2.2 Decommissioning and Cleaning

2.2.1 Steam System Draining

All water/steam spaces in the steam turbines and condenser will be drained and opened to permit ventilation. Turbine enclosures will be sealed and locked in place. The boilers will be drained rapidly, from hot condition if possible, and vented as fast as possible to allow water to evaporate. The boilers will be vented through the top and bottom manholes for several days, and then closed tight. All feedwater heaters will be drained and closed. Once these systems have been adequately drained, doors/hatches/openings will be stitch welded shut to prevent possible entry.

2.2.2 Boiler, Precipitator and Ash System Cleaning and Wash Down

Upon shut down of plant, KCP&L staff and vendors will vacuum boilers, precipitators, coal handling and ash systems. Once these systems are cleaned, the boilers and hoppers will be washed down. This cost covers the labor, equipment, and disposal of coal combustion residuals and slag located in this equipment.

2.2.3 Debris and Trash Removal

Upon shut down of the plant, KCP&L staff will remove and dispose of any loose furniture, office materials, trash, and combustible debris from the administration building, boiler house, turbine hall, and out buildings. Should the facility sit idle for an extended period, removing this material will prevent possible fire hazards. This cost estimate assumes that tenant debris will be disposed of at the Courtney Ridge Landfill located in Sugar Creek, MO at a cost of $82 per ton including transportation and disposal.

2.2.4 Fuel Oil, Lubricating, and Hydraulic Systems Drained

Upon shut down of the plant, KCP&L staff will drain approximately 69,500 gallons of fuel oils, lubricants, and hydraulic fluids as identified in the RMA from major systems such as turbine lube oil tanks, gear boxes, motors, and pumps. Igniter oil systems, including the tanks, underground piping, and above grade piping will be drained. Oils and greases located in miscellaneous barrels and containers shall be removed and disposed of as well. This cost includes labor, equipment, and disposal of fuel oils, lubricants, and hydraulic fluids located within the plant.

2.3 Environmental

2.3.1 Asbestos and Non-ACM Insulation Abatement

The cost for the removal of the asbestos-containing material (ACM) has been included in this estimate. The cost for the removal of friable ACM was developed using the quantities extracted (see Table 2-2) from the Power Engineers asbestos survey dated 12/18/17 (found in the Burns & McDonnell RMA). Based on the

- The trailers will be repowered from a distribution line extension. This will include:
    - A distribution line extension from the guard shack to security trailers – seven 40' poles, three 500kVA pole mounted transformers, and 1950' distribution line.
    - Three drops to trailers – three 75kVA transformers with 120V 225A panels, disconnects, and trenching.

A markup of the one-line drawings has been included in Appendix B.

2.1.6 Information Technology and Telecommunications

Sibley Station communications is tied to the rest of the KCP&L network via the Sibley microwave tower located near the 345kV Substation approximately 1.5 miles southeast of the plant. Existing single-mode and multi-mode fiber exists between the plant communications/LAN room, the 69kV Substation, the 161kV Substation, and the microwave building. Assuming the existing fiber infrastructure from the Admin/LAN room and through the 69kV and 161kV to the microwave building is not damaged or removed, this existing communication fiber infrastructure would be unaffected. These stations would continue to communicate via the existing fiber to the microwave facility and thereby would leave opportunities for continued connectivity to the KCP&L network for any remaining security or site monitoring needs. This estimate covers the cost for KCP&L staff to decommission or remove/provision circuits in Operations Technology (OT) and Information Technology (IT) network environments.

2.1.7 Switchyard Upgrades/Changes

The Sibley Switchyard scope of work is outlined below:

- Remove 161kV Unit 3 connection.
    - Remove redundant plant controls from breakers R5-10 and R7-10.
    - Add new bus differential relaying and panel to 161kV control building to protect the resulting open bus.
    - Switch 1088 remains as is, locked open.
- Remove 69kV Unit 1, Unit 2, Start-Up 1 & 2, and Start-Up 3 connections.
    - Plant no longer requires start-up connections.
- Primary station service supply is provided from 69kV yard. Reconfigure the AC system to support the new site configuration.
- There are existing independent DC battery systems for both 161kV and 69kV control buildings.
    - Evaluate and possibly reconfiguration the 69kV DC system.
    - Plant DC system overlap to be reconfigured and removed.
- Provide AC service to "guard shack" from distribution line/pole-mount transformer.

Table 2-1: Mechanical System Dependencies

Fluid/Material Type	System Names	Dependency	Maintain Functionality
Water	Fire Protection	All Units	No
Water	Circulating Water	Units 1/2	No
Water	Circulating Water	Unit 3	No
Water	Service Water	Units 1/2	No
Water	Service Water	Unit 3	No
Water	River Water	All Units	No
Water	Potable Water	All Units	No
Water	Sanitary System	All Units	No

A markup of the existing Process and Instrumentation Diagrams (P&IDs) have been included in Appendix B. The markups include a location for isolation for each system.

2.1.4 Electrical Systems Isolation

Unit 1 and Unit 2 generators operate at 2,400 volts and connect to the 69kV main bus. Unit 1 and 2 startup generator operates at 2,400 volts and connects to the 69kV main bus. Unit 3 generator operates at 22,000 volts and connects to the 161kV bus. Unit 3 startup generator operates at 4,160 volts and connects to the 69kV transfer bus. The generator and startup ties will be disconnected.

- Unit 1 generator tie to 69kV main bus will be isolated by removal of the Unit 1 69kV/13.8kV Generator Step-up Transformer (GSU) and Lock Out Tag Out (LOTO) of the bus disconnect switch 618.
- Unit 2 generator tie to 69kV main bus will be isolated by removal of the Unit 2 69kV/13.8kV GSU and LOTO of the bus disconnect switch 660.
- Unit 1 and 2 startup ties to 69kV startup bus will be isolated by removal of Unit 1 and 2 69kV/2.4kV startup transformer and LOTO of any bus disconnect switch.
- Unit 3 generator tie to 161kV bus will be isolated by removal of Unit 3 161kV/22kV GSU transformer and LOTO of the bus disconnect switch 1088.
- Unit 3 startup tie to 69kV transfer bus will be isolated by removal of the two Unit 3 69kV/4.16kV startup transformers and LOTO of any bus disconnect switch(es).

2.1.5 Electrical Systems Repowering

A landfill leachate system currently in operation will be changed from powered to gravity operation Repowering work will involve:

2.0 RETIREMENT-IN-PLACE SCOPE OF WORK

2.1 System De-Energization

2.1.1 Generator Hydrogen Evacuated

The hydrogen in Units 1 through 3 turbines will be purged by using an inert gas, the inert gas is replaced by air. Carbon dioxide or nitrogen can be used for this purpose, as they do not form combustible mixtures with hydrogen and are inexpensive. Gas purity sensors are used to indicate the end of the purging cycle, which shortens the shutdown time and reduces consumption of the purging gas. Carbon dioxide is favored due to the very high-density difference that easily displaces the hydrogen. The carbon dioxide is admitted to the bottom of the generator first, pushing the hydrogen out at the top. Then air is admitted to the top, pushing the carbon dioxide out at the bottom. Purging is best done with the generator stopped. Any hydrogen bottles/tanks will be removed from the site.

2.1.2 Intake and Discharge Closure

The Units 1, 2, and 3 intakes will be sealed by installing stop logs and then installing a permanent steel or concrete bulkhead and filling the Unit 1, 2, and 3 intake structures with concrete or flowable fill material. The intake structure in the Missouri River will remain, but equipment will be removed from the structure and openings will be permanently sealed and made safe. All underground intake piping will then be abandoned in place. The discharge tunnel associated with Units 1, 2, and 3 will be permanently sealed, as well, by installing a concrete or steel bulkhead and the entire length of the pipe will be filled with concrete or flowable fill to prevent any materials from entering or exiting the structure. All underground discharge piping will then be abandoned in place.

2.1.3 Mechanical Systems Isolation

Units 1, 2, and 3 service water and circulating water systems are operated independently while boiler makeup water is fed by a common system. Once the intake structure is sealed as mentioned in Section 2.1.2; the main water systems will be isolated including the fire protection system which is part of the filtered water on-site. Table 2-1 lists the main systems for Units 1, 2, and 3 that will be isolated and their unit dependency.

Once the production rates and material quantities were established, hourly labor and equipment costs were applied as well as disposal and recycling fees. Current market labor and equipment rates, disposal fees, and scrap quantities were verified through local scrap steel recycling outlets and landfills.

Backfill and topsoil materials are assumed to be readily available from an on-site borrow source and industry accepted unit rates were used for grading and seeding of the demolition areas. Flowable fill material is being proposed to seal the intake and discharge structures. These unit rates were based on past experience/judgments from similar projects and verified through review of RS Means national average costs for these activities.

Where information was available on quantities of regulated materials, asbestos, and universal waste, a bottom up estimate was developed for the removal and disposal of these items. Where information was not available, costs were developed using the qualifications, judgments, and industry experience of Burns & McDonnell's staff when performing similar work on facilities of a similar type, size, and vintage.

1.5 Statement of Limitation

Estimates and projections prepared by Burns & McDonnell relating to schedules, performance, construction costs, recovery costs, and operating and maintenance costs are based on our experience, qualifications, and judgment as a professional consultant. Since Burns & McDonnell has no control over weather, cost and availability of labor, material and equipment, labor productivity, contractor's procedures and methods, unavoidable delays, contractor's method of determining prices, economic conditions, government regulations and laws (including interpretation thereof), competitive bidding and market conditions or other factors affecting such estimates or projections. Burns & McDonnell does not guarantee that actual rates, costs, performance, schedules, etc., will not vary from the estimates and projections prepared by Burns & McDonnell.

Decommissioning costs include the removal of fuels, chemicals, greases, and lubricants drained from equipment along with cleaning of coal and ash from boilers, precipitators, and ash handling equipment. It is assumed that the majority of draining and cleaning work will be performed in house with KCP&L staff. Industry accepted unit rates or built up production rates and crews were applied to the tasks and quantities of materials to be drained, cleaned, removed, transported, and disposed of to determine the total retirement-in place cost.

To minimize hazards that can exist at an idled facility, KCP&L will also perform limited demolition work. The following facility and structures will be demolished:

- Unit 1 and 2 Precipitators and Ductwork
- Chimney
- Coal Conveyors and Handling Equipment

The costs for the retirement-in-place scenario includes abatement of asbestos and non-asbestos insulation and the costs of de-energizing mechanical and electrical equipment (see Appendix A) to remove the plant from service. Costs for the closure of the CCR impoundments and landfill are also included in the RIP estimate. The retirement-in-place cost also includes annual property tax, utilities, security, operation and maintenance costs assumed for the Plant as provided by KCP&L.

1.4.2 Full Demolition

The indicative full demolition estimate was developed using a "bottom up" approach, where the cost estimate is a result of site-specific quantity estimates. This estimate was based on as-built drawings (showing site layout); equipment general arrangement drawings; plant elevation drawings; and a site visit performed on November 15, 2017, where Burns & McDonnell developed a comprehensive list of the facilities to be demolished as well as the tasks associated with each of the demolition activities.

Once these tasks were developed, Burns & McDonnell used the information obtained during the site visit, as well as the plant as-built drawings, to quantify the building materials associated with each structure at the site. The materials quantified included construction and demolition debris, concrete, and ferrous and non-ferrous steel. Once building materials were quantified, industry standard demolition means and methods were applied to calculate the production rate at which demolition labors and equipment could safely and efficiently demolish the structures. The means, methods, and production rates were based on the judgments and expertise of Burns & McDonnell's subject matter experts. Most of the structures were assumed to be demolished using conventional labor and heavy equipment to remove structures to grade. As part of this estimate, implosion methods are being proposed to bring the boilers and chimney down.

1.3 Full Demolition Estimate

The base and upper bound estimated cost for full demolition are shown in Table 1-2.

Table 1-2: Summary of Base Case Full Demolition Costs

Cost Category*	Structure/Utilities Retirement	CCR Closure	Non-CCR Closure	TOTAL
Base Case Estimated Cost	$ 17,855,000	$ 8,170,000	$ 1,687,000	$ 27,712,000
Upper Bound Estimated Cost	$ 37,451,000	$ 10,811,000	$ 2,883,000	$ 51,145,000

** - Costs include direct, indirect, contingency and estimated owners costs*

The upper bound costs include the base case items along with the following:

- Slab and Foundation Demolition (to 2 feet below grade)
- Backfill from On-Site Borrow Source
- Asphalt Removal
- Fine Grading and Seeding
- Removal and Disposal of PCB coated Galbestos
- Units 1 thru 3 ACM Boiler Internals Abatement
- PCB Building Material Abatement

1.4 Estimating Methodology

1.4.1 Retirement-in-Place

Indicative retirement-in-place costs were developed using information provided by KCP&L and data collected by Burns & McDonnell in the *Sibley Generating Station Regulated Materials Assessment (RMA)*, dated March 2018 (Burns & McDonnell 2018) as well as a site visit performed on November 15, 2017. Burns & McDonnell estimated quantities of regulated materials based on a visual inspection of the facilities along with Burns & McDonnell's professional judgment. In the RMA, Burns & McDonnell staff walked the plant and created an inventory of regulated materials identified during the survey. This inventory was used to estimate the quantities of materials and the tasks required to be performed for the retirement-in-place effort. A KCP&L staff labor rate of $71.25 per hour was provided by KCP&L and current equipment, and unit pricing was then developed for each task. Unit pricing was developed for each site based on the labor rates, equipment costs, and disposal costs specific to the general area in which the work is to be performed.

1.0 EXECUTIVE SUMMARY

1.1 Summary/Introduction

Kansas City Power & Light Company (KCP&L) retained Burns & McDonnell Engineering Co., Inc. (Burns & McDonnell) to develop a scope of work (SOW) and associated cost estimate for the retirement-in-place (RIP) and full demolition of the Sibley power plant located on East Johnson Rd., Sibley, Missouri. The purpose of this document is to provide an initial RIP and full demolition scope of work and associated estimate for the Units 1 through 3, turbine hall, precipitators, coal handling, out buildings, and associated equipment.

Burns & McDonnell understands that a complete retirement of the Sibley Station will occur at the end of 2018. Two scope of work scenarios are being consider for the Sibley Station retirement, scenario one (1) is to put the plant in a cold, dark, and safe condition where it will remain in an idled condition indefinitely. Scenario two (2) is to perform a full demolition of the facility and restore the site to a flat, level condition.

1.2 Retirement-in-Place Estimate

The minimum, base and upper bound estimated costs for the one-time and annual retirement-in-place costs are shown in Table 1-1.

Table 1-1: Summary of Minimum, Base and Upper Bound Retirement-in-Place Costs

Cost Category*	Structure/Utilities Retirement	CCR Closure	Non-CCR Closure	TOTAL	Annual RIP Costs
Minimum Estimated Cost	$ 3,396,000	$ 8,170,000	$ 1,687,000	$ 13,253,000	$ 353,000
Base Case Estimated Cost	$ 20,693,000	$ 8,170,000	$ 1,687,000	$ 30,550,000	$ 353,000
Upper Bound Estimated Cost	$ 37,370,000	$ 10,811,000	$ 2,883,000	$ 51,064,000	$ 378,000

** - Costs include direct, indirect, contingency and estimated owners costs*

Abbreviation	Term/Phrase/Name
O&M	Operations and Maintenance
OT	Operational Technology
PCB	Polychlorinated Biphenyl
P&ID	Process and Instrumentation Diagrams
PPM	Parts per Million
RMA	Regulated Materials Assessment
RIP	Retirement-in-Place
SOW	Scope of Work
SY	Square Yard
SPCC	Spill Prevention, Control and Countermeasure Plan
T&D	Transportation and Disposal
TSCA	Toxic Substances Control Act
V	Volt

LIST OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Term/Phrase/Name</u>
A	Ampere
AC	Alternating Current
ACM	Asbestos Containing Material
C&D	Construction and Demolition Debris
CCR	Coal Combustion Residuals
CIP	Critical Infrastructure Protection
CFC	Chlorofluorocarbon
CY	Cubic Yards
DC	Direct Current
GSU	Generator Step-Up Transformer
HDPE	High-Density Polyethylene
IDS	Intrusion Detection System
IT	Information Technology
KCP&L	Kansas City Power & Light
kV	Kilovolt
kVA	Kilovolt-Amp
LLDPE	Linear Low-Density Polyethylene
LOTO	Lockout Tagout

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Sibley Station Retirement Scope and Cost Estimate

prepared for

Kansas City Power & Light
Sibley Station Retirement Scope and Cost Estimate

Sibley, Missouri

Project No. 103871

Revision 1
4/12/2018

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, MO

BURNS McDONNELL

Sibley Station Retirement Scope and Cost Estimate

KCP&L
energizing life

Kansas City Power & Light Company

Sibley Station Retirement Scope and Cost Estimate

Project No. 103871

Revision 1
4/12/2018

KCPL GMO
Case Name: 2019 Sibley Accounting Order Request/Complaint
Case Number: EC-2019-0200

Response to Schallenberg Bob Interrogatories - OPC_20190530
Date of Response: 6/19/2019

Question:1037

Was a $20 to $58 million range of retirement costs for the Sibley Generating Station provided at this meeting? If no, what is the current expected range for retirement costs for the Sibley Generating Station? Please provide copies of all the management studies that considered these costs in evaluation of the decision to retire the Sibley Generating Station.

Response:

At the November 1, 2018 meeting, a range of $20 to $58 million was provided for retirement cost. The Burns & McDonnell report Sibley Station Retirement Scope and Cost Estimate is attached.

Information Provided By:
Richard Pearce, PE, Manager of Engineering –

ATTACHMENT:
Q1037 – Burns and McDonnell report - Sibley Station Retirement Scope and Cost Estimate
Q1037_Verification.pdf

KCPL GMO
Case Name: 2019 Sibley Accounting Order Request/Complaint
Case Number: EC-2019-0200

Response to Schallenberg Bob Interrogatories - OPC_20190530
Date of Response: 6/19/2019

Question:1031

What is the cash flow impact of the MECG and OPC's accounting order on GMO for years 2019 thru GMO next expected rate case?

Response:

Based upon the deferral requested by MECG and OPC there is no near-term cash impact, however there is a potential for a significant earnings impact.

Response by: Ronald Klote, Director Regulatory Affairs

Attachment: Q1031_Verification.pdf