OVERHEAD AND UNDERGROUND DISTRIBUTION INSPECTIONS

District Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date Prepared Date Revised:

OBJECTIVE

To ensure reliable, high-quality, and safe operation of electrical distribution facilities.

RATIONALE/PURPOSE

Inspections of overhead primary, secondary, service, and other associated electric distribution facilities. Additionally, the exterior of underground secondary substructures should be inspected for safety and accessibility in conjunction with a more thorough inspection of primary facilities.

METHODS/PROCEDURES

Overhead Inspections

Overhead distribution facilities (primary, secondary, and service) should be scheduled for inspection on a five-year cycle. These inspections should be detailed visual observations of the facilities installed, looking for abnormalities or circumstances that will negatively impact safety, reliability, or asset life. Schedules should be established such that facilities will be inspected at least once every five years.

Underground Inspections

Underground distribution facilities (including pad-mounted equipment) should be scheduled for inspection on a three-year cycle. These inspections should be detailed visual observations of the facilities installed, looking for abnormalities or circumstances, which will negatively impact safety, reliability, or asset life. Schedules should be established such that facilities will be inspected at least once every three years.

Maintenance

Maintenance items identified during inspections shall be prioritized with a response/repair grade. Routine maintenance may be scheduled with other associated work.

Inspectors shall complete all possible repairs of abnormal conditions, which can safely be done by a single individual. These repairs will typically involve visibility strips, guy markers, ground moldings, broken ground wires, graffiti, minor vegetation removal, etc.

**This model form/template must be customized to meet your Agency’s needs.**

Inspection documentation should consist of three individual documents, which, used together, will provide adequate and consistent inspection records.

1. **Index map:** A map of electric facilities with adequate detail to sufficiently record poles and enclosures inspected. This serves as an easy, graphical way to track progress on the inspection of all electrical facilities.
2. **Inspection log:** A form used to document identified abnormalities, which require correction, follow-up inspection, or referral to other departments or entities. This inspection log will serve to link the index map by the specific inspection date to a database.
3. **Maintenance tag:** A form used to document any specific condition with an impact associated with safety, service reliability, or asset life.

The inspection documentation process, as defined, is focused on the person performing the inspection and the data input person.

The inspection log should be used to document any new abnormalities as they are encountered in the field. Individual tags should be completed as required to detail each abnormality as it is encountered. All field tags should be entered into a database as soon as practicable.

The input personnel should record, in the appropriate column of the inspection log form, the corresponding tag number for each entry. Upon completion of entry, the inspection log will be filed by inspection date in the master inspection logbook. The tags, photocopies of maps and logs, should be routed to the supervisor for work scheduling.

Inspection Log: Record each abnormality as encountered during the inspection. Use inspection logs in conjunction with tags to identify corrective work or action(s) required. Inspection logs should be turned in at the end of each day to the data input personnel.

Maintenance Tag:Fill out appropriate tags as abnormalities or conditions requiring attention are identified during the inspection (suggestion: attach map copies for work requiring engineering/estimating).

Infrared inspections: This should be performed in conjunction with the underground inspection process. Personnel performing these inspections should be thoroughly familiar with all the equipment involved and all safety rules and procedures associated with such equipment.

The following grades are intended to be a guide. During the inspection, circumstances may dictate a different rating. Grade requirements should be assessed by the person performing the inspection at the time. The inspector should complete minor (Grade 2) or incidental work at the time of inspection.

|  |  |
| --- | --- |
| **Condition** | **Grade** |
| Visibility strips on barrier post missing | 2 |
| No lock on removable barrier post | 2 |
| No barrier post or inadequate protection | 2 |
| Needs retaining wall | 2 |
| Grade problem | 2 |
| Insufficient working space | 2 |
| Insufficient clearance from third party structure | 2 |
| Vegetation is obstructing covers, door, and/or working space | 2 |
| Deteriorated due to chemical exposure (e.g., waste oil) | 1 to 2 |
| Ground rod, rig bus, and/or connectors have become disconnected or ineffective | 1 |
| Fault indicator missing or not working | 2 |
| Overheating discovered with infrared check | 1 or 2 |
| Ground rod and/or connectors have become disconnected or ineffective | 1 or 2 |
| Internal insulated barriers with obvious localized discoloration, tracking, or arcing | 2 |

Markings

|  |  |
| --- | --- |
| **Condition** | **Grade** |
| High voltage sign missing | 2 |
| Equipment number missing | 2 |
| Missing decal: Maintain 8-foot clear space in front of doors | 2 |
| Sectionalizing tag and/or phase/voltage tag missing or illegible(**Live front must be de-energized** | 2 |
| Riser tag missing | 2 |

Cables

|  |  |
| --- | --- |
| **Condition** | **Grade** |
| Jackets damaged, not sealed | 2 |
| Deteriorated concentric | 2 |
| Needs cable protector **(Live front must be de-energized)** | 2 |
| Bending radius exceeded or cable training not operable | 2 |

Splices

|  |  |
| --- | --- |
| **Condition** | **Grade** |
| Bleeder (drain) wire broken or missing | 2 |
| Swollen secondary cable or splice | 1 or 2 |
| Overheating discovered with infrared check | 1 or 2 |
| Secondary multi-tap bus bar covers or insulation open or missing caps or plugs | 2 |

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Terminations

|  |  |
| --- | --- |
| **Condition** | **Grade** |
| Swollen cable/terminations | 1 |
| Missing capacitance test caps | 2 |
| Missing bail on elbow | 1 |
| Stress cone dust cover tape (silicone) unraveled or torn **(Must be de-energized)** | 2 |
| Stress cone is contacting fiber barrier **(Must be de-energized)** | 1 or 2 |
| Overheating discovered with Infrared check | 1 or 2 |

Enclosures

|  |  |
| --- | --- |
| **Condition** | **Grade** |
| Vegetation is obstructing covers, doors, and/or grade problems | 2 |
| Retaining wall and/or grade problems | 2 |
| Covers not secured or missing bolts | 2 |
| Anti-skid surface needed | 2 |
| Cable supports are broken or ineffective | 2 |
| Fault Indicator viewport damaged | 2 |
| Hazardous Materials: oil, chemicals, needles, razor blades, broken glass, etc. | 1 or 2 |
| Dirt and debris in the enclosure | 2 |
| Deterioration of enclosure or pad | 2 |
| Ladder rusted or corroded or missing anti-slip protection | 2 |
| Sump pump in need of repair or replacement | 2 |

COST BENEFIT

* Reduce system failure.
* Avoid costly repair and replacement.
* Create a manageable capital improvement budget.
* Enhance system reliability.

INSPECTION FORMS/CHECKLISTS/DOCUMENTATION/ASSETS

* Distribution Inspection Cycles.
* Pad-mounted Transformers Inspections.

REFERENCES

Electrical work shall comply with the latest revisions to the following codes and standards:

A. [Public Utilities Commission General Order](https://www.cpuc.ca.gov/generalorders/) Number 95, 128 and 165

B. National Electrical Safety Code (NESC) - ANSI C2

C. [Cal OSHA 8 CCR – 2299-2599](https://www.dir.ca.gov/title8/sb5g1.html) (Low Voltage) and [2700-2889 High Voltage](https://www.dir.ca.gov/title8/sb5g2.html)

Title 8, Division 1, Chapter 4, Subchapter 5 (Electrical Safety Order)

Group 1 Low Voltage, Group 2 High Voltage safety Order

D. Occupational Safety and Health Act (OSHA)

Title [29 CFR 1910 Subpart S](https://www.osha.gov/laws-regs/standardinterpretations/standardnumber/1910/1910%20Subpart%20S%20-%20Index/result) - Electrical

Title [29 CFR 1926 Subpart K](https://www.osha.gov/laws-regs/interlinking/standards/1926%20Subpart%20K/regulations), Subpart V - Electrical

E. [NFPA 70E- Standard for Electrical Safety Requirements for Employee Workplaces](https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70E)

F. [International Electrical Testing Association (NETA) Section 7](http://www.iemworldwide.com/pdf/ansi-neta-ats-2009.pdf)