APS Sample Plan Review & Installer Guidelines Checklist
Interconnected Distributed Generation

Instructions: Check the "Confirm" column for each item as it pertains to your drawing/installation. If the requirement does not apply to your drawing, check the "N/A" column.

	One Line & Three Line Electrical Drawing	Confirm	N/A
1.0	**General Requirements**		
1.1	One Line and Three Line are up-to-date.	□	□
1.2	Drawings are professional, legible, and without color in accordance with APS sample diagrams.	□	□
1.3	There is indication of the location of loads on both the One Line and Three Line.	□	□
1.4	All Overcurrent Protective Devices (OCPDs) and phase current-carrying conductors are rated for system voltage and sized for 125% of the inverter(s) AC output current.	□	□
1.5	All panels (AC combiner, load, etc.) are rated for system output current and to withstand the available fault current.	□	□
1.6	If AC combiner panel(s) are installed to accommodate multiple static inverters tied into one back-fed OCPD, the AC combiner panel(s) are labeled per APS labeling requirements.	□	□
1.7	Labels (equipment identification, directories, and hazard warnings) of each component are up-to-date and consistent throughout each drawing and in accordance with APS Interconnection Requirements and sample diagrams.	□	□
1.8	All system AC equipment (Meter, Utility Disconnect, combiner panel, etc.) are properly labeled per NEC and Section 8.6 of the APS Interconnection Requirements.	□	□
1.9	For center-fed panelboards and multi-ampacity busbars, the bus or conductor ampere rating complies with *NEC Article 705.12*.	□	□
1.10	The main breaker (or other OCPD) has been de-rated to meet NEC Requirements and has been properly labeled/identified as such in the field per APS labeling requirements.	□	□
1.11	All AC equipment are rated appropriately (voltage and current rating).	□	□
1.12	The existing Service Entrance Section (SES) is replaced with a new SES.	□	□
	a. The new SES is an All-in-One panel per the ESRM approved list.	□	□
	b. The new SES has the same rating (Ampacity) as the original SES.	□	□
	c. The new SES is able to withstand the available fault current.	□	□
1.13	Fault current calculations are provided on the drawings indicating that the fault current at the Utility Disconnect(s) is limited to 10,000A. Use fault current values outlined in Section 800.2-1 of the ESRM.	□	□
	a. If fault current exceeds 10,000A, there is a current-limiting fuse upstream of the Utility Disconnect(s) that is series rated with the Utility Disconnect.	□	□
1.14	The fuse make, model, and type are provided on the drawings.	□	□
1.15	Voltage drop calculations are provided on the drawings indicating that the voltage drop from the inverter to SES is less than 3%.	□	□
1.16	Transformer OCPD is in compliance with *NEC Article 450.3.*	□	□
1.17	The secondary conductor of the transformer is protected per *NEC Article 240.21(C).*	□	□
2.0	**Bi-Directional & Production Meters ("PV/Wind/ESS System Meter," "Wind System Meter," "Energy Storage System Meter," etc.)**		
2.1	The Meter's Voltage, Ampere Rating, form number, and socket type are correct per Section 300 of the APS ESRM. (Meter socket must be ring type).	□	□
2.2	A directional arrow is placed on drawing to identify the load/line side of the production meter.	□	□
2.3	The meter socket is rated to withstand the available fault current.	□	□
	a. If the meter socket is not rated to withstand the available fault current, verify it is series rated with the upstream fuse.	□	□

Instructions: Check the "Confirm" column for each item as it pertains to your drawing/installation. If the requirement does not apply to your drawing, check the "N/A" column.

2.4	For Meters that are Current Transformer (CT) rated, the following note has been added to the drawing: "Note: Send shop drawings to APS Metershop (submittals.metershop@apsc.com) for approval."	□	□
2.5	A Meter Disconnect for the CT rated meter is installed on the inverter side of the meter for source isolation.	□	□
2.6	The Meter Disconnect is installed within the same work space as the CT rated meter in accordance with Section 9.2(D) of the APS Interconnection Requirements.	□	□
2.7	The Production Meter enclosure is not used as a junction box, raceway, or wireway for wiring to other equipment. Refer to Section 9.2 of APS Interconnection Requirements.	□	□
2.8	The Production Meter is labeled per APS labeling requirements.	□	□
2.9	The Production Meter complies with Section 9.2 of APS Interconnections Requirements.	□	□
3.0	**PV/Wind/ES System Utility Disconnect**		
3.1	The Utility Disconnect make and model matches the manufacturer's list of APS approved visible open Utility Disconnect(s).	□	□
3.2	The fixed jaws of the Utility Disconnect(s) are on the utility (line) side of the switch.	□	□
3.3	The Utility Disconnect(s) is rated to withstand the available fault current.	□	□
3.4	The Utility Disconnect(s) is labeled "Utility Disconnect" consistently throughout the drawings (i.e. One Line, Three Line, Site Plan) and abide by the APS Interconnection Requirements labeling standards.	□	□
3.5	All poles of the Utility Disconnect(s) are shown on the Three Line diagram.	□	□
3.6	The Utility Disconnect is directly adjacent to the SES. If not, justification and documentation on the chosen location of the disconnect/meter pair has been submitted to the APS Meter Shop and there is a note on the drawing stating that a placard will be placed at both the SES and Utility Disconnect(s) with explicit and concise instructions to the location of the other. See APS equipment labels for examples.	□	□
3.7	The Utility Disconnect(s) is readily accessible as defined per APS Interconnection Requirements.	□	□
3.8	The neutral conductor is depicted on the drawings. It is not fused or switched.	□	□
3.9	The Utility Disconnect(s) enclosure is not used as a junction box, raceway, or wireway for wiring to other equipment. Refer to Section 8.2(F) of APS Interconnection Requirements.	□	□
4.0	**PV/Wind/ES System Fused Disconnect**		
4.1	The fuse is rated and sized to system specifications.	□	□
4.2	Fuse make, model, and type are provided on the drawings indicating the fuses are current-limiting.	□	□
4.3	All poles of the Fused Disconnect are shown on the Three Line diagram.	□	□
5.0	**Grounding**		
5.1	Equipment Grounding Conductor (EGC) and equipment bonding jumpers are shown terminated inside every metallic electrical enclosure (Disconnect(s), Meter(s), Panel(s), etc.) per *NEC Article 250, Part IV – VII (NEC 2017).*	□	□
5.2	The EGC and bonding jumpers are sized per *NEC Table 250.122.*	□	□
5.3	The AC Grounding Electrode Conductor (GEC) is sized per *NEC Table 250.66.*	□	□
5.4	The neutral to ground bond is established at the SES and is sized per *NEC Table 250.102(C)(1).*	□	□

Instructions: Check the "Confirm" column for each item as it pertains to your drawing/installation. If the requirement does not apply to your drawing, check the "N/A" column.

6.0	**Supply Side Taps**		
6.1	There is Rigid Metal Conduit (RMC) between the SES and Service Disconnect branching from the tap point.	□	□
6.2	The tap conductor meets the minimum size of #2 CU, 90°C.	□	□
6.3	N-G Bond connections are re-established at every Service Disconnect.	□	□
6.4	The neutral bars in both the SES and Service Disconnect(s) are connected to the grounding electrode (i.e. per *2020 NEC Exhibit 250.34).*	□	□
6.5	There is no EGC between the SES and Service Disconnect(s).	□	□
6.6	If the tap is performed in the SES, Customer shall provide APS the Letter of Compliance issued to the NRTL certified by OSHA (i.e. CSA, TUV, UL, etc.) as well as a photograph of the approval sticker affixed to the SES at the time the work is completed in the field.	□	□
6.7	The appropriate UL listed tap kit is used in accordance with the panel manufacturer's instructions. Provide manufacturer letter to APS.	□	□
6.8	Connections between a separated meter base and service disconnect panelboard are made inside the junction box.		
6.9	The note/label: "Warning – A generation source is connected to the supply (Utility) side of the service disconnecting means. Follow proper lockout/tagout procedures to ensure the Service Disconnect is opened prior to performing work on this device" is attached to the SES.	□	□
7.0	**Load Side Taps**		
7.1	PV breaker supplied by the tap conductor does not exceed 120% of the busbar rating per *NEC Article 705.12.*	□	□
7.2	If the tap is performed in the SES, Customer shall provide APS the Letter of Compliance issued to the NRTL certified by OSHA (i.e. CSA, TUV, UL, etc.) as well as a photograph of the approval sticker affixed to the SES at the time the work is completed in the field.	□	□
7.3	Ensure that the tap does not interfere with any factory installed hardware or structure and that the UL listing has not been affected. *Note: Local AHJ to determine if the work violates not only NEC, but also UL regulations.*	□	□

	Generator and Battery Systems	**Confirm**	**N/A**
1.0	**Generator Systems**		
1.1	Transfer switches are listed for UL 1008/1008A or UL 98. Manufacturer specification sheet has been provided.	□	□
1.2	The transfer switch is indicated on the One Line to be either open transition (break-before-make), or closed transition (make-before-break).	□	□
1.3	If there is no UL 1008/1008A or UL 98 transfer switch or if the transfer switch operates in closed transition, a Utility Disconnect is identified.	□	□
1.4	One Line details the transfer switch connections and how the on-site generator is grounded.	□	□
1.5	The transfer switch make and model is provided on the drawing.	□	□
1.6	Emergency or Standby Generators that operate in an open transition mode by means of an automatic transfer switch are labeled per APS ESRM Section 104.11-1.	□	□
2.0	**Battery Systems**		
2.1	The battery interconnection is in compliance with APS Energy Storage System Metering Isolation concept diagrams.	□	□
	a. If not, the energy storage drawing has been submitted to APS for engineering review.	□	□

Instructions: Check the "Confirm" column for each item as it pertains to your drawing/installation. If the requirement does not apply to your drawing, check the "N/A" column.

	Site Plan	Confirm	N/A
1.0	**Site Plan**		
1.1	The Site Plan is up-to-date.	□	□
1.2	The Site Plan explicitly and clearly indicates the location of each of the following: SES, Utility Bi-Directional Revenue Meter, Utility Disconnect, Fused Service Disconnect, Customer or third party disconnect(s), Production Meter, third party meter(s), Inverter(s), DC Disconnect, and North arrow.	□	□
2.0	**Elevation Profile**		
2.1	The heights for the Utility Disconnect and the Production Meter are in accordance with the APS Interconnection Requirements and APS ESRM.	□	□
2.2	The arrangements of each PV System AC equipment matches the equipment arrangement on the Site Plan.	□	□
3.0	**APS Access/Work Space**		
3.1	Site Plan drawing designates the following: "Note: Utility has 24-hr unrestricted and unobstructed access to all system components located at service entrance."	□	□
3.2	APS has access to the Service Entrance Section (SES). Diagrams show all gates and/or lockboxes.	□	□
3.3	APS has access to all Utility Disconnects and Production Meters.	□	□
3.4	The Site Plan drawing contains the following: "Note: Work space in front of AC Electrical System Components shall be in Accordance with APS and NEC Requirements."	□	□
3.5	There is a minimum of 36" by 36" clear working space (with the doors open) in front of all AC Components per APS Interconnection Requirements.	□	□
3.6	If AC Components are installed in an equipment room, APS has access to the room from outside the building. *Note: Refer to Section 301.9 of the APS ESRM.*	□	□
3.7	All work spaces and escape passages are clear and unobstructed (free of debris).	□	□

	Safety Inspection and Standard Requirements	Confirm	N/A
1.0	**Field Inspection**		
1.1	Field work shall be audited to verify that the requirements shown on the drawings have been followed.	□	□
1.2	Appropriate electrical rated clothing and other PPE shall be worn by installer. No conductive articles such as jewelry or metal framed glasses should be worn. Refer to *NFPA Article 70E, 2018.*	□	□
1.3	Visually verify that metal surfaces are connected to Earth before touching and by taking measurement to known Earthed metallic surface (i.e. ground rod).	□	□
1.4	The equipment shutdown has been identified in preparation for an emergency. Refer to *NFPA 70E and OSHA for electrical Safety-Related Work Practices.*	□	□
1.5	Check for proper terminations, good workmanship, and proper binding screws/splicing devices. Check lugs to verify that they are tight per manufacturer's specifications *(NEC Articles 110.14 and 110.12).*	□	□
1.6	Access door to electric cabinets and junction boxes are locked after work is complete, to avoid access by unauthorized personnel. Verify no electrical covers are missing *(NEC Articles 110.26, 110.27, and OSHA 1910.303(h)(2)(v)(D)).*	□	□

Instructions: Check the "Confirm" column for each item as it pertains to your drawing/installation. If the requirement does not apply to your drawing, check the "N/A" column.

2.0	**Technical Equipment/Specifications**		
2.1	If installer has provided and installed a leasing company/3rd Party Production Meter, the meter is properly identified and labeled "Leasing Company PV [or Wind] Production Meter" *Note: 3rd party metering shall be installed on the generator/inverter side of APS' Production Meter.*	☐	☐
2.2	The inverter is capable of operating within Tolerable Service Voltage (Range B) as defined by *ANSI C84.1-2011* (i.e. for a 120/240V System Range B is 220V – 254V).	☐	☐
2.3	The inverter is listed per *UL Standard 1741/1741SA.*	☐	☐

Other Comments/Notes

NOTE: This checklist was developed to assist design/engineering groups create drawing sets for DG systems applying for interconnection to the APS Electrical System. APS has provided this checklist to be used as a tool to ensure APS' minimum interconnection and general safety requirements are met (i.e. NEC). Completion of this checklist does not ensure drawings will be approved by APS. Refer to the APS Interconnection Requirements and APS Electric Service Requirements Manual for additional information. As a reminder, APS is not responsible for the design and installation of (3rd party) DG systems. Additionally, several items noted pertain to field validation/installation, workmanship, and safety. These items were provided to ensure safety/reliability of the DG system/premise wiring, Installer employees, our mutual customer, and the public.