



Cleco Power LLC

SPECIFICATION COG-2007

FOR

**PARALLEL OPERATION OF CUSTOMER-OWNED GENERATION ON CLECO'S
ELECTRICAL SYSTEM**

Revised: August 29, 2007

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1.0 SCOPE

- 1.1 This technical specification states the minimum requirements and procedures for safe and effective connection and operation of Customer-owned generation with the Cleco electrical system.
- 1.2 It is emphasized that the requirements outlined in this specification are general and may not cover all details in specific cases. Therefore, if there is any conflict in terms between this specification and the executed Interconnection Agreement, the Interconnection Agreement takes precedence.
- 1.3 The term “Customer” will be used in this specification to refer to the entity requesting parallel operation of generation as described in section 1.1.

2.0 POLICY ON CUSTOMER GENERATION

- 2.1 It is the policy of Cleco to permit any Customer to operate his generating equipment in parallel with the electric system provided the Customer's generating equipment has been reviewed and approved by Cleco and all associated technical, operational, and regulatory issues have been appropriately addressed.
 - 2.1.1 Any Customer desiring to operate his generating facility in parallel with the Cleco system must do so without adversely affecting other Customers, utilities, or Cleco equipment or personnel.
 - 2.1.2 Certain protective devices (circuit breakers, relays, etc.) shall be installed by the Customer in accordance with prudent electrical practices at the location where a Customer desires to operate generating equipment in parallel with the Cleco system.
 - 2.1.3 Generators rated 20MW (gross nameplate rating) and below may be connected to the distribution system if no technical exceptions are determined in the system impact study. For generation connected in parallel to the distribution system, the Customer must adhere to this specification and the provisions in IEEE 1547 and IEEE 1547.1.
 - 2.1.4 Generators rated above 20MW (gross nameplate rating) must be connected directly to the transmission system. For generation connected to the transmission system, the Customer should use this specification as a guideline but all protection and metering will be reviewed on a case by case basis.

- 2.2 Three-phase and single-phase Customer generators may be connected in parallel with the Cleco system if the requirements of this specification are met and the appropriate approvals are obtained as outlined under "Approval" (Article 3.0) of this specification.
- 2.2.1 Customer generation greater than 25 KW shall be three-phase unless specifically approved in writing by Cleco. Where multiple generators are connected to the Cleco system through a single service point, the sum of the rating of the generators will be used.
- 2.2.2 Any unapproved generating equipment found operating in parallel with the Cleco system or with required protective devices disconnected or bypassed may be immediately disconnected by Cleco and not allowed to reconnect until the appropriate review and approval from Cleco has been obtained.
- 2.3 Cleco will not assume any responsibility for the protection of the Customer's electrical system. The Customer is fully responsible for protecting his equipment in such a manner that faults or other disturbances on the Cleco system do not cause damage to the Customer's equipment.
- 2.4 All costs to Cleco, including costs incurred after the interconnection has been made, resulting from the installation, maintenance and/or rearrangement of equipment that is required to permit parallel operation of Customer generation shall be borne by the Customer.
- 2.5 The Customer shall indemnify and hold Cleco harmless for all damages and injuries to Cleco or others arising out of the Customer's use, ownership, or operation of the Customer's facilities.
- 2.6 Any Customer desiring to sell power to Cleco shall sign a contract with Cleco, prior to parallel operation, specifying the terms and conditions under which the interconnection shall take place.

3.0 APPROVAL

- 3.1 The Standard Interconnection Evaluation Form located in Appendix 1 of this document shall be completed by the Customer to begin the interconnection process. This form will be used to determine the correct interconnection process to be followed.

- 3.2 The Customer shall complete and sign the appropriate “Intent to Interconnection” Application in accordance to the Small Generation Interconnection Procedure (for units equal to or less than 20 MW) or the Large Generator Interconnection Procedure (for units greater than 20 MW). Cleco will use this data to simulate the impact of the Customer generating equipment on the Cleco system during normal operating conditions and in the event of a disturbance on the Cleco system.
- 3.3 The Customer shall submit to Cleco for review of the protective functions three (3) copies of his detailed electrical system one-line diagram showing his generators, transformers, circuit breakers, disconnect switches, and protective relays. The copies shall be stamped by a professional engineer registered in the State of Louisiana.
- 3.4 For generation 20MW and below, Customer must have “Type Tests” conducted by the manufacturer of the generating equipment or a third party test facility per Section 5 of IEEE standard 1547.1 and “Production Tests” conducted by the manufacture of the generating equipment or a third party test facility per section 6 of IEEE standard 1547.1. The Customer must submit reports from these two tests to Cleco as part of the approval process.
- 3.5 Upon installation, the generation facilities shall be commission tested per section 7 of IEEE 1547.1 by a qualified person and witnessed by Cleco personnel. The results of these tests shall be submitted to Cleco for review and approval prior to the generation equipment being placed in service.
- 3.6 Any modifications made by the Customer to his facility that may affect the Cleco system require review by Cleco prior to implementation.
- 3.7 Prior to service being made available to the Customer's generating equipment, Cleco may inspect the Customer's facility and witness testing of any protective equipment or devices associated with the interconnection.
- 3.8 The Customer may not commence parallel operation of his generators with the Cleco system until final written approval has been given by Cleco.

4.0 GENERAL OPERATING REQUIREMENTS

- 4.1 Cleco primary distribution voltages vary depending on the geographic location. The Customer should contact Cleco for information on the specific circuit that will serve his generating facility.
 - 4.1.1 If Cleco changes the primary distribution voltage in the future, i.e., from a lower voltage to a higher voltage, for example, from 13.2 kV to 34.5 kV,

the Customer will be responsible for all costs (transformers, breakers, etc.) required to re-interconnect to the Cleco system.

- 4.2 The interconnection of the Customer's generating equipment with the Cleco system shall not cause any reduction in the quality of service being provided to other Customers. In order to minimize service abnormalities due to the Customer's parallel generation with the Cleco system, the following criteria shall be met by the Customer's generating equipment.
- 4.2.1 The Customer shall operate his generation equipment in such a manner that the maintained voltage levels are in the same range as if his generating equipment were not connected to the Cleco system. The Customer shall provide an automatic method of disconnecting his generating equipment from the Cleco system according to table 1 in IEEE 1547-2003 as shown below:
- a. Within 2 seconds for a voltage range of $50\% \leq V < 88\%$ where V is the % of base voltage
 - b. Within 1 second for a voltage range of $110\% < V < 120\%$ where V is the % of base voltage
 - c. Within 0.16 seconds for a voltage range of $V < 50\%$ or $V \geq 120\%$ where V is the % of base voltage
- 4.2.2 Voltage flicker on the distribution system caused by the Customer's generating facilities must be limited to the "Borderline of Irritation" curve shown in Figure 9.11. Failure to meet these limits will result in immediate disconnection by the Company until such time that all problems are corrected.
- 4.2.3 Total harmonic current distortion measured at the Customer's meter shall not exceed 5% of the fundamental 60Hz frequency and shall not exceed the values in Table 3 of IEEE 1547-2003.
- 4.2.4 The operating frequency of the Customer's generating equipment shall not deviate more than +0.5 hertz or -0.7 hertz from a 60 hertz base. The Customer shall automatically disconnect his generating equipment from the Cleco system within 10 cycles if this frequency tolerance cannot be maintained.
- 4.2.5 The power factor of the Customer's generator(s) shall be from 0.90 lagging to 0.90 leading at the generator terminals at all times. It shall be the Customer's responsibility to correct the generator power factor to meet this criterion.

- 4.2.6 The Customer shall be responsible for disconnecting his generating equipment from Cleco facilities within 10 cycles of an outage caused by short circuits or grounds on the Cleco circuit serving the Customer's generating facilities.
- 4.2.7 The Customer shall have the sole responsibility for protecting his generating equipment from excessive negative and zero sequence currents.
- 4.2.8 The Customer shall provide the necessary protective devices to prevent parallel operation of his generating equipment with the Cleco system unless the Cleco system voltage is of normal magnitude and phase sequence.
- 4.2.9 Cleco reserves the right to specify the installation of shunt capacitors, at Customer's expense, for correction of Customer's power factor.
- 4.3 The Customer shall be connected to the Cleco system through a dedicated power transformer.
- 4.4 It shall be the sole responsibility of the Customer to properly synchronize his generator(s) with the Cleco system. The Customer shall provide an automatic or semi-automatic synchronizing scheme to prevent closing of its circuit breaker when the two electrical systems are out of synchronism. The synchronizing system of the Customer must allow the generator to be operated in parallel only when Cleco's electrical circuit is energized from the Cleco system at the point of common coupling.
- 4.5 Control devices shall be installed by the Customer in accordance with prudent electrical practices to prevent the energization of a de-energized Cleco circuit.
- 4.6 Cleco reserves the right to open the interconnecting breaker for any of the following reasons:
 - 4.6.1 During system emergencies.
 - 4.6.2 To facilitate maintenance, test, or repair of Cleco facilities.
 - 4.6.3 The Customer's generating equipment interferes with other Customers or with the operation of the Cleco system.

- 4.6.4 Inspection of the Customer's generating and/or protective equipment reveals a hazardous condition.
- 4.6.5 A lack of scheduled maintenance and/or maintenance records for Customer protective equipment.
- 4.6.6 The Customer's protective devices do not comply with this specification.
- 4.7 All costs resulting from future additional protective relaying requirements shall be borne by the Customer.

5.0 SPECIFIC REQUIREMENTS - THREE-PHASE GENERATORS

- 5.1 Customers who desire to install and operate three-phase generators in parallel with the Cleco system are required to install certain protective devices (relays, circuit breakers, etc.). The purpose of these devices is to promptly remove the Customer's generating equipment from the Cleco system whenever a fault or abnormal event occurs.
- 5.2 Protective equipment at the Customer's location shall be owned, operated, and maintained by the Customer.
 - 5.2.1 All interconnection relays shall be "utility grade" and shall be powered by a DC battery storage system.
 - 5.2.2 All protective devices installed to protect the Cleco system from Customer in-feed shall conform to prudent electrical practices.
 - 5.2.3 The installation of these devices shall be subject to the inspection of Cleco.
 - 5.2.4 All relay settings on the interconnecting breaker shall be reviewed by Cleco.
 - 5.2.5 The Customer has the sole responsibility for the routine maintenance of his protective and generating equipment. Cleco reserves the right to verify on demand the calibration and operation of all Customer protective equipment. Verification shall include the tripping of the circuit breaker(s) by the protective relays. Maintenance of protective equipment is to be performed at least annually or as required by Cleco to ensure safe and reliable operation when operating in parallel with the Cleco system. Complete maintenance records shall be maintained by the Customer and a

copy of each test sent to Cleco for review. Failure of the Customer to provide proper routine maintenance and/or maintenance records shall result in the Customer being disconnected as specified in sub-division 4.6.5 of this specification.

- 5.3 All Customer generator facilities must be connected to Cleco's system through a power transformer that is owned, operated and maintained by the Customer. This transformer must be connected in such a manner as to isolate the zero sequence circuit of the Customer's generator from the zero sequence network of Cleco. Customer shall submit their proposed transformer connection (wye grounded-delta, delta-wye grounded, etc.) to Cleco for approval before ordering transformer. If the generator capacity is greater than 50% of the load that would be served by the generator in an islanding condition, then the preferred transformer connection is grounded wye on Cleco's side and delta on the Customer's side. This connection will eliminate overvoltages on the Cleco system during a phase-ground fault. If the generator capacity is less than 50% of the connected load, then other transformer connections should be considered.
- 5.4 Customer generators shall not be connected in parallel with the Cleco system through power transformers protected by high side fuses unless approved in writing by Cleco. The use of a three-phase automatic disconnecting device is intended to significantly reduce the possibility of damaging the Customer's generator(s) due to negative-sequence currents.
- 5.5 Because most short circuits on overhead lines are of a temporary nature, it is Cleco's practice to automatically reclose the substation circuit breakers on such lines 2-3 seconds after they have automatically tripped. Reclosing of three-phase line reclosers located between the Cleco substation and Customer generator is also practiced. [These three-phase line reclosers will automatically reclose within 1.5 - 2.0 seconds after they have automatically tripped.] It shall be the Customer's responsibility to automatically disconnect his generator(s) from the Cleco system prior to the Cleco substation breaker or line recloser automatic reclosure.
- 5.5.1 Customer breakers or reclosers shall not automatically or manually reclose after tripping until a minimum of 120 seconds after the Cleco service voltage of normal magnitude and phase sequence has returned.
- 5.5.2 Under no condition will the Customer be permitted to energize a non-energized Cleco circuit. Equipment to effectively block the Customer from energizing a non-energized Cleco circuit shall be installed.

- 5.6 Figures 9.1 through 9.10 indicate connections and protection for three-phase Customer generators which can be used as a guide by the Customer when designing his facilities.
- 5.7 The most commonly used protective devices which may be installed by the Customer to satisfy the protection requirements of Cleco are as follows:
- 25 - Synchronizing device
 - 27 - Undervoltage relay
 - 32 - Directional power relay
 - 46 - Phase-balance current relay
 - 47 - Phase-sequence voltage relay (negative sequence)
 - 50/51 - Phase overcurrent relay
 - 51G - Ground overcurrent relay
 - 50/51V - Voltage restrained/controlled overcurrent relay.
 - 59 - Overvoltage relay
 - 62 - Time delay relay
 - 67 - Directional overcurrent relay
 - 81O - Overfrequency relay
 - 81U - Underfrequency relay

It is likely that most Customer installations will not require the use of all of the listed relays; however, various installations may require that additional protective relaying be installed that has not been shown. The Customer is advised to consult the Cleco representative regarding his proposed protective/control scheme before any equipment is purchased.

- 5.8 The Customer's main interconnecting circuit breaker/recloser shall be a three-phase device with an electronic or electromechanical control. Hydraulically controlled breakers/reclosers shall not be used.
- 5.8.1 The symmetrical current interrupting capability shall be greater than the maximum available system fault duty (assume infinite bus).
- 5.8.2 The breaker/recloser and its control shall be located so as to be accessible at all times to Cleco personnel.
- 5.9 All Customer generators shall be separable from the Cleco system by a visible break disconnecting device.

- 5.9.1 A three-phase, manual load break disconnecting device shall be installed to separate the Customer's generating facilities from the Cleco system. If the switch is located in the Customer's system, Customer shall install in accordance with prudent electrical practices. If the switch is located in Cleco's system, Cleco will install at the Customer's expense.
- 5.9.2 Customer owned visible break disconnecting devices shall be accessible to and allow padlocking in the open position by Cleco personnel.
- 5.10 If the generator is rated greater than 20MW, the generator exciter shall be equipped and operated with an automatic voltage regulator (AVR) set to control the generator terminal voltage. Customer shall notify Cleco TOC immediately when the AVR is not working for any reason. Under steady state conditions, the AVR shall be capable of automatically maintaining the generator or terminal voltage (without hunting) to within plus or minus 0.1% of any set point within an operating range of plus or minus 10% of the rated terminal voltage of the generator.
- 5.11 All excitation systems for synchronous generators greater than 20MW shall be equipped with a Power System Stabilizer.
- 5.12 For installations greater than 100 KW capacity, telephone facilities for voice communications with Cleco personnel shall be provided by the Customer at the generator site.

6.0 SPECIFIC REQUIREMENTS - SINGLE-PHASE GENERATORS

- 6.1 Customers desiring to install and operate single-phase generators in parallel with the Cleco system, 25 KW or less, will be allowed at most locations on the radial distribution system if they meet the requirements of this specification. Depending on the point of interconnection to the Cleco system, single-phase generators larger than 25 KW may be allowed.
- 6.2 It is the responsibility of each Customer to install, operate, protect, and maintain all facilities required for the safe and effective operation of his generating equipment in parallel with the Cleco system.
- 6.3 The Customer shall install a manual disconnecting visible blade "safety switch" device that will provide a visible opening between the Cleco system and Customer generating facilities. This visible blade "safety switch" device shall be accessible to and allow padlocking in the open position by Cleco personnel.

- 6.4 Because of the transient nature of most faults on the overhead electrical system, it is Cleco's practice to automatically reclose the substation breakers 2 - 3 seconds after they have tripped. [Reclosing of single-phase reclosers located between the Cleco substation and Customer generator is also practiced. These single phase reclosers will automatically reclose within 1.0 - 2.0 seconds after they have automatically tripped]. It shall be the Customer's responsibility to automatically disconnect his generator(s) from the Cleco system prior to the Cleco substation breaker or line recloser automatic reclosure.
- 6.5 Customer generator controls shall be equipped with a line voltage sensing relay or contactor which will prevent the generator from being connected to a de-energized Cleco circuit.
- 6.6 The Customer shall normally be connected to the Cleco system through a dedicated distribution transformer to ensure that the generator cannot become isolated with a small amount of other Customer load and confine any voltage fluctuations or harmonics produced by the generator to the Customer's own system. In instances where it is impractical to provide a dedicated transformer, the Customer may be required to install over and under voltage and over and under frequency relays arranged to disconnect the generator(s) from the Cleco system.
- 6.7 Figure 9.5 shows a method of connecting and protecting a single-phase Customer generator which can be used as a guide by the Customer when designing his facilities.

7.0 INDUCTION GENERATORS AND INVERTER SYSTEMS

- 7.1 Due to the possibility of self-excited operation, all installations of power factor correction devices for induction generators or power inverters shall be reviewed by Cleco.
- 7.2 The starting of induction generators shall be permitted only where the inrush will not exceed allowable limits. In cases where starting or load changing on induction generators will have an adverse impact on the Cleco system voltage, the Customer may be required to install step-switched capacitors or other techniques to bring voltage fluctuations to acceptable levels.
- 7.3 Inverter system installations shall be designed such that an interruption on the Cleco system shall result in the removal of the inverter infeed to the Cleco system. If a Customer using an inverter for parallel generation causes any reduction in the quality of service provided to other utility Customers, the

generating Customer will be required to install filtering to bring the harmonic output of his inverter to an acceptable level.

- 7.4 Figure 9.6 shows a method of connecting and protecting an inverter system which can be used as a guide by the Customer when designing his facilities.

8.0 Metering Requirements

8.1 Accuracy Requirements for Metering Facilities

All metering facilities shall conform to accuracy requirements of ANSI C-12 and IEEE Standard C57.13 and in compliance with all regulations from authorities having jurisdiction. All generation interconnection metering facilities shall be in accordance with current applicable Cleco standards and guidelines. Contact Cleco Transmission Services for details.

Generation interconnection metering installations (including POI metering, Gross Unit Generation metering, Net Unit Generation metering, and Auxiliary Load metering, when required) shall conform to the minimum accuracy requirements below:

- 8.1.1 The specifications of the purchased meter(s) shall have stated accuracy of: +/- 0.20% or better.
- 8.1.2 The specifications of the purchased metering potential transformers (PT's) shall have stated accuracy of: +/- 0.30% or better on the secondary current outputs through all standard burdens W, X, Y, Z, and ZZ¹ (nameplate accuracy designation 0.3 WXYZ.ZZ). CCVT's are not acceptable for metering purposes.
- 8.1.3 The specifications of the purchased metering current transformers (CT's) shall have stated accuracy of: +/- 0.30% or better on the secondary current outputs through a maximum burden of 1.8 ohms² (nameplate accuracy designation 0.3B1.8). For metering CT's, a minimum rating factor (RF) of 3.0 is required. Metering CT primary continuous current ratings, and CT ratios, shall be selected in order to maximize accuracy and maintain minimum accuracy of 0.60% over full range of anticipated loads. If the range of anticipated power flow is extremely large, or if the power flow

¹ The actual total burden placed on ALL secondary windings of the metering instrument transformers shall be within their specified accuracy rating(s).

² The actual total burden placed on ALL secondary windings of the metering instrument transformers shall be within their specified accuracy rating(s).

may be close to zero, high accuracy (0.15% class) CTs shall be installed. Note: IEEE Standard C57.13.6 requires 0.15% class metering CTs to have an accuracy of 0.15% from a range of 5% of rated current through rating factor times rated current.

8.2 Point of Interconnection (POI) Metering

Interconnection requires that a bi-directional Siemens 2510 meter be installed on the Cleco side of the POI in order to measure the facility's net export/import quantities into/out of the transmission system. For those cases where metering transformers are not installed precisely at the POI, the meters shall be programmed to compensate for losses back to the POI.

For installations with two or more Points of Interconnection, each individual POI shall have a separate bi-directional POI meter installed, and the bi-directional POI meters shall be totaled to provide net export/import quantities unless specified otherwise by Cleco. Summing CTs from multiple interconnections into one meter is not acceptable.

Each new meter installation shall be compliant with Blondel's Theorem including the number of PTs and CTs and the number of sensing elements in the meter. A three element meter along with three CTs and three PTs are required for four wire interconnections, i.e. three phase conductors and a neutral such as on grounded wye circuits. A two element meter along with two CTs and two PTs are required for three wire interconnections, i.e. delta or ungrounded wye circuits.

POI metering shall satisfy the accuracy requirements of section 8.1 throughout the entire range of anticipated power flow. The meters shall be capable of measuring and telemetering the following data at a minimum to Cleco's TOC through a remote terminal unit (RTU) and/or dial-up as specified in section 9.3

[Note: The Cleco TOC metering convention is that energy exported by generation facilities into the Cleco transmission control area is considered Energy Received (Rec) and energy leaving the Cleco control area is considered Energy Delivered (Del).]

8.2.1 Instantaneous bi-directional MW flow between Customer and Transmission System (Rec/Del)

8.2.2 Instantaneous bi-directional MVAR flow between Customer and Transmission System (Rec/Del)

- 8.2.3 Integrated MW-Hours from Customer to Transmission System (Rec hourly)
- 8.2.4 Integrated MW-Hours from Transmission System to Customer (Del hourly)
- 8.2.5 Integrated MVAR-Hours from Customer to Transmission System (Rec hourly)
- 8.2.6 Integrated MVAR-Hours from Transmission System to Customer (Del hourly)
- 8.2.7 Instantaneous uni-directional line-to-line bus voltage (kV)

Note that depending on the size of the generator, KW may also be required.

All metering installations shall be equipped with telephone modem(s), or other communication devices as specified and provided by Cleco. A standard voice telephone line shall be provided by the Customer for dial up access to meter data, unless specified otherwise by Cleco.

8.3 Metering Costs

The Customer shall be responsible for all costs associated with the design, specification, calibration and installation of meter equipment required for interconnection to the Cleco transmission system. In addition, the Customer shall be responsible for all ongoing maintenance costs specified in the applicable approved tariffs. In the event of a modification that significantly changes the generation capacity of the generation facility, the Customer shall also be responsible for all costs associated with metering equipment upgrades necessary to obtain the required metering accuracy over the range of power expected to be exchanged.

8.4 Metering Ownership, Maintenance and Installation

Cleco will specify, own and maintain the POI metering equipment, including meters and instrument transformers. Cleco will purchase, install, and test the meters, instrument transformers, and control cables. The POI metering shall be located within and/or on Cleco facilities.

Since the instrument transformers for Gross Unit Generation metering, Net Unit Generation metering, and Auxiliary Load metering are to be located at the Customer's facility, agreements may be reached to allow the Customer to

purchase and/or install the instrument transformers and/or cables, as per Cleco specifications. Cleco will purchase the metering panels, program the meters, terminate all cabling, and test the meter installations. Cleco reserves the right to test, witness Customer's testing of, or receive copies of Customer's test results for any instrument transformers installed by Customer for transmission interconnection metering requirements.

Unless agreed to otherwise by Cleco, for all Customer's facilities in which Cleco Transmission requires Gross Unit Generation metering data and/or Net Unit Generation metering data, Cleco shall specify, own and maintain the meters, but not the instrument transformers and cabling. The Customer shall own the instrument transformers and cabling associated with Unit Generation metering facilities. The Customer shall install, maintain, and operate its metering facilities in compliance with Cleco policies. The Customer shall contact Cleco for specific requirements. Under no circumstances shall the Customer modify or disconnect metering facilities without communication with and approval from the Cleco TOC.

8.5 Access to Metering Equipment

The Customer shall provide access to metering equipment for Cleco personnel to perform routine and emergency maintenance as requested by Cleco Transmission. The Customer shall be responsible for providing, at the Customer's expense, any special equipment, escorts, and/or training necessary for Cleco personnel to access metering equipment inside of the Customer's facilities.

9.0 Communication Requirements

9.1 Operator Communications

Customer facilities connected to the Cleco system shall maintain operating communications between Cleco's system operator or the designated representative and Customer operations personnel via standard voice and facsimile capabilities using the public telephone network, provided at the Customer's expense. The operational communications shall include, but not be limited to, system paralleling or separation, scheduled and unscheduled shutdowns, equipment clearances and hourly and daily load schedules and reports.

9.2 Dial-Up Data Communications

Unless otherwise specified by Cleco, the Customer shall provide PSTN (public switched telephone network) dial-up voice-grade line. If required, Customer shall install line sharing switch as per Cleco specifications. The line will be used for data retrieval and remote access to metering and/or RTU equipment.

9.3 General RTU Data and Communications

The metering data requirements specified in 8.2, as applicable, as well as applicable equipment status and control (see below), shall be communicated to the Cleco TOC via a dedicated data link.

The data required shall be collected by Cleco using a multi-ported RTU or Cleco approved equivalent data collection and transfer equipment. Unless otherwise specified by Cleco, the data shall be communicated via separate, dedicated 4-wire, full-duplex, data quality communications circuits, operating at 9600 baud to Cleco's TOC. Cleco approved telecommunications equipment shall be installed and maintained at the Customer's expense in order to communicate with the host computer systems at Cleco's TOC.

An alarm shall be provided indicating a DNP communications link failure between the RTU and all meter(s). This alarm shall be programmed as a digital indication point. If metering data is communicated between RTU's or other data collection and transfer equipment, then a digital alarm shall be provided indicating a DNP communications link failure between devices.

This data will be input into the TOC host computer systems to assist in the performance of various system operational functions, such as billing, load forecasting, generation scheduling and maintenance.

9.4 Data Communications for Cleco RTU

Data collection and transfer equipment, such as an RTU, required to collect the necessary data on the Cleco side of the POI shall be installed, owned, and maintained by Cleco. The Customer shall be responsible for Cleco's costs associated with RTU installation and/or modification(s) for generator interconnection requirements.

9.5 Data Communications for Customer RTU

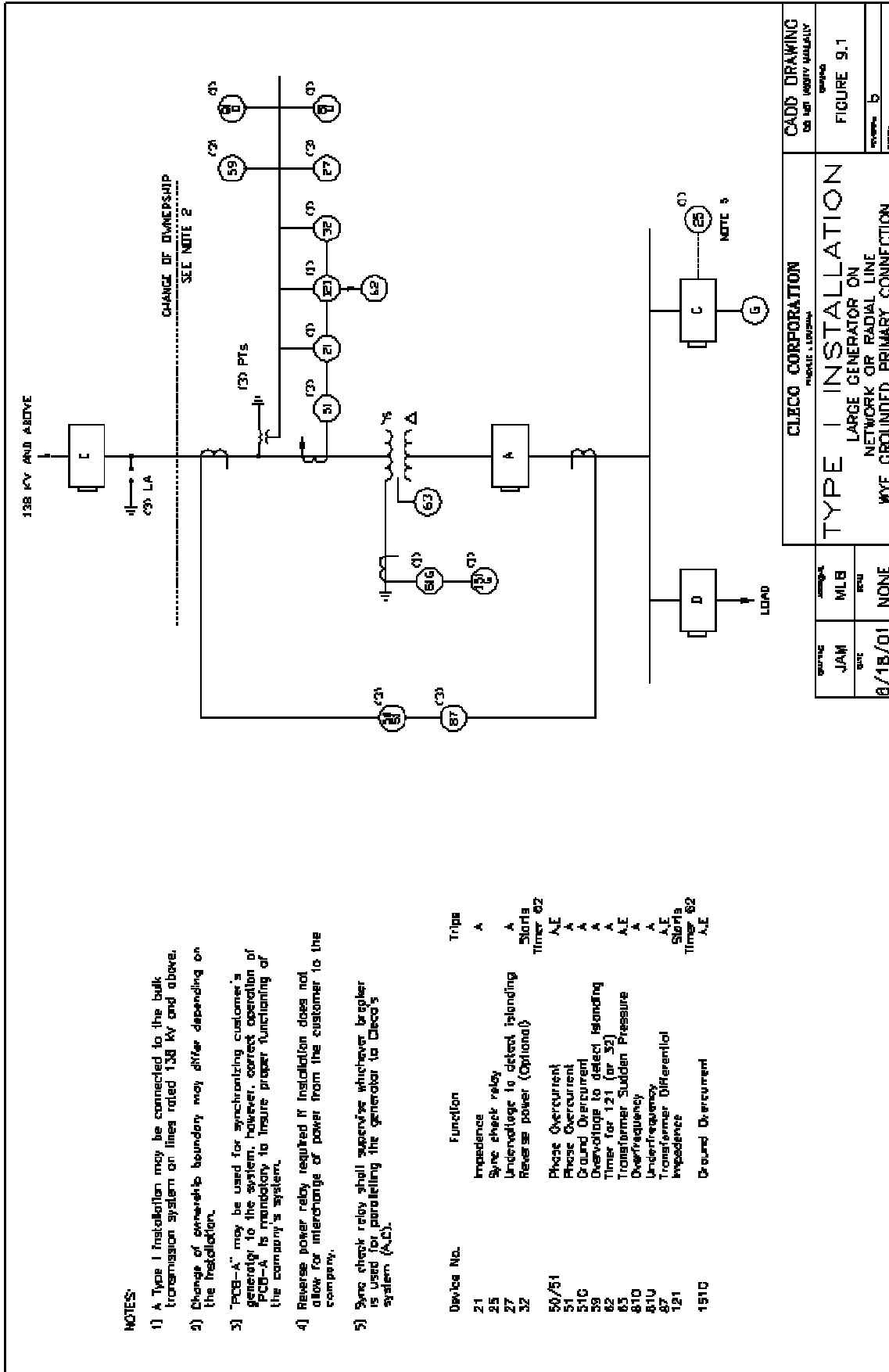
Data collection and transfer equipment required to collect the necessary data on the Customer's side of the POI shall be installed, owned, and maintained by the Customer, at the Customer's expense. The communication protocol for the data links between Cleco's TOC and the Customer data collection equipment shall be specified by Cleco Transmission.

Note: Cleco uses GE RTU equipment and software for Cleco-owned RTU's. Use of the GE software and firmware is governed by a proprietary agreement between Cleco and GE, and Cleco can not offer or install software or firmware in the Customer's RTU.

9.6 Quantities to be Telemetered

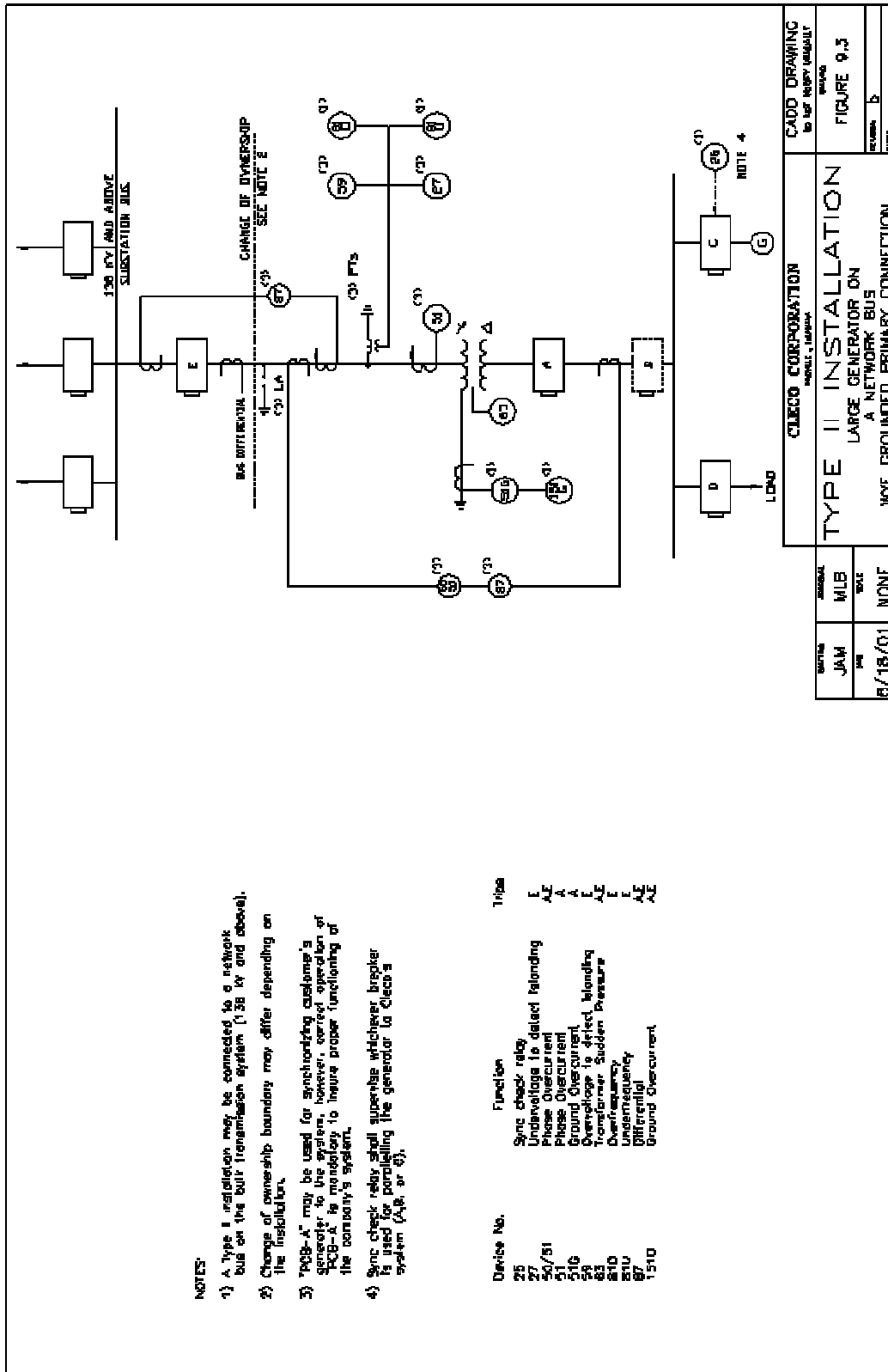
The following quantities shall be telemetered directly to Cleco's TOC from the RTU:

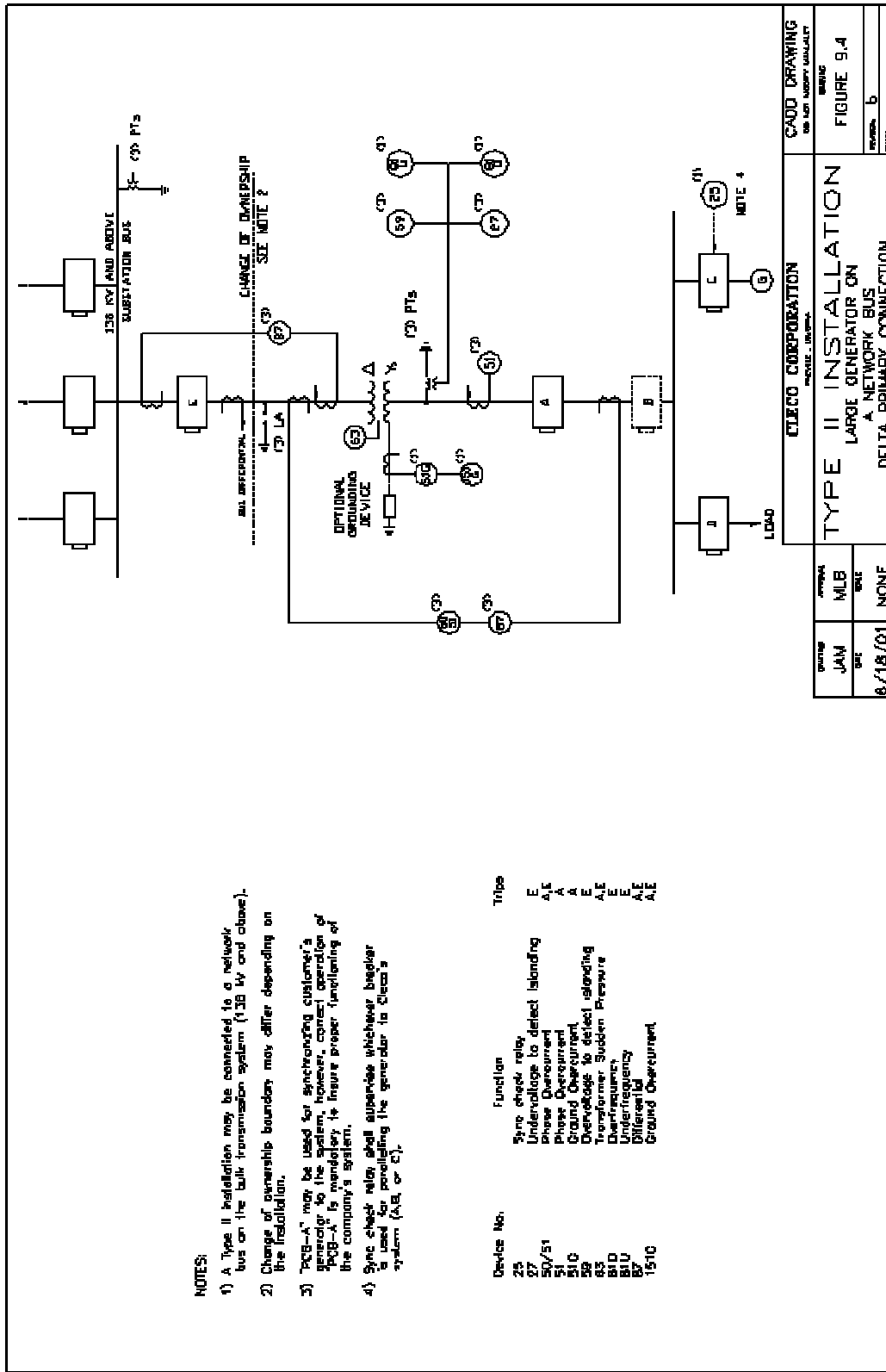
- 9.6.1 At generator(s): Metering data as specified in section 8.2 (as applicable)
- 9.6.2 Status of Customer generator breaker(s) (open/closed).
- 9.6.3 Status of first interrupting device(s) on Customer side of POI (open/closed).
- 9.6.4 Status of first visible disconnecting device(s) on Customer side of POI, when applicable (open/closed).
- 9.6.5 AVC status (See section 5.10 Voltage Requirements.)



- NOTES:**
- 1) A Type I installation may be connected to the bulk transmission system on lines rated 138 KV and above.
 - 2) Change of ownership boundary may differ depending on the installation.
 - 3) "PCB-A" may be used for synchronizing customer's generator to the system, however, correct operation of PCB-A is mandatory to insure proper functioning of the company's system.
 - 4) Reverse power relay required if installation does not allow for interchange of power from the customer to the company.
 - 5) Sync check relay shall supervise whichever breaker is used for paralleling the generator to Cleco's system (A,C).

Device No.	Function	Trips
21	Impedance	A
25	Sync check relay	A
27	Under-voltage to detect islanding	A
32	Reverse power (Optional)	Starts Timer #2
50/51	Phase Overcurrent	A,E
51	Phase Overcurrent	A
51G	Ground Overcurrent	A
59	Over-voltage to detect islanding	A
62	Timer for 1.21 (for 32)	A
65	Transformer Sudden Pressure	A,E
810	Underfrequency	A
81U	Transformer Differential	A,E
87	Impedance	Starts Timer #2
121	Impedance	A,E
1510	Ground Overcurrent	A

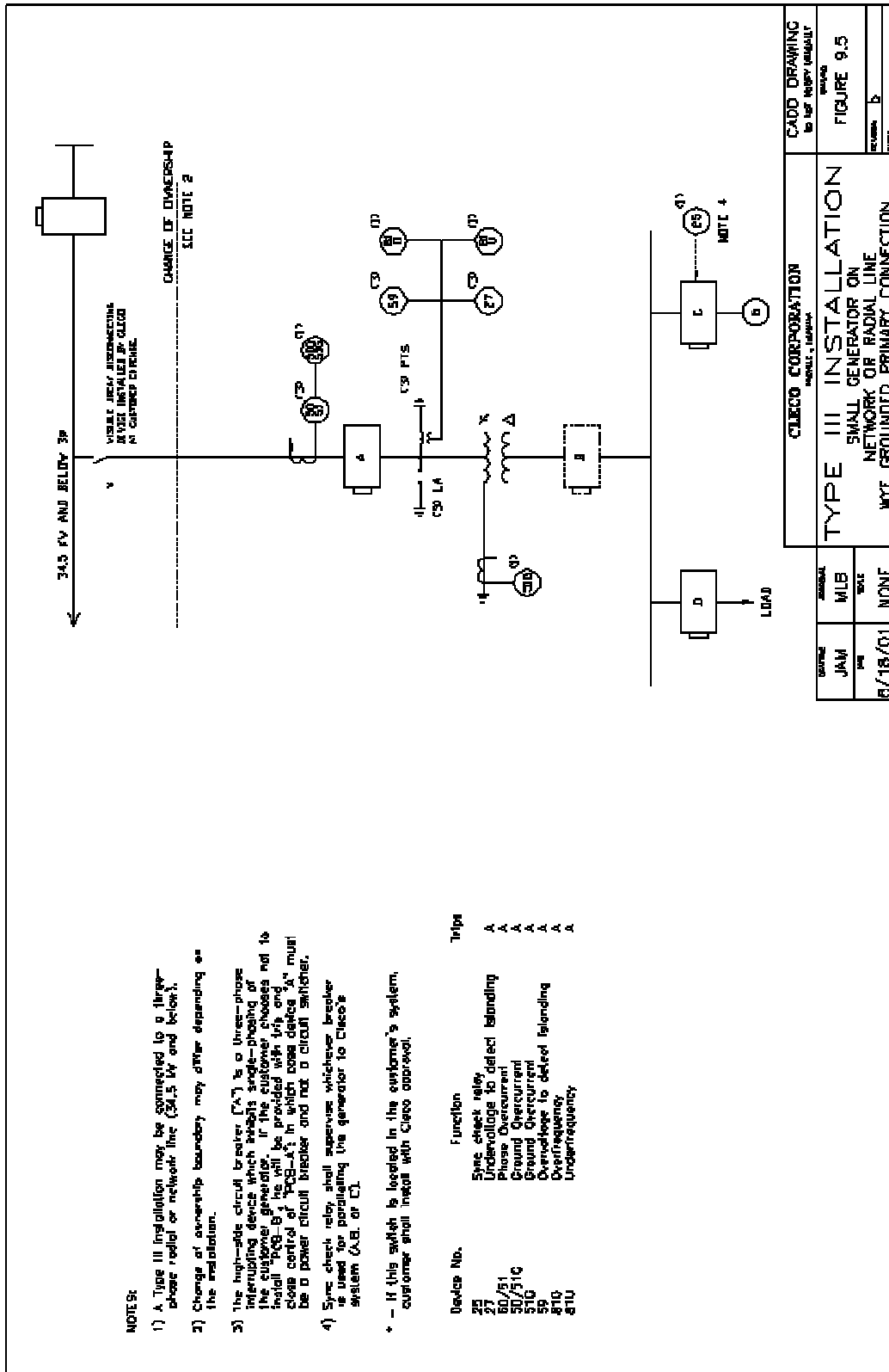


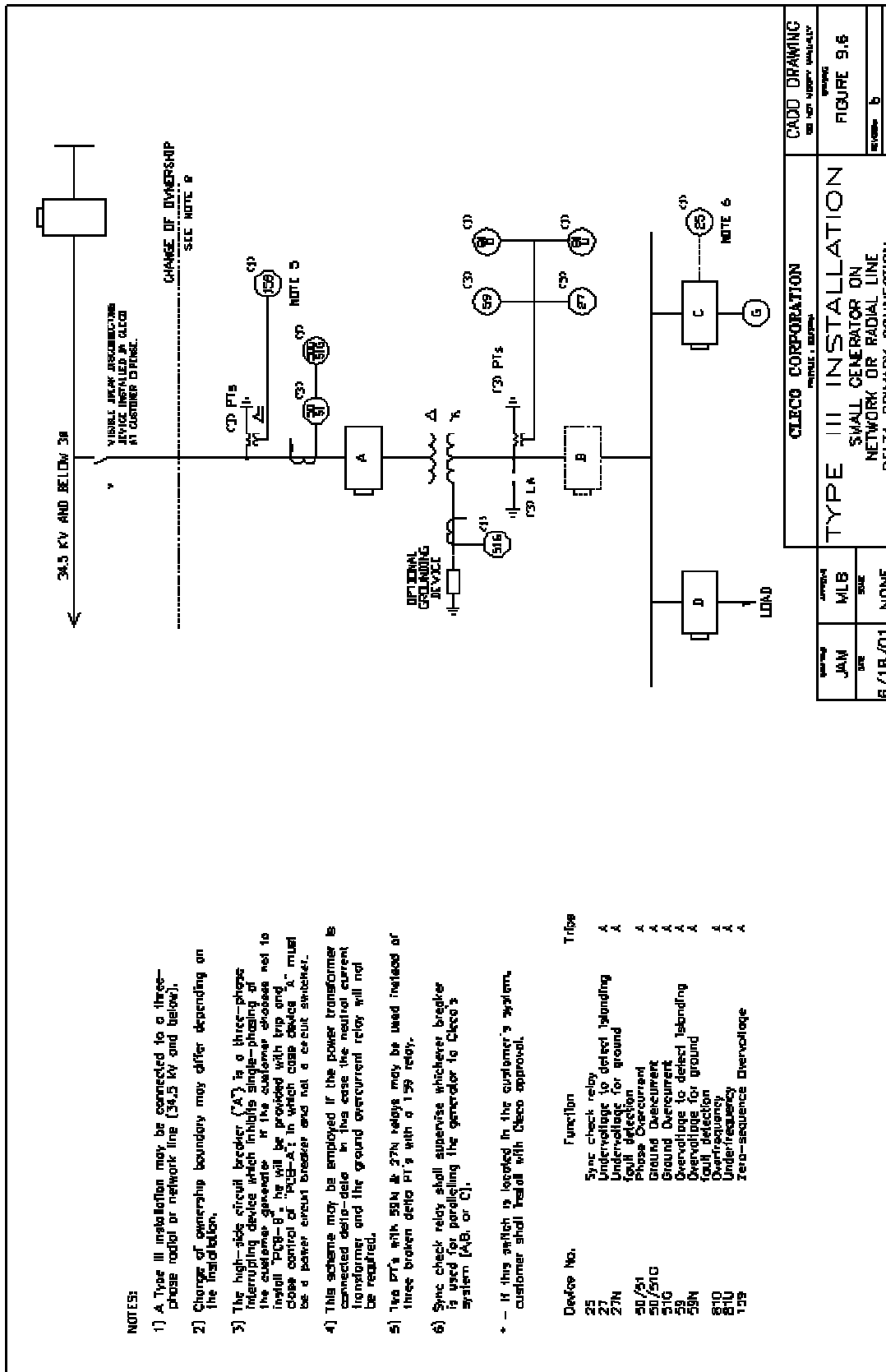


NOTES:

- 1) A Type II installation may be connected to a network bus on the bulk transmission system (138 kV and above).
- 2) Change of ownership boundaries may differ depending on the installation.
- 3) PCB-A may be used for synchronizing customer's generator to the system, however, correct operation of PCB-A is mandatory to insure proper functioning of the company's system.
- 4) Sync check relay shall supervise whichever breaker is used for paralleling the generator to Cleco's system (A, B, or C).

Device No.	Function	Tripe
25	Sync check relay	E
27	Under-voltage to detect islanding	A/E
50/51	Phase Overcurrent	A
51	Phase Overcurrent	A
51C	Ground Overcurrent	A
52	Over-voltage to detect islanding	A/E
53	Transformer Sudden Pressure	E
81D	Underfrequency	E
81U	Differential	A/E
87	Ground Overcurrent	A/E
1510		





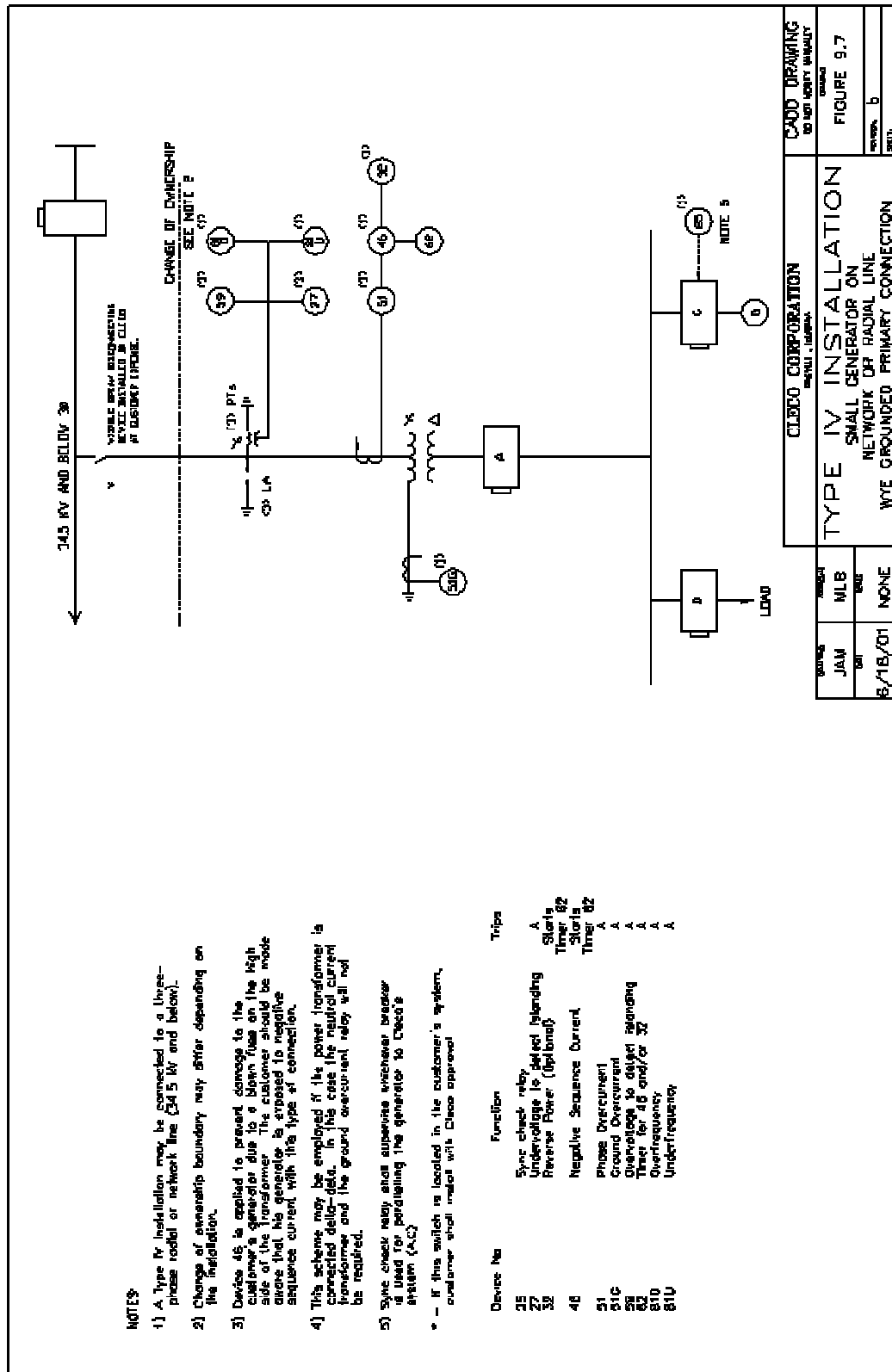
NOTES:

- 1) A Type III installation may be connected to a three-phase radial or network line (34.5 kv and below).
- 2) Change of ownership boundary may differ depending on the installation.
- 3) The high-side circuit breaker ("A") is a three-phase interrupting device which inhibits single-phasing of the customer generator. If the customer wishes not to install "A", it will be provided with trip and close control of "A" and "B" in which case device "A" must be a power circuit breaker and not a circuit switcher.
- 4) This scheme may be employed if the power transformer is connected delta-delta in two cases the neutral current transformer and the ground overcurrent relay will not be required.
- 5) Two PT's with 50N & 27N relays may be used instead of three broken delta PT's with a 159 relay.
- 6) Sync check relay shall supervise whichever breaker is used for paralleling the generator to Cleco's system (A, B, or C).

* - If this switch is located in the customer's system, customer shall install with Cleco approval.

Device No.	Function	Trips
25	Sync check relay	A
27	Undervoltage to detect islanding	A
27N	Undervoltage for ground fault detection	A
50/51	Phase Overcurrent	A
51G	Ground Overcurrent	A
59	Overvoltage to detect islanding	A
59N	Overvoltage for ground fault detection	A
810	Underfrequency	A
81U	Zero-sequence Overvoltage	A
159		A

CLECO CORPORATION MABLE, MISSOURI		CADD DRAWING SEE CADD SYSTEMS
DATE JAN 01	APPROVAL MLB	FIGURE 9.16
DATE 6/18/01	SCALE NONE	SECTION b
TYPE III INSTALLATION SMALL GENERATOR ON NETWORK OR RADIAL LINE DELTA PRIMARY CONNECTION		REVISED BY



34.5 KV AND BOLDV 38

WYE BREAK RECONNECTION SWITCH INSTALLED IN CLECO'S SERVICE AREA.

CHANGE OF OWNERSHIP SEE NOTE 2

LA

PTs

PT 27

PT 29

PT 31

PT 33

PT 35

PT 37

PT 39

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PT 49

PT 51

PT 53

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PT 993

PT 995

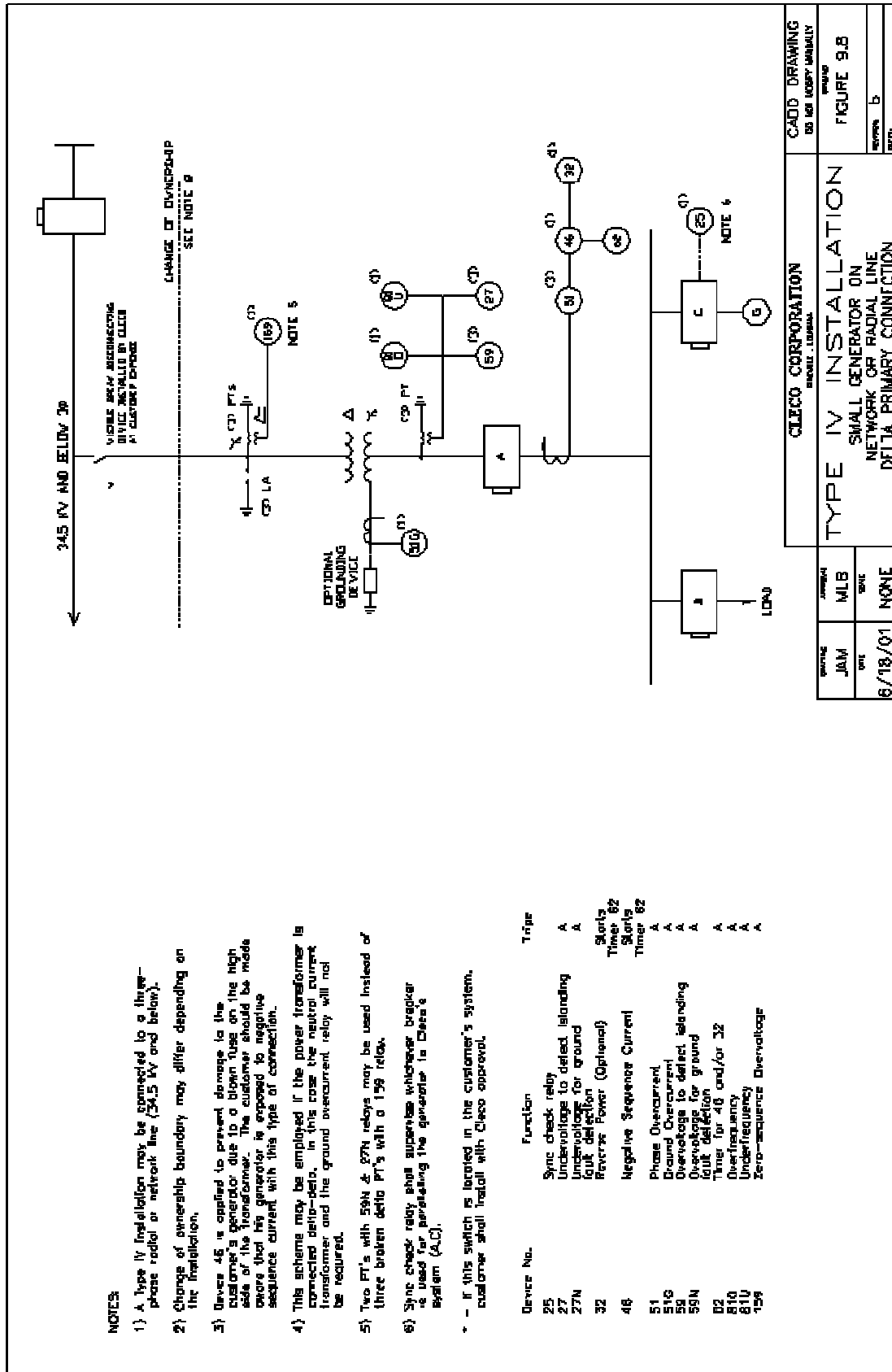
PT 997

PT 999

- NOTES:
- 1) A Type IV installation may be connected to a three-phase radial or network line (34.5 KV and below).
 - 2) Change of ownership boundary may differ depending on the installation.
 - 3) Device 46 is applied to prevent damage to the customer's generator due to a open fuse on the high side of the transformer. The customer should be made aware that the generator is exposed to negative sequence current with this type of connection.
 - 4) This scheme may be employed if the power transformer is connected delta-delta. In this case the neutral current transformer and the ground overcurrent relay will not be required.
 - 5) Sync check relay and supervisor synchronizer monitor is used for paralleling the generator to Cleco's system (AC).
- * - If this switch is located in the customer's system, customer shall consult with Cleco approval.

Device No	Function	Trips
25	Sync check relay	A
27	Under-voltage to detect blending	A
39	Reverse Power (Optional)	Timer 82
46	Negative Sequence Current	Timer 82
51	Phase Overcurrent	A
51C	Ground Overcurrent	A
59	Over-voltage to detect re-energizing	A
63	Timer for 4.6 and/or 37	A
810	Overfrequency	A
81U	Underfrequency	A

CLECO CORPORATION 10000 W. 10th St., Tulsa, OK 74117		CADD DRAWING TO NOT APPEAR UNLESS CHECKED
TYPE IV INSTALLATION SMALL GENERATOR ON NETWORK OF RADIAL LINE WYE GROUNDED PRIMARY CONNECTION		FIGURE 9.7
DATE	MLB	REVISED
5/18/01	NONE	b
		DATE
		BY

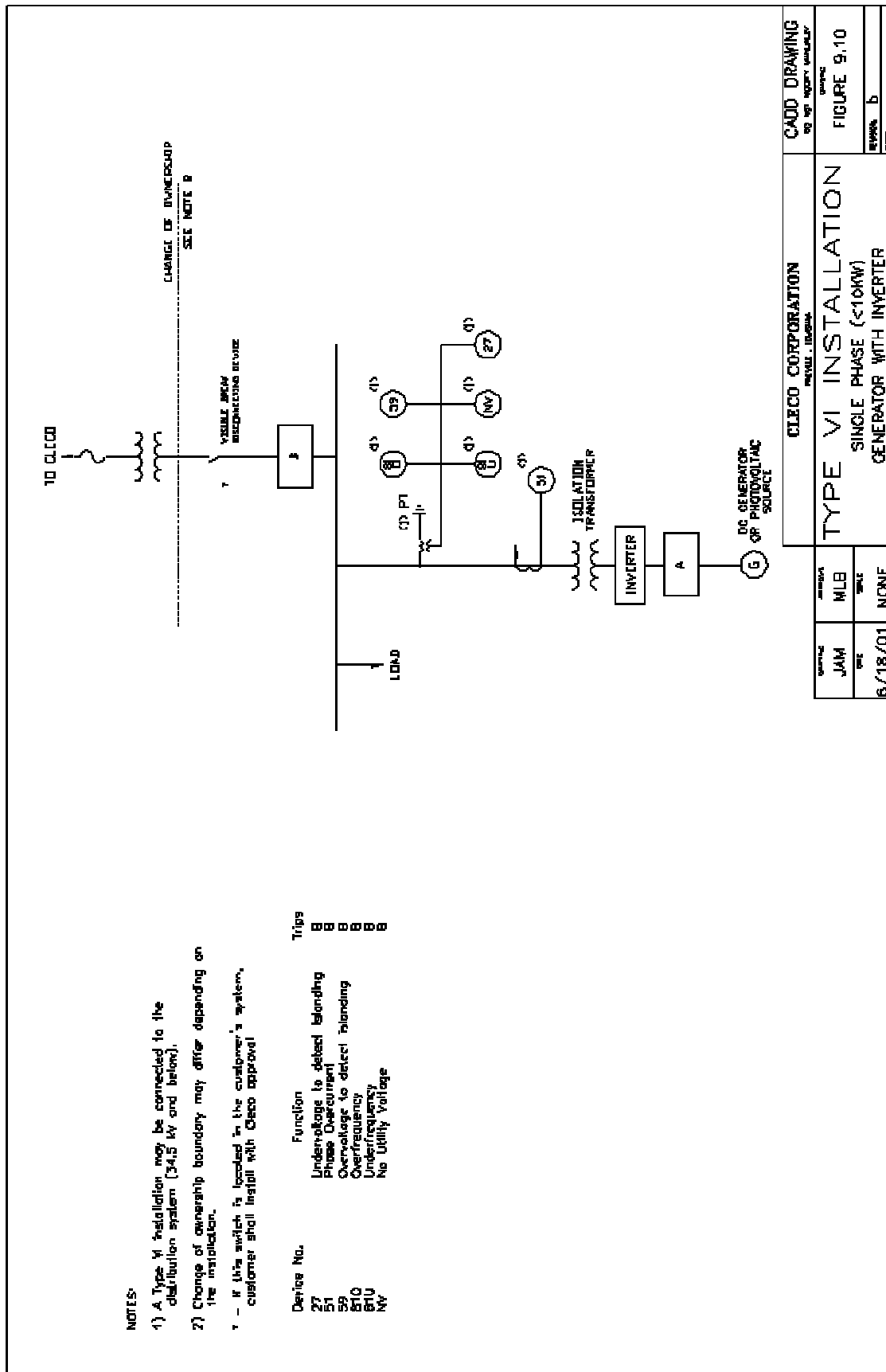


NOTES

- 1) A Type IV Installation may be connected to a three-phase radial or network line (34.5 kV and below).
 - 2) Change of ownership boundary may differ depending on the installation.
 - 3) Device 45 is applied to prevent damage to the customer's generator due to a blown fuse on the high side of the transformer. The customer should be made aware that his generator is exposed to negative sequence current with this type of connection.
 - 4) This scheme may be employed if the power transformer is connected delta-delta. In this case the neutral current transformer and the ground overcurrent relay will not be required.
 - 5) Two PT's with 50N & 27N relays may be used instead of three broken delta PT's with a 199 relay.
 - 6) Sync check relay that supervises whichever breaker is used for paralleling the generator to Cleco's system (A.C).
- * - If this switch is located in the customer's system, customer shall trail with Cleco approval.

Device No.	Function	Tripe
25	Sync check relay	A
27	Undervoltage to delect islanding	A
27N	Undervoltage for ground fault detection	A
32	Reverse Power (Optional)	Starts Timer 62
46	Negative Sequence Current	Starts Timer 62
51	Phase Overcurrent	A
51G	Ground Overcurrent	A
59	Overvoltage to delect islanding	A
59N	Overvoltage for ground fault detection	A
D2	Timer for 48 and/or 32	A
810	Overfrequency	A
81U	Underfrequency	A
159	Zero-sequence Overvoltage	A

DATE JAN 01		APP'D MLB		CLECO CORPORATION MOBILE, LOUISIANA		CADD DRAWING DO NOT MODIFY MANUALLY	
DATE 6/18/01		APP'D NONE		TYPE IV INSTALLATION SMALL GENERATOR ON NETWORK OR RADIAL LINE DELTA PRIMARY CONNECTION		FIGURE 9.8	
						REVISED b	
						BY	



- NOTES:**
- 1) A Type VI installation may be connected to the distribution system (34.5 kV and below).
 - 2) Change of ownership boundary may differ depending on the installation.
 - 3 - If this switch is located in the customer's system, customer shall install with Cleco approval.

Device No.	Function	Trips
27	Under-voltage to detect islanding	<input type="checkbox"/>
51	Phase Overcurrent	<input type="checkbox"/>
50	Over-voltage to detect islanding	<input type="checkbox"/>
510	Under-frequency	<input type="checkbox"/>
51U	Under-frequency	<input type="checkbox"/>
51V	No Utility Voltage	<input type="checkbox"/>

CLECO CORPORATION INSTALL - DESIGN		CADD DRAWING NO. OF REVISIONS
DATE JAM	MLB	FIGURE 9.10
TIME 6/18/01	NONE	REVISION B
TYPE VI INSTALLATION SINGLE PHASE (<10KW) GENERATOR WITH INVERTER		REVISION B

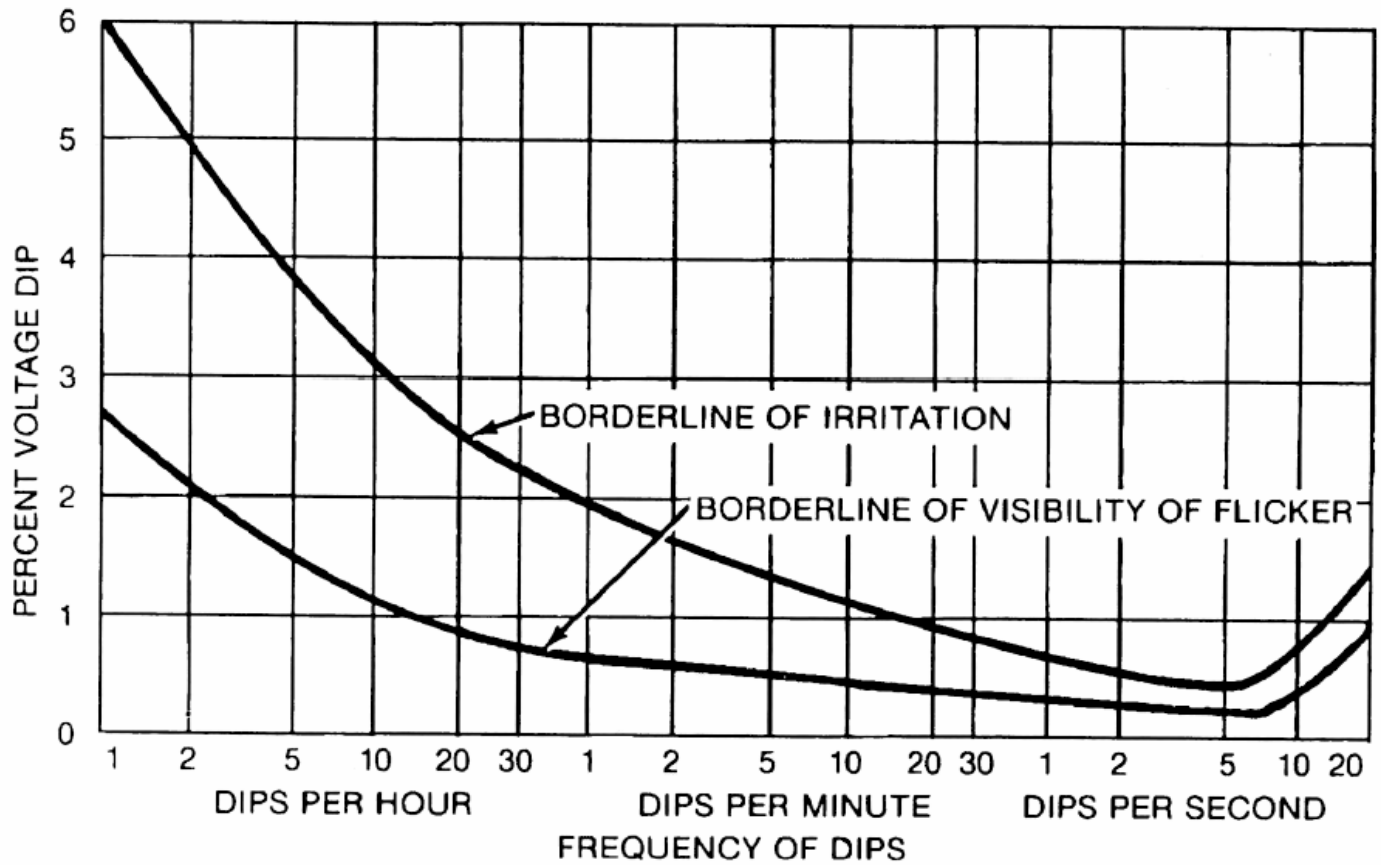


Figure 9.11 —Flicker tolerance curve from IEEE Std 141-1993/IEEE Std 519-1992

APPENDIX 1
CLECO POWER LLC
STANDARD INTERCONNECTION EVALUATION FORM

Section 1. Customer Information

Name: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Facility Location (if different from above): _____

Daytime Phone: _____ Mobile Phone: _____

Utility Customer Account (from electric bill, if customer): _____

Section 2. Generation Facility Information

Please Select Applicable Generator Type:

Solar _____ Wind _____ Hydro _____ Geothermal _____ Biomass _____

Fuel Cell _____ Micro Turbine _____ Gas _____ Oil _____ Solid Fuel _____

Other: _____

Generator Rating (kW): _____ AC or DC (circle one)

Requested Voltage Connection to Cleco System: _____

Location of nearest Cleco Substation or Transmission Line: _____

Approximate Daily Run-Time of Generator (Hours) _____

Approximate Weekly Run-Time of Generator (Hours) _____

Section 3. Intended Use of Facility (Please select all that apply)

____ 1. Self-supply load

____ 2. Sell excess energy to Cleco

____ 3. Sell excess energy to third party

If planning to sell excess to CLECO, what is the expected daily export? _____

This form must be fully completed and returned to Cleco before any interconnection requests will be considered.

Please Mail This Form To:

Cleco Power, LLC
Attn: Richard C. Landry
Post Office Box 5000
Pineville, LA 71360

Or Fax To:

ATTENTION: Richard C. Landry
Fax No: 318-484-7686