

Basin Electric Power Cooperative Facility Study Report ERAS-2025-001

1. Background:

- 1.1 Per the Facility Study Request sent on March 6, 2026, Basin Electric performed the below studies on the following upgrades listed in the request.
 - 1.1.1 Two 345 kV Terminal additions at the Leland Olds 345 kV Substation.
 - 1.1.2 Non Shared Network Updates and Transmission Owner Interconnection Facilities costs will be identified as described in the request.
 - 1.1.3 Replacement of two disconnect switches at Antelope Vally Station 345 kV Substation.
 - 1.1.4 Kummer Ridge 345 kV Capacitor Bank.

2. Study Requirements:

BEPC has completed this Facility Study Report in accordance with the Facility Study request letter.

2.1. The Facility Study Report includes an evaluation of the following:

- 2.1.1. Perform/develop a substation layout, perform a preliminary bus design, determine all electrical equipment requirements, and if required determine a suitable site location to accommodate the Request. Develop/compile cost estimates for all BEPC labor, overheads, equipment additions, modifications, etc. to accommodate the interconnection request.
- 2.1.2. Develop an overall construction schedule for completion of the necessary additions and/or modifications.
- 2.1.3. Point Of Change of Ownership. For the purposes of this Interconnection Study Report, the Point of Change of Ownership location is defined as the take-off structure(s) at the BEPC Switchyard or Switch where the Interconnection Customers (IC) transmission line(s) connects to the take-off structure(s). IC will furnish and install the conductor jumper and insulator assembly to the take-off structure(s).
- 2.1.4. Other Interconnection/Metering Requirements. Basic indication, metering, monitoring, control, and relaying requirements due to an interconnection are included in the cost estimate. BEPC's metering requirements, as an SPP Transmission Owner, must be met. A list of specific needs will be provided by BEPC once design has progressed.

3. Study Results for Project:

- 3.1. The following results in Section 3.2, 3.3, and 3.4 document the analysis of the required facilities for this Facility Study Request as outlined in Section 1.1.1. BEPC has determined that the following additions and improvements are required to maintain a safe and reliable interconnection to BEPC's transmission system. Reference Figures A1, A2, A3, A4, A5, and A6

3.2 Terminals at Leland Olds 345 kV Substation

There will be two 345 kV line terminals added to the Leland Olds 345 kV Substation. The Interconnection customer will have cost responsibilities of both terminals, however one of these terminals will be used for the AVS #1 transmission line which will be relocated from its present terminal. This is done to reduce crossing of 345 kV transmission lines. This relocation will also require the installation of current transformers for revenue metering. These terminals will be constructed to BEPC's internal design standards. Protection and Control schemes will be reviewed for applicability for the interconnection. The Owner will require the Customer to provide means to remove all energy sources in the event of fault detection. This will be through a communication medium that provides adequate reliability and redundancy for the application. The Owner, at the Customer's expense, will install instrument transformers and an appropriate revenue meters for the application.

3.3 Disconnect Switch replacement at Antelope Valley Station 345 kV Substation

Disconnect switches 3899 and 4099 will be replaced with 3000 Amp rated disconnect switches. The existing steel structures and motor operators will be reused. Protection and Control schemes will be reviewed for applicability for the interconnection. All protection and control schemes will follow BEPC's internal design standards.

3.4 Kummer Ridge 345 kV Capacitor Bank

There will be a 300 MVAR capacitor bank installed at the Kummer Ridge 345/115 kV Substation. There will be a 345 kV terminal built out for this capacitor bank. Additionally, there will be synchronous breakers installed to provide step switching of the bank in 100 MVAR increments. Each breaker will also have an isolation disconnect switch. This terminal will be the 5th 345 kV terminal at the facility which will necessitate the conversion of the facility from a 345 kV ring bus to a breaker and a half configuration. This conversion will require the addition of two breakers, bus potential transformers, bus relaying, and relay modifications for other terminals. The configuration of this capacitor bank addition will require the expansion of the substation fence. This study assumes that the substation expansion would require further property and the neighboring landowner would be agreeable to selling BEPC additional property. Reference Figures A3 and A4. All protection and control schemes will follow BEPC's internal design standards.

3.5 Environmental Requirements

Compliance with all applicable federal, state, and local regulations will be strictly adhered to. Additionally, all applicable and required permits and approvals will be obtained prior to construction.

3.6 Cost Estimate

| LOS 345 kV Terminal Addition TOIF #1 Estimated Costs (UID 170778) | |
|--|--------------------|
| Line Costs | |
| Engineering Labor | \$0 |
| Construction Labor | \$0 |
| Reactive Compensation (Labor & Materials) | \$0 |
| Material | \$0 |
| Right of Way | \$0 |
| Line Sub Total | \$0 |
| Station Costs | |
| Engineering Labor | \$158,694 |
| Construction Labor | \$862,879 |
| Site Property Rights | \$0 |
| Reactive Compensation | \$0 |
| Material | \$1,418,044 |
| Right of Way | \$0 |
| Station Sub Total | \$2,439,617 |
| AFUDC | \$0 |
| Contingency | \$757,656 |
| LOS 345 kV Terminal Addition TOIF #1 (UID 170778) Total Costs | \$3,197,273 |

| LOS 345 kV Terminal Addition TOIF #2 Estimated Costs (UID 170779) | |
|--|--------------------|
| Line Costs | |
| Engineering Labor | \$0 |
| Construction Labor | \$0 |
| Reactive Compensation (Labor & Materials) | \$0 |
| Material | \$0 |
| Right of Way | \$0 |
| Line Sub Total | \$0 |
| Station Costs | |
| Engineering Labor | \$158,694 |
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| LOS 345 kV Terminal Addition TOIF #2 (UID 170779) Total Costs | \$3,197,273 |

| LOS 345 kV Terminal Addition NSNU #1 Estimated Costs (UID 170808) | |
|--|---------------------|
| Line Costs | |
| Engineering Labor | \$90,000 |
| Construction Labor | \$500,000 |
| Reactive Compensation (Labor & Materials) | \$0 |
| Material | \$760,000 |
| Right of Way | \$0 |
| Line Sub Total | \$1,350,000 |
| Station Costs | |
| Engineering Labor | \$848,059 |
| Construction Labor | \$3,474,047 |
| Site Property Rights | \$0 |
| Reactive Compensation | \$0 |
| Material | \$2,816,630 |
| Right of Way | \$0 |
| Station Sub Total | \$7,138,736 |
| AFUDC | \$0 |
| Contingency | \$2,636,291 |
| LOS 345 kV Terminal Addition NSNU #1 (UID 170808) Total Costs | \$11,125,027 |

| LOS 345 kV Terminal Addition NSNU #2 Estimated Costs (UID 170821) | |
|--|--------------------|
| Line Costs | |
| Engineering Labor | \$0 |
| Construction Labor | \$0 |
| Reactive Compensation (Labor & Materials) | \$0 |
| Material | \$0 |
| Right of Way | \$0 |
| Line Sub Total | \$0 |
| Station Costs | |
| Engineering Labor | \$380,865 |
| Construction Labor | \$753,376 |
| Site Property Rights | \$0 |
| Reactive Compensation | \$0 |
| Material | \$991,073 |
| Right of Way | \$0 |
| Station Sub Total | \$2,125,314 |
| AFUDC | \$0 |
| Contingency | \$660,045 |
| LOS 345 kV Terminal Addition NSNU #2 (UID 170821) Total Costs | \$2,785,359 |

| AVS 345 kV Disconnect Replacement Estimated Costs (UID 172064) | |
|---|------------------|
| Line Costs | |
| Engineering Labor | \$0 |
| Construction Labor | \$0 |
| Reactive Compensation (Labor & Materials) | \$0 |
| Material | \$0 |
| Right of Way | \$0 |
| Line Sub Total | \$0 |
| Station Costs | |
| Engineering Labor | \$87,704 |
| Construction Labor | \$99,779 |
| Site Property Rights | \$0 |
| Reactive Compensation | \$0 |
| Material | \$167,843 |
| Right of Way | \$0 |
| Station Sub Total | \$355,326 |
| AFUDC | \$0 |
| Contingency | \$109,820 |
| AVS 345 kV Disconnect Replacement Total Costs (UID 172064) | \$465,146 |

| Kummer Ridge 345 kV Capacitor Bank Estimated Costs (UID 172058) | |
|--|---------------------|
| Line Costs | |
| Engineering Labor | \$0 |
| Construction Labor | \$0 |
| Reactive Compensation (Labor & Materials) | \$0 |
| Material | \$0 |
| Right of Way | \$0 |
| Line Sub Total | \$0 |
| Station Costs | |
| Engineering Labor | \$2,629,792 |
| Construction Labor | \$5,027,238 |
| Site Property Rights | \$253,780 |
| Reactive Compensation | \$3,806,696 |
| Material | \$8,673,187 |
| Station Sub Total | \$20,390,693 |
| AFUDC | \$0 |
| Contingency | \$6,369,028 |
| Kummer Ridge 345 kV Capacitor Bank Total Costs (UID 172058) | \$26,759,721 |

| | |
|--|---------------------|
| LOS 345 kV Terminal Addition TOIF #1 (UID 170778) Total Costs | \$3,197,273 |
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| LOS 345 kV Terminal Addition NSNU #2 (UID 170821) Total Costs | \$2,785,359 |
| AVS 345 kV Disconnect Replacement Total Costs (UID 172064) | \$465,146 |
| Kummer Ridge 345 kV Capacitor Bank Total Costs (UID 172058) | \$26,759,721 |
| Total Cost | \$47,529,799 |

3.7 Construction Schedule

The preliminary project schedule provided is for planning level purposes only and will be adjusted with additional project definition. If it is determined that North Dakota Public Service Commission approval, NEPA and/or ROW condemnation is required, 12-18 months will be added to the In-Service date.

Schedule

| Activity | Duration | Estimated Start | Estimated Finish |
|--|-----------------|------------------------|-------------------------|
| Executed Notice to Proceed Letter | -- | Month 0 | -- |
| Project Development | 4 Months | Month 0 | Month 4 |
| Engineering Design | 14 Months | Month 5 | Month 19 |
| Equipment Procurement | 56 Months | Month 4 | Month 60 |
| Advertise and Award Construction Contracts | 3 Months | Month 37 | Month 40 |
| Construction | 30 Months | Month 30 | Month 60 |
| Energize and In-Service Date | 4 Month | Month 60 | Month 64 |

Figure A1: LOS 345 kV Switching Diagram

- LEGEND:**
- EXISTING EQUIPMENT
 - NON SHARED NETWORK UPGRADES
 - SHARED NETWORK UPGRADES
 - TRANSMISSION OWNERS
 - INTERCONNECTION FACILITIES
 - INTERCONNECTION CUSTOMER
 - INTERCONNECTION FACILITIES
 - FUTURE

**FIGURE A1
LOS 345KV SUBSTATION**

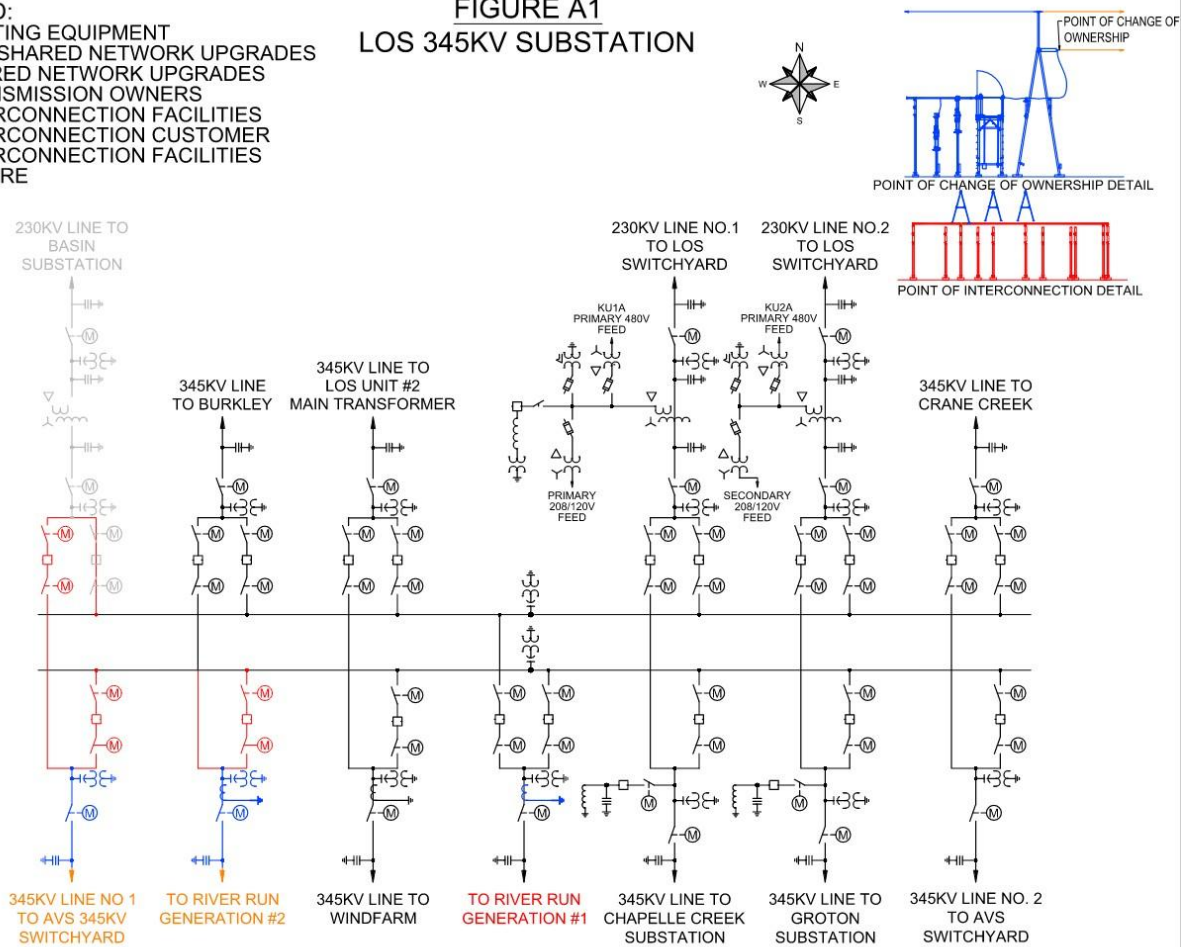


Figure A2: LOS 345 General Arrangement

- LEGEND:**
- EXISTING EQUIPMENT
 - NON SHARED NETWORK UPGRADES
 - SHARED NETWORK UPGRADES
 - TRANSMISSION OWNERS
 - INTERCONNECTION FACILITIES
 - INTERCONNECTION CUSTOMER
 - INTERCONNECTION FACILITIES
 - FUTURE

**FIGURE A2
LOS 345KV SUBSTATION**

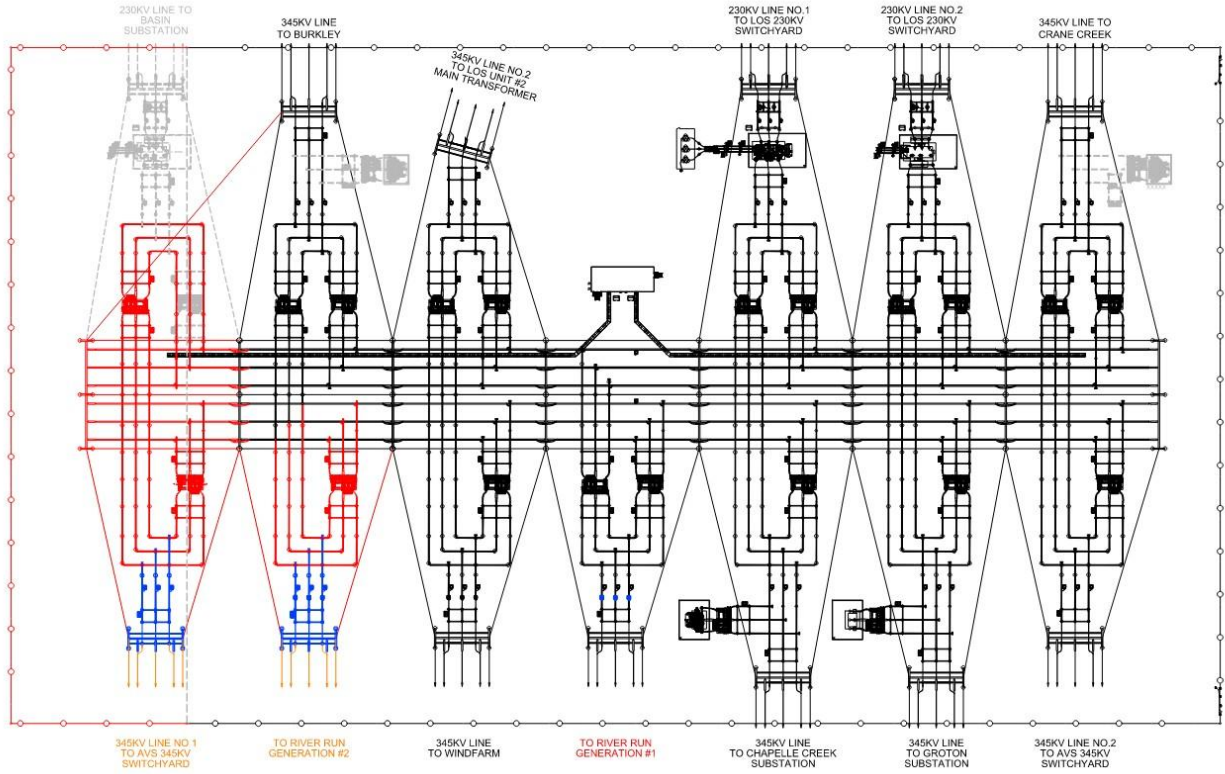


Figure A3: Kummer Ridge 345 kV Substation Switching Diagram

**FIGURE A3
KUMMER RIDGE 345KV
SUBSTATION**

LEGEND:

- EXISTING EQUIPMENT
- NON SHARED NETWORK UPGRADES
- SHARED NETWORK UPGRADES
- TRANSMISSION OWNERS INTERCONNECTION FACILITIES
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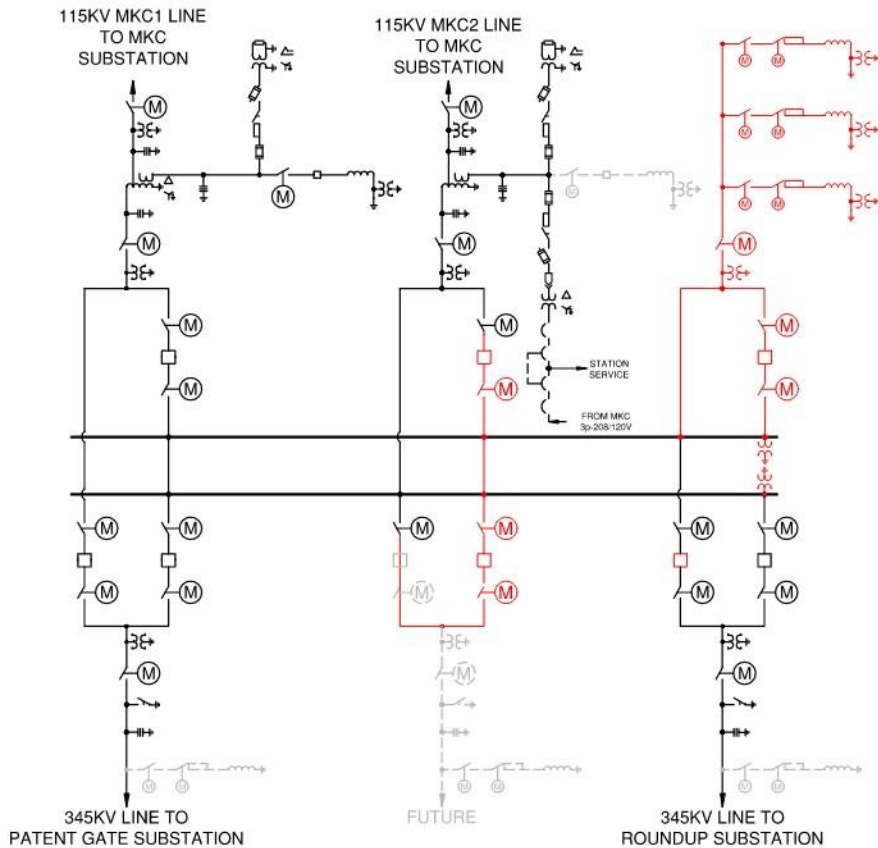
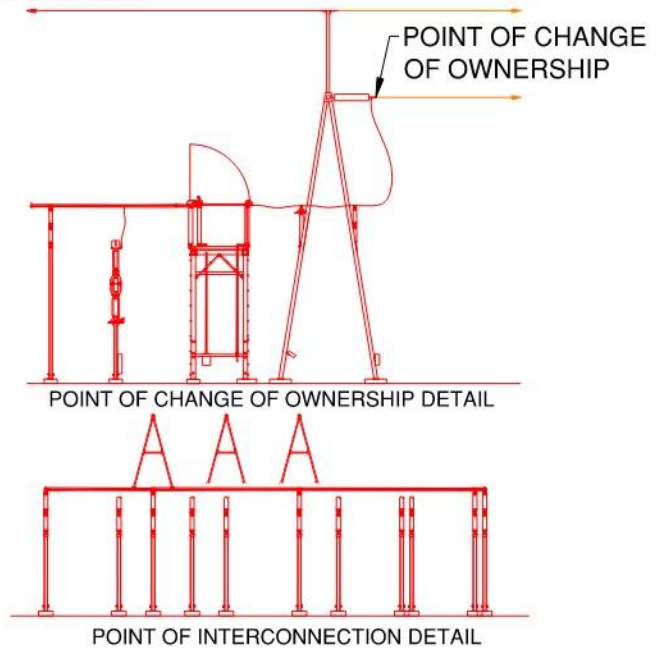
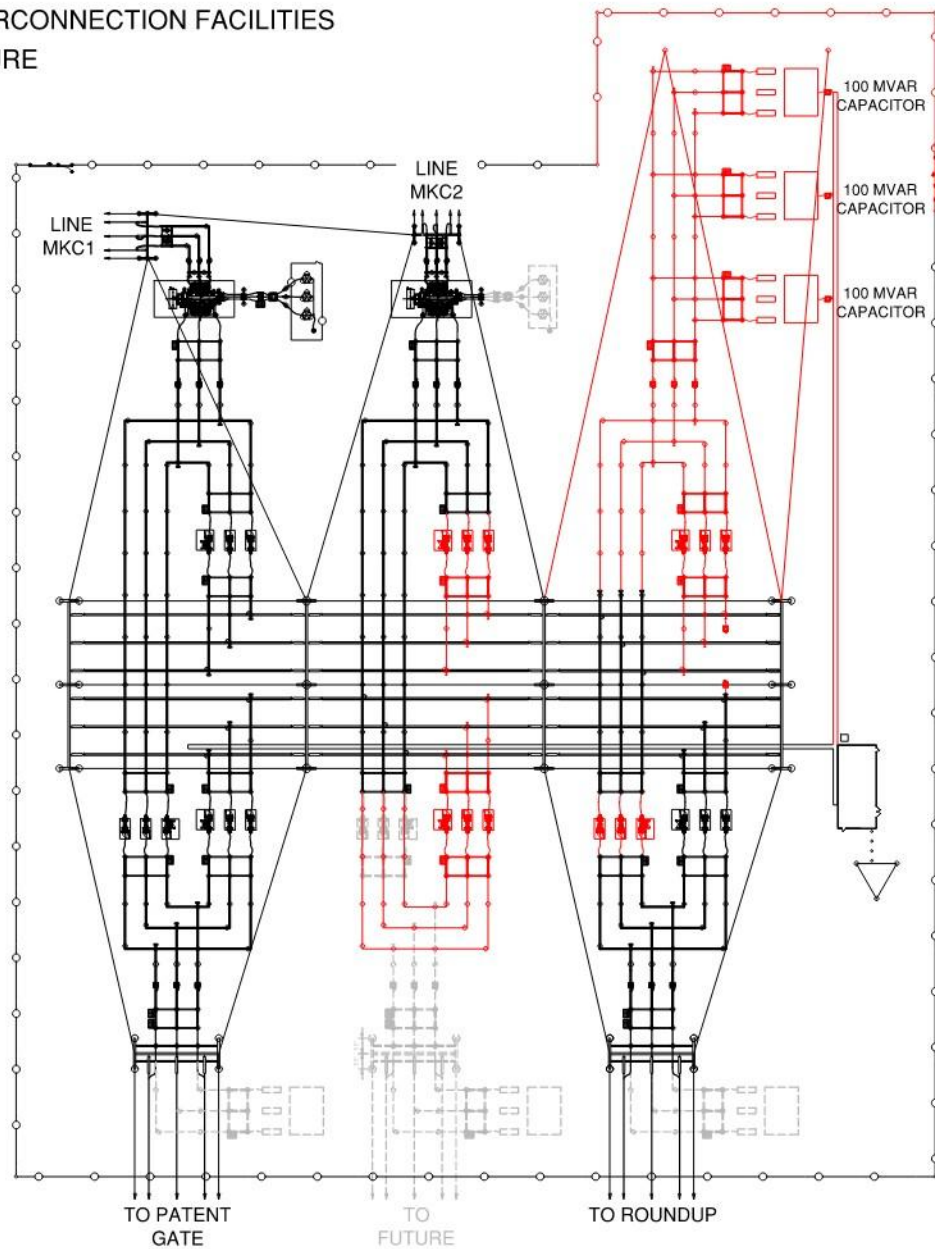
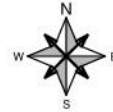


Figure A4: Kummer Ridge 345 kV Substation General Arrangement

FIGURE A4
KUMMER RIDGE 345KV
SUBSTATION

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** If the upgrade cost studied is higher than 20% of DISIS estimates, please provide justification in the facility report.*

The scope of the Facilities Study is to determine the cost estimates of equipment, engineering, procurement, and construction as well as the associated lead times.

For the completion of this Facilities Study request, please provide a Facilities Study report to SPP within forty-five (45) calendar days to include all their Interconnection and Network Upgrade(s) listed in the table above. Additionally, please provide an updated and completed Standardized Cost Estimate Report (SCERT) via the Transmission Reporting and Communication (TRAC) tool.

Sincerely,
SPP Generator Interconnection Department
201 Worthen Drive
Little Rock, AR 72223-4936

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| Construction | 30 Months | Month 30 | Month 60 |
| Energize and In-Service Date | 4 Month | Month 60 | Month 64 |

Figure A1: LOS 345 kV Switching Diagram

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- EXISTING EQUIPMENT
 - NON SHARED NETWORK UPGRADES
 - SHARED NETWORK UPGRADES
 - TRANSMISSION OWNERS
 - INTERCONNECTION FACILITIES
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**FIGURE A1
LOS 345KV SUBSTATION**

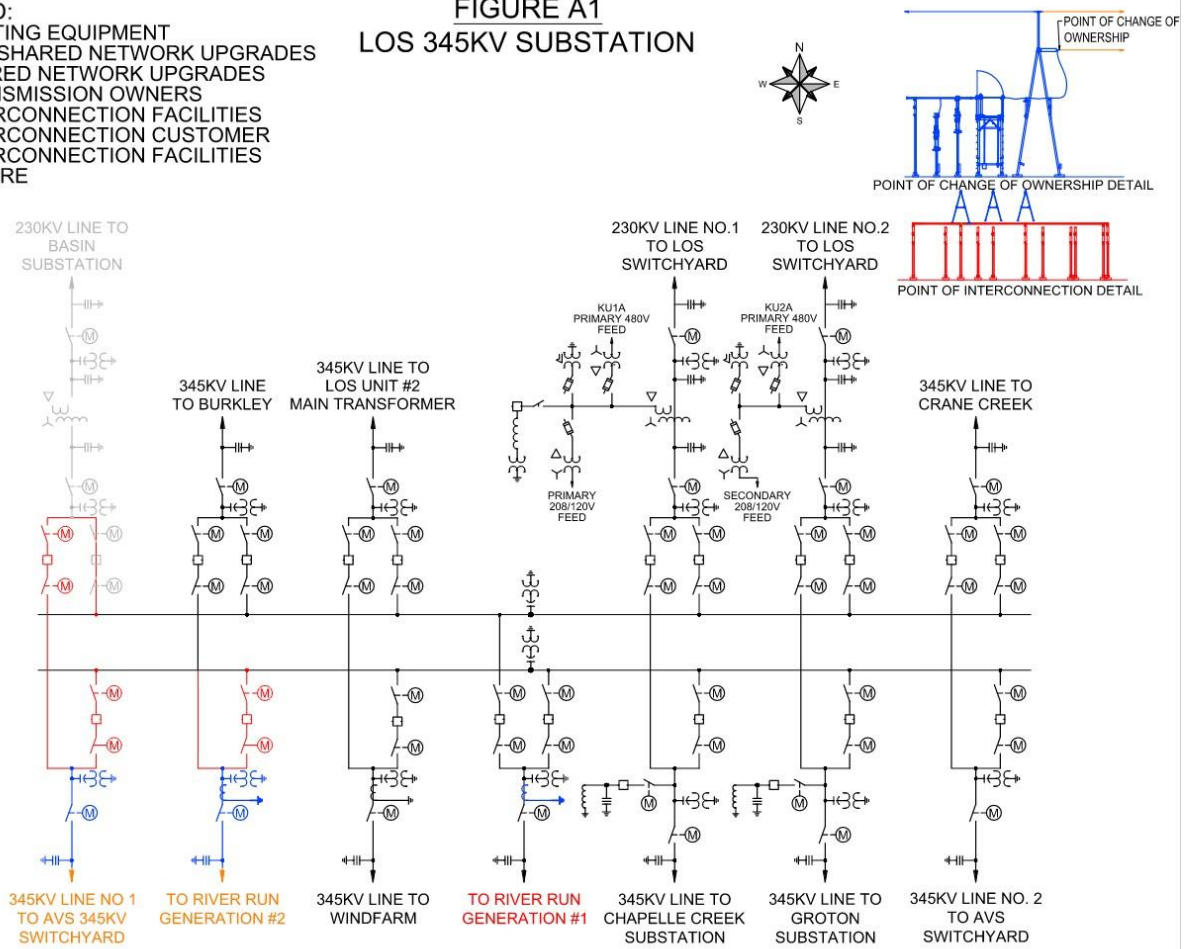


Figure A2: LOS 345 General Arrangement

- LEGEND:**
- EXISTING EQUIPMENT
 - NON SHARED NETWORK UPGRADES
 - SHARED NETWORK UPGRADES
 - TRANSMISSION OWNERS
 - INTERCONNECTION FACILITIES
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LOS 345KV SUBSTATION**

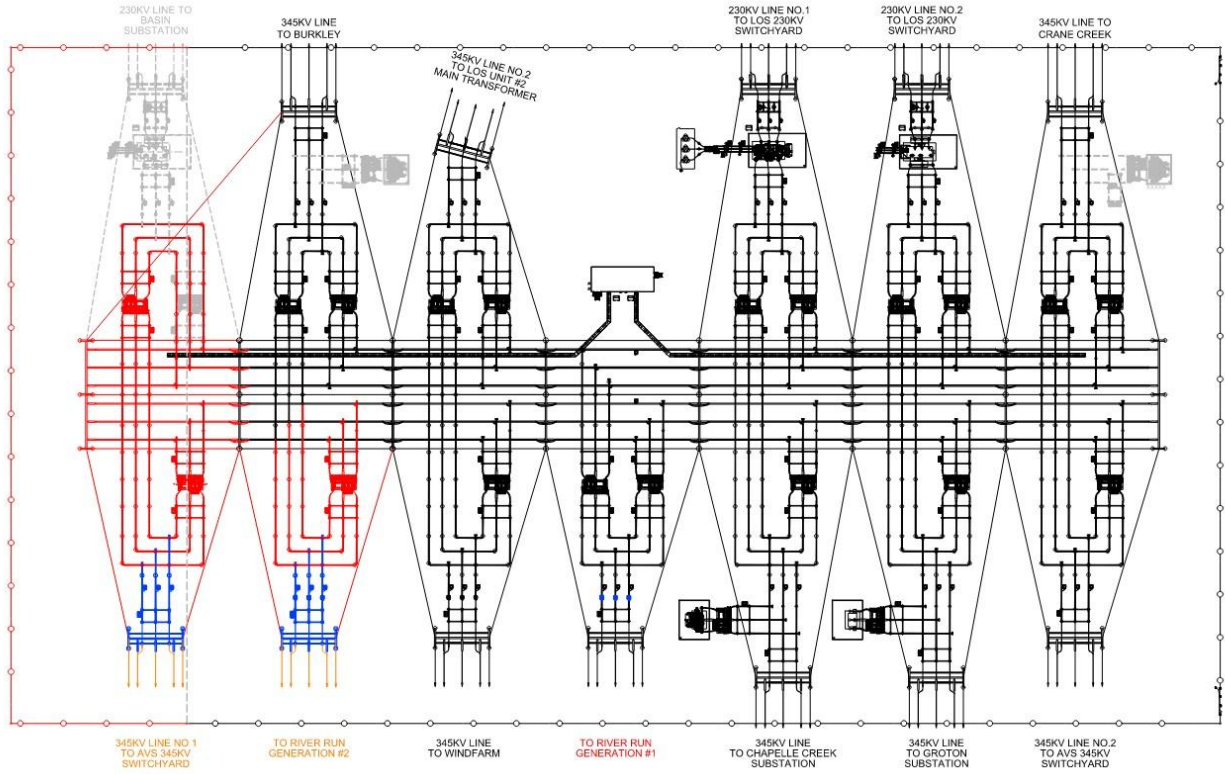


Figure A3: Kummer Ridge 345 kV Substation Switching Diagram

**FIGURE A3
KUMMER RIDGE 345KV
SUBSTATION**

LEGEND:

- EXISTING EQUIPMENT
- NON SHARED NETWORK UPGRADES
- SHARED NETWORK UPGRADES
- TRANSMISSION OWNERS INTERCONNECTION FACILITIES
- INTERCONNECTION CUSTOMER INTERCONNECTION FACILITIES
- FUTURE

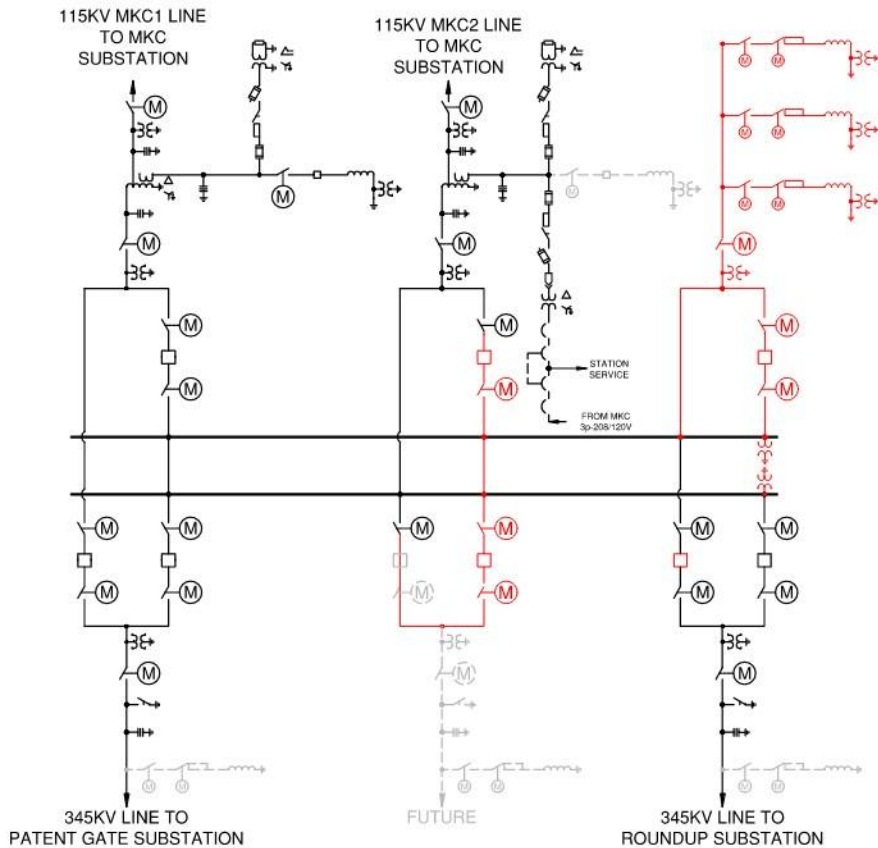
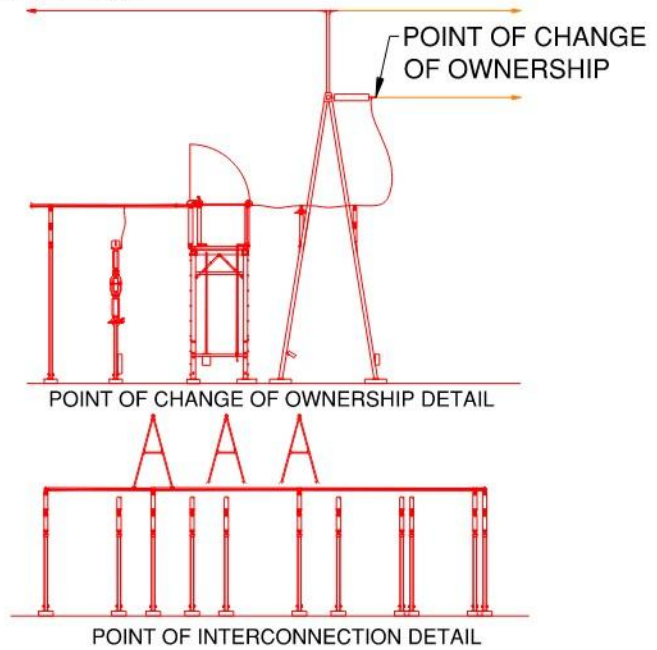
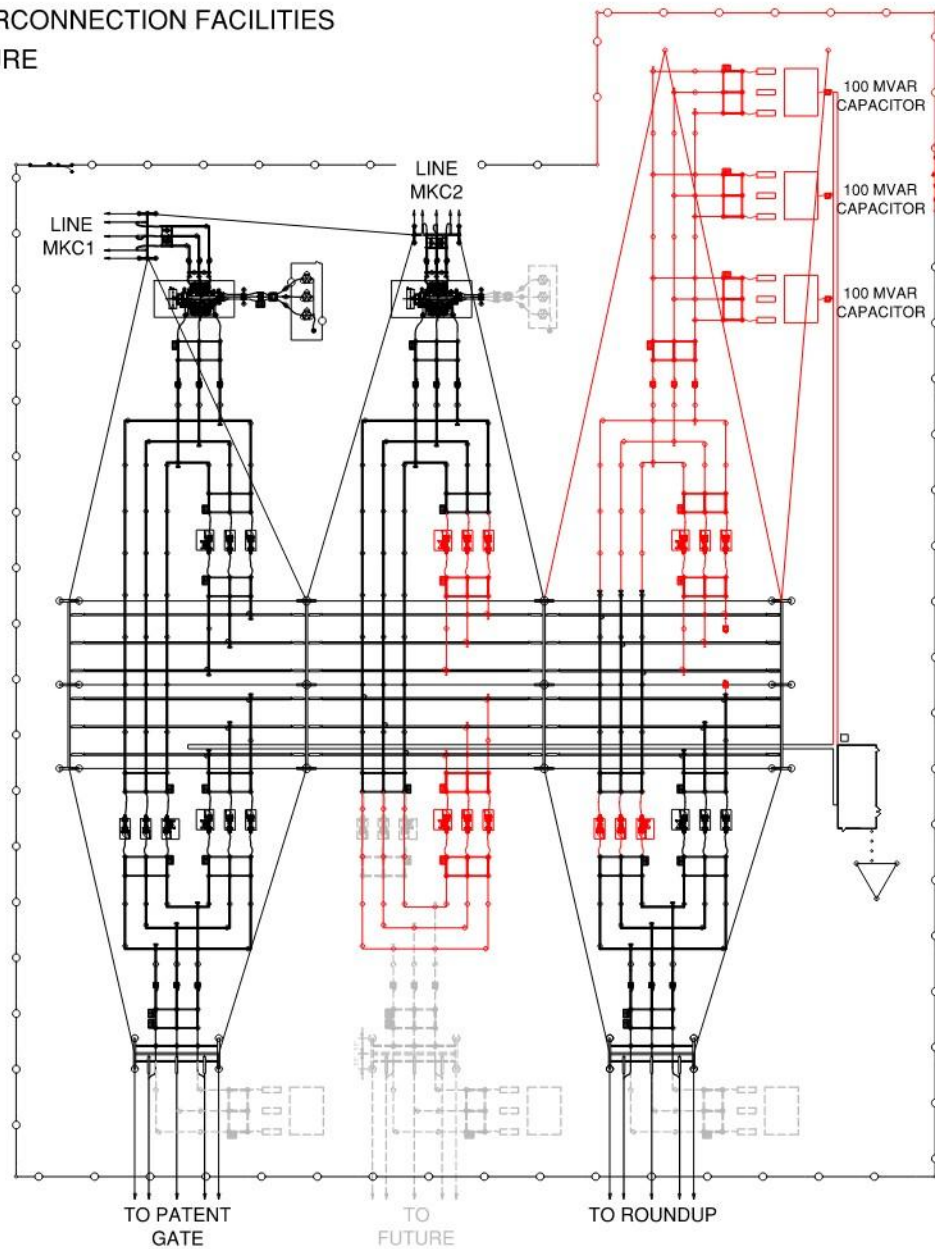
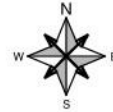


Figure A4: Kummer Ridge 345 kV Substation General Arrangement

FIGURE A4
KUMMER RIDGE 345KV
SUBSTATION

LEGEND:

- EXISTING EQUIPMENT
- NON SHARED NETWORK UPGRADES
- SHARED NETWORK UPGRADES
- TRANSMISSION OWNERS INTERCONNECTION FACILITIES
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** If the upgrade cost studied is higher than 20% of DISIS estimates, please provide justification in the facility report.*

The scope of the Facilities Study is to determine the cost estimates of equipment, engineering, procurement, and construction as well as the associated lead times.

For the completion of this Facilities Study request, please provide a Facilities Study report to SPP within forty-five (45) calendar days to include all their Interconnection and Network Upgrade(s) listed in the table above. Additionally, please provide an updated and completed Standardized Cost Estimate Report (SCERT) via the Transmission Reporting and Communication (TRAC) tool.

Sincerely,
SPP Generator Interconnection Department
201 Worthen Drive
Little Rock, AR 72223-4936