GENERATOR INTERCONNECTION

FEASIBLITY STUDY REPORT

for integration of the proposed

1050 MW [redacted] PROJECT

(GI PROJECT #570)

to the

IDAHO POWER COMPANY ELECTRICAL SYSTEM

in

JEROME, LINCOLN, and MINIDOKA COUNTIES; IDAHO

for

[redacted]

Report v.0

June 12, 2020

Table of Contents

1.0 Introduction

[redacted] has contracted with Idaho Power Company ("Transmission Provider") to perform a Generator Interconnection Feasibility Study for the integration of the proposed 1050 MW [redacted] wind project (Project). The Project's location is in Idaho Power Company's (IPC's) Southern Region in Jerome, Lincoln, and Minidoka Counties; Idaho. The project is Generation Interconnect (GI) queue number 570 (GI #570). The project has chosen in the Feasibility Study to be studied as both an Energy Resource (ER) Interconnection Service and a Network Resource (NR) Interconnection Service.

The Project has applied to connect to the Idaho Power's transmission system for an injection of 1050 MW at a single Point of Interconnection (POI) at 500kV at Idaho Power's [redacted] bus.

IPC projects queue GI #530, GI #551, GI #557, GI #561, and GI #568 are senior queued project in the affected area of IPC's transmission system and the facilities and subsequent cost to integrate the 1050 MW GI #570 [redacted] project is contingent on these projects' integration facilities.

This report documents the basis for and the results of this Feasibility Study for the GI #570 Generation Interconnection Customer. The report describes the proposed project, the determination of the project interconnection requirements and estimated costs for integration of the project to the Transmission Provider transmission system. This report satisfies the feasibility study requirements of the Idaho Power Tariff.

2.0 Summary

The feasibility of interconnecting the GI #570 1050 MW generation project to the Transmission Provider's transmission system was evaluated. GI #570 can be interconnected to the Idaho Power transmission system. The Point of Interconnection (POI) is located at Idaho Power's [redacted] station.

A System Impact Study is required to determine if any additional network upgrades are required to integrate this project into the IPCo transmission system and to evaluate full system impacts (thermal, voltage, transient stability, reactive margin). Generator interconnection service (either as an Energy Resource or a Network Resource) does not in any way convey any right to deliver electricity to any specific customer or point of delivery.

GI #570 will be required to control voltage in accordance with a voltage schedule as provided by Idaho Power Grid Operations. GI #570 will be required to manage the real power output of their generation project at the POI. Also, it may be beneficial for [redacted] for their own modeling compliance requirements, to install additional PMU devices at their facilities to monitor the generation source(s).

The total "Energy Resource Interconnection Service" generation interconnection preliminary cost estimate to interconnect the project to the primary study POI is as follows:

- Energy Resource Interconnection Service at proposed 500kV POI - **$6,613,855**

See Section 6.5 Energy Resource Cost Estimate for the required Energy Resource facilities and cost breakdowns.

The total "Network Resource Interconnection Service" generation interconnection preliminary cost estimate to interconnect the [redacted] project is as follows:

- Network Resource Interconnection Service - **$42,011,338**
    - This does not include costs for required facilities from senior queued GI #530, GI #551, GI #557, GI#561, and GI#568 projects (See Appendix B).

See Section 7.5 Network Resource Cost Estimate for the required Network Resource facilities and cost breakdowns. The cost estimate includes a 20% contingency and 8.5% overhead. These are cost estimates only and final charges to the customer will be based on the actual construction costs incurred. It should be noted that the preliminary cost estimates do not include the cost of the customer's owned equipment.

The schedule for designing, procuring, and constructing facilities will be developed and optimized during the Facility Study should the generation interconnection customer choose to move to that study phase of the interconnection process.

3.0 Scope of Interconnection Feasibility Study

The Interconnection Feasibility Study was done and prepared in accordance with the Transmission Provider's Standard Generator Interconnection Procedures to provide a preliminary evaluation of the feasibility of the interconnection of the proposed generating project to the Idaho Power system. As listed in the Interconnection Feasibility Study agreement, the Interconnection Feasibility Study report provides the following information:

- preliminary identification of any circuit breaker short circuit capability limits exceeded because of the interconnection;
- preliminary identification of any thermal overload or voltage limit violations resulting from the interconnection; and
- preliminary description and non-binding estimated cost of facilities required to interconnect the Large Generating Facility to the IPC System and to address the identified short circuit and power flow issues.

All other proposed Generation projects prior to this project in the Generator Interconnect queue were considered in this study. A current list of these projects can be found in the Generation Interconnection folder located on the Idaho Power web site at the link shown below:

http://www.oatioasis.com/ipco/index.html.

4.0 Contingent Facilities

GI #570 Energy Resource, ER, Interconnection Service at the 500kV POI is contingent upon upgrades associated with the senior queued project #530. Because GI #530 generation interconnection plan of service is to split the [redacted] line ([redacted] and [redacted] lines), the [redacted] series compensation was required to be replaced, and with part of the existing series compensation in the form of a new [redacted] series capacitor bank relocated to [redacted] in the [redacted] line. If GI #530 in-service date is delayed and/or withdraws their project, GI #570 will be responsible for some or all the [redacted] series compensation replacement. And, because of GI #570 [redacted] station interconnection, the [redacted] series capacitor would likely be identified in the System Impact Study as being needed to be replaced due to its size i.e. current rating.

IPC projects queue GI #530, GI #551, GI #557, GI #561, and GI #568 are senior queued project in the affected area of IPC's transmission system. Idaho Power studied GI #570 with all Network Upgrades identified for GI #530, GI #551, GI #557, GI #561, and GI #568 modeled as in service (Contingent Facilities). Contingent Facilities for each of these GI projects are detailed in Appendix B. Changes to senior queued projects including in-service

date and withdrawal from the queue, may trigger a restudy associated with GI #570 Network Resource, NR, service, (some or all the network upgrades identified for GI #530, GI #551, GI #557, GI #561, and GI #568 may be required by GI #570).

5.0 Description of Proposed Generating Project

Assumptions

The primary point of interconnection for GI #570 is at Idaho Power's [redacted] station. GI #570 Project's is a wind generation project with a maximum 1050 MW delivered at the POI. The Project's location is in Idaho Power Company's (IPC's) Southern Region in Jerome, Lincoln, and Minidoka Counties; Idaho. The Project's Commercial Operation Date (COD) is December 1, 2023.

GI #570

- One 11.7-miles 500kV transmission line (Project to POI)
- Two 500/230kV station transformers with a 383/510/637 MVA capacity each
- Five 230kV lines with lengths ranging from 4.9 to 18.0 miles
- Five 230/34.5kV GSU transformers from 225 to 285 MVA
- 363 GE 3.03-140 wind turbines – 3.189/3.03 MVA/MW with a Power Factor 0.95 dispersed among the five Collector Stations (C, D, K, O, and W)
- Total plant limited to 1050 MW at the 500kV POI
- All generation in voltage regulation (Reactive capability used to regulate voltage – supply/absorb reactive)

6.0 Energy Resource (ER) Interconnection Service

Energy Resource (ER) Interconnection Service allows the Interconnection Customer to connect its Generating Facility to Transmission Provider's transmission system and to be eligible to deliver electric output using firm or non-firm transmission capacity on an as available basis.

The GI #570 project has applied to connect to the Idaho Power transmission system for an injection of 1050 MW with a new 500kV line-terminal at Idaho Power's [redacted] station. All generation projects in the area ahead of this project in the IPC generation queue and their associated transmission system improvements were modeled in a preliminary power flow analysis to evaluate the feasibility of interconnecting GI #570.

6.1 Description of Substation/Transmission Facilities

As an Energy Resource, a Transmission Service Request will be required to determine the specific Network Upgrades required to deliver the project output to a designated point of delivery. A System Impact Study will be required to determine the specific network upgrades

required to integrate the project. Listed below are the required transmission facilities to interconnect the Project.

Substation/Transmission Interconnection Facilities:

The proposed generation interconnection will require a new [redacted] line terminal bay which requires two 500kV breakers.

The actual station layout and detailed equipment requirements will be determined in the Facility Study should the interconnection customer choose to move to that study phase of the interconnection process.

6.2 Description of Distribution Facilities

No distribution facilities are directly impacted by this project.

6.3 Short Circuit Study Results

The short circuit/fault duty at the GI #570 POI 500kV bus location (with/without GI #570 modeled) is as follows:

Fault Study (w/o GI #570)			
Location	**SLG (A)**	**LTL (A)**	**3PH (A)**
[redacted]	12,984	12,279	14,272

Fault Study (w/ GI #570)			
Location	**SLG (A)**	**LTL (A)**	**3PH (A)**
[redacted]	14,334	12,586	14,598

Studies indicate that there is adequate load and short circuit interrupting capability on the Transmission Provider's existing 500kV breakers after this project is interconnected.

6.4 Electric System Protection Results and Grounding Requirements

For 500kV line protection, the Transmission Provider's System Protection Department utilizes permissive and line differential protection schemes integrated with our existing digital communication infrastructure. Digital communication infrastructure for the interconnection customer's 500kV line terminal will be the responsibility of said interconnection customer.

The project single line does not indicate the winding configuration on the 500kV side of the 500/230kV transformers. Idaho Power requires a wye grounded connection on the high side and delta included in the transformer to create a solid ground path for the transmission system. This can be achieved with auto-transformers with a delta tertiary which is a source of

ground current, other configurations can and do exist. Refer to Appendix A, Section 3.0, for additional protection and grounding requirements.

6.5 Energy Resource Cost Estimate

In Table 1 below a summary is provided of the generation interconnection facilities and conceptual costs required to interconnect the GI #570 project to the Transmission Provider's transmission system as an Energy Resource.

GI #570 [redacted] Project **Energy Resource Generation Interconnection Facilities**	
Direct Assigned	**Cost**
None	$0
Network Assigned	
[redacted] Station New 500kV Line Terminal Bay (with two 500kV breakers)	$5,079,766
Subtotal	**$5,079,766**
Contingencies (~20.0%) (1)	$1,015,953
Subtotal	**$6,095,719**
Overheads (~8.5%) (2)	$518,136
Energy Resource – Total Estimated Cost (3)	**$6,613,855**

Table 1. Estimated GI #570 Project's Energy Resource Generation Interconnection Costs

(1) Contingency is added to cover the unforeseen costs in the estimate. These costs can include unidentified design components, material cost increases, labor estimate shortfalls, etc.
(2) Overhead costs cover the indirect costs associated with the Project.
(3) This cost estimate includes direct equipment, material, labor, and overheads as shown.

- Note that these estimates do not include the cost of the customer's equipment/facilities or required communication circuits for SCADA, PMU, and metering.
- Note that the overhead rates are subject to change during the year.
- These are estimated costs only and final charges to the customer will be based on the actual construction costs incurred.
- These are non-binding conceptual level cost estimates that will be further refined upon the request and completion of the Facility Study.

The schedule for designing, procuring, and constructing facilities will be developed and

optimized during the Facility Study should the generation interconnection customer choose to move to that study phase of the interconnection process.

7.0 Network Resource (NR) Interconnection Service

Network Resource Interconnection Service allows the Interconnection Customer to integrate its Generating Facility with the Transmission Provider's Transmission System in a manner comparable to that in which the Transmission Provider integrated its generating facilities to serve native load customers. The transmission system is studied under a variety of conditions to determine the transmission improvements/upgrades which are necessary. Network Resource Interconnection Service in and of itself does not convey Transmission Service.

7.1 Network Resource Single Event Exposure

If the full 1050 MW Project elects to move forward as an Idaho Power Network Resource, consideration must be given to the amount of generation that can be lost due to a single event (for example a single 500kV line outage, bus fault, or breaker failure). Loss of 1050 MW of generation is well beyond Idaho Power's current capability.

Section 23 and Section 24 of Business Practices, Waivers, and Exemptions on the Idaho Power OASIS site discusses Capacity Benefit Margin (CBM) and Transmission Reliability Margin (TRM) respectively. These business practices are in accordance with Idaho Power's OATT, Commission orders, Commission regulations, and Commission approved NERC Standards. Idaho Power currently reserves 330 MW of CBM based upon Idaho Power's Most Severe Single Contingency (MSSC). Moreover, Idaho Power's contingent operating reserves are also based on the MSSC. As a Network Resource Idaho Power cannot tolerate a single contingency loss of GI #570 1050 MW project. This would represent a significant increase to Idaho Power's MSSC.

For a NR Interconnection Service interconnection, the GI #570 interconnection will require a second 500kV line, not on a common structure and preferably geographically diverse, from the Project to the [redacted] 500kV station, and the Project's 500/230kV station will be required at a minimum to be a four-position ring-bus configuration – two 500kV line terminals and two 500/230 kV transformers with alternating ring-bus positions between line terminals and 500/230kV transformers.

And, several deficiencies were also identified in the Project's conceptual 500/230kV station which could expose Idaho Power to generation loss greater than our present MSSC:

- Loss of a single 500/230kV 637 MVA transformer will result in generation curtailment greater than Idaho Power's present MSSC.
- Loss of both 500/230kV transformer due to a common 230kV breaker-failure.
- Loss of Project's generation (430^{+} MW) due to common 230kV breaker-failures between 230kV collector lines.

The actual station layout and detailed equipment requirements will be determined in the Facility Study should the interconnection customer choose to move to that study phase of the interconnection process.

7.2 Description of Power Flow Cases

For the Network Resource Interconnection Service study, two power flow cases were used to study the Transmission Provider's transmission system with westbound and eastbound transmission flows to determine the required Network Transmission Upgrades.

The WECC 2019 Heavy Summer case was chosen as a power flow base case for the study. The case was modified to represent a summer month with high west to east (eastbound) transfers across Midpoint West. Pacific Northwest generation resources were displaced by the Project's 1050 MW generation.

For the second case, a WECC 2019 Light Winter operating case, was modified to represent a shoulder month condition with high east to west (westbound) transfers across Midpoint West. Eastern generation resource in Wyoming and Utah were displaced by the Project's 1050 MW generation.

7.3 Power Flow Analysis Results

Results from the high Midpoint West eastbound transfer case indicate the addition of the GI #570 project will result in post-contingency overloads for two P1 contingencies. The following list are the overloaded contingency from the eastbound transfer case. No contingency violations were identified in the westbound transfer case.

1. P1: [redacted] Transformer
   a. Post-contingency loading 109.0% of the emergency rating of [redacted] 230kV (31.7 miles).
   b. Post-contingency loading 108.7% of the emergency rating of [redacted] 230kV (24.4 miles).
2. P1: [redacted] 500kV
   a. Post-contingency loading 102.9% of the emergency rating [redacted] Transformer.

7.4 Network Resource Transmission Upgrades

From the power flow/contingency analysis, the following Network Transmission upgrades were identified for the integration of GI #570 in addition to the Energy Resource generation interconnection facilities. A System Impact Study will ultimately be required to determine the specific network upgrades required to integrate the project.

[redacted]

- Build a 2nd 500kV Line Terminal for NR Interconnection Service
- Install new [redacted] T502 500/345kV 1800 MVA Transformer

IPC projects queue GI #530, GI #551, GI #557, GI #561, and GI #568 are senior queued project in the affected area of IPC's transmission system. Idaho Power studied GI #570 with all Network Upgrades identified for senior queued projects as in service (Contingent Facilities). Contingent Facilities for each of these GI projects are detailed in Appendix B. Changes to senior queued projects including in-service date and withdrawal from the queue, may trigger a restudy associated with GI #570 Network Resource, NR, service, (some or all the network upgrades identified for senior queued projects may be required by GI #570).

7.5 Network Resource Cost Estimate

Table 2 below is a summary of the Network Transmission generation interconnection facilities and conceptual costs required to interconnect the GI #570 project to the Transmission Provider's transmission system as a Network Resource. A System Impact Study will ultimately be required to determine the specific network upgrades required to integrate the project.

GI #570 [redacted] 1050 MW Project **Network Upgrades** **Network Resource Generation Interconnection Facilities**	
Network Resource Transmission Upgrades:	**Cost**
[redacted] 2nd 500kV Line Terminal Bay (with two 500kV breakers)	$5,079,766
New T502 2nd 500/345kV 1800 MVA Transformer	$22,107,241
Subtotal	**$27,187,007**
Contingency (~20%)	$5,437,401
Subtotal	**$32,624,408**
Overheads (~8.5%)	$2,773,075
Network Transmission – Total Estimated Cost	**$35,397,483**
Energy Resource – Estimated Costs	$6,613,855

Network Resource – Total Estimated Cost (3)	**$42,011,338**

Table 2. Estimated GI #570 Network Resource Generation Interconnection Costs

(1) Contingency is added to cover the unforeseen costs in the estimate. These costs can include unidentified design components, material cost increases, labor estimate shortfalls, etc.
(2) Overhead costs cover the indirect costs associated with the Project.
(3) This cost estimate includes direct equipment, material, labor, and overheads as shown.

- Note that these estimates do not include the cost of the customer's equipment/facilities or required communication circuits for SCADA, PMU, and metering.
- Note that the overhead rates are subject to change during the year.
- These are estimated costs only and final charges to the customer will be based on the actual construction costs incurred.
- These are non-binding conceptual level cost estimates that will be further refined upon the request and completion of the Facility Study.

The schedule for designing, procuring, and constructing facilities will be developed and optimized during the Facility Study should the generation interconnection customer choose to move to that study phase of the interconnection process.

8.0 Alternate POI at [redacted]

For the alternate POI at the [redacted] 345kV bus, a high-level study was performed. The high east to west (westbound) transfer case was modified to move the POI from the [redacted] 500kV bus to the [redacted] 345kV bus. Power flow analysis results indicate the loss of [redacted] 230kV line resulted in post-contingency overload on [redacted] transformer and loss of the other [redacted] 230kV line approached [redacted] transformer's emergency rating.

1. P1: [redacted] 230kV
   a. Post-contingency loading 102.9% of the emergency rating of [redacted] Transformer.
2. P1: [redacted] 230kV
   a. Post-contingency loading 98.0% of the emergency rating of [redacted] Transformer.

These results were obtained with Idaho Power's WECC Path 17 Borah West transfer path (eastern Idaho to Midpoint) at approximately 40% of its stated east-to-west 2557 MW total transfer capacity (TTC). At higher Borah West transfers, pre-contingency loading on the [redacted] transformer will also mandate upgrading its capacity. With the Project interconnected at the [redacted] 345kV bus, loss of the [redacted] transformer will require a second [redacted] 500/345kV transformer to be installed. The second [redacted] 500/345kV transformer was also identified/required for the primary 500kV POI. Furthermore, with the Project's POI at the [redacted] 345kV bus and higher Borah West

east-to-west transfers, the size requirements of the [redacted] 500/345kV transformers will become unmanageable.

9.0 Description of Operating Requirements

It is the generation project's responsibility to provide reactive power capability of the project to have a power factor operating range of at least 0.95 leading (absorbing) to at least 0.95 lagging (supplying) at the POI over the range of real power output (up to maximum output of the project. With only a single 500kV Project line to the POI, preliminary analysis indicated that approximately 225^{+} MVAr shunt compensation will be required to be installed to achieve the 0.95 lagging (supplying) power factor.

Identification of any additional equipment required at the plant to meet Idaho Power reactive power capability interconnection requirements will be provided in the System Impact Study if the generation interconnection customer chooses to move to the next study phase of the interconnection process.

GI #570 will be required to control voltage in accordance with a voltage schedule as provided by Idaho Power Grid Operations, and GI#570 will be required to manage the real power output of their stated generation at the project's POI.

The project(s) is required to comply with the applicable Voltage and Current Distortion Limits found in IEEE Standard 519-1992 *IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems*.

Installation of phasor measurement unit devices at the POI and maintenance costs associated with communication circuits needed to stream PMU data will also be required to be provided to interconnect GI #570. The specific costs associated with the IPC requirements for interconnection customers with aggregate facilities larger than 20 MW to provide PMU data to IPC will be identified in the Facility Study should the generation interconnection customer choose to proceed to that phase of the interconnection process. Also, it may be beneficial for [redacted] for their own modeling compliance requirements, to install additional PMU devices at their facilities to monitor the generations sources separately.

Additional operating requirements for this project may be identified in the System Impact study when it is performed.

10.0 Conclusion

GI #570 can be interconnected to the Idaho Power transmission system.

Interconnection requirements detailed in Section 6.5 totaling $6,613,855 are required to interconnect the project as an Energy Resource at the primary 500kV POI. If the project

connects as a Network Resource detailed in Section 7.5, the cost to integrate the project is $42,011,338. The Network Resource connection is also reliant on network facility upgrades identified in senior queued generation interconnection.

A System Impact Study is required to determine the specific Transmission Network Upgrades required to integrate the project as a Network Resource and to evaluate the system impacts (thermal overload, voltage, transient stability, reactive margin). Generator interconnection service (either as an Energy Resource Interconnection Service or a Network Resource Interconnection Service) does not in any way convey any right to deliver electricity to any specific customer or point of delivery. A Transmission Service Request will be required to study the Transmission System Impacts.

APPENDIX A

A-1.0 Method of Study

The Feasibility Study plan inserts the Project up to the maximum requested injection into the selected Western Electricity Coordinating Council (WECC) power flow case and then, using Power World Simulator or GE's Positive Sequence Load Flow (PSLF) analysis tool, examines the impacts of the new resource on Idaho Power's transmission system (lines, transformers, etc.) within the study area under various operating and outage scenarios. The WECC and Idaho Power reliability criteria and Idaho Power operating procedures were used to determine the acceptability of the configurations considered. The WECC case is a recent case modified to simulate stressed but reasonable pre-contingency energy transfers utilizing the IPC system. For distribution feeder analysis, Idaho Power utilizes DNV·GL's Synergi Electric software and EPRI's OpenDSS software.

A-2.0 Acceptability Criteria

The following acceptability criteria were used in the power flow analysis to determine under which system configuration modifications may be required:

The continuous rating of equipment is assumed to be the normal thermal rating of the equipment. This rating will be as determined by the manufacturer of the equipment or as determined by Idaho Power. Less than or equal to 100% of continuous rating is acceptable.

Idaho Power's Voltage Operating Guidelines were used to determine voltage requirements on the system. These states, in part, that distribution voltages, under normal operating conditions, are to be maintained within plus or minus 5% (0.05 per unit) of nominal everywhere on the feeder. Therefore, voltages greater than or equal to 0.95 pu voltage and less than or equal to 1.05 pu voltage are acceptable.

Voltage flicker during starting or stopping the generator is limited to 5% as measured at the point of interconnection, per Idaho Power's T&D Advisory Information Manual.

Idaho Power's Reliability Criteria for System Planning was used to determine proper transmission system operation.

All customer generation must meet IEEE 519 and ANSI C84.1 Standards.

All other applicable national and Idaho Power standards and prudent utility practices were used to determine the acceptability of the configurations considered.

The stable operation of the system requires an adequate supply of volt-amperes reactive (VAr or VArs) to maintain a stable voltage profile under both steady-state and dynamic system conditions. An inadequate supply of VArs will result in voltage decay or even collapse under the worst conditions.

Equipment/line/path ratings used will be those that are in use at the time of the study or that

are represented by IPC upgrade projects that are either currently under construction or whose budgets have been approved for construction in the near future. All other potential future ratings are outside the scope of this study. Future transmission changes may, however, affect current facility ratings used in the study.

A-3.0 Electrical System Protection Guidance

IPC requires electrical system protection per Facility Connection Requirements found on the Idaho Power Web site,

https://docs.idahopower.com/pdfs/BusinessToBusiness/FacConnReq.pdf

A-4.0 WECC Coordinated Off-Nominal Frequency Load Shedding and Restoration Requirements

IPC requires frequency operational limits to adhere to WECC Under-frequency and Over-frequency Limits per the WECC Coordinated Off-Nominal Frequency Load Shedding and Restoration Requirements available upon request.

APPENDIX B

Table B1 is a summary of the Network Transmission generation interconnection facilities and conceptual costs required to interconnect the GI #530 Project to the Transmission Provider's transmission system as a Network Resource.

GI #530 Project	
Network Resource Transmission Upgrades:	**Cost**
[redacted] **230kV Line** Rebuild 35.6 miles of 230kV line with 1590 MCM ACSR "Lapwing" Conductor	$30,470,000
[redacted] **230kV Line** Rebuild 3.1 miles of 230kV line with 1590 MCM ACSR "Lapwing" Conductor	$2,655,000
[redacted] **230kV Line Loop in-and-out of** [redacted] **Station** Build 1.25 miles 230kV Double Circuit Line with 1272 MCM ACSR "Bittern" Conductor	$1,040,000
[redacted] **230kV Station** Add two 230kV Line Terminals	$1,775,000
[redacted] **500/230kV 2nd Transformer**	$10,600,000
Subtotal	**$46,540,000**
Contingencies (~20%)	$9,308,000
Subtotal	**$55,848,000**
Overheads (~10.0%)	$5,584,800
Network Transmission – Total Estimated Cost	**$61,432,800**
Energy Resource – Total Estimated Cost	$86,020,000
Network Resource – Total Estimated Cost	**$147,452,800**

Table B1 GI #530 Network Resource

Table B2 is a summary of the Network Transmission generation interconnection facilities and conceptual costs required to interconnect the GI #551 Project to the Transmission Provider's transmission system as a Network Resource.

GI #551 Project	
Network Resource Transmission Upgrades:	**Cost**
Network Transmission – Total Estimated Cost	**$0**
Energy Resource – Total Estimated Cost	$917,937
Network Resource – Total Estimated Cost	**$917,937**

Table B2 GI #551 Network Resource

Table B3 is a summary of the Network Transmission generation interconnection facilities and conceptual costs required to interconnect the GI #557 Project to the Transmission Provider's transmission system as a Network Resource.

GI #557 Project	
Network Resource Transmission Upgrades:	**Cost**
[redacted] **138kV Rebuild** Includes Air break switches at [redacted]	$2,020,000
[redacted] **138kV Rebuild** Includes Air break switch at [redacted]	$665,000
Subtotal	**$2,685,000**
Overheads (~10%)	$268,500
Subtotal	**$2,953,500**
Contingency (~20.0%)	$590,700
Network Transmission – Total Estimated Cost	**$3,544,200**
Energy Resource – Total Estimated Cost	$554,400
Network Resource – Total Estimated Cost	**$4,098,600**

Table B3 GI #557 Network Resource

Table B4 is a summary of the Network Transmission generation interconnection facilities and conceptual costs required to interconnect the GI #560 Project to the Transmission Provider's transmission system as a Network Resource.

GI #560 Project	
Network Resource Transmission Upgrades:	**Cost**
Withdrawn	$0
Network Resource – Total Estimated Cost	**$0**

Table B4 GI #560 Network Resource

Table B5 is a summary of the Network Transmission generation interconnection facilities and conceptual costs required to interconnect the GI #561 Project to the Transmission Provider's transmission system as a Network Resource.

GI #561 Project	
Network Resource Transmission Upgrades:	**Cost**
Network Transmission – Total Estimated Cost	**$0**
Energy Resource – Total Estimated Cost	$1,209,648
Network Resource – Total Estimated Cost	**$1,209,648**

Table B5 GI #561 Network Resource

Table B6 is a summary of the Network Transmission generation interconnection facilities and conceptual costs required to interconnect the GI #568 Project to the Transmission Provider's transmission system as a Network Resource.

GI #568 Upgrades	
Network Resource Transmission Upgrades:	**Cost**
New 230kV ring interconnection station	$4,925,687
[redacted] 230kV Rebuild	$31,150,723
Subtotal	**$36,076,410**
Contingency (~20%)	$7,215,282
Subtotal	**$43,291,692**
Overheads (~8.5%)	$3,679,794
Network Transmission – Total Estimated Cost	**$46,971,486**
Energy Resource – Estimated Costs	$9,114,000
Network Resource – Total Estimated Cost (3)	**$56,085,486**

Table B6 GI #568 Network Resource

Revision History

Date	Revision	Initials	Summary of Changes
06/12/2020	0	MDH	Initial Report