	(2,840,688)	(1,738)	-	(5,307,403)
Project Total						22,507,655

TABLE 5.11

RED WING STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Unit 2	Common	Station	Station Total
Red Wing Unit Rating (MWe)	9	9			18
Characterization / Temporary Services	34,000	34,000	-	403,212	471,212
Worker Access	61,694	61,694	-		123,388
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	257,800	257,800	-		515,600
Asbestos / Lead Paint Remediation	721,939	721,939	-		1,443,877
Equipment Removal	780,906	780,906	468,918		2,030,731
Boiler(s)	270,092	270,092	-		540,184
Structures Demolition	731,187	731,187	1,042,878		2,505,253
Backfill / Grade / Landscaping / Well Closure	215,931	215,931	547,677	100,000	1,079,539
Ash Landfills / Ash Ponds & Landfills Inculding Evaporation Ponds			457,152		457,152
Utility Management / Oversight				1,119,169	1,119,169
Demolition Contractor Management / Supervisory / Safety Staff				1,130,906	1,130,906
Security				272,488	272,488
Property Taxes	-	-	-	-	0
Project Expenses					
Shared Heavy Equipment / Operating Engineers				1,209,872	1,209,872
Small Tool Allowance	56,315	56,315	41,189	n/a	153,819
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)				41,849	41,849
Permits				146,292	146,292
Demolition Contractors Insurance				344,233	344,233
Demolition Contractors Fee				1,382,875	1,382,875
Sub-Total					14,968,441
Contingency					2,389,654
Project Total (before scrap credit)					17,358,094
Scrap Credit	(662,363)	(662,363)	(484,203)	-	(1,808,929)
Project Total					15,549,165

TABLE 5.1m

RIVERSIDE STATION
SUMMARY OF ACTIVITY COSTS
(2019 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	160	0	171	171			590
Characterization / Temporary Services	48,000	48,000	80,000	93,000	81,000	81,000	-	604,818	1,035,818
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	170,600	170,600	-	170,600	-	-	15,000		526,800
Asbestos Remediation	1,025,353	1,025,353	-	1,117,201	-	-	-		3,167,908
Equipment Removal	-	-	987,364	473,484	1,377,540	1,377,540	18,220		4,234,148
Boiler(s)	875,389	875,389	-	942,798	-	-	-		2,693,576
Structures Demolition	1,041,505	1,041,505	574,865	2,627,561	952,584	952,584	2,221,292		9,411,897
Backfill / Grade / Landscaping / Well Closure	197,838	197,838	364,420	590,917	246,508	246,508	554,174	100,000	2,498,203
Utility Management / Oversight								3,482,165	3,482,165
Demolition Contractor Management / Supervisory / Safety Staff								4,775,533	4,775,533
Security								965,867	965,867
Property Taxes			-		-		-	-	0
Project Expenses									
Shared Heavy Equipment / Operating Engineers								4,169,727	4,169,727
Small Tool Allowance	63,762	63,762	40,133	116,899	33,220	33,220	55,874	n/a	406,870
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)								65,339	65,339
Permits								412,323	412,323
Demolition Contractors Insurance								970,216	970,216
Demolition Contractors Fee								3,699,103	3,699,103
Sub-Total									42,515,494
Contingency									6,694,115
Project Total (before scrap credit)									49,209,609
Scrap Credit	(1,202,298)	(1,202,298)	(1,141,914)	(2,432,111)	(1,179,549)	(1,179,549)	(146,430)	-	(8,484,150)
Project Total									40,725,459

TABLE 5.1n

SHERBURNE COUNTY STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Unit 2	Unit 3	Common	Station	Station Total
Sherburne County Unit Rating (MWe)	680	682	876			2238
Characterization / Temporary Services	171,000	171,000	190,000	-	604,818	1,136,818
Worker Access	642,334	642,334	703,642	-		1,988,310
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	1,081,050	1,081,050	1,081,050	-		3,243,150
Asbestos Remediation	2,508,884	2,508,884	-	500,000		5,517,768
Equipment Removal	5,699,637	5,547,162	6,568,928	4,670,760		22,486,487
Boiler(s)	4,182,168	4,182,168	4,619,900	-		12,984,236
Turbine Generator & Condensor	609,899	609,899	686,634			1,906,432
Exhaust Gas Treatment Equipment and Structures	4,245,955	4,398,430	4,741,985			13,386,370
Structures Demolition	7,038,228	7,038,228	7,657,026	6,378,958		28,112,441
Backfill / Grade / Landscaping / Well Closure	1,656,105	1,656,105	1,814,172	4,761,063	100,000	9,987,445
Coal Yard Closure				8,264,365		8,264,365
Ash Landfills / Ash Ponds & Landfills Including Evaporation Ponds / Ash Pond Dewatering			3,169,905	20,754,000		23,923,905
Utility Management / Oversight	1,079,289	1,079,289	1,208,276	494,016		3,860,869
Demolition Contractor Management / Supervisory / Safety Staff	1,713,520	1,713,520	1,918,305	784,319		6,129,664
Security	317,316	317,316	355,239	145,243		1,135,113
Property Taxes	-	-	-	-	-	0
Project Expenses						
Shared Heavy Equipment / Operating Engineers	1,544,579	1,544,579	1,729,174	706,991		5,525,323
Small Tool Allowance	535,084	535,084	539,646	326,216	n/a	1,936,030
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)					76,789	76,789
Permits					1,832,569	1,832,569
Demolition Contractors Insurance					4,312,127	4,312,127
Demolition Contractors Fee					18,327,570	18,327,570
Sub-Total						176,073,780
Contingency						26,962,844
Project Total (before scrap credit)						203,036,624
Scrap Credit	(9,982,485)	(9,982,485)	(12,096,244)	(2,619,893)	-	(34,681,107)
Project Total						168,355,517

TABLE 5.1o

SIBLEY GAS PLANT
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Station	Station Total
Sibley Unit Rating (MWe)	0		0
Characterization / Temporary Services	25,000	100,803	125,803
Equipment Removal	1,129,907		1,129,907
Structures Demolition	84,384		84,384
Grade / Landscaping	164,731	-	164,731
Utility Management / Oversight		839,852	839,852
Demolition Contractor Management / Supervisory / Safety Staff		499,554	499,554
Security		177,374	177,374
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		781,061	781,061
Small Tool Allowance	28,080	n/a	28,080
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)		27,241	27,241
Permits		35,510	35,510
Demolition Contractors Insurance		83,556	83,556
Demolition Contractors Fee		307,534	307,534
Sub-Total			4,284,587
Contingency			642,688
Project Total (before scrap credit)			4,927,275
Scrap Credit	(338,307)	-	(338,307)
Project Total			4,588,968

TABLE 5.1p

WESCOTT GAS PLANT
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Station	Station Total
Wescott Unit Rating (MWe)	0		0
Characterization / Temporary Services	25,000	134,404	159,404
Equipment Removal	4,647,516		4,647,516
Structures Demolition	763,648		763,648
Grade / Landscaping	756,289	-	756,289
Utility Management / Oversight		1,003,663	1,003,663
Demolition Contractor Management / Supervisory / Safety Staff		1,028,973	1,028,973
Security		227,502	227,502
Property Taxes	-	-	0
Project Expenses			
Shared Heavy Equipment / Operating Engineers		1,028,362	1,028,362
Small Tool Allowance	123,849	n/a	123,849
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)		34,940	34,940
Permits		106,787	106,787
Demolition Contractors Insurance		251,276	251,276
Demolition Contractors Fee		984,009	984,009
Sub-Total			11,116,217
Contingency			1,667,433
Project Total (before scrap credit)			12,783,650
Scrap Credit	(1,541,232)	-	(1,541,232)
Project Total			11,242,417

TABLE 5.1q

WILMARTH STATION
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Activities	Unit 1	Unit 2	Common	Station	Station Total
Wilmarth Unit Rating (MWe)	9	9			18
Characterization / Temporary Services	34,000	34,000	-	403,000	471,000
Worker Access	61,694	61,694	-		123,388
Pre-Demolition Cleaning (Boiler / Precipitator / Tanks)	257,800	257,800	-		515,600
Asbestos / Lead Paint Remediation	721,939	721,939	-		1,443,877
Equipment Removal	780,906	780,906	184,689		1,746,502
Boiler(s)	420,643	420,643	-		841,285
Structures Demolition	626,917	626,917	745,744		1,999,579
Backfill / Grade / Landscaping / Well Closure	217,690	217,690	245,389	100,000	780,770
Ash Landfills			1,400,239		1,400,239
Utility Management / Oversight				1,119,169	1,119,169
Demolition Contractor Management / Supervisory / Safety Staff				1,130,906	1,130,906
Security				272,488	272,488
Property Taxes	-	-	-	-	0
Project Expenses					
Shared Heavy Equipment / Operating Engineers				1,209,872	1,209,872
Small Tool Allowance	57,276	57,276	23,516	n/a	138,068
Utilities Allowance (Office Equip & supplies / Telephone, Electric etc.)				41,849	41,849
Permits				148,037	148,037
Demolition Contractors Insurance				348,338	348,338
Demolition Contractors Fee				1,401,050	1,401,050
Sub-Total					15,132,016
Contingency					2,414,190
Project Total (before scrap credit)					17,546,206
Scrap Credit	(737,645)	(737,645)	(167,478)	-	(1,642,767)
Project Total					15,903,439

5.2 WIND FARMS

An estimate for dismantling each of the Xcel Energy wind farm generating stations in Minnesota and North 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 wind farm's major cost categories is presented in Table 5.2. Breakdowns of the major cost categories by wind farm are provided in Tables 5.2a through 5.2p. Note that columns may not total due to rounding.

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

TURBINE SITE REMOVAL

Dismantle Wind Turbine Generators – The cost associated with removal of the nacelle, hub, blades and tower. Also included is a percentage of the utility, DOC, and security staffing, miscellaneous expenses, and site characterization costs.

Haul Off of Materials (Trucking/Rail) – The cost associated with the transportation of the scrap material.

Foundation Removal – The cost of removal of the WTG concrete foundation or in the 48-inch scenario, the pedestal removal.

Crane Mobilization & Demobilization – All heavy equipment costs.

SITE CIVIL WORK REMOVAL

Balance of Site Civil Work Removals – The cost associated with backfilling below grade voids, and grading and landscaping the grounds to preclude erosion of soils. Also included is a percentage of the utility, DOC, and security staffing, miscellaneous expenses and site characterization costs.

COLLECTION SYSTEM REMOVAL

Remove Collection Cable, Remove Junction Boxes & Turbine Switchgears – The cost associated with excavation of the cable and back-fill of the trench. Also included is a percentage of the utility, DOC, and security staffing, miscellaneous expenses and site characterization costs.

Contingency (15%) - The cost to cover expenses for unforeseen events that are likely to occur.

Approximate scrap value of components – A credit to the project for the recovery of scrap metals. This corresponds to value shown in Table 4.3b through 4.3c.

TABLE 5.2

SUMMARY OF ACTIVITY COSTS – WIND FARMS
(2019 Dollars)

ITEM	DESCRIPTION	Blazing Star I AMOUNT	Blazing Star I (48 in.) AMOUNT	Border Winds Project AMOUNT	Border Winds Project (48 in.) AMOUNT	Courtenay AMOUNT	Courtenay (48 in.) AMOUNT	Foxtail AMOUNT	Foxtail (48 in.) AMOUNT	Grand Meadow AMOUNT	Grand Meadow (48 in.) AMOUNT	Lake Benton II AMOUNT	Lake Benton II (48 in.) AMOUNT	Nobles AMOUNT	Nobles (48 in.) AMOUNT	Pleasant Valley AMOUNT	Pleasant Valley (48 in.) AMOUNT	Complete Removal AMOUNT	Removal (to to 48" depth) ITEM
1	TURBINE SITE REMOVAL																		
1a	Dismantle Wind Turbine Generators - Model 1	$1,392,653	$1,437,495	$11,136,713	$11,604,079	$13,597,829	$13,970,467	$993,756	$1,025,000	$10,279,573	$10,906,283	$804,060	$837,777	$18,641,078	$19,146,628	$15,900,269	$16,381,957	$72,745,929	$75,309,687
	Dismantle Wind Turbine Generators - Model 2	$12,625,322	$13,028,894	$0	$0	$0	$0	$9,723,737	$10,027,257	$0	$0	$6,529,184	$6,792,178	$0	$0	$0	$0	$28,878,242	$29,848,328
1b	Haul Off of Materials (Trucking/Rail)	$3,053,850	$2,643,300	$1,769,707	$1,462,533	$2,568,667	$2,158,116	$2,353,658	$1,987,602	$2,336,369	$2,072,402	$1,608,528	$1,391,969	$4,017,223	$3,339,613	$2,713,931	$2,285,819	$20,421,933	$17,341,355
1c	Foundation Removal - Model 1	$609,370	$73,272	$5,263,779	$585,008	$6,704,742	$801,686	$465,755	$54,629	$3,416,996	$525,128	$302,318	$37,728	$7,736,964	$1,012,965	$6,787,708	$792,287	$31,287,631	$3,882,702
	Foundation Removal - Model 2	$5,484,331	$659,444	$0	$0	$0	$0	$4,524,475	$530,685	$0	$0	$2,358,079	$294,280	$0	$0	$0	$0	$12,366,885	$1,484,409
1d	Crane Mobilization & Demobilization	$1,998,541	$1,903,425	$2,417,050	$2,283,888	$1,954,154	$1,846,356	$1,522,963	$1,453,212	$2,201,454	$2,138,044	$1,015,680	$977,633	$1,947,813	$1,871,720	$2,150,726	$2,061,951	$15,208,380	$14,536,230
	SUBTOTAL	**$25,164,068**	**$19,745,830**	**$20,587,249**	**$15,935,508**	**$24,825,391**	**$18,776,625**	**$19,584,343**	**$15,078,385**	**$18,234,392**	**$15,641,858**	**$12,617,848**	**$10,331,565**	**$32,343,078**	**$25,370,926**	**$27,552,633**	**$21,522,014**	**$180,909,001**	**$142,402,711**
2	SITE CIVIL WORK REMOVAL																		
2a	Balance of Site Civil Work Removals	$10,397,806	$10,084,299	$8,909,810	$8,622,688	$11,048,476	$10,695,312	$8,406,384	$8,171,092	$7,490,034	$7,343,033	$4,848,790	$4,759,976	$13,434,084	$13,038,736	$10,584,412	$10,237,618	$75,119,796	$72,952,756
	SUBTOTAL	**$10,397,806**	**$10,084,299**	**$8,909,810**	**$8,622,688**	**$11,048,476**	**$10,695,312**	**$8,406,384**	**$8,171,092**	**$7,490,034**	**$7,343,033**	**$4,848,790**	**$4,759,976**	**$13,434,084**	**$13,038,736**	**$10,584,412**	**$10,237,618**	**$75,119,796**	**$72,952,756**
3	COLLECTION SYSTEM REMOVAL																		
3a	Remove MV Collection Cable	$2,023,676	$408,958	$1,933,366	$397,071	$2,050,705	$407,251	$1,609,155	$324,523	$1,697,809	$366,382	$1,054,685	$221,763	$2,399,425	$479,044	$2,165,432	$438,778	$14,934,254	$3,043,769
3b	Remove Junction Boxes & Turbine Switchgears	$313,937	$31,394	$248,574	$24,857	$331,432	$33,143	$248,574	$24,857	$210,338	$21,034	$138,132	$13,813	$420,675	$42,068	$313,937	$31,394	$2,225,597	$222,560
	SUBTOTAL	**$2,337,613**	**$440,352**	**$2,181,939**	**$421,928**	**$2,382,137**	**$440,394**	**$1,857,729**	**$349,380**	**$1,908,147**	**$387,416**	**$1,192,817**	**$235,576**	**$2,820,100**	**$521,112**	**$2,479,368**	**$470,172**	**$17,159,851**	**$3,266,329**
	SITE SUBTOTAL	**$37,899,487**	**$30,270,481**	**$31,678,997**	**$24,980,125**	**$38,256,004**	**$29,912,331**	**$29,848,456**	**$23,598,856**	**$27,632,572**	**$23,372,307**	**$18,659,455**	**$15,327,118**	**$48,597,262**	**$38,930,775**	**$40,616,414**	**$32,229,804**	**$273,188,648**	**$218,621,796**
	CONTINGENGY (15%)	$5,684,923	$4,540,572	$4,751,850	$3,747,019	$5,738,401	$4,486,850	$4,477,268	$3,539,828	$4,144,886	$3,505,846	$2,798,918	$2,299,068	$7,289,589	$5,839,616	$6,092,462	$4,834,471	$40,978,297	$32,793,269
	Project Total (before scrap credit)	$43,584,410	$34,811,053	$36,430,847	$28,727,143	$43,994,405	$34,399,181	$34,325,724	$27,138,685	$31,777,458	$26,878,153	$21,458,374	$17,626,185	$55,886,851	$44,770,391	$46,708,876	$37,064,275	$314,166,945	$251,415,066
	APPROXIMATE SCRAP VALUE OF COMPONENTS	($8,818,650)	($6,449,499)	($5,456,601)	($3,681,527)	($7,680,961)	($5,311,810)	($6,767,995)	($4,850,452)	($6,741,282)	($5,180,812)	($4,628,964)	($3,429,286)	($12,298,196)	($8,815,111)	($7,970,541)	($5,558,899)	($60,363,190)	($43,277,397)
	TOTAL PRICE	**$34,765,760**	**$28,361,555**	**$30,974,246**	**$25,045,616**	**$36,313,443**	**$29,087,370**	**$27,557,729**	**$22,288,232**	**$25,036,176**	**$21,697,340**	**$16,829,410**	**$14,196,899**	**$43,588,656**	**$35,955,280**	**$38,738,336**	**$31,505,376**	**$253,803,755**	**$208,137,669**

Note: Model 1 and Model 2 designate the two Models of WTG at Blazing Star I, Foxtail, and Lake Benton II.

TABLE 5.2a
Blazing Star I Wind Farm

SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

					Blazing Star I
ITEM	**DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT PRICE**	**AMOUNT**
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - V110	10	EA	$139,265	$1,392,653
	Dismantle Wind Turbine Generators - V120	90	EA	$140,281	$12,625,322
1b	Haul Off of Materials (Trucking/Rail)	100	EA	30,539	$3,053,850
1c	Foundation Removal - V110	10	EA	$60,937	$609,370
	Foundation Removal - V120	90	EA	$60,937	$5,484,331
1d	Crane Mobilization & Demobilization	1	LS	$1,998,541	$1,998,541
		SUBTOTAL			**$25,164,068**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$10,397,806	$10,397,806
		SUBTOTAL			**$10,397,806**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$2,023,676	$2,023,676
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$313,937	$313,937
		SUBTOTAL			**$2,337,613**
		SITE SUBTOTAL			**$37,899,487**
	CONTINGENGY (15%)				$5,684,923
	Project Total (before scrap credit)				$43,584,410
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($8,818,650)
TOTAL PRICE					**$34,765,760**

TABLE 5.2b
Blazing Star I Wind Farm
(Removal to 48 inches)
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Blazing Star I (48 in.)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - V110	10	EA	$143,749	$1,437,495
	Dismantle Wind Turbine Generators - V120	90	EA	$144,765	$13,028,894
1b	Haul Off of Materials (Trucking/Rail)	100	EA	26,433	$2,643,300
1c	Foundation Removal V110	10	EA	$7,327	$73,272
	Foundation Removal V120	90	EA	$7,327	$659,444
1d	Crane Mobilization & Demobilization	1	LS	$1,903,425	$1,903,425
		SUBTOTAL			**$19,745,830**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$10,084,299	$10,084,299
		SUBTOTAL			**$10,084,299**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$408,958	$408,958
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$31,394	$31,394
		SUBTOTAL			**$440,352**
		SITE SUBTOTAL			**$30,270,481**
	CONTINGENGY (15%)				$4,540,572
	Project Total (before scrap credit)				$34,811,053
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($6,449,499)
TOTAL PRICE					**$28,361,555**

TABLE 5.2c
Border Winds Project

SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Border Winds Project AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators V100.20	75	EA	$148,490	$11,136,713
1b	Haul Off of Materials (Trucking/Rail)	75	EA	23,596	$1,769,707
1c	Foundation Removal V100.20	75	EA	$70,184	$5,263,779
1d	Crane Mobilization & Demobilization	1	LS	$2,417,050	$2,417,050
		SUBTOTAL			**$20,587,249**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$8,909,810	$8,909,810
		SUBTOTAL			**$8,909,810**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$1,933,366	$1,933,366
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$248,574	$248,574
		SUBTOTAL			**$2,181,939**
		SITE SUBTOTAL			**$31,678,997**
	CONTINGENGY (15%)				$4,751,850
	Project Total (before scrap credit)				$36,430,847
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($5,456,601)
TOTAL PRICE					**$30,974,246**

TABLE 5.2d
Border Winds Project
(Removal to 48 inches)
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Border Winds Project (48 in.) AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - V100-2.0	75	EA	$154,721	$11,604,079
1b	Haul Off of Materials (Trucking/Rail)	75	EA	19,500	$1,462,533
1c	Foundation Removal - V100-2.0	75	EA	$7,800	$585,008
1d	Crane Mobilization & Demobilization	1	LS	$2,283,888	$2,283,888
		SUBTOTAL			**$15,935,508**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$8,622,688	$8,622,688
		SUBTOTAL			**$8,622,688**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$397,071	$397,071
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$24,857	$24,857
		SUBTOTAL			**$421,928**
		SITE SUBTOTAL			**$24,980,125**
	CONTINGENGY (15%)				$3,747,019
	Project Total (before scrap credit)				$28,727,143
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($3,681,527)
TOTAL PRICE					**$25,045,616**

TABLE 5.2e
Courtenay Wind Farm

SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Courtenay AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - V100-2.0	100	EA	$135,978	$13,597,829
1b	Haul Off of Materials (Trucking/Rail)	100	EA	25,687	$2,568,667
1c	Foundation Removal - V100-2.0	100	EA	$67,047	$6,704,742
1d	Crane Mobilization & Demobilization	1	LS	$1,954,154	$1,954,154
		SUBTOTAL			**$24,825,391**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$11,048,476	$11,048,476
		SUBTOTAL			**$11,048,476**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$2,050,705	$2,050,705
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$331,432	$331,432
		SUBTOTAL			**$2,382,137**
		SITE SUBTOTAL			**$38,256,004**
	CONTINGENGY (15%)				$5,738,401
	Project Total (before scrap credit)				$43,994,405
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($7,680,961)
TOTAL PRICE					**$36,313,443**

TABLE 5.2f
Courtenay Wind Farm
(Removal to 48 inches)
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Courtenay (48 in.)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - V100-2.0	100	EA	$139,705	$13,970,467
1b	Haul Off of Materials (Trucking/Rail)	100	EA	21,581	$2,158,116
1c	Foundation Removal - V100-2.0	100	EA	$8,017	$801,686
1d	Crane Mobilization & Demobilization	1	LS	$1,846,356	$1,846,356
		SUBTOTAL			**$18,776,625**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$10,695,312	$10,695,312
		SUBTOTAL			**$10,695,312**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$407,251	$407,251
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$33,143	$33,143
		SUBTOTAL			**$440,394**
		SITE SUBTOTAL			**$29,912,331**
	CONTINGENGY (15%)				$4,486,850
	Project Total (before scrap credit)				$34,399,181
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($5,311,810)
TOTAL PRICE					**$29,087,370**

TABLE 5.2g
Foxtail Wind Farm

SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

					Foxtail
ITEM	**DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT PRICE**	**AMOUNT**
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - V110	7	EA	$141,965	$993,756
	Dismantle Wind Turbine Generators - V120	68	EA	$142,996	$9,723,737
1b	Haul Off of Materials (Trucking/Rail)	75	EA	31,382	$2,353,658
1c	Foundation Removal - V110	7	EA	$66,536	$465,755
	Foundation Removal - V120	68	EA	$66,536	$4,524,475
1d	Crane Mobilization & Demobilization	1	LS	$1,522,963	$1,522,963
		SUBTOTAL			**$19,584,343**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$8,406,384	$8,406,384
		SUBTOTAL			**$8,406,384**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$1,609,155	$1,609,155
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$248,574	$248,574
		SUBTOTAL			**$1,857,729**
		SITE SUBTOTAL			**$29,848,456**
	CONTINGENGY (15%)				$4,477,268
	Project Total (before scrap credit)				$34,325,724
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($6,767,995)
TOTAL PRICE					**$27,557,729**

TABLE 5.2h
Foxtail Wind Farm
(Removal to 48 inches)
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Foxtail (48 in.)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - V110	7	EA	$146,429	$1,025,000
	Dismantle Wind Turbine Generators - V120	68	EA	$147,460	$10,027,257
1b	Haul Off of Materials (Trucking/Rail)	75	EA	26,501	$1,987,602
1c	Foundation Removal - V110	7	EA	$7,804	$54,629
	Foundation Removal - V120	68	EA	$7,804	$530,685
1d	Crane Mobilization & Demobilization	1	LS	$1,453,212	$1,453,212
		SUBTOTAL			**$15,078,385**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$8,171,092	$8,171,092
		SUBTOTAL			**$8,171,092**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$324,523	$324,523
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$24,857	$24,857
		SUBTOTAL			**$349,380**
		SITE SUBTOTAL			**$23,598,856**
	CONTINGENGY (15%)				$3,539,828
	Project Total (before scrap credit)				$27,138,685
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($4,850,452)
TOTAL PRICE					**$22,288,232**

TABLE 5.2i
Grand Meadow Wind

SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

					Grand Meadow
ITEM	**DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT PRICE**	**AMOUNT**
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - GE1.5-77	67	EA	$153,426	$10,279,573
1b	Haul Off of Materials (Trucking/Rail)	67	EA	34,871	$2,336,369
1c	Foundation Removal - GE1.5-77	67	EA	$51,000	$3,416,996
1d	Crane Mobilization & Demobilization	1	LS	$2,201,454	$2,201,454
		SUBTOTAL			**$18,234,392**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$7,490,034	$7,490,034
		SUBTOTAL			**$7,490,034**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$1,697,809	$1,697,809
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$210,338	$210,338
		SUBTOTAL			**$1,908,147**
		SITE SUBTOTAL			**$27,632,572**
	CONTINGENGY (15%)				$4,144,886
	Project Total (before scrap credit)				$31,777,458
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($6,741,282)
TOTAL PRICE					**$25,036,176**

TABLE 5.2j
Grand Meadow Wind
(Removal to 48 inches)
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Grand Meadow (48 in.) AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - GE1.5-77	67	EA	$162,780	$10,906,283
1b	Haul Off of Materials (Trucking/Rail)	67	EA	30,931	$2,072,402
1c	Foundation Removal - GE1.5-77	67	EA	$7,838	$525,128
1d	Crane Mobilization & Demobilization	1	LS	$2,138,044	$2,138,044
		SUBTOTAL			**$15,641,858**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$7,343,033	$7,343,033
		SUBTOTAL			**$7,343,033**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$366,382	$366,382
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$21,034	$21,034
		SUBTOTAL			**$387,416**
		SITE SUBTOTAL			**$23,372,307**
	CONTINGENGY (15%)				$3,505,846
	Project Total (before scrap credit)				$26,878,153
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($5,180,812)
TOTAL PRICE					**$21,697,340**

TABLE 5.2k
Lake Benton II Wind

SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Lake Benton II

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - GE2.1-116	5	EA	$160,812	$804,060
	Dismantle Wind Turbine Generators - GE2.3-116	39	EA	$167,415	$6,529,184
1b	Haul Off of Materials (Trucking/Rail)	44	EA	36,557	$1,608,528
1c	Foundation Removal - GE2.1-116	5	EA	$60,464	$302,318
	Foundation Removal - GE2.3-116	39	EA	$60,464	$2,358,079
1d	Crane Mobilization & Demobilization	1	LS	$1,015,680	$1,015,680
		SUBTOTAL			**$12,617,848**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$4,848,790	$4,848,790
		SUBTOTAL			**$4,848,790**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$1,054,685	$1,054,685
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$138,132	$138,132
		SUBTOTAL			**$1,192,817**
		SITE SUBTOTAL			**$18,659,455**
	CONTINGENGY (15%)				$2,798,918
	Project Total (before scrap credit)				$21,458,374
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($4,628,964)
TOTAL PRICE					**$16,829,410**

TABLE 5.2l
Lake Benton II Wind
(Removal to 48 inches)
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

Lake Benton II (48 in.)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - GE2.1-116	5	EA	$167,555	$837,777
	Dismantle Wind Turbine Generators - GE2.3-116	39	EA	$174,158	$6,792,178
1b	Haul Off of Materials (Trucking/Rail)	44	EA	31,636	$1,391,969
1c	Foundation Removal - GE2.1-116	5	EA	$7,546	$37,728
	Foundation Removal - GE2.3-116	39	EA	$7,546	$294,280
1d	Crane Mobilization & Demobilization	1	LS	$977,633	$977,633
		SUBTOTAL			**$10,331,565**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$4,759,976	$4,759,976
		SUBTOTAL			**$4,759,976**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$221,763	$221,763
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$13,813	$13,813
		SUBTOTAL			**$235,576**
		SITE SUBTOTAL			**$15,327,118**
	CONTINGENGY (15%)				$2,299,068
	Project Total (before scrap credit)				$17,626,185
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($3,429,286)
TOTAL PRICE					**$14,196,899**

TABLE 5.2m
Nobles Wind Farm

SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Nobles AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - GE1.5-77	134	EA	$139,113	$18,641,078
1b	Haul Off of Materials (Trucking/Rail)	134	EA	29,979	$4,017,223
1c	Foundation Removal - GE1.5-77	134	EA	$57,739	$7,736,964
1d	Crane Mobilization & Demobilization	1	LS	$1,947,813	$1,947,813
		SUBTOTAL			**$32,343,078**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$13,434,084	$13,434,084
		SUBTOTAL			**$13,434,084**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$2,399,425	$2,399,425
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$420,675	$420,675
		SUBTOTAL			**$2,820,100**
		SITE SUBTOTAL			**$48,597,262**
	CONTINGENGY (15%)				$7,289,589
	Project Total (before scrap credit)				$55,886,851
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($12,298,196)
TOTAL PRICE					**$43,588,656**

TABLE 5.2n
Nobles Wind Farm
(Removal to 48 inches)
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

					Nobles (48 in.)
ITEM	**DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT PRICE**	**AMOUNT**
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - GE1.5-77	134	EA	$142,885	$19,146,628
1b	Haul Off of Materials (Trucking/Rail)	134	EA	24,922	$3,339,613
1c	Foundation Removal - GE1.5-77	134	EA	$7,559	$1,012,965
1d	Crane Mobilization & Demobilization	1	LS	$1,871,720	$1,871,720
		SUBTOTAL			**$25,370,926**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$13,038,736	$13,038,736
		SUBTOTAL			**$13,038,736**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$479,044	$479,044
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$42,068	$42,068
		SUBTOTAL			**$521,112**
		SITE SUBTOTAL			**$38,930,775**
	CONTINGENGY (15%)				$5,839,616
	Project Total (before scrap credit)				$44,770,391
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($8,815,111)
TOTAL PRICE					**$35,955,280**

TABLE 5.2o
Pleasant Valley Wind Farm

SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Pleasant Valley AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - V100-2.0	100	EA	$159,003	$15,900,269
1b	Haul Off of Materials (Trucking/Rail)	100	EA	27,139	$2,713,931
1c	Foundation Removal - V100-2.0	100	EA	$67,877	$6,787,708
1d	Crane Mobilization & Demobilization	1	LS	$2,150,726	$2,150,726
		SUBTOTAL			**$27,552,633**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$10,584,412	$10,584,412
		SUBTOTAL			**$10,584,412**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$2,165,432	$2,165,432
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$313,937	$313,937
		SUBTOTAL			**$2,479,368**
		SITE SUBTOTAL			**$40,616,414**
	CONTINGENGY (15%)				$6,092,462
	Project Total (before scrap credit)				$46,708,876
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($7,970,541)
TOTAL PRICE					**$38,738,336**

TABLE 5.2p
Pleasant Valley Wind Farm
(Removal to 48 inches)
SUMMARY OF ACTIVITY COSTS
(2019 Dollars)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Pleasant Valley (48 in.) AMOUNT
1	TURBINE SITE REMOVAL				
1a	Dismantle Wind Turbine Generators - V100-2.0	100	EA	$163,820	$16,381,957
1b	Haul Off of Materials (Trucking/Rail)	100	EA	22,858	$2,285,819
1c	Foundation Removal - V100-2.0	100	EA	$7,923	$792,287
1d	Crane Mobilization & Demobilization	1	LS	$2,061,951	$2,061,951
		SUBTOTAL			**$21,522,014**
2	SITE CIVIL WORK REMOVAL				
2a	Balance of Site Civil Work Removals	1	LS	$10,237,618	$10,237,618
		SUBTOTAL			**$10,237,618**
3	COLLECTION SYSTEM REMOVAL				
3a	Remove MV Collection Cable	1	LS	$438,778	$438,778
3b	Remove Junction Boxes & Turbine Switchgears	1	LS	$31,394	$31,394
		SUBTOTAL			**$470,172**
		SITE SUBTOTAL			**$32,229,804**
	CONTINGENGY (15%)				$4,834,471
	Project Total (before scrap credit)				$37,064,275
	APPROXIMATE SCRAP VALUE OF COMPONENTS				($5,558,899)
TOTAL PRICE					**$31,505,376**

6. REFERENCES

1. E-mail dated November 18, 2019 from Roger P. Schluessel of Xcel Energy to Ben Stochmal at TLG Services; "Labor Rates"
2. E-mail dated December 11, 2019 from Roger P. Schluessel of Xcel Energy to Ben Stochmal at TLG Services; subject "Utility Salaries for 2019"
3. "Building Construction Cost Data 2019," Robert Snow Means Company, Inc., Kingston, Massachusetts [Open]
4. Recycler's World, Iron and Steel Recycling Section and Scrap Copper Recycling Section, U.S. Scrap Metal Index, January 1, 2015 to December 31, 2019 [Open]
5. T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986 [Open]
6. W.J. Manion and T.S. LaGuardia, "Decommissioning Handbook," U.S. Department of Energy, DOE/EV/10128-1, November 1980 [Open]
7. AACE International, Skills and Knowledge of Cost Engineering, 4th Edition, 1999 [Open]
8. 29 CFR Part 1926, Subpart T - Demolition , United States Department of Labor, 2019 https://www.osha.gov/doc/topics/demolition/index.html

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	Granite City	Hennepin Island	High Bridge	Inver Hills	Key City	Maplewood	Minnesota Valley	Red Wing	Riverside	Sherburne County	Sibley	Wescott	Wilmarth
Station Rating (Mwe)		511	386	409	545	0	14	606	371	0	0	0	178	502	2238	0	0	18
2	Piping 0.25 to 2 inches diameter, linear foot	79,850	31,521	11,835	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	36,003	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	24,870	10,357	3,138	-	11,173	6,964	3,138	1,120	6,427	2,186	10,687	103,907	520	5,585	2,186
5	Piping >8 to 14 inches diameter, linear foot	30,662	8,006	16,782	6,229	445	-	8,015	1,348	445	330	4,778	1,457	7,125	89,271	385	2,265	1,457
6	Piping >14 to 20 inches diameter, linear foot	7,208	2,614	7,217	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	4,260	2,419	-	-	3,971	-	-	70	1,803	289	3,716	37,053	16	-	289
8	Piping >36 inches diameter, linear foot	5,335	898	3,074	1,796	-	-	2,420	-	-	-	17	173	2,126	15,991	-	60	173
9	Valves <2 inches	1,373	1,308	20	144	108	-	-	216	108	-	54	540	1,418	4,118	-	-	540
10	Valves >2 to 4 inches	935	1,660	1,869	672	72	-	698	174	72	330	402	360	698	2,805	346	-	360
11	Valves >4 to 8 inches	610	592	886	464	80	-	381	264	80	78	207	240	369	1,830	47	104	240
12	Valves >8 to 14 inches	1,519	272	531	142	24	-	159	62	24	44	134	120	123	1,115	54	35	120
13	Valves >14 to 20 inches	158	84	102	48	-	-	78	-	-	2	29	50	66	587	-	4	50
14	Valves >20 to 36 inches	128	22	31	24	-	-	36	-	-	-	14	16	36	476	-	-	16
15	Valves >36 inches	56	6	22	12	-	-	26	-	-	-	1	14	18	104	-	-	14
24	Pipe hangers for small bore piping, each	5,018	3,641	3,225	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	1,672	1,089	121	-	1,249	391	121	64	393	543	1,237	9,618	40	317	543
26	Pump and motor set < 300 pounds	77	17	62	72	16	-	13	108	16	6	32	38	13	507	3	7	38
27	Pumps, 300-1000 pound pump	23	16	18	12	-	-	13	-	-	-	4	8	13	73	-	7	8
28	Pumps, >1000-10,000 pound pump	14	5	15	-	-	-	2	-	-	-	4	11	2	44	-	-	11
29	Pumps, >10,000 pound pump	13	5	14	4	-	-	8	-	-	-	5	8	4	9	-	-	8
32	Pump motors, 300-1000 pound pump	23	32	18	12	-	-	13	-	-	-	4	8	13	28	-	7	8
33	Pump motors, >1000-10,000 pound pump	13	5	12	-	-	-	3	-	-	-	4	11	3	68	2	-	11
34	Pump motors, >10,000 pound pump	13	5	14	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	2	-	-	-	1	-	-	-	3	2	2	3	-	-	2
39	Heat exchanger <3000 pound	16	12	30	101	-	-	6	210	-	-	15	12	6	60	-	-	12
40	Heat exchanger >3000 pound	-	27	12	48	-	-	5	96	-	-	7	14	5	21	-	-	14
41	Feedwater heater/deaerator	9	6	25	2	-	-	2	-	-	-	7	12	2	31	-	-	12
49	Main condenser (pounds per MW(e) input)	1	1	2	-	-	-	1	-	-	-	3	2	1	3	-	-	2
51	Tanks, <300 gallons, filters, and ion exchangers	38	33	41	20	16	3	10	34	16	5	39	12	10	66	28	25	12
52	Tanks, 300-3000 gallons	12	32	29	4	12	-	11	8	12	6	7	2	6	132	9	4	2
53	Tanks, >3000 gallons, square foot surface	27,566	75,184	4,933	62,690	2,847	-	23,259	7,069	2,847	101,764	87,790	33,585	1,859	162,458	81,889	374,754	6,871
54	Electrical equipment, <300 pound	742	686	881	647	420	54	150	846	420	21	222	322	128	6,686	36	-	322
55	Electrical equipment, 300-1000 pound	144	296	500	350	40	16	289	184	40	17	51	18	280	936	13	15	18
56	Electrical equipment, 1000-10,000 pound	122	190	203	280	80	25	207	175	80	7	39	56	201	122	2	32	56
57	Electrical equipment, >10,000 pound	19	99	18	128	28	36	16	168	28	5	4	16	16	30	3	5	16
59	Electrical transformers < 30 tons	3	13	22	14	2	-	4	18	2	2	10	-	4	6	2	1	-
60	Electrical transformers > 30 tons	3	9	6	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	450	180	80	10	200	100	80	30	163	38	150	498	30	24	38
65	Incandescent light fixture	1,564	288	1,000	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	13,091	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	45,448	8,631	2,471	4,790	13,688	-	2,471	2,060	18,605	8,658	11,905	119,404	2,000	8,500	8,658
69	Mechanical equipment, <300 pound	788	288	670	52	44	5	31	78	44	8	258	360	21	2,388	6	48	360
70	Mechanical equipment, 300-1000 pound	198	312	290	812	64	8	274	30	64	-	77	14	274	457	21	9	14
71	Mechanical equipment, 1000-10,000 pound	204	60	38	127	-	38	59	1,000	-	3	23	60	44	516	17	28	60
72	Mechanical equipment, >10,000 pound	68	160	106	238	60	26	141	219	60	20	5	45	103	90	8	62	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	Granite City	Hennepin Island	High Bridge	Inver Hills	Key City	Maplewood	Minnesota Valley	Red Wing	Riverside	Sherburne County	Sibley	Wescott	Wilmarth
Station Rating (Mwe)		511	386	409	545	0	14	606	371	0	0	0	178	502	2238	0	0	18
76	HVAC equipment, <300 pound	108	14	-	16	-	-	-	24	-	-	4	10	-	328	-	-	10
77	HVAC equipment, 300-1000 pound	-	22	4	-	-	-	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	273,680	-	-	8,175	142,100	-	-	-	96,406	18,295	38,202	439,440	-	-	18,295
201	Standard reinforced concrete, cubic yard	24,015	6,662	22,278	14,027	3,806	2,006	18,008	14,800	1,903	770	7,390	9,138	23,366	89,076	591	7,914	5,248
202	Grade slab concrete, cubic yard	10,800	1,329	8,959	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	7,007	-	-	-	-	-	-	-	3,788	1,793	3,035	22,775	-	-	1,793
222	Hollow masonry block wall, cubic yard	-	1,103	374	58	-	-	425	-	-	-	-	-	2,219	-	-	-	109
224	Solid masonry block wall, cubic yard	3,788	-	4,114	-	-	458	-	-	-	-	8,809	663	3,011	14,335	-	-	663
229	Backfill of below grade voids, cubic yard	29,218	11,074	14,043	12,493	2,170	20,000	19,394	6,898	1,308	-	32,816	17,556	12,325	-	-	-	20,531
230	Excavation of clean material, cubic yard	8,747	-	13,387	-	-	-	-	-	-	-	7,307	5,760	18,507	34,560	-	-	5,760
235	Building by volume, cubic foot	5,117,058	229,493	35,076	970,228	189,562	-	318,816	247,411	189,562	159,000	155,740	321,500	597,793	9,863,100	107,000	390,842	321,500
236	Building metal siding, square foot	217,256	42,789	56,780	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	32,544	-	-	9,375	110,000	-	-	-	23,588	9,129	119,469	237,266	-	-	9,129
245	Placement of cofferdam, linear foot	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
248	Lead paint removal from concrete surfaces, square foo	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	-	-	-	-	-	5	6	-	-	-
260	Structural steel, pounds	24,541,699	2,731,615	13,947,804	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	77,000	2,429,526
262	Steel floor grating, square foot	161,222	16,242	43,412	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	-	83,881	-	-	-	-	-	-	-	19,777	13,043	-	210,181	-	-	13,043
270	Landscaping with topsoil, acre	3	4	4	1	0	2	1.9	2	0	3	1	4	3	33	2	4	2
271	Landscaping w/o topsoil, acre	29	4	5	8	2	-	4	9	2	3	7	3	8	239	2	4	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	3,450	995
273	Railroad track, linear foot	3,000	-	3,600	-	-	-	-	-	-	-	-	-	-	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	36,515	14,776	75,398	12,441	14,550	-	75,398	-	6,959	17,695	78,517	219,533	-	-	17,695
359	Steam drum removal (fossil)	1	3	5	6	-	-	6	-	-	-	3	2	9	6	-	-	2
360	Water drum removal (fossil)	-	-	-	-	-	-	-	-	-	-	4	4	-	12	-	-	4
361	Upper/lower waterwall headers (fossil)	26	-	22	-	-	-	-	-	-	-	14	6	27	72	-	-	6
362	Top sup boiler waterwall (8'x8' section), inches cut	138,902	-	75,985	-	-	-	-	-	-	-	45,627	13,392	128,711	470,566	-	-	13,392
369	Boiler convective superheaater platens	307	-	356	-	-	-	-	-	-	-	256	116	459	1,344	-	-	116
370	Boiler radiant superheater platens	-	-	-	-	-	-	-	-	-	-	-	-	-	156	-	-	-
371	Boiler reheat platens	140	-	180	-	-	-	-	-	-	-	-	-	90	666	-	-	-
372	Boiler economizer platens	420	-	169	-	-	-	-	-	-	-	39	-	163	1,344	-	-	-
374	Stationary soot blowers	98	-	64	-	-	-	-	-	-	-	21	-	32	315	-	-	-
375	Retractable soot blowers	70	-	36	-	-	-	-	-	-	-	7	16	18	144	-	-	16
376	Process ductwork (8'x8' section), inches cut	757,268	321,019	1,009,405	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	-	9	-	-	-	-	-	-	-	8	8	4	13	-	-	8
380	Non-asbestos insulated recuperative air preheaters	-	-	-	-	-	-	-	-	-	-	4	-	8	-	-	-	-
382	Induced, forced, primary draft fans	9	-	11	-	-	-	-	-	-	-	4	4	-	42	-	-	4
383	Coal car dumpers	1	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-
384	Conveyors	5,528	-	-	-	-	-	-	-	-	-	-	625	-	5,000	-	-	625
385	Transfer Towers	100,500	-	-	-	-	-	-	-	-	-	-	-	-	201,000	-	-	-
386	Stacker-reclaimers	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
389	Ball mills	12	-	8	-	-	-	-	-	-	-	4	-	-	43	-	-	-
390	Coal feeders	120	-	122	-	-	-	-	-	-	-	40	86	-	1,019	-	-	86

TABLE A
SUMMARY OF STATION SYSTEMS AND STRUCTURES INVENTORIES

WIND FARMS ONLY

Index	System/Structure Inventory Data Point	Blazing Star I	Blazing Star I (48 in.)	Border Winds Project	Border Winds Project (48 in.)	Courtenay	Courtenay (48 in.)	Foxtail	Foxtail (48 in.)	Grand Meadow	Grand Meadow (48 in.)	Lake Benton II	Lake Benton II (48 in.)	Nobles	Nobles (48 in.)	Pleasant Valley	Pleasant Valley (48 in.)
Station Rating (Mwe)		200	200	148	148	190	190	150	150	99	99	99	99	197	197	196	196
56	Electrical equipment, 1000-10,000 pound	100	100	75	75	100	100	75	75	67	67	44	44	134	134	100	100
57	Electrical equipment, >10,000 pound	300	300	225	225	300	300	225	225	134	134	132	132	268	268	300	300
67	Electrical conduit, linear foot	1,731,165	-	1,298,374	-	1,731,165	-	1,298,374	-	1,159,881	-	513184	0	2,319,761	-	1,731,165	-
72	Mechanical equipment, >10,000 pound	1,550	1,550	1,163	1,163	1,550	1,550	1,163	1,163	1,039	1,039	770	770	2211	2,211	1650	1650
201	Standard reinforced concrete, cubic yard	36,220	4,067	28,822	3,125	36,182	4,029	28,397	3,086	18,865	2,765	15854	1908	43,432	5,336	38,082	3,997
229	Backfill of below grade voids, cubic yard	207,034	174,881	156,858	131,161	207,034	174,881	156,471	131,161	133,270	117,170	90893	76948	272,437	234,341	208,965	174,881
230	Excavation of clean material, cubic yard	333,101	187,310	249,826	140,483	333,101	187,310	249,826	140,483	223,178	125,498	146565	82416	446,356	250,996	333,101	187,310
235	Building by volume, cubic foot	132,000	132,000	132,000	132,000	108,000	108,000	108,000	108,000	95,625	95,625	102,000	102,000	123,930	123,930.00	88,560	88,560
270	Landscaping with topsoil, acre	71	71	53	53	71	71	53	53	47	47	31	31	95	95	71	71
271	Landscaping w/o topsoil, acre	4	4	3	3	4	4	3	3	3	3	3	3	3	3	3	3
294	Carbon steel plate 1/2 inch thick, square foo	892,716	892,716	588,123	588,123	784,164	784,164	669,644	669,644	658,346	658,346	524316	524316	1,316,693	1,316,692.58	1,156,983	1,156,983

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	60.80	790.34
Craftsmen	2.0	4.333	71.33	618.15
Foreman	1.0	4.333	73.44	318.22
General Foreman	0.25	4.333	74.44	80.64
Fire Watch	0.05	4.333	60.80	13.17
Total labor cost				1,820.52

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
Gas torch consumables 1 @ $19.93/hr x 1 hr {1}	19.93
Subtotal cost of equipment and materials	19.93
Overhead & profit on equipment and materials @ 16.88%	3.36
Total costs, equipment & material	23.29
TOTAL COST Removal of heat exchanger <3000 pound:	**1,843.81**
Total labor cost:	1,820.52
Total equipment/material costs:	23.29
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 (2019) Division 01 54 33, Section 40-6360 Page 736

APPENDIX C

UNIT COST FACTOR LISTING

TABLE C-1

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2019 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	6.97	6.89	0.1	-	4	-	0.5	-	-	-	-
3	Piping >2 to 4 inches diameter, linear foot	9.79	9.68	0.2	-	7	-	0.9	-	-	0.4	-
4	Piping >4 to 8 inches diameter, linear foot	18.72	18.56	0.3	-	22	-	-	-	-	-	-
5	Piping >8 to 14 inches diameter, linear foot	36.53	36.34	0.6	-	57	-	-	-	-	-	-
6	Piping >14 to 20 inches diameter, linear foot	47.51	46.93	0.7	-	-	120	-	-	-	-	-
7	Piping >20 to 36 inches diameter, linear foot	69.90	69.13	1.1	-	-	221	-	-	-	-	-
8	Piping >36 inches diameter, linear foot	83.05	82.27	1.3	-	-	417	-	-	-	-	-
9	Valves <2 inches	133.87	133.10	2.0	-	-	-	-	-	-	-	-
10	Valves >2 to 4 inches	124.03	122.86	1.9	75	-	-	8.8	-	-	4.4	-
11	Valves >4 to 8 inches	187.18	185.61	2.8	510	-	-	-	-	-	-	-
12	Valves >8 to 14 inches	365.29	363.36	5.6	1,066	-	-	-	-	-	-	-
13	Valves >14 to 20 inches	475.15	469.33	7.3	-	-	2,040	-	-	-	-	-
14	Valves >20 to 36 inches	699.04	691.28	10.7	-	-	3,334	-	-	-	-	-
15	Valves >36 inches	830.45	822.69	12.7	-	-	11,535	-	-	-	-	-
24	Pipe hangers for small bore piping, each	43.43	37.61	0.6	-	10	-	-	-	-	-	-
25	Pipe hangers for large bore piping, each	156.79	145.14	2.3	-	50	-	-	-	-	-	-
26	Pump and motor set < 300 pounds	316.32	306.61	4.7	-	-	50	12.5	-	-	-	62.3
27	Pumps, 300-1000 pound pump	866.84	851.31	12.7	293	-	49	48.9	-	-	-	-
28	Pumps, >1000-10,000 pound pump	3,438.05	3,414.76	51.3	2,834	-	472	472.3	-	-	-	-
29	Pumps, >10,000 pound pump	6,651.40	6,581.52	98.9	43,693	-	7,282	7,282.1	-	-	-	-
32	Pump motors, 300-1000 pound pump	362.10	362.10	5.4	-	-	-	-	-	-	-	307.8
33	Pump motors, >1000-10,000 pound pump	1,428.02	1,428.02	21.5	-	-	-	-	-	-	-	3,531.6
34	Pump motors, >10,000 pound pump	3,213.05	3,213.05	48.3	-	-	-	-	-	-	-	42,324.5
37	Turbine-driven pumps > 10,000 pounds	8,904.73	8,827.09	132.7	20,000	-	20,000	-	-	-	-	-
38	Main turbine-generator (pounds per MW(e) input)	208,434.81	206,943.98	3,042.0	-	-	851,500	-	-	-	-	851,500.0
39	Heat exchanger <3000 pound	1,843.81	1,820.52	27.3	-	-	416	623.4	-	-	-	-
40	Heat exchanger >3000 pound	4,644.67	4,551.49	68.3	-	-	5,599	8,397.9	-	-	-	-
41	Feedwater heater/deaerator	13,109.71	12,923.36	194.2	-	-	12,000	18,000.0	-	-	-	-
49	Main condenser (pounds per MW(e) input)	573,864.75	553,556.38	8,243.6	149,400	-	149,400	199,200.0	-	-	-	-
51	Tanks, <300 gallons, filters, and ion exchangers	406.82	395.17	6.0	-	-	401	401.2	-	-	-	-
52	Tanks, 300-3000 gallons	1,281.67	1,258.38	19.1	-	-	2,700	300.0	-	-	-	-
53	Tanks, >3000 gallons, square foot surface	10.64	10.35	0.2	-	21	-	-	-	-	-	-
54	Electrical equipment, <300 pound	171.33	171.33	2.6	-	-	56	-	-	-	2.9	-
55	Electrical equipment, 300-1000 pound	589.54	589.54	8.8	-	-	624	-	-	-	32.8	-

TABLE C-1 (continued)

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2019 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	1,179.09	1,179.09	17.6	-	-	2,212	-	-	-	116.4	-
57	Electrical equipment, >10,000 pound	2,779.22	2,779.22	41.0	-	-	19,950	-	-	-	1,050.0	-
59	Electrical transformers < 30 tons	1,930.13	1,930.13	28.4	-	-	11,250	-	-	-	3,750.0	-
60	Electrical transformers > 30 tons	5,558.44	5,558.44	81.9	-	-	375,000	-	-	-	125,000.0	-
61	Standby diesel-generator, <100 kW	1,971.46	1,971.46	29.1	2,340	-	-	-	-	-	-	260.0
62	Standby diesel-generator, 100 kW to 1 MW	4,400.42	4,400.42	64.8	9,450	-	-	-	-	-	-	1,050.0
63	Standby diesel-generator, >1 MW	9,109.78	9,109.78	134.2	47,250	-	-	-	-	-	-	5,250.0
64	Fluorescent light fixture	71.90	71.90	1.1	-	-	-	-	-	-	-	-
65	Incandescent light fixture	36.05	36.05	0.6	-	-	-	-	-	-	-	-
66	Electrical cable tray, linear foot	16.12	15.73	0.2	-	-	-	-	6.6	6.6	-	-
67	Electrical conduit, linear foot	7.04	6.85	0.1	-	-	-	-	3.4	3.4	-	-
69	Mechanical equipment, <300 pound	171.33	171.33	2.6	-	-	127	-	-	-	-	-
70	Mechanical equipment, 300-1000 pound	589.54	589.54	8.8	-	-	641	-	-	-	-	-
71	Mechanical equipment, 1000-10,000 pound	1,179.09	1,179.09	17.6	-	-	4,184	-	-	-	-	-
72	Mechanical equipment, >10,000 pound	2,779.22	2,779.22	41.0	-	-	11,938	-	-	-	-	-
76	HVAC equipment, <300 pound	207.18	207.18	3.1	-	-	184	-	-	-	-	-
77	HVAC equipment, 300-1000 pound	708.37	708.37	10.6	-	-	643	-	-	-	-	-
78	HVAC equipment, 1000-10,000 pound	1,411.80	1,411.80	21.0	-	-	3,813	-	-	-	-	-
79	HVAC equipment, >10,000 pound	2,779.22	2,779.22	41.0	-	-	19,391	-	-	-	-	-
82	HVAC ductwork, pound	0.68	0.68	0.0	-	-	-	-	1.0	-	-	-
201	Standard reinforced concrete, cubic yard	77.12	26.84	0.4	-	183	-	-	-	-	-	-
202	Grade slab concrete, cubic yard	87.72	30.65	0.5	-	183	-	-	-	-	-	-
206	Heavily rein concrete w/#9 rebar, cubic yard	111.41	39.28	0.6	-	730	-	-	-	-	-	-
222	Hollow masonry block wall, cubic yard	26.45	10.27	0.1	-	66	-	-	-	-	-	-
224	Solid masonry block wall, cubic yard	26.45	10.27	0.1	-	66	-	-	-	-	-	-
229	Backfill of below grade voids, cubic yard	31.11	4.21	0.1	-	-	-	-	-	-	-	-
230	Excavation of clean material, cubic yard	3.23	1.49	0.0	-	-	-	-	-	-	-	-
235	Building by volume, cubic foot	0.34	0.21	-	-	-	1	-	-	-	-	-
236	Building metal siding, square foot	1.74	1.28	0.0	-	-	-	-	2.4	-	-	-
242	Standard asphalt roofing, square foot	3.01	3.01	0.1	-	-	-	-	-	-	-	-
243	Galbestos panels, square foot	2.58	2.06	0.0	-	-	-	-	-	-	-	-
245	Placement of cofferdam, linear foot	-	-	-	-	-	-	-	-	-	-	-

TABLE C-1 (continued)

UNIT COST FACTOR LISTING
Minnesota Stations
(Costs are in 2019 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	10.07	8.11	0.1	-	-	-	-	-	-	-	-
253	Overhead cranes/monorails < 10 ton capacity, each	810.83	810.83	11.8	-	3,700	-	-	-	-	-	-
255	Overhead cranes/monorails >10 - 50 ton capacity, each	1,945.99	1,945.99	28.3	-	-	298,832	-	-	-	3,018.5	-
258	Gantry cranes > 50 ton capacity, each	31,034.60	31,034.60	457.3	-	-	712,800	-	-	-	7,200.0	-
260	Structural steel, pounds	0.24	0.20	-	-	1	-	-	-	-	-	-
262	Steel floor grating, square foot	5.73	5.32	0.1	-	-	6	-	1.1	-	-	-
268	Placement of scaffolding in clean areas, square foot	18.58	6.42	0.1	-	-	-	-	-	-	-	-
270	Landscaping with topsoil, acre	24,287.33	3,567.37	52.6	-	-	-	-	-	-	-	-
271	Landscaping w/o topsoil, acre	1,151.70	380.40	5.3	-	-	-	-	-	-	-	-
272	Chain link fencing, linear foot	4.13	3.47	0.1	-	-	-	-	10.0	-	-	-
273	Railroad track, linear foot	28.23	14.43	0.2	-	91	-	-	-	-	-	-
274	Asphalt pavement, square foot	1.02	0.75	0.0	-	-	-	-	-	-	-	-
291	Carbon steel plate 1/4 inch thick, square foot	4.48	3.80	0.1	-	-	10	-	-	-	-	-
294	Carbon steel plate 1/2 inch thick, square foot	4.73	4.00	0.1	-	-	20	-	-	-	-	-
359	Steam drum removal (fossil)	26,089.30	25,934.00	411.6	-	-	480,000	-	-	-	-	-
360	Water drum removal (fossil)	9,683.73	9,654.62	153.2	-	-	320,000	-	-	-	-	-
361	Upper/lower waterwall headers (fossil)	7,308.10	7,278.99	115.5	-	-	120,000	-	-	-	-	-
362	Top sup boiler waterwall (8'x8' section), inches cut	0.87	0.83	0.0	-	-	11	-	-	-	-	-
369	Boiler convective superheaater platens	2,090.33	1,888.47	29.6	-	-	19,501	-	-	-	-	-
370	Boiler radiant superheater platens	884.30	798.91	12.5	-	-	51,652	-	-	-	-	-
371	Boiler reheat platens	884.30	798.91	12.5	-	-	19,501	-	-	-	-	-
372	Boiler economizer platens	1,125.50	1,016.81	15.9	-	-	11,703	-	-	-	-	-
374	Stationary soot blowers	46.10	46.10	0.7	-	-	500	-	-	-	-	50.0
375	Retractable soot blowers	435.82	435.82	6.8	-	-	11,150	-	-	-	-	100.0
376	Process ductwork (8'x8' section), inches cut	0.43	0.40	0.0	-	-	0	-	-	-	-	-
378	Non-asbestos insulated regenerative air preheaters	13,695.05	11,878.10	188.5	-	-	1,376,000	-	-	-	-	-
380	Non-asbestos insulated recuperative air preheaters	7,571.40	6,435.81	101.6	-	-	1,376,000	-	-	-	-	-
382	Induced, forced, primary draft fans	2,080.55	2,033.96	31.9	-	-	30,000	-	-	-	-	3,531.6
383	Coal car dumpers	18,719.68	15,924.38	249.4	-	-	125,000	-	-	-	-	500.0
384	Conveyors	17.64	16.48	0.3	-	-	820	-	-	-	-	-
385	Transfer Towers	0.31	0.17	-	-	-	5	-	-	-	-	-
386	Stacker-reclaimers	190,631.94	190,631.94	3,008.3	-	-	300,000	-	-	-	-	2,000.0
387	Coal crushers	1,260.40	1,248.75	19.3	-	-	36,000	-	-	-	-	250.0
389	Ball mills	1,816.03	1,816.03	28.1	-	-	360,000	-	-	-	-	7,063.1
390	Coal feeders	457.07	445.42	7.1	-	-	1,194	-	-	-	-	-

TABLE C-2

UNIT COST FACTOR LISTING
North Dakota Stations
(Costs are in 2019 dollars/Scrap Weights in pounds)

Unit Cost Factors					Scrap Weight				
UCF #	Description	Total Cost	Labor Cost	Labor Hours	Carbon Steel No. 1	Mixed Scrap	No. 2 Copper	Large Motor	Aluminum
56	Electrical equipment, 1000-10,000 pound	1,179.09	1,179.09	17.6	-	2,212	116.4	-	-
57	Electrical equipment, >10,000 pound	2,779.22	2,779.22	41.0	-	19,950	-	75,610	-
67	Electrical conduit, linear foot	7.06	6.85	0.1	-	-	0.3	-	1.2
72	Mechanical equipment, >10,000 pound	2,779.22	2,779.22	41.0	-	11,938	-	-	-
201	Standard reinforced concrete, cubic yard	82.15	26.84	0.4	183	-	-	-	-
229	Backfill of below grade voids, cubic yard	33.80	4.21	0.1	-	-	-	-	-
230	Excavation of clean material, cubic yard	3.41	1.49	0.02	-	-	-	-	-
235	Building by volume, cubic foot	0.35	0.21	0.003	-	1	-	-	-

TABLE C-3

UNIT COST FACTOR LISTING
South Dakota Station
(Costs are in 2019 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	6.97	6.89	0.1	-	4	-	0.5	-	-	-	-
3	Piping >2 to 4 inches diameter, linear foot	9.79	9.68	0.2	-	7	-	0.9	-	-	0.4	-
4	Piping >4 to 8 inches diameter, linear foot	18.71	18.56	0.3	-	22	-	-	-	-	-	-
5	Piping >8 to 14 inches diameter, linear foot	36.52	36.34	0.6	-	57	-	-	-	-	-	-
6	Piping >14 to 20 inches diameter, linear foot	47.48	46.93	0.7	-	-	120	-	-	-	-	-
7	Piping >20 to 36 inches diameter, linear foot	69.86	69.13	1.1	-	-	221	-	-	-	-	-
8	Piping >36 inches diameter, linear foot	83.00	82.27	1.3	-	-	417	-	-	-	-	-
9	Valves <2 inches	133.82	133.10	2.0	-	-	-	-	-	-	-	-
10	Valves >2 to 4 inches	123.95	122.86	1.9	75	-	-	8.8	-	-	4.4	-
11	Valves >4 to 8 inches	187.08	185.61	2.8	510	-	-	-	-	-	-	-
12	Valves >8 to 14 inches	365.17	363.36	5.6	1,066	-	-	-	-	-	-	-
13	Valves >14 to 20 inches	474.79	469.33	7.3	-	-	2,040	-	-	-	-	-
14	Valves >20 to 36 inches	698.56	691.28	10.7	-	-	3,334	-	-	-	-	-
15	Valves >36 inches	829.97	822.69	12.7	-	-	11,535	-	-	-	-	-
24	Pipe hangers for small bore piping, each	43.07	37.61	0.6	-	10	-	-	-	-	-	-
25	Pipe hangers for large bore piping, each	156.07	145.14	2.3	-	50	-	-	-	-	-	-
26	Pump and motor set < 300 pounds	315.72	306.61	4.7	-	-	50	12.5	-	-	-	62.3
27	Pumps, 300-1000 pound pump	865.89	851.31	12.7	293	-	49	48.9	-	-	-	-
28	Pumps, >1000-10,000 pound pump	3,436.62	3,414.76	51.3	2,834	-	472	472.3	-	-	-	-
29	Pumps, >10,000 pound pump	6,647.09	6,581.52	98.9	43,693	-	7,282	7,282.1	-	-	-	-
32	Pump motors, 300-1000 pound pump	362.10	362.10	5.4	-	-	-	-	-	-	-	307.8
33	Pump motors, >1000-10,000 pound pump	1,428.02	1,428.02	21.5	-	-	-	-	-	-	-	3,531.6
34	Pump motors, >10,000 pound pump	3,213.05	3,213.05	48.3	-	-	-	-	-	-	-	42,324.5
38	Main turbine-generator (pounds per MW(e) input)	208,342.91	206,943.98	3,042.0	-	-	851,500	-	-	-	-	851,500.0
39	Heat exchanger <3000 pound	1,842.38	1,820.52	27.3	-	-	416	623.4	-	-	-	-
40	Heat exchanger >3000 pound	4,638.92	4,551.49	68.3	-	-	5,599	8,397.9	-	-	-	-
41	Feedwater heater/deaerator	13,098.22	12,923.36	194.2	-	-	12,000	18,000.0	-	-	-	-
49	Main condenser (pounds per MW(e) input)	572,617.94	553,556.38	8,243.6	149,400	-	149,400	199,200.0	-	-	-	-
51	Tanks, <300 gallons, filters, and ion exchangers	406.10	395.17	6.0	-	-	401	401.2	-	-	-	-
52	Tanks, 300-3000 gallons	1,280.24	1,258.38	19.1	-	-	2,700	300.0	-	-	-	-
53	Tanks, >3000 gallons, square foot surface	10.63	10.35	0.2	-	21	-	-	-	-	-	-
54	Electrical equipment, <300 pound	171.33	171.33	2.6	-	-	56	-	-	-	2.9	-
55	Electrical equipment, 300-1000 pound	589.54	589.54	8.8	-	-	624	-	-	-	32.8	-
56	Electrical equipment, 1000-10,000 pound	1,179.09	1,179.09	17.6	-	-	2,212	-	-	-	116.4	-
57	Electrical equipment, >10,000 pound	2,779.22	2,779.22	41.0	-	-	19,950	-	-	-	1,050.0	-
59	Electrical transformers < 30 tons	1,930.13	1,930.13	28.4	-	-	11,250	-	-	-	3,750.0	-
60	Electrical transformers > 30 tons	5,558.44	5,558.44	81.9	-	-	375,000	-	-	-	125,000.0	-

TABLE C-3 (continued)

UNIT COST FACTOR LISTING
South Dakota Station
(Costs are in 2019 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
61	Standby diesel-generator, <100 kW	1,971.46	1,971.46	29.1	2,340	-	-	-	-	-	-	260.0
64	Fluorescent light fixture	71.90	71.90	1.1	-	-	-	-	-	-	-	-
65	Incandescent light fixture	36.05	36.05	0.6	-	-	-	-	-	-	-	-
66	Electrical cable tray, linear foot	16.09	15.73	0.2	-	-	-	-	6.6	6.6	-	-
67	Electrical conduit, linear foot	7.03	6.85	0.1	-	-	-	-	3.4	3.4	-	-
69	Mechanical equipment, <300 pound	171.33	171.33	2.6	-	-	127	-	-	-	-	-
70	Mechanical equipment, 300-1000 pound	589.54	589.54	8.8	-	-	641	-	-	-	-	-
71	Mechanical equipment, 1000-10,000 pound	1,179.09	1,179.09	17.6	-	-	4,184	-	-	-	-	-
72	Mechanical equipment, >10,000 pound	2,779.22	2,779.22	41.0	-	-	11,938	-	-	-	-	-
76	HVAC equipment, <300 pound	207.18	207.18	3.1	-	-	184	-	-	-	-	-
77	HVAC equipment, 300-1000 pound	708.37	708.37	10.6	-	-	643	-	-	-	-	-
78	HVAC equipment, 1000-10,000 pound	1,411.80	1,411.80	21.0	-	-	3,813	-	-	-	-	-
82	HVAC ductwork, pound	0.68	0.68	0.0	-	-	-	-	1.0	-	-	-
201	Standard reinforced concrete, cubic yard	74.02	26.84	0.4	-	183	-	-	-	-	-	-
202	Grade slab concrete, cubic yard	84.20	30.65	0.5	-	183	-	-	-	-	-	-
206	Heavily rein concrete w/#9 rebar, cubic yard	106.96	39.28	0.6	-	730	-	-	-	-	-	-
222	Hollow masonry block wall, cubic yard	25.45	10.27	0.1	-	66	-	-	-	-	-	-
229	Backfill of below grade voids, cubic yard	29.45	4.21	0.1	-	-	-	-	-	-	-	-
235	Building by volume, cubic foot	0.33	0.21	-	-	-	1	-	-	-	-	-
236	Building metal siding, square foot	1.71	1.28	0.0	-	-	-	-	2.4	-	-	-
242	Standard asphalt roofing, square foot	3.01	3.01	0.1	-	-	-	-	-	-	-	-
248	Lead paint removal from concrete surfaces, square foot	9.80	7.96	0.1	-	-	-	-	-	-	-	-
253	Overhead cranes/monorails < 10 ton capacity, each	810.83	810.83	11.8	-	3,700	-	-	-	-	-	-
255	Overhead cranes/monorails >10 - 50 ton capacity, each	1,945.99	1,945.99	28.3	-	-	298,832	-	-	-	3,018.5	-
260	Structural steel, pounds	0.23	0.20	-	-	1	-	-	-	-	-	-
262	Steel floor grating, square foot	5.70	5.32	0.1	-	-	6	-	1.1	-	-	-
270	Landscaping with topsoil, acre	23,009.82	3,567.37	52.6	-	-	-	-	-	-	-	-
271	Landscaping w/o topsoil, acre	1,104.15	380.40	5.3	-	-	-	-	-	-	-	-
272	Chain link fencing, linear foot	4.09	3.47	0.1	-	-	-	-	10.0	-	-	-
274	Asphalt pavement, square foot	1.01	0.75	0.0	-	-	-	-	-	-	-	-
293	Carbon steel plate 3/8 inch thick, square foot	4.56	3.90	0.1	-	-	15	-	-	-	-	-
294	Carbon steel plate 1/2 inch thick, square foot	4.68	4.00	0.1	-	-	20	-	-	-	-	-
359	Steam drum removal (fossil)	26,079.72	25,934.00	411.6	-	-	480,000	-	-	-	-	-
376	Process ductwork (8'x8' section), inches cut	0.43	0.40	0.01	-	-	0.03	-	-	-	-	-