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Professional T&D Utility Consulting Services

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Matt MacDonald
Assistant Manager Power Construction & Maintenance, Energy Department
Imperial Irrigation District
333 E. Barioni
Imperial, CA 92251

Dear Mr. MacDonald:

This document, drawn from our 2020 Territory Survey report, provides a summary of improvement recommendations based on Fuentes Consulting field observations and IID staff follow-up equipment records research.

Territory Survey: Field Observations and Recommendations

1. Field observations
   1.1. IID's overhead distribution system shows considerable aging and degradation in many areas, likely contributing to the outage clusters that were surveyed. According to Inspectors and Troubleshooters, these issues have been previously reported for these areas but not resolved due to resource constraints. Key findings include:
      1.1.1. Old 4-kV (box) cutouts and insulators in areas where the voltage has been increased.
      1.1.2. Observations of tracking on poles where a bare common neutral was stapled to the underside of the cross-arm and attached to surge arresters.
      1.1.3. Poles split in various locations, typically due to a series of bolts drilled in the same direction.
      1.1.4. Lack of line guard where electrical connections are being made, e.g., high side jumpers from the cutouts to the line.
      1.1.5. Extensive bird contamination.
      1.1.6. Inconsistent use of surge arresters
      1.1.7. Lack of hard caps on transformer hanger bolts, missing pole steps, high voltage signs damaged or missing, ground molding damage and other easily fixed issues.

2. Overall improvement strategy recommendation
   2.1. IID Line Construction and Maintenance needs to review and update its existing GO 165 inspection and maintenance plan and ensure that the plan is up to date and meets with the CPUC standard.
   2.2. Once the plan has been reviewed and revised, IID line construction leadership should dedicate full-time resources to resolve critical inspection and maintenance issues, including inspectors and crew(s) to implement a "find it and fix it" strategy. These resources should also be tasked with major outage/weather event coordination and communications (possibly staffing a pop-up command and control center), as well as post-event root cause analysis.
   2.3. The strategy should include and execute a cyclical, time-based inspection and maintenance plan for the Power Line Inspection unit that includes location-specific "state of the infrastructure" assessments based on a scale rating for, i.e., 1-5. The scale will identify hazardous conditions and severity, such that IID can develop a fixed time frame for repairs or replacements, including the resolution of dangerous vegetation issues

3. Other recommendations

Several other recommendations have been sorted by IID organizational units that may want to pursue them:

Organizational Unit(s)	Recommendations
Vegetation Management	3.1. IID needs to communicate with CAL FIRE to adjust certain designation areas. Some areas denoted by CAL FIRE as moderate or high fire risk need to be downgraded to little or no fire risk – There's very little fuel in these mountain areas west of County Line and La Quinta. 3.2. Poles that have expulsion fuses (cut-outs) and surge arresters should have the area around the base of the pole cleared of vegetation and sterilized so that that it will not catch fire when the pole equipment operates as designed. A diameter of approximately 10' is recommended. 3.3. There is substantial vacant property vegetation near power lines in the Mecca area: IID needs to report these issues to CAL FIRE. IID Vegetation Management will address vegetation located in the power line corridor. 3.4. IID needs to report vacant lot vegetation near power lines in the Salton City area to Imperial County Fire Department. IID Vegetation Management will address vegetation located in the power line corridor. 3.5. Notices to Imperial County Fire, CAL Fire, or other agencies should be recorded on the IID system of record.

Organizational Unit(s)	Recommendations
Power Line Inspections	3.6. The use of drones would be a valuable improvement to the inspection process. A drone can provide greater details of the conditions at an elevated level, such as contamination due to birds, tracking, cross-arms and poles split out, tracking on high voltage equipment and devices, overall condition of the conductors, and so forth. Drone-mounted thermal cameras can identify "hot spots," detecting problems before they get more serious. IID needs to have a mechanism to report issues and non-conformance infractions to meet GO95 requirements. These issues can be resolved during the GO 165 "Find it and Fix it" implementation. 3.7. Telephone and cable companies need to remove all abandoned meters and electrical equipment from their poles. The two abandoned meter sockets found were on either telephone or cable company poles. 3.8. IID should record the third party infraction notice on the IID system of record. 3.9. The City of El Centro needs to keep alleys with power lines clear of trash and debris.
Electrical Engineering	3.10. IID should continually upgrade their system with the latest AMI and Distribution Smart Grid infrastructure to obtain better information about their grid, understand outage details, and remotely access more controls and dispatch resources with better information. 3.11. Surge arresters need proper grounding: They should have a copper braided ground in order to allow the expulsion to blow out the bottom side of the arrester. Currently, the arrester is attached with a #4 or #6 solid ground that won't allow the arrester to operate properly.
Line Construction & Maintenance	3.12. IID needs to designate the common neutral throughout the service territory – GO 95 states: 3.12.1. "Designation of Common Neutral In common neutral systems, where the common neutral line conductor is installed in a primary pin position - it shall be designated at each pin position with the letters "CN". A weather and corrosion–resisting material shall be used and the letters shall be clearly legible." 3.13. IID should remove all power equipment from abandoned poles, as well as all IID ownership labels, pole number labels from abandoned poles. 3.14. IID should record when a pole is abandoned on the IID system of record.

Organizational Unit(s)	Recommendations
Line Construction & Maintenance; Electrical Engineering	3.15. There should be consistent grounding of the neutral - it appeared that there were areas where there was no grounding of the neutral. 3.15.1. Per GO 95 B. - Neutral Conductors: "(1) Locations: The common neutral grid system shall be grounded at intervals not greater than 1,000 feet. On branch circuits extending from a grid, where return loop paths are not available, the common neutral conductor shall be grounded at intervals not greater than 500 feet. 3.15.2. For each transformer installed on a branch circuit without a loop return, the transformer shall be so located that there will be one or more grounds, of a combined resistance not greater than 3.5 ohms." 3.16. IID needs to install appropriate devices to deter birds from landing on poles in certain areas. There were numerous areas of avian contamination and bird nests in high voltage equipment. 3.17. Pole steps should be added where required. The position of the steps should be in line with the conductors. This is especially true in alleys where trucks can make contact with them while driving.
Line Construction & Maintenance; Troubleshooters	3.18. Since Gang-Operated-Air-Brake switches are not permanently grounded in the field, IID should ensure that an insulator mat is put in place before operating the switch. This would place the worker in an equipotential zone and protect them from a high voltage flashover that would migrate down the handle to ground.

Equipment Records: Research Findings and Recommendations

4. Research findings
   - 4.1. Of the approximately 50 poles that were found with issues during the survey, IID staff reviewed 31 SAP pole equipment records:
     - 4.1.1. 6 poles had no sap equipment record - these are possible illegible pole tags or records are not in the SAP database.
     - 4.1.2. 24 pole equipment records had no notification or order records for the period 2/12/2000 - 2/11/2021.
     - 4.1.3. 21 pole functional location records had no notification or order records for the period 2/12/2000 - 2/11/2021.
     - 4.1.4. 3 pole functional location records contained notification and order records for repairs for the period 2/12/2000 - 2/11/2021.
     - 4.1.5. 8 pole tags do not match the SAP equipment technical identification number - found added hyphens, letters in the sap records.

5. Records-related recommendations
   - 5.1. The SAP technical identification number and the pole tag number should be identical. We found differences which made it difficult to find some equipment records.
   - 5.2. Add the geolocation of the equipment location to the equipment record.

5.3. Fully maintain equipment record information fields - much of the information is missing, e.g., installation date, city location, circuit, pole class.
5.4. Add fields in SAP to track reinforced poles; date of reinforcement, type of reinforcement used, reinforcement manufacturer, pole class achieved with reinforcement.
5.5. Replace illegible pole tags in the field.
5.6. Note: IID staff are working to resolve technical issues with the transfer of inspection information from GIS to SAP.

Regards,

Max Fuentes

Max Fuentes
Owner – Fuentes Consulting LLC