



INSPECTION MANUAL


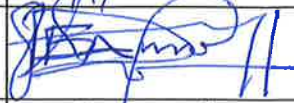


FOR

THE ELECTRICITY SUPPLY

INDUSTRY OF LIBERIA

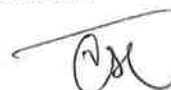
December 2024

Inspection Manual

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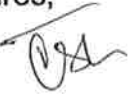
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Executive Summary

The Liberia Electricity Regulatory Commission (LERC) Inspection Manual provides guidelines to pursue inspections by the Commission. It also sets the framework for assessing the licensee's or Permit Holder's compliance with the LERC Regulations, Codes, and Standards meant to improve quality-of-service delivery in the electricity sector. Stakeholders, including Regulators and Inspectors, shall use this Manual to verify licensees' or Permit holder plan, design, construction, installation, operation, and maintenance compliance that promotes the safety, reliability, effectiveness, and efficiency of licensees' or Permit Holders' network or service delivery.

The Manual guides the Inspection procedures on account of Inspection Coverage, and Inspection Processes, this includes Pre-inspection preparations, Inspection Procedures, and Inspection Reporting.



ABBREVIATIONS and ACRONYMS

EDCL	Electricity Distribution Code of Liberia
HEMP	Health Safety and Environmental Management Plan
JEP	Jungle Energy Power
LEC	Liberia Electricity Corporation
LERC	Liberia Electricity Regulatory Commission
LEGC	Liberia Electricity Grid Code
LV	Low Voltage
MGCL	Minigrid Code of Liberia
MV	Medium Voltage
PV	Photo Voltaic
TEC	Totota Electric Cooperative
TSMP	Technical and Safety Management Plan



1.1 INTRODUCTION

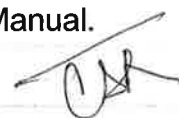
In 2015, the Electricity Law of Liberia (the Law) was enacted, which delineates the roles of sector players in policymaking, regulation, and operation. The Law also liberalized the sector and established the Liberia Electricity Regulatory Commission (LERC) as an independent regulator with respect to its budget, management, staffing, and the exercise of its duties and authorities (Section 13.3 of the Law). Formally operational in 2019, the main functions of LERC are licensing operators in the sector, approving tariffs, establishing and monitoring technical standards and codes, and resolving service or license-related disputes.

To establish a clear basis for the exercise of its regulatory functions, the LERC has developed several regulatory instruments to facilitate the liberalization and efficient operation of the electricity sector.

While the LERC has made significant progress in the development of regulatory instruments, codes, and standards, a robust Inspectorate Unit is needed to operationalize inspection, auditing, and monitoring of the licensee's or Permit holder's performance. The Law (Sections 3.3A) (5,6,8, & 10) and 3.3B (1 & 3) mandates the LERC to establish technical, performance safety, and customer care standards for the electricity sector, monitor and enforce their compliance, and take appropriate steps in the case of non-performance or non-compliance.

This Inspection Manual guides the implementation of the LERC regulatory policies. The Inspection Manual is structured as below:

- ✓ Part 1 deals with the introduction, scope, and overview of compliance inspection;
- ✓ Part 2 discusses Compliance Inspection Methodology, Compliance Inspection Coverage, Compliance Inspection Processes, and Self-Supply Facility Inspection;
- ✓ Part 3 outlines the checklists for compliance inspections in this Manual.



1.2 SCOPE

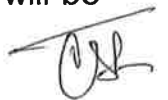
The Inspection Manual shall be used by licensees and Permit holders including Regulators to perform compliance audits and inspections in the electricity supply industry of Liberia. This Manual focuses on licensees' or Permit Holders' quality of service delivery ranging from generation, reporting compliance, construction, installation, operation, and maintenance compliance, and sets the framework or processes to be carried out when implementing an inspection.

The LERC intends to set up robust inspectorate practices in Liberia's Electricity Sector, thus developing this Inspection Manual aims for fair, effective, efficient, and reliable electricity service delivery. This Manual guides inspectors and licensee or Permit holders in executing inspection activities. It also seeks to enhance the Commission's responsibilities in conducting inspection activities across the electricity value chain per terms and conditions of licenses or permits, and technical requirements and standards as adopted by the Commission.

1.3 OVERVIEW OF COMPLIANCE INSPECTION

The Compliance Inspection is of focus in this Manual. It sets a rigorous framework to evaluate licensees' or Permit Holders' systems, and procedures to verify compliance with regulatory standards and codes. During Compliance Inspection, the Inspectors shall delve extensively into the licensees' or Permit Holders' operation to unearth compliance and non-compliance issues, vulnerabilities, and areas that present a risk of divergence from the established standards and terms and conditions of issued Licenses or Permits.

Compliance Inspection is essential in demonstrating licensees' or permit holders' commitment to adhere to industrial regulations and best practices. This activity is a tool for evaluating the effectiveness of compliance initiatives, identifying areas of non-compliance, and instituting corrective measures. The Compliance inspections will be guided by checklists from LERC Regulatory instruments.



2. INSPECTION METHODOLOGY

2.1 INSPECTION COVERAGE

In terms of coverage for compliance inspections, the following conditions apply:

- a. LERC licensees or Permit Holders;
- b. licensee's or Permit holder's facilities, networks, or infrastructure;
- c. follow-up inspections to ensure that non-compliance of licensees or Permit Holders is resolved; and
- d. Incident/accident investigations and customer complaints investigations.

2.2 INSPECTION PROCESSES

Each Inspection follows a well-defined process that has the following distinct phases:

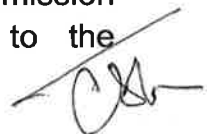
- i. Pre-inspection preparations
- ii. Inspection procedure, and
- iii. Inspection reporting.

i. Pre-Inspection Preparations

The LERC shall issue Inspection Call Letters to licensees or permit holders at least twenty (20) days before any inspection, informing them about the impending inspection activities. The Inspection Called Letter shall be sent to the entity's head office. The Inspection Called Letter shall specify or indicate the dates on which the intended inspection is planned to take place.

An Inspection Call Letter of notification shall include:

- a. Names and contact details of the LERC Inspectors participating in the inspection;
- b. Objective(s) of the inspection;
- c. Date(s) and expected overall duration of the inspection;
- d. Date, time, and venue of the inspectorate opening meeting; and
- e. For the first Inspection Called, the Commission shall attach the Inspection Manual to the



Inspection Call Letter. The amended copy shall be attached when an amendment is made to the inspection manual.

In cases of emergency such as electrical shock, environmental health & safety issues, or if the Commission has evidence that a licensee or permit holder is in non-compliance with the license, permit, or regulatory provisions, the Commission shall inform the licensee or permit holder at least 24hrs via a telephone call, a text message, or email providing information for an emergency inspection.

Before an inspection, the LERC Inspectors should familiarize themselves with the following:

- a. the Inspection Manual (this document);
- b. the relevant inspection questionnaire;
- c. the relevant terms and conditions of licenses or permits issued; and
- d. the relevant regulatory provisions and prescribed standards for the intended inspection.

At least five (5) days before the commencement of a planned inspection, the LERC shall remind (via email or hardcopy letter) the licensee/permit holder of the pending site visit/inspection.

ii. Inspection Procedures

Unless the situation dictates otherwise, every inspection commences with a visit to the licensee or permit holder's head office or the licensee or permit holder's regional office. Conducting an inspection shall include the following procedures:

- a. Opening meeting;
- b. Examination of documents and processes;
- c. Site inspection;
- d. Interviews (when required); and
- e. Closing meeting

All inspection meetings must have an attendance log and minutes of meetings signed by all parties. The attendance log(s) and meeting(s) minutes shall be attached to the final inspection report.

At any given time during an inspection, the LERC inspection team shall be accompanied by an assigned Inspection Focal Person and other relevant representatives of the licensee or permit holder to ensure that the inspection team is granted access to sites and provided all required data and information indicated in the

inspection notification letter.

iii. Inspection reporting

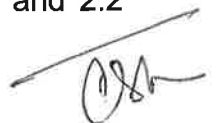
A draft report of findings from the inspection shall be shared with the licensee's or Permit holder's assigned Inspection focal Person for their review and comments after the inspection. The Focal person shall submit a written response to the draft report within 48 hours of the scheduled closing Meeting.

Within twenty (20) days following the closing meeting, the LERC shall officially communicate the outcome of the inspection and any corrective measures to be taken with the licensee or permit holder.

Within ten (10) days after the circulation of the Inspection Report, the licensee or Permit Holder shall submit to the Commission a detailed Plan of Action on how all non-compliance issues identified during the inspection will be addressed. In the event that a licensee or permit holder fails to address the non-compliance issues contained in an Inspection Report, LERC shall take administrative or legal action as specified in the Electricity Distribution Code of Liberia and other regulatory instruments.

2.3 SELF-SUPPLY FACILITY INSPECTION

Self-Supplier shall provide the Commission's staff with unlimited access to inspect the relevant generation facilities following the Commission's schedules for Inspection as mandated by Electricity Licensing Regulation (ELR 2021) regulation 56(1). The Commission shall notify a Self-Supplier five (5) days prior to an inspection. Unless otherwise, the methodology for inspecting a self-supplier facility remains 2.1 and 2.2 respectively.

A handwritten signature in black ink, consisting of a stylized 'O' followed by a horizontal line and a small flourish.

3. CHECKLISTS FOR COMPLIANCE INSPECTION

These checklists focus on the licensee’s or Permit Holder’s compliance with provisions enshrined in the Electricity Distribution Code of Liberia known as EDCL, the Liberia Electricity Grid Code (LEGC), the Minigrid Code of Liberia (MGCL), and other regulatory instruments.

i. Checklist for Documents Verification

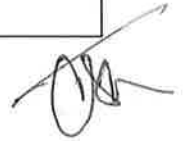
The listed documents below are requested from the licensees or Permit holders to enable the LERC to audit and verify the compliance of its operations with the provisions of the EDCL, LEGC, MGCL, and other regulatory instruments. These documents must be prepared by the licensees or permit holders and presented to the LERC Inspectors during inspection processes.

Codes	Regulatory criteria	Results	
		Yes	No
4.2.1, EDCL	Has the licensee or Permit Holder filed with the LERC a list of “Non-compliance” assets consistent with the Electricity Distribution Code of Liberia?		
6.1.1, EDCL	Has the Licensee or Permit Holder developed, published, and provided in hard copies detailed requirements, qualifications, and administrative procedures to be fulfilled or followed by those seeking services provided by the Licensee or Permit Holder? See the EDCL 8.2.3 for requirements.		
7.4.1, EDCL	Has the licensee or Permit Holder provided its Annual Distribution Network Planning Report to the LERC? See the EDCL 7.1, 7.4.1, 7.4.2, 7.4.3, and 7.4.5.		
7.5.1, EDCL	Has the licensee or Permit Holder developed its System Studies to support the development of its [5-Year] Distribution Plan?		
7.5.3, EDCL	Has the licensee or Permit Holder published the Distribution Network Planning Report on its Website as required by the Electricity Distribution Code of Liberia?		
8.1, EDCL	Is the licensee or Permit Holder abiding by Appendix A: information in a connection agreement with a customer of the EDCL?		
11.4.3, EDCL	Has the licensee or Permit Holder developed and documented fair and reasonable criteria and processes to pre-qualify contractors for construction work on its electricity distribution projects?		
16.2.8, EDCL	Has the licensee or Permit Holder established and implemented operating instructions, procedures, standards, and guidelines to cover the safe operation of the distribution system under normal and abnormal system conditions?		
16.2.14,	Has the licensee or Permit Holder developed Load		

EDCL	Shedding Procedures for LERC approval and subsequent publication?		
16.6b, EDCL	Does the licensee or Permit Holder record the secondary currents and voltages of the distribution transformers at least once a month during expected peak load hours on all the phases?		
16.7.2, EDCL	Has the licensee or Permit Holder established a Technical and Safety Management Plan (TSMP) and implementation guidelines to ensure the health and safety of personnel working on the distribution system or any equipment connected to the distribution system? See 16.7.2, 16.7.3, and 16.7.5.		
16.8.4, EDCL	Has the licensee or Permit Holder established a corporate policy that addresses environmental stewardship such as a Health Safety and Environmental Management Plan (HEMP) for all its operations?		
16.10.1, EDCL	Is the licensee or Permit Holder abiding by the Planned Interruptions/ Reliability of Supply Standards indices/targets?		
16.10.2, EDCL	Has the licensee's or Permit Holder's policies and procedures for planned outages been described in the Customer Service Charter?		
16.11.4, EDCL	Does the licensee or Permit Holder prepare and publish a rotational load-shedding management plan? See 16.12.3 of the EDCL.		
16.13.1, EDCL	Has the licensee or Permit Holder developed and maintained a Distribution System Emergency Procedures Manual? See 16.13.4 and section 18 of the EDCL.		
16.13.13, EDCL	Has the licensee or Permit Holder conducted network studies such as load flow, fault level, stability, and resonance studies?		
16.23.1, EDCL	Does the licensee or Permit Holder have maintenance schedules for Lines and Equipment Testing?		
16.24.2, EDCL	Does the licensee or Permit Holder have an inventory of spares required for maintenance and replacement?		
16.25, EDCL	Does the licensee or Permit Holder have a training program for cold and hot line workers that meets up-to-date health and safety techniques?		
18, EDCL	Has the licensee or Permit Holder developed its Emergency Response Plan? See section 18 of EDCL for details.		
19.3.3, EDCL	Before 31 December each year, the licensee or Permit Holder must have published on its website, and in a newspaper circulating in the area in which its distribution system is located, its targets agreed with LERC for reliability of supply for the following year. Has the licensee or Permit Holder done so?		
20.8.1,	Has the licensee or Permit Holder created, maintained,		

EDCL	<p>and administered a metering database containing the following information below:</p> <p>(a) name and unique identifier of the metering installation; (b) the date on which the metering installation was commissioned;</p> <p>(c) the connecting parties at the metering installation;</p> <p>(d) maintenance history schedules for each metering installation;</p> <p>(e) telephone numbers used to retrieve information from the metering installation;</p> <p>(f) type and form of the meter at the metering installation;</p> <p>(g) fault history of a metering installation; and</p> <p>(h) commissioning documents for all metering installations.</p>		
21.10.11, EDCL	Does the licensee or Permit Holder have stored operational information that is kept electronically for at least five years or the life of the plant or equipment concerned?		
21.11.1, EDCL	Does the licensee or Permit Holder have network performance data such as performance indicators, operational information, and reports?		
21.11.3, EDCL	Does the licensee or Permit Holder publish weekly report on the power distribution system performance, including a report on Significant Incidents and operating conditions relevant to the operation of the distribution system?		
22.1.1, EDCL	Does the licensee or Permit Holder have a Customer Service Charter?		
EDCL	Has the licensee or Permit Holder filed annual summary reports of detailed patrol inspection activities that have taken place during the previous year as well as an outline of inspection plans ("compliance plan") for the forthcoming year? See Table C-2-Sample annual Inspection Summary Report (Page 161 of EDCL).		
EDCL	Has the licensee or Permit Holder carried out the distribution system inspection cycles (Minimum number of inspections/patrols in a year) as required in TABLE C-1 of the EDCL?		
EDCL	Check Appendix 8 for details on Appendix C- (Minimum Inspection Requirements C.1 Distribution Inspection Standards).		
EDCL	Is the licensee or Permit Holder abiding by the EDCL - Technical Schedule TS-G: CUSTOMER SERVICE PERFORMANCE STANDARDS/INDICES/TARGETS?		
License/ Permit Terms and Conditions	Does the Licensee/Permit Holder complies comply with its License/Permit terms and Conditions with reference to Compliance Monitoring and Reporting?		

Additional Observation:



APPENDIX 1: Checklist for Substation

Licensee or Permit Holder:		
Substation:		
Inspection Date:		
Licensee's or Permit Holder's Representatives:		
Signature:		
Inspector's Name:		
Signature:		
Substation Information		
What is the total number of power transformers installed?		
What is the total installed power transformer capacity?		
What is the substation installed capacity?		
How many incomers (circuit) i.e. 66kV?		
What is the installed capacity of the incomer lines i.e 66kV?		
How many 22/33kV outgoing feeders?		
What is the installed capacity of each 22/33kV outgoing control feeder?		
What is the substation's current capacity or peak demand?		
What is the peak load for any 22/33kV outgoing control feeder?		
How many spare feeders are there?		
Additional Observation:		
Safety Coordination – EDCL 16.7.3 (c, f, and g) and 16.2.11		
	Yes	No
Are all grounding mats covered (i.e. no wires protruding)?		
If lines/equipment are out of service, are all devices securely locked and tagged?		
Are all equipment labeled and in good condition (e.g. switches, circuit breakers)?		
Is lightning protection in place?		
Does a visual check of the substation bus reveal any problems (broken insulators, cracked surge arrestors, etc.)?		
Are there any oil leaks visible from potheads or power transformers?		
Is there any unwanted sound from the power transformer?		
Is there any problem with the standby generator?		
Are there emergency lights that come on automatically during a blackout?		
Is there any visible damage to building structures (leaks, holes, cracks, etc)?		

Are there clear warning/hazard signs posted in appropriate places (fences, buildings)?		
Is there adequate personal protective equipment?		
Are communication facilities in place between all control centers, power stations, and substations?		
Are fire extinguishers/firefighting facilities in place?		
Is there a borehole or water facility available?		
Are fire assembly points in place?		
Is an emergency exit in place?		
Additional Observation:		
Data Logging Protocol – EDCL 16.5 b		YES
NO		
Does the site have an operation logbook and register?		
Are the riser poles in good condition?		
Are the Cables in good condition?		
Are the Cables Terminated properly?		
Are the Arrestors in good condition?		
Additional Observation:		
Quality of Supply/Power Quality – EDCL 15: Confirm whether the licensee or Permit Holder is following the Technical Schedule TS-A and TS-F (standard nominal Voltage and Power Frequency variations) of the Electricity Distribution Code of Liberia:		
YES NO		
Is the Voltage within the Voltage (MV) variation limit for all control room panels? Technical Schedule - TS-A -EDCL		
a) 33kV limit from 29.70kV to 36.30kV b) 22kV limit from 19.80kV to 24.20kV c) 11kV limit from 9.90kV to 12.10kV		
Is the Power Frequency within the Frequency variation limit for control room panels? Technical Schedule - TS-F - EDCL		
a) From 1.0kV up to 100kVA Min. Lagging Leading 0.95 b) From 1.0kV up to 100kVA Max. Lagging Leading 0.95 c) Over 2 MVA Max. Lagging Leading 0.96		
Additional Observation:		

Confirm whether the following data monitoring is in place: EDCL 16.2.11, 16.3, 16.4.3 and 16.5		
	YES	NO
Does the licensee or Permit Holder carry out data monitoring on all feeders?		
Does the licensee or Permit Holder do hourly readings of the current?		
Does the licensee or Permit Holder do hourly readings of power (load)?		
Does the licensee or Permit Holder do hourly readings of the voltage?		
Does the licensee or Permit Holder monitor and log power factor?		
Does the licensee or Permit Holder monitor and log frequency?		
Does the licensee or Permit Holder do daily energy meter readings for both active and reactive energy received and sent from the substation?		
Additional Observation:		
Data Retention – EDCL 21.10.7a: Confirm the following:		
	YES	NO
Are there voice recording/data retention facilities in control rooms?		
Are the voice recording/data retained for at least three months except where there is an incident involved?		
Does the licensee or Permit Holder have an annual maintenance plan in place?		
Is consistent maintenance evidence (history) available?		
Additional Observation:		
Confirm whether the following is properly issued and kept on file:		
	YES	NO
▪ Permits-to-work		
▪ Switching instructions		
▪ Limitation-of-access permits		
Additional Observation:		

SUBSTATION YARDS		
	YES	NO
Is there any garbage or unused equipment or material stored in the yard?		
Are the grounding sticks secured and stored properly?		
Is the site accessible (road) by people and vehicles?		
Are site grounds well maintained (no weeds, etc)?		
Does the site have spill containment and adequate drainage around transformer/oil/fuel storage areas?		
Is firefighting training conducted?		
Are there emergency means of communication available?		
Is there a fire alarm system?		
Are permits-to-work properly issued and kept on file?		
Is the fire alarm system in sound working condition?		
Does the site have adequate danger/warning notices/warning signs?		
Does the site have a first aid kit?		
Is first aid training conducted?		
Are substation ballast stones or firewalls in place (where applicable)?		
Is the control room building in good condition?		
Is the substation fencing in good repair (no holes in the fence/excavations under the fence)?		
Are all gate locks secured and in good working order?		
Is the site manned/security in place?		
Additional Observation:		

Appendix 2: Checklist For MV Lines: EDCL - Appendix C: 8 A to L: Minimum Inspection Requirements C.1 Distribution Inspection Standards

Licensee or Permit Holder:		
MV Line Routes & Feeder Name:		
Inspection Date:		
Licensee's or Permit Holder's Representative:	Signature:	
Inspector's Name:	Signature:	
MV Lines	YES	NO
Are the MV line poles earthed?		
Has bush clearing been done?		
Are the MV poles in good condition?		
Are stay wires in good condition?		
Are cross arms properly mounted?		
Are permits-to-work properly issued and kept on file?		
Are the insulators in good condition?		
Is there any vegetation in the Right of Way?		
Does the MV line have isolation points?		
Are the MV line isolators in good condition?		
Is there a locking facility for the isolators on the MV lines?		
Do line clearances conform to specifications?		
Are all jumpers properly connected?		
Are connectors used to points of connection?		
Is the MV pole span in an open community for the 33kV lines within 100 meters and 50 meters within communities?		
Is the licensee or Permit Holder using 8 and 9 meters for LV poles?		
Is the LV pole span between 40 to 50 meters?		
Considering the cable size, is the total LV length from supply/source including all customers on said feeder within the limit of 1000 meters?		
Is the customer service drop/wire within the limit of 50 meters?		
Are the conductor loading of the distribution feeders below 85%?		
Are the equipment loading below 85%?		

Are the lines properly sagged? If no, briefly explain.		
Additional Observation:		
LV NETWORK		
	YES	NO
Has bush clearing been done?		
Do line clearances conform to specifications?		
Does a visual check of the line reveal any problems (broken conductor insulation, damaged pole-box circuit breakers, etc.)?		
Are stay wires in good condition?		
Are poles in good condition?		
Are connectors used to points of connection?		
Is there any vegetation on the LV?		
Are permits-to-work properly issued and kept on file?		
The number of MV poles that are not in good condition (broken, bent, brunt, and damaged).		
The Number of stays that are not in good condition.		
The Number of cross arms not in good condition.		
The Number of insulators that are not in good condition.		
The number of LV poles that are not in good condition (broken, bent, brunt, and damaged).		
Additional Observation:		
11 and 13 - Electricity Mini Grid Code of Liberia		
Conductor Size		
Conductor Installed Load Capacity		
Conductor Capacity (Peak Demand)		

Additional Observation:

Van

Appendix 3: Transformer Checklist: EDCL - Appendix C: 8 A to L: Minimum Inspection Requirements C.1 Distribution Inspection Standards

Licensee or Permit Holder:		
Transformer Rating:		
Inspection Date:		
Licensee's or Permit Holder's Representative:	Signature:	
Inspector's Name:	Signature:	
Transformer Installed	Yes	No
Are the transformers installed properly?		
Are there any oil leakages on the transformers?		
Are the fuses properly mounted on the cross-arms?		
Are the transformers labeled and legible (nameplate data)?		
Do the transformers have surge arresters?		
Are the surge arresters mounted/installed properly?		
Are all the insulators in good condition?		
Is there any damage to the transformer bushings?		
Are the transformer-mounted poles in good condition?		
Is there any physical damage or unwanted sound from the transformers?		
Are there meters indicating the transformer load, current, and voltages?		
Does the transformer have a breaker/low-voltage distribution box?		
Is the transformer breaker/low voltage distribution box in good condition?		
Is the transformer breaker/low voltage distribution box mounted/installed properly?		
Are the LV cables terminated properly and in good condition?		
Is the transformer earthed?		
Are the other accessories/transformer structures earthed?		
Is there any vegetation on the transformer?		
Are the transformers' Voltage within the Voltage variation limits? Technical Schedule - TS-A - EDCL a) 230V limit from 207.0V to 253.0V b) 415V limit from 373.5V to 456.5V		

How many transformers are not within the Voltage variation limits? Technical Schedule - TS-A - EDCL	
How many transformers have physical damage or unwanted sound?	
The number of transformers not properly installed.	
How many transformers are there without surge arresters?	
How many insulators are not in good condition?	
How many damaged bushings are there on the transformers?	
How many damaged bushings are there on the transformers?	
The number of transformers inspected.	
What is the average load per customer?	
Are permits-to-work properly issued and kept on file?	
How many customers are connected on:	
Additional Observation:	

OSK

Appendix 4: Checklist For Transmission Lines: EDCL - Appendix C: 8 A to L: Minimum Inspection Requirements C.1 Distribution Inspection Standards

Licensee or Permit Holder:		
Transmission Line Route & Name:		
Inspection Date:		
Licensee's or Permit Holder's Representative:	Signature:	
Inspector's Name:	Signature:	
OHL Details	Yes	No
Is there vegetation interfering with the lines?		
Are the poles/towers in good condition?		
The number of poles/towers not in good condition (broken, bent, burnt, and damaged).		
Are the poles/towers earthed?		
Are the poles/tower foundations in good condition?		
Are stay/guy wires in good condition?		
Are the insulators in good condition?		
The Number of insulators that are not in good condition.		
What is the installed capacity of the line/circuit?		
Circuit peak demand (peak load/on-peak).		
The number of poles/tower foundations that are not in good condition.		
The Number of stays that are not in good condition.		
Are permits-to-work properly issued and kept on file?		
Additional Observation:		

Appendix 5: Checklist For Generation: EDCL

Licensee or Permit Holder:		
Generation Plant Nomenclature:		
Inspection Date:		
Licensee's or Permit Holder's Representative:	Signature:	
Inspector's Name:	Signature:	
Generation Details		
What is Plant Installed Capacity?		
What is Plant Peak Demand?		
	Yes	No
Is there a maintenance schedule available?		
Is maintenance consistently done?		
Are there maintenance records?		
Does the plant have procedures for safe shutdown?		
Are there lifts/Cranes for repair?		
Are the lifts/Cranes in a good state?		
Are there fire extinguishers?		
Are there fire extinguishers in a good state?		
Does the plant have first-aid facilities and documented procedures?		
Is there a fire alarm system?		
Is the fire alarm system in good condition?		
Are there emergency lights that come on during a blackout?		
Is there any leakage on the turbine/unit/tank/penstock?		
Are appropriate danger warning notices or signs in place?		
Is a fire assembly point available?		
Is PPE available for staff?		
Is there an emergency escape route clearly marked?		
Are the Circuit Breakers and Isolators in good condition?		
How many Circuit Breakers and Isolators are not in good condition?		

Is there an Operational Logbook available and in use?		
Is the battery regularly maintained and tested?		
Are there records for equipment maintenance?		
Are Fire Blast Walls Appropriately Installed?		
Is there enough ventilation available?		
Is equipment earthed?		
Is the equipment labeling available and in good condition?		
Can the battery room floor contain electrolyte spillage?		
Is there adequate lighting in the control room?		
Are the governors in good working condition?		
Are all indication lights working?		
Are communication facilities in place?		
Are permits-to-work properly issued and kept on file?		
Additional Observation:		

Appendix 6: Checklist For Solar Plant: EDCL

Licensee or Permit Holder:		
Solar Plant Nomenclature:		
Inspection Date:		
Licensee's or Permit Holder's Representative:	Signature:	
Inspector's Name:	Signature:	
Solar Plant Details	Yes	No
What is the total installed capacity (PV panel ratings)?		
What is the net Sent Out/Export Capacity?		
What is the AC/DC power ratio?		
What is the Plant Peak Power Generated?		
What are the inverters' total installed capacity?		
What is the transformer(s) installed capacity?		
What is the network connection voltage?		
What is the storage capacity?		
What is the Installation type (Ground/Roof Mounted)?		
What is the System type (Fixed/Tracking)?		
SAFETY CONSIDERATIONS	Yes	No
Are the PV plant structures earthed?		
If lines/ equipment is out of service, are all devices securely locked and tagged?		
Are all equipment labels legible and in good condition (e.g. switches, CBs)?		
Are there any oil leaks visible from potheads or transformers?		
Is there any visible damage to building structures (leaks, holes, tears, etc)?		
Are there clear warning/ hazard signs posted in appropriate places (fences, buildings)?		
Does the site have a First Aid kit and guidelines?		
Is there adequate personal protective clothing?		
Are breakers in place and in working condition?		
Are communication facilities in place?		
Are fire extinguishers in place and working?		

Are fire assembly points in place?		
Does the site have an operation logbook?		
Are permits-to-work properly issued and kept on file?		
Are switching instructions properly issued and kept on file?		
Are limitation-of-access permits appropriately issued and kept on file?		
Does the licensee or Permit Holder have adequate annual maintenance plans in place?		
Is consistent maintenance evidence (history) available?		
Does the utility have competent personnel to carry out the maintenance work and operation?		
Is housekeeping done properly?		
Is power quality monitored?		
Is the Power Frequency within the Frequency variation limit for control room panels? Technical Schedule - TS-F - EDCL a) From 1.0kV up to 100kVA Min. Lagging Leading 0.95 b) From 1.0kV up to 100kVA Max. Lagging Leading 0.95 c) Over 2 MVA Max. Lagging Leading 0.96		
Is the Voltage within the Voltage (MV) variation limit for all control room panels? Technical Schedule - TS-A - EDCL a) 33kV limit from 29.70kV to 36.30kV b) 22kV limit from 19.80kV to 24.20kV c) 11kV limit from 9.90kV to 12.10kV		
Are the transformers' Voltage within the Voltage variation limits? Technical Schedule - TS-A - EDCL a) 230V limit from 207.0V to 253.0V b) 415V limit from 373.5V to 456.5V		
Are all gate locks secured and in good working order?		
Is the site manned by competent personnel?		

Additional Observation:

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Appendix 7: Checklist: 20. EDCL-Metering

Licensee's or Permit Holder's Representative:		Signature:													
Inspector's Name:		Signature:													
Codes EDCL	Regulatory criteria	Results													
		Yes	No												
20.2.1	<p>Does the licensee or Permit Holder have the principle of metering as characterized below:</p> <p>(a) each point of supply connecting an end-use customer to the distribution system;</p> <p>(b) each point of connection between a generator and the distribution system; and</p> <p>(c) each point connecting the distribution systems of Liberia to a neighboring country.</p>														
20.6.1	<p>Does the licensee or Permit Holder calibrate and refurbish its meters and equipment, at intervals not exceeding those specified in Table 20-1 below?</p> <p>Table 20-1 — Intervals for periodic calibration of meters</p> <table border="1"> <thead> <tr> <th>Load</th> <th>Calibration interval (years)</th> </tr> </thead> <tbody> <tr> <td>≥ 100 MVA</td> <td>5</td> </tr> <tr> <td>10 MVA to < 100 MVA</td> <td>5</td> </tr> <tr> <td>1 MVA to < 10 MVA</td> <td>10</td> </tr> <tr> <td>< 1 MVA (electronic)</td> <td>10</td> </tr> <tr> <td>< 1 MVA (electromechanical)</td> <td>20</td> </tr> </tbody> </table>	Load	Calibration interval (years)	≥ 100 MVA	5	10 MVA to < 100 MVA	5	1 MVA to < 10 MVA	10	< 1 MVA (electronic)	10	< 1 MVA (electromechanical)	20		
Load	Calibration interval (years)														
≥ 100 MVA	5														
10 MVA to < 100 MVA	5														
1 MVA to < 10 MVA	10														
< 1 MVA (electronic)	10														
< 1 MVA (electromechanical)	20														
20.7	<p>Does the licensee or Permit Holder do meter reading as indicated below:</p> <p>Table 20-2 — Periodic meter reading intervals</p> <table border="1"> <thead> <tr> <th>Load</th> <th>Meter reading interval</th> </tr> </thead> <tbody> <tr> <td>≥ 100 MVA</td> <td>Daily</td> </tr> <tr> <td>10 MVA to < 100 MVA</td> <td>Weekly</td> </tr> <tr> <td>1 MVA to < 10 MVA</td> <td>Monthly</td> </tr> <tr> <td>100 kVA < 1 MVA</td> <td>Monthly</td> </tr> <tr> <td>< 100 kVA</td> <td>Three-monthly</td> </tr> </tbody> </table>	Load	Meter reading interval	≥ 100 MVA	Daily	10 MVA to < 100 MVA	Weekly	1 MVA to < 10 MVA	Monthly	100 kVA < 1 MVA	Monthly	< 100 kVA	Three-monthly		
Load	Meter reading interval														
≥ 100 MVA	Daily														
10 MVA to < 100 MVA	Weekly														
1 MVA to < 10 MVA	Monthly														
100 kVA < 1 MVA	Monthly														
< 100 kVA	Three-monthly														
Additional Observation:															