DRAFT REV. D

EPC COST - BASIS OF ESTIMATE

B&V PROJECT NO. 195523
B&V FILE NO. 10.2300

PREPARED FOR

VECTREN Power Supply

Vectren Power Supply, Inc.

15 MARCH 2018

BLACK & VEATCH

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Executive Summary

The following is a progress report for the EPC Definitive Cost Estimate for the A.B. Brown Combined Cycle for the self-build Options. The cost estimates contained in this report are based on the preliminary design by Black & Veatch, equipment pricing bids from suppliers of power island and balance of plant equipment, and pricing from competitive bids for the construction costs. Power island equipment includes the combustion turbine(s), steam turbine, and HRSG(s).

The ten plant alternatives that were estimated are as follows:

F CLASS 2X1 CCPP	H CLASS 1X1 CCPP
GE 7F.05 Unfired GE 7F.05 Fired	GE 7HA.02 Fired
Siemens SGT6 - 5000F Fired	Siemens SGT6 - 8000H Fired
MHPS GAC Fired	MHPS JAC Fired

1.0 Estimate Updates from +/- 10% Equipment, +/-30% Construction Issue

The following major updates have been made since the previous issue:

- **GE Engineered Equipment Package (EEP) Pricing** – Updates for the GE unfired pricing were requested. GE provided updated power island equipment pricing for the 2x1 7F.05 unfired and fired cases. GE indicated that these updates represented correction of errors in the original pricing bids where scope was indicated as included, but was not. The updates represented an increase from their Sept 2016 proposal for the unfired equipment and from their April 2017 proposal for the fired equipment. Wet compression was removed from the design basis, GE informed that the cost for wet compression was not included in the previous revision.
- **Switchyard Estimate/Allowance** – The previous estimate assumed that no upgrades would be required for the switchyard and only included costs to connect the generators to the existing switchyard. Since June a load flow and short circuit analysis has been completed showing that costs need to be included for connecting to the existing switchyard as well as switchyard upgrades including replacement of the existing twenty circuit breakers, the installation of one additional circuit breaker in the open position of existing Bay 6 and a new two position Bay 7. This will accommodate connection of all new CCPP generation to the 138 kV switchyard and the new transmission line to Pigeon Creek while allowing the existing connections to A.B. Brown Units 1 and 2 to remain. An estimate has been included for the F Class options.

  Preliminary results indicate the 1x1 options and M501 JAC options will require that the connection to the 345 kV lines. The basis for the switchyard estimate for these options is connecting both combustion turbine generators to the existing 138 kV switchyard and the steam turbine generator to the existing 345 kV switchyard. Upgrades to the existing 138 kV switchyard include replacement and the addition of a new Bay 7. Costs are also included to expand the existing 345 kV ring bus, including connection to the steam turbine generator and a steam turbine generator high side circuit breaker.
- **Construction** – Construction costs have been updated as a result of the construction services competitive bid. The estimate includes a multiple subcontract approach whereby the most competitive bid for civil, mechanical, and electrical construction work was selected. The construction management costs were updated from a self-perform (direct-hire) EPC approach to a multiple subcontract EPC approach. A multiple subcontract approach accounts for subcontractor G&A/Fee as well as the additional construction management required to coordinate the multiple subcontracts.

- **Indirects** – Based on the construction services bids. Indirect costs were updated to match current market conditions for categories such as scaffolding costs and small tools.
- **Heavy Haul Transportation** – OEM equipment price was based on delivery to the nearest rail siding. Previously, a [redacted] allowance was included for the heavy haul contractor to get from the nearest rail siding to site. Vectren has now obtained a quote from [redacted] for delivery of the equipment from the [redacted] port to site. The previous [redacted] allowance was replaced by the [redacted] estimate from [redacted] for the F-Class 2x1, and [redacted] for the H-Class 1x1 [see Open Item 3.8].
- **Gas Compression-** Previous estimates included a [redacted] evaluation factor for on-site gas compression for Siemens and MHPS options. The latest information on the gas supply shows that on-site gas compression is only required for MHPS options. Costs for on-site gas compression have been obtained for MHPS options and the allowance has been replaced.
- **Condenser and Cooling Tower Pricing** –Pricing was updated to reflect the differences in heat rejection systems (condenser and cooling tower) for MHPS and Siemens machines.

2.0 Estimate Basis

The cost estimate is based on a +/-10 percent accuracy for engineering, equipment and construction costs. Switchyard scope is based on a Class 4 cost estimate.

The cost estimate is based upon a lump-sum turnkey EPC approach. Under this approach, the EPC contractor would have the responsibility for payment and performance of the power island equipment. The EPC structure used for the estimate is based upon the EPC contractor using multiple subcontractors rather than self-performing the work.

The cost estimates are based on competitive bids obtained for major equipment and construction services, as well as detailed material takeoffs based on the preliminary design of the A.B. Brown combined cycle with reference to similar sized plants that Black & Veatch has designed, constructed, and/or estimated on an EPC basis, and supplemented with knowledge of the markets and industry conditions for commodity pricing and minor equipment.

The estimate provided herein is based on preliminary information, and as such is to be considered a non-binding price opinion, and does not represent an offer to sell or a maximum price for the work scope. The estimate assumes moderate level of EPC commercial risk position and does not include specific pricing or schedule impacts for extensive site preparation. Other factors that can impact the price:

- Changes in labor market - A Labor Market Survey was compared against local contractor pricing for basis of this estimate.
- Final site conditions - Soil boring were secured for the proposed site.
- Noise requirements - Night-time steam blow conditions were assumed.
- Final project schedule - Project Schedule: Starts July 2020, Commercial June 2023.

2.1 QUANTITIES

Quantities that form the basis of the estimate were provided by developing engineering bill of quantities (BOQ) deliverables. Engineered quantities were developed based on detailed information and specific site conditions. Where details were not available, assumptions were made based on similar sized plants and arrangements.

2.2 MATERIAL

For equipment, specifications for equipment over one million dollars ($1,000,000) were developed and the equipment was competitively bid to qualified suppliers. Bid tabulations were developed to evaluate the bids for completeness, scope, and adherence to the specification. The lowest evaluated bid was selected to use as the basis of the estimate.

Power island equipment costs were obtained for all configurations. For other major equipment, estimates were based on the GE designs. Adjustments were made to other configurations to account for differences between options as required.

2.3 LABOR

The BOQ's for the GE7FA.05 Fired 2x1 combined cycle were sent to multiple local and regional contractors to provide input regarding their understanding of the cost to perform the work. The GE 7FA.05 option was selected due to contractor experience with F-Class combustion turbines and the balance of plant equipment.

When the bids were received, their pricing was analyzed and a contractor for each scope of work was deemed most competitive to perform the work, by discipline. The pricing for that scope of work was included in the estimate (Civil/Structural, Mechanical/Pipe, and Electrical/Instrumentation). The contractors based the execution on recent experience performing union labor in the region. No extreme site conditions or labor circumstances were anticipated. Black & Veatch conducted a labor survey of craft availability and wage rates to analyze the local labor market and compared that to the contractors. A 50-hr work week is the basis of the wage rates, with no craft per diem included.

The contractor indirects were internally estimated for each scope of work since each contractor provided overall indirects to perform the entire construction scope of work.

2.4 INDIRECTS

Construction management and indirects were estimated based on Black & Veatch's experience with similar plants and scopes of work as well as comparison against the construction services bids. Based on the site visit, project specific construction indirect costs were added to align with the scope. Costs were estimated for the construction laydown area and parking facilities including covered operations parking and ramp for accessing the laydown area. Costs for temporary utilities were included for set-up and costs of a temporary construction transformer to be used for site electricity during construction was also included. Field offices for the owner and EPC contractor were included. Estimates were incorporated for heavy lifts of the major pieces of OEM equipment.

Insurances and a letters of credit are included, based on typical EPC requirements.

2.5 CONTINGENCY

[redacted]

[redacted]

This results in an unallocated line item contingency of 6.5 percent in the estimate.

[redacted]

-- Attorney/Client Communication/Work Product --
-- Prepared in Anticipation of Litigation --

[redacted]

DRAFT REV. C

EPC COST - BASIS OF ESTIMATE

Partnership Study

B&V PROJECT NO. 195523
B&V FILE NO. 10.2300

QPREPARED FOR

VECTREN Power Supply

Vectren Power Supply, Inc.

15 MARCH 2018

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Executive Summary

The following is a progress report for the EPC Definitive Cost Estimate for the A.B. Brown Combined Cycle (CPCN Project) for the Partnership. The cost estimates contained in this report are based on the preliminary design by Black & Veatch, equipment pricing bids from suppliers of power island and balance of plant equipment, and pricing from competitive bids for the construction costs. Power island equipment includes the combustion turbine(s), steam turbine, and HRSG(s).

The four plant alternatives that were estimated are as follows:

H CLASS 2X1 CCPP
GE 7HA.02 UNFIRED
GE 7HA.01 Fired
Siemens 8000H Fired
MHI 501JAC Unfired

1.0 Estimate Basis

The cost estimate is based on a +/-10 percent accuracy for engineering, equipment and construction costs. Switchyard scope is based on a Class 4 cost estimate.

The cost estimate is based upon a lump-sum turnkey EPC approach. Owner will purchase Power Island Equipment and fully assign to EPC contractor. Under this approach, the EPC contractor would have the responsibility for payment and performance of the power island equipment. The EPC structure used for the estimate is based upon the EPC contractor using multiple subcontractors rather than self-performing the work.

The cost estimates are based on competitive bids obtained for major equipment and construction services, as well as detailed material takeoffs based on the preliminary design of the A.B. Brown combined cycle with reference to similar sized plants that Black & Veatch has designed, constructed, and/or estimated on an EPC basis, and supplemented with knowledge of the markets and industry conditions for commodity pricing and minor equipment.

The estimate provided herein is based on preliminary information, and as such is to be considered a non-binding price opinion, and does not represent an offer to sell or a maximum price for the work scope. The estimate assumes moderate level of EPC commercial risk position and does not include specific pricing or schedule impacts for extensive site preparation. Other factors that can impact the price:

Changes in labor market - A Labor Market Survey was performed and was compared against local contractor pricing for basis of this estimate.
Final site conditions - Soil boring were secured for the proposed site.
Noise requirements - Night-time steam blow conditions were assumed.
Final project schedule.

1.1 QUANTITIES

Quantities that form the basis of the estimate were provided by developing engineering Bill of Quantities (BOQ) deliverables. Engineered quantities were developed based on detailed information and specific site conditions. Where details were not available, assumptions were made based on similar sized plants and arrangements.

1.2 MATERIAL

For equipment, specifications for equipment over one million dollars ($1,000,000) were developed and the equipment was competitively bid to qualified suppliers. Requests for bid were sent out for both GE 7HA.01 fired and GE 7HA.02 unfired options. Bid tabulations were developed to evaluate the bids for completeness, scope, and adherence to the specification. The lowest evaluated bid was selected to use as the basis of the estimate.

Power island equipment costs were obtained for all configurations. For other major equipment, estimates were based on the GE designs. Adjustments were made to other configurations to account for differences between options as required.

Heat rejection systems were sized for each option. Pricing for the cooling tower and condenser was adjusted to reflect the differences in heat rejection systems (condenser and cooling tower) for MHPS and Siemens machines.

1.3 SWITCHYARD

The basis for the switchyard estimate is connecting both combustion turbine generators to the existing 138 kV switchyard and the steam turbine generator to the existing 345 kV switchyard. Load flow and short circuit analyses indicate costs need to be included for connecting to the existing 138 kV switchyard as well as switchyard upgrades. Upgrades to the existing 138 kV switchyard include replacement of all twenty existing circuit breakers, the addition of one new circuit breaker in the open Bay 6 position and the addition of a new Bay 7. Costs are also included to expand the existing 345 kV ring bus, including connection to the steam turbine generator and a steam turbine generator high side circuit breaker. Costs associated with adding a new autotransformer between the existing 138 kV and 345 kV switchyard are not included in the base of the estimate, but are included as an option. An estimate has been included for the H Class 2x1 options.

1.4 LABOR

Construction costs have been updated as a result of the construction services competitive bid. The estimate includes a multiple subcontract approach whereby the most competitive bid for civil, mechanical, and electrical construction work was selected. The construction management costs were updated from a self-perform (direct-hire) EPC approach to a multiple subcontract EPC approach. A multiple subcontract approach accounts for subcontractor G&A/Fee as well as the additional construction management required to coordinate the multiple subcontracts.

The BOQs for the GE HA.02 Unfired 2x1 combined cycle were sent to multiple local and regional contractors to provide input regarding their understanding of the cost to perform the work.

When the bids were received, their pricing was analyzed and a contractor for each scope of work was deemed most competitive to perform the work, by discipline. The pricing for that scope of work was included in the estimate (Civil/Structural, Mechanical/Pipe, and Electrical/ Instrumentation). The contractors based the execution on recent experience performing union labor in the region. No extreme site conditions or labor circumstances were anticipated. Black & Veatch conducted a labor survey of craft availability and wage rates to analyze the local labor market and compared that to the contractors. A 50-hr work week is the basis of the wage rates, with no craft per diem included.

The contractor indirects were internally estimated for each scope of work since each contractor provided overall indirects to perform the entire construction scope of work.

Because only the GE 7HA.02 BOQ was sent to the contractors, adjustments were made to the other arrangements (see estimate basis for list of configurations) based on Black & Veatch's experience. Black & Veatch estimated the quantity and labor for all configurations. To adjust for

different OEM's and configurations, the differences between the construction service bids and the Black & Veatch estimate for the GE 7HA.02 option were reviewed and adjustments were made based on these differences. This was done on a discipline basis in the following categories:

Civil

Sitework
Concrete

Mechanical

Buildings
Steel
Mechanical Equipment
- CTG
- HRSG
- STG
- BOP Equipment

Pipe

Electrical

Electrical
Instrumentation

The construction staff plan includes providing the following positions:

Project Field Manager
- Civil/Structural Superintendent
- Mechanical/Pipe Superintendent
- Electrical/Instrumentation Superintendent
- Cost Engineer
- Field Scheduler
- Materials Manager
- Contracts Administrator
- QC Manager
- Construction Turnover Coordinator
- Safety & Health Manager
- Administrative Assistant

Field Engineering Manager
- Civil Field Engineer
- Structural Field Engineer
- Pipe Field Engineer
- BOP Mechanical Field Engineer
- CT/ST/HRSG Field Engineer

- Electrical Field Engineer
- I&C Field Engineer

Start-up Manager

- 3 Mechanical Start-up Engineers
- 2 I&C Start-up Engineers
- 2 Electrical Start-up Engineers
- 2 DCS Start-up Engineers
- 4 Start-up Operations Supervisors
- Start-up Turnover Coordinator
- Start-up LOTO Coordinator

1.5 INDIRECTS

Construction management and indirects were estimated based on Black & Veatch's experience with similar plants and scopes of work as well as comparison against the construction services bids.

Heavy haul transportation was based on Vectren obtained quote from Barnhart for delivery from the gulf port to site. Power Island Bids were based on delivery to the nearest rail siding. Power Island Bids were adjusted to reflect delivery to the port as the OEMs had not performed detailed analysis of the delivery plan. [See Open Item 2.9].

Based on the site visit, project specific construction indirect costs were added to align with the scope. Costs were estimated for the construction laydown area and parking facilities including covered operations parking and ramp for accessing the laydown area. Costs for temporary utilities were included for set-up and costs of a temporary construction transformer to be used for site electricity during construction was also included. Field offices for the owner and EPC contractor were included. Estimates were incorporated for heavy lifts of the major pieces of OEM equipment.

Insurances and a letters of credit are included, based on typical EPC requirements.

1.6 CONTINGENCY

[redacted]

[redacted]

This results in an unallocated line item contingency of 6.5 percent in the estimate.

[redacted]

[redacted]