

CASE No. 2020-00219
AEUG MADISON SOLAR, LLC
RESPONSES TO WELLS ENGINEERING'S FIRST REQUEST FOR INFORMATION

Question#1

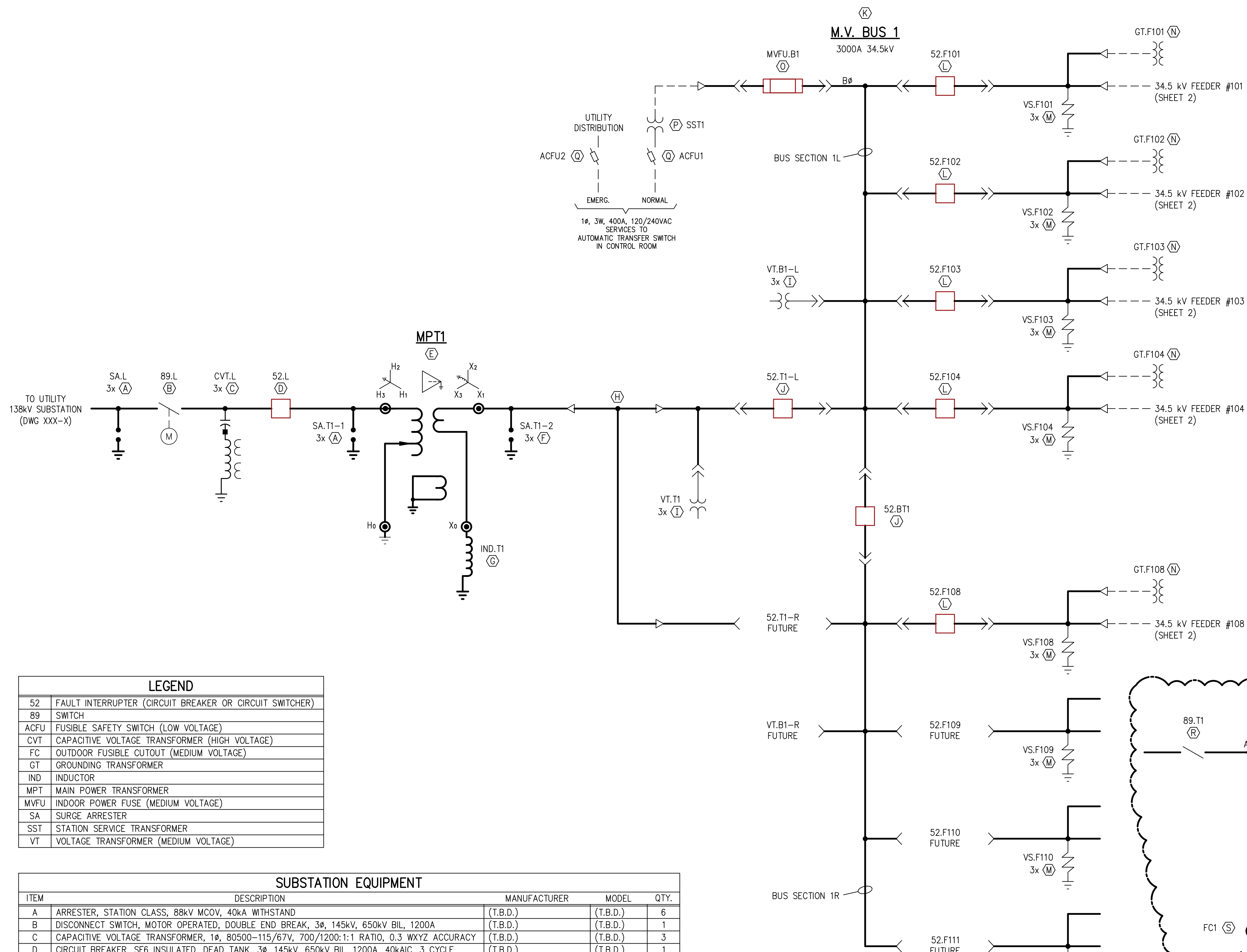
Electrical One-Line Diagram

Electrical One-line diagram is very important document required for understanding and evaluating the Electrical Power Network and Interconnection.

Applicant to submit Electrical One-line diagram of the installation.

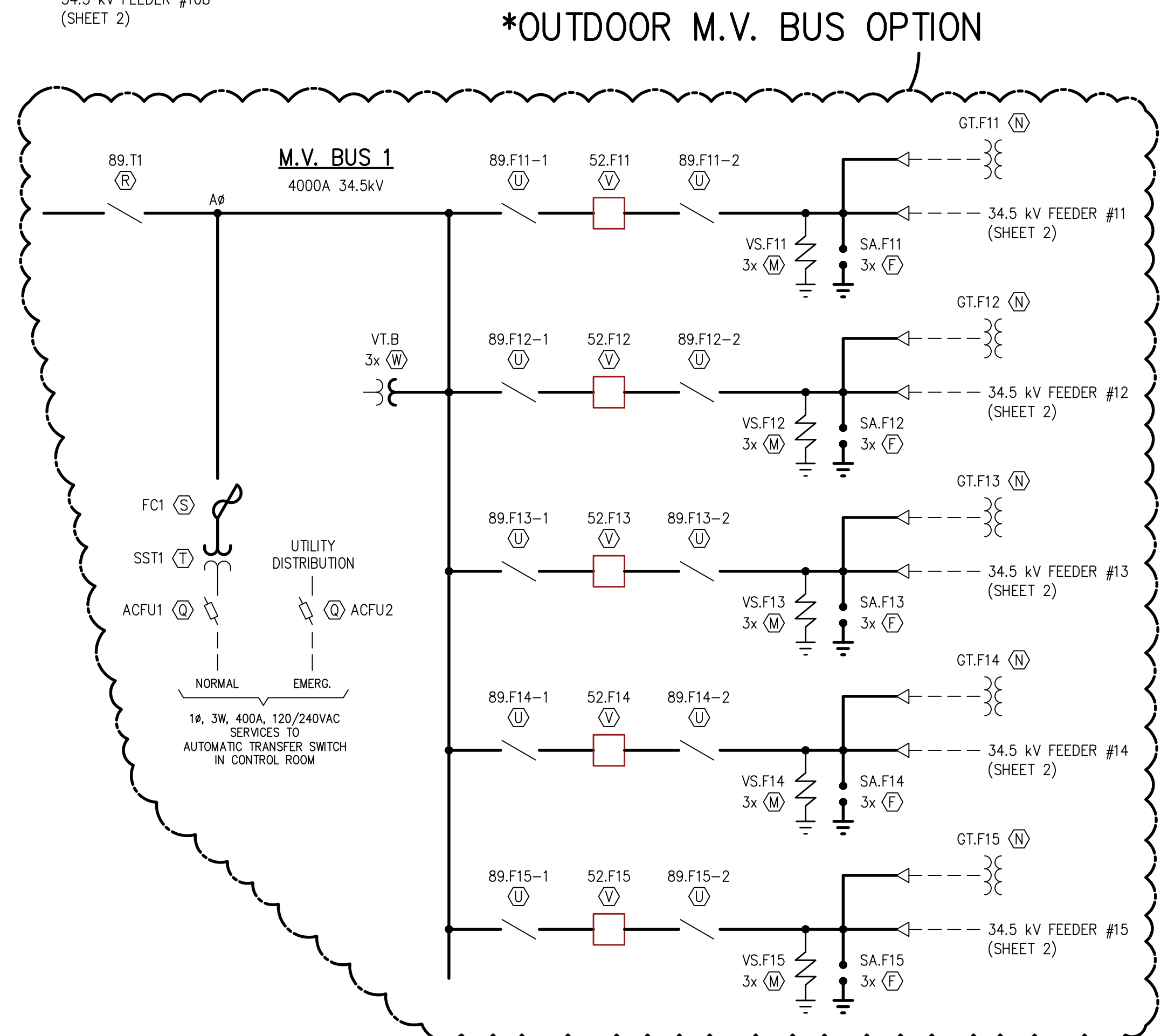
RESPONSE: See attached document.

WITNESS: Jaime Saez Ramirez



LEGEND	
52	FAULT INTERRUPTER (CIRCUIT BREAKER OR CIRCUIT SWITCHER)
89	SWITCH
ACFU	FUSIBLE SAFETY SWITCH (LOW VOLTAGE)
CVT	CAPACITIVE VOLTAGE TRANSFORMER (HIGH VOLTAGE)
FC	OUTDOOR FUSIBLE CUTOUT (MEDIUM VOLTAGE)
GT	GROUNDING TRANSFORMER
IND	INDUCTOR
MPT	MAIN POWER TRANSFORMER
MVPU	INDOOR POWER FUSE (MEDIUM VOLTAGE)
SA	SURGE ARRESTER
SST	STATION SERVICE TRANSFORMER
VT	VOLTAGE TRANSFORMER (MEDIUM VOLTAGE)

SUBSTATION EQUIPMENT				
ITEM	DESCRIPTION	MANUFACTURER	MODEL	QTY.
A	ARRESTER, STATION CLASS, 88kV MCOV, 40kA WITHSTAND	(T.B.D.)	(T.B.D.)	6
B	DISCONNECT SWITCH, MOTOR OPERATED, DOUBLE END BREAK, 3ø, 145kV, 650kV BIL, 1200A	(T.B.D.)	(T.B.D.)	1
C	CAPACITIVE VOLTAGE TRANSFORMER, 1ø, 80500-115/67V, 700/1200:1:1 RATIO, 0.3 WXYZ ACCURACY	(T.B.D.)	(T.B.D.)	3
D	CIRCUIT BREAKER, SF6 INSULATED, DEAD TANK, 3ø, 145kV, 650kV BIL, 1200A, 40kAIC, 3 CYCLE	(T.B.D.)	(T.B.D.)	1
E	POWER TRANSFORMER, OIL-FILLED, 3ø, 144/192/240 MVA @ 65°C RISE, Z=7.25%, 3 WINDING, 138000-34500-12000 VOLTS, HIGH VOLTAGE O.L.T.C. WITH 33 TAPS +/- 15% REGULATION	(T.B.D.)	(T.B.D.)	1
F	ARRESTER, STATION CLASS, 24.4kV MCOV, 40kA WITHSTAND	(T.B.D.)	(T.B.D.)	3
G	INDUCTOR, NEUTRAL GROUNDING, 200kV BIL, ?????A, X=? OHMS	(T.B.D.)	(T.B.D.)	1
H	CABLE BUS, OUTDOOR, 3ø, 38kV, 4000A, ?? LINEAR FEET	(T.B.D.)	(T.B.D.)	1
I	VOLTAGE TRANSFORMER, DRAWER MOUNTED, 1ø, 20125-115/67V, 175/300:1:1 RATIO, 0.3 WXYZ ACCURACY	(T.B.D.)	(T.B.D.)	6
J	CIRCUIT BREAKER, VACUUM BOTTLE, ROLL-IN, 3ø, 38kV, 200kV BIL, 3000A, 40kAIC, 3 CYCLE	(T.B.D.)	(T.B.D.)	2
K	SWITCHGEAR, METAL-CLAD, INDOOR, 3ø, 38kV, 200kV BIL, 3000A, 40kA WITHSTAND, 11 CUBICLES	(T.B.D.)	(T.B.D.)	1
L	CIRCUIT BREAKER, VACUUM BOTTLE, ROLL-IN, 3ø, 38kV, 200kV BIL, 1200A, 40kAIC, 3 CYCLE	(T.B.D.)	(T.B.D.)	5
M	VOLTAGE SENSOR, RESISTIVE DIVIDER, 1ø, 35kV CLASS, 300:1 RATIO, 0.5% ACCURACY	(T.B.D.)	(T.B.D.)	24
N	TRANSFORMER, OIL-FILLED, PADMOUNT TYPE, GROUNDING, 3ø, 34500V, 200kV BIL, ZIG-ZAG OR WYE-DELTA, Z0=?? OHMS/PHASE, ?????A NEUTRAL FOR 10 SECONDS	(T.B.D.)	(T.B.D.)	5
O	POWER FUSE, DRAWER MOUNTED, 1ø, 38kV, 200kV BIL, 10kAIC, WITH 7E FUSE LINK	(T.B.D.)	(T.B.D.)	1
P	TRANSFORMER, OIL-FILLED, PADMOUNT TYPE, 1ø, 200kV BIL, 100 kVA, 20000-240/120V	(T.B.D.)	(T.B.D.)	1
Q	FUSIBLE SAFETY SWITCH, HEAVY DUTY, NEMA 4X, 2ø WITH SOLID NEUTRAL, 250V, 400A	(T.B.D.)	(T.B.D.)	2
R	DISCONNECT SWITCH, MANUAL OPERATOR, DOUBLE END BREAK, 3ø, 38kV, 200kV BIL, 4000A	(T.B.D.)	(T.B.D.)	0
S	FUSIBLE CUTOUT, STATION MOUNT, POLYMER, 38kV, 200kV BIL, 10kAIC, WITH 7E FUSE LINK	(T.B.D.)	(T.B.D.)	0
T	TRANSFORMER, OIL-FILLED, OVERHEAD POLE TYPE, 1ø, 100 kVA, 20000-120/240V	(T.B.D.)	(T.B.D.)	0
U	DISCONNECT SWITCH, MANUAL OPERATOR, DOUBLE END BREAK, 3ø, 38kV, 200kV BIL, 1200A	(T.B.D.)	(T.B.D.)	0
V	CIRCUIT BREAKER, VACUUM BOTTLE, DEAD TANK, 3ø, 38kV, 200kV BIL, 1200A, 40kAIC, 3 CYCLE	(T.B.D.)	(T.B.D.)	0
W	VOLTAGE TRANSFORMER, 1ø, 20125-115/67V, 175/300:1:1 RATIO, 0.3 WXYZ ACCURACY	(T.B.D.)	(T.B.D.)	0



PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

XXXX

XXXX-DWG-HVS-101-000003

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Question#2

Overall Project Layout

Applicant to submit the Overall layout diagram of the project, indicating the fence line, 200' setback line, Solar Panel Locations, Battery & Inverter locations, Substation location, Transmission line route and Easements, Employee stay/quarters, Provision of Medical/First-Aid service.

RESPONSE: Please refer to the updated project site drawing, which is attached as Exhibit A.

It includes:

- Fence line.
- 200' setback line
- Solar Panel locations
- Inverter locations. Note there is no battery.
- Point of interconnection substation and project substation. Note there is no transmission line associated to the project because the project substation is adjacent (fence to fence) to the POI substation. The drawing shows the relocation of the existing three forks line end in the new POI substation.
- The drawing shows three lay down yard areas. The project offices will be situated in the main lay down yard area (south of the site, near access A2). The works related to the POI substation and the project substation will have its own offices at the lay down yard area situated near the North West entrance to the site).

Concerning Medical/First Aid Services - Site managers for both construction and operations will have contact information for all local police, fire, and medical emergency response providers. Construction and operations personnel will receive regular training to ensure their familiarity with emergency procedures and emergency contact numbers. Construction

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jobsite trailers and operations facilities and vehicles will be equipped with first aid kits and all personnel will receive first aid training.

WITNESS: Jaime Saez Ramirez and Mark Randall

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Question#3

Project Schedule

Applicant to submit an over-all tentative schedule of the project, starting from the receipt of the certificate for construction to the completion of the project.

This document helps in understanding the total time required and the major milestones involved. It will also be used to confirm the timing of the economic benefits listed.

RESPONSE: See attached document

WITNESS: Jaime Saez Ramirez

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Question#4

Project Generation Capacity

The document 'Generation Interconnection Feasibility Study Report for Queue Project AE2-308 THREE FORKS-DALE 138 KV 110 MW Capacity / 150 MW Energy' which is Appendix E of the Vol. I of the submittal lists 150MW max capacity and 110MW output recognized by PJM. Whereas the application indicates only 100MW as the capacity.

Reference section #2 of application Vol. I, Page 1. Applicant to provide information on, *What is the reasoning behind the different numbers and what is the actual max output that will be delivered onto the grid at any given time?*

RESPONSE: The PJM Interconnection request submitted for Madison Solar is 150 MW and is comprised of 100 MW solar and 50 MW BESS (Battery Electric Storage System). The maximum allowed Capacity Interconnection Rights (CIR) a project can request are based on the PJM technology factors assigned to solar and BESS. Specifically, the 110 MW CIR request is the sum of the allowed solar capacity (60% of 100 MW solar = 60 MW) plus 100% BESS capacity (100% of 50 MW BESS = 50MW).

The 100 MW listed in the application is because the final project scope will only include buildout of the 100 MW of solar. A formal request to remove the 50 MW BESS will be submitted to PJM after the Interconnection Service Agreement (ISA) is signed therefore, the final MFO is 100 MW solar with 60 MW designated as CIRs. The expected execution of the ISA is May 2021.

WITNESS: Jaime Saez Ramirez

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Question#5

Area occupied by solar panels.

What is the area occupied by Solar panels is filled with, Sand or Concrete?

Applicant to submit a site plan indicating access road, maintenance pathway, vegetation, and site screening and fencing.

RESPONSE: Please refer to the updated site plan, attached as Exhibit A, where the panels, fencing and roads are shown. No sand or concrete cover is planned. The area underneath the solar panels will be seeded with low-maintenance groundcover. The internal roads will be used for maintenance. From the internal roads to the actual position of each panel the access will be either walking or via 4x4 utility terrain vehicle driving in between the panels.

WITNESS: Jaime Saez Ramirez

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Question#6

Applicant to provide pertinent information for,
At end of life when the system is decommissioned will the area be restored? Will the soil be useful for farming after the demolition of the solar plant after 30 years? If not, will the companies do something to bring the soil back to normal?

RESPONSE: The Applicant has obligations to each Lessor to remove the solar facilities and restore the premises to pre-construction conditions upon the expiration or termination of the lease agreement. The Conditional Use Permit received from the Madison County Board of Adjustments includes further obligations for the decommissioning and restoration activities, including an obligation to provide financial surety to ensure the obligations are completed. The construction and operation of the Project is not expected to have any adverse impacts on the existing soil conditions.

WITNESS: Mark Randall

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Question#7

New Roads.

Applicant to provide information on any new roads paved or stoned. If no new roads are paved, the Applicant shall provide information on the 'routes of vehicle movement.'

RESPONSE: The updated site drawing shows the access roads from existing roads (KY 388, Lost Fork Road, Bill Eades Road) to the project site and also shows the internal roads routing. The routing of the roads may be modified during the detailed design phase. All the roads will be gravel roads.

WITNESS: Jaime Saez Ramirez

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Question#8

Largest Trailer/Truck.

Applicant to provide information on the largest trailer or truck that will be used for transporting the plant equipment? & What roadways will be used to access the site for these vehicles?

RESPONSE: The truck bringing the Main Power Transformer will have a weight (truck + load) of around 554,000 lb. It will access the site either from access A2 or access A5, as determined via road study to be performed in subsequent phases of the project. The Applicant will secure overweight and over-dimensional permits, as applicable. Other construction traffic and equipment deliveries will conform to typical weight and dimensional requirements. The roadways used to access the site for these vehicles are in the planning phase. All necessary permits from Kentucky DOT will be obtained as appropriate.

WITNESS: Jaime Saez Ramirez

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Question#9

Residential Quarters/trailer homes.

Applicant to provide information on constructing any residential quarters or installing trailer homes for the operations staff.

RESPONSE: The construction of any type of temporary housing quarters is not being contemplated for this project.

WITNESS: Jaime Saez Ramirez

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Question#10

Construction Power

Applicant to provide information on the power required for construction of the plant.

RESPONSE: If practical, the project will establish temporary service from the local electric provider. Portable gasoline or diesel generators may also be used, if necessary.

WITNESS: Jaime Saez Ramirez

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Question#11

Storage Battery Potential Hazards

Applicant to provide information on the potential hazards associated with the storage batteries and what are the safety precautions taken?

RESPONSE: No battery storage is planned for this project.

WITNESS: Jaime Saez Ramirez

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Question#12

Storage Battery Environmental Impact

Applicant to provide information on the environmental impact these batteries impose.

RESPONSE: No battery storage is planned for this project.

WITNESS: Jaime Saez Ramirez

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Question#13

Local/Regional Grid reliability

Applicant to provide information on any adverse effect on the local or regional grid reliability. Have interconnection studies been completed to that effect?

Ref: KRS 278.710 (1) (f)

RESPONSE: PJM conducted a System Impact Study (SIS) for the AEUG Madison Solar project (Queue #AE2-308) with its final report issued in February 2020. The primary purpose of the SIS is to address any adverse effect on the local or regional grid reliability and assign required mitigation for violations identified. The SIS also addresses potential congestion issues due to local energy “deliverability” (i.e., a project’s “capacity rights”) including the delivery of the energy portion of the project. As such, any potential congestion problems identified in the study will result in “operational restrictions” (i.e., economic curtailment) to the project rather than required mitigation identified for any reliability violations.

The project is also studied and tested for compliance with NERC, PJM, Transmission Owner and other applicable criteria. Steady state condition and 38 contingencies were studied by PJM including three phase faults, single-phase faults with stuck breaker and single-phase faults with delayed clearing.

The AE2-308 Final SIS concluded that no reliability violations were identified by the addition of Madison Solar.

WITNESS: Rodrigo Gonzales

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Question#14

Cell Phone Towers

Applicant to provide information on any cell phone tower that may be required/constructed for the project.

RESPONSE: The project does not contemplate the construction of cell phone towers.

WITNESS: Jaime Saez Ramirez

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Question#15

Fiber Optic Communication & Associated excavation

Applicant to provide information on any fiber optic or any kind of communication network installed as part of the project?

Applicant to provide information on excavation that may be required for the above.

RESPONSE: There will be a fiber optic network in parallel with the MV collection system that will connect the inverters with the project substation. The fiber optic cable will run in parallel with the MV collection system, and in case the MV runs in trench, it will share the same trench.

WITNESS: Jaime Saez Ramirez

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Question#16

PV Cell/Solar Panel Manufacturing

Applicant to provide information on where the PV cells/Solar Panels are manufactured?

Applicant to indicate the % of Import & % of Made in USA

RESPONSE: The final decision on the PV Module manufacturer has not been made yet.

WITNESS: Jaime Saez Ramirez

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Question#17

Substation

Applicant to provide information on the location where the substation which acts as a collector of solar generation is constructed and indicate it on the plant layout.

RESPONSE: The project substation that will collect the medium voltage collection circuits is situated in the North West of the project, adjacent to the EKPC POI (Point of Interconnection Substation) and in the vicinity of the existing transmission line. Please refer to the updated project drawing. As the project substation and the POI substation are adjacent, the transmission line will be just a few dozen feet long and running above the fenced area of both substations.

WITNESS: Jaime Saez Ramirez

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Question#18

DOE Compliant Transformer

Applicant to provide information on the DOE Compliant transformers used at site.

RESPONSE: The only transformer that falls under DOE efficiency requirements is station service (item P on the single-line diagram, see response to question 1 above). This transformer will comply with DOE requirements.

WITNESS: Jaime Saez Ramirez

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Question#19

Transmission line Easements

Applicant to provide indicative information on the Transmission line routing and easements.

RESPONSE: The transmission line for the project runs from the project substation to the EKPC POI substation. As the project substation and the POI substation are adjacent, the transmission line will be just a few dozen feet long and running above the fenced area of both substations.

WITNESS: Jaime Saez Ramirez

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Question#20

Transfer Function

Applicant to provide a preliminary power system transfer function, available if any.

RESPONSE: The plant is modeled in PSSE following PJM Requirements. This model has been submitted to PJM in the interconnection studies phase and will be updated with the as built data once the project is built. PSSE models are based on transfer functions in the s-domain, block diagrams of the controls are available in PSSE user manual.

WITNESS: Rodrigo Gonzales

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Question#21

Additional Compliance

Applicant to provide compliance on the following,

- (i) **Copy of the specification/requirement of 200' setback distance as per local planning zone.**

RESPONSE:

Madison County, Kentucky Board of Adjustments – Certification of Land Use Restrictions –
Conditional Use Permit for AEUG Madison Solar, LLC - Dated December 7, 2020

Solar Farm Facilities are subject to the following requirements/conditions:

“1. Setbacks: Setbacks shall be 200ft from the center of any road. Setbacks shall be 200ft between the solar facility and any adjacent nonparticipating property. Setbacks shall be 200ft between the solar facility and any adjacent property which contains a residence.”

This document was attached to Volume I of the Application as Appendix D.

WITNESS: Mark Randall

- (ii) **Summary of efforts as per KRS 278.706(2)(g)**

RESPONSE: AEUG Madison Solar was unable to find an existing generation site with land available for development that could support a large utility-scale solar facility such as the one proposed. The nearest generation facilities to the proposed AEUG Madison Solar Project site were hydroelectric generation plants on the Kentucky River or a small, retired coal-powered generation facility also sited adjacent to the Kentucky River. Without any viable alternatives at existing electric generation sites, AEUG Madison Solar evaluated the existing land use and identified the site in the immediate vicinity of the targeted Point of Interconnection. The 138-kV transmission line between the Three Forks Tap and the Dale Substation crosses the proposed

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project area, allowing an interconnection via a new switching station and eliminating the need for any significant high-voltage generation tie-line.

WITNESS: Kyle Gerking - Tenaska