	DEPARTMENT KEARNY MAINTENANCE AND OPERATIONS	DIVISION ELECTRIC TRANSMISSION AND DISTRIBUTION	DOCUMENT SECURITY CONFIDENTIAL
	SUBJECT STANDARD OPERATING PRACTICES		12/10/2021
TITLE <b>TRANSMISSION LINE MAINTENANCE PRACTICES</b>		VERSION NUMBER <b>8D</b>	DOCUMENT NUMBER <b>TCM807 (AKA ESP807)</b>

## 1. INTRODUCTION

- 1.1. San Diego Gas and Electric's (SDG&E) electric transmission system is comprised of 69kV, 138kV, 230kV and 500kV tielines. These Maintenance Practices outline SDG&E's standard procedures for maintaining the electric transmission system. This document outlines detailed descriptions and procedures for SDG&E Overhead and Underground Inspection, Maintenance, Assessment and Restoration programs. A Construction Supervisor assesses any potential safety hazards or Public Resource Codes 4292 and 4293, GO 95 and GO 128 infractions, or system defects identified during routine or non-routine inspections/patrols. During this secondary assessment, the Construction Supervisor determines if corrective maintenance is required. This maintenance is handled either by Transmission Construction & Maintenance (TCM) or by other departments at SDG&E. Other programs that are described in detail include Insulator Wash Activity and Wood Pole Groundline Inspection, Treatment and Restoration/Replacement.
- 1.2. These Maintenance Practices provide guidelines for uniform Inspection and Maintenance of SDG&E's transmission system consistent with California Public Utility Code Section 348 requirements. These guidelines shall apply to all transmission system facilities that are owned and maintained by SDG&E.
- 1.3. SDG&E is subject to mandatory Western Electricity Coordinating Council (WECC) Regional Reliability Standard FAC-501-WECC-1 "Transmission Maintenance". This Standard is applicable to Transmission Owners or Operators that maintain the transmission paths identified in FAC-501-WECC-1, Attachment 2 –TOP-007-WECC-1, titled "Major WECC Transfer Paths in the Bulk Electric System" and is applicable only to those facilities associated with each of the paths identified. For all SDG&E equipment associated with these transfer paths, see Section 10.8, "Attachment H – WECC Transfer Path Equipment List".

## 2. PURPOSE

- 2.1. The purpose of SDG&E's Transmission Inspection & Maintenance Program is to promote safety for the general public, SDG&E personnel and contractors by providing a safe operating and construction environment, while maintaining system reliability. This inspection and maintenance program enables SDG&E to identify and repair component/conditions and reduce defective equipment on the transmission system to minimize safety hazards and maintain system reliability.

- 2.2. SDG&E strives to provide cost effective inspection and maintenance of electrical transmission facilities and timely restoration of damaged equipment. This includes effective outage coordination, utilizing energized maintenance activities and maintaining emergency stock material. SDG&E also directs appropriate personnel to transmission structures, conductors, right-of-way and equipment requiring inspection or maintenance, while adhering to the guidelines within these Maintenance Practices.

### 3. DEFINITIONS

- 3.1. Component: A part of an entire structure, conductor, or right-of-way, see 10.3. Attachment C – “Transmission Overhead & Underground Components”.
- 3.2. Condition: The state of a component at the time of inspection , see 10.4. Attachment D - “Transmission Overhead & Underground Transmission Conditions”.
- 3.3. Deferred: A component condition that does not require repair within the 12 months following assessment. A Construction Supervisor, Engineer or Consultant assessing the condition will specify a date for follow-up.
- 3.4. External Department: Any department outside of Transmission Construction & Maintenance that supports Transmission related field activities. This includes Land Services, Environmental Services, Transmission Engineering, Civil Engineering, Design & Construction Management, Vegetation Management, Compliance Management and Street Repair.
- 3.5. Good Utility Practices: As defined by the CAISO Tariff, Appendix A: Any of the practices, methods and acts engaged in or approved by a significant portion of the utility industry during relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in the light of facts known at the time the decision was made, could have been expected to accomplish the desired results at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be any one of a number of optimum practices, methods, or acts to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.
- 3.6. Grid Operations: The SDG&E department that controls the transmission Grid and runs the transmission switching center.
- 3.7. Hold: All maintenance activities are subject to environmental, cultural, military, grid, legal and permitting restrictions which may hinder the ability to complete work in the specified timeline. A component condition is put on HOLD when the date specified for corrective action cannot be met. These instances can require coordination with Federal, State and Local agencies and/or customers where SDG&E is unable to control the timeline in which access/permits are granted. Examples where a HOLD is utilized: on military installations, in environmentally sensitive areas, third party refusal, customer issues, system emergencies, or in areas where right of entry must be granted before beginning work.

- 3.8. Inspection/Patrol: Systematic observation of transmission system tielines, structures, conductors, right-of-way and their components via land access and/or from helicopter or drone, as outlined in Section 4, "Overhead & Underground Transmission System Inspection".
- 3.9. Inspector/Patrolman: Shall be a person who, by reason of, training, experience and instruction, is qualified to perform the inspection/patrol. This person may be an SDG&E employee or may be contracted labor.
- 3.10. CAISO: The California Independent System Operator Corporation, a State chartered nonprofit corporation that operationally controls the transmission facilities of all participating Transmission Owners and dispatches certain Generating Units and Loads.
- 3.11. PowerWorkz: Software used for documenting transmission system inspections, insulator washing and road maintenance.
- 3.12. Reclosing: An attempt to re-energize a tieline following a relay/breaker operation interrupting service.
- 3.13. Right-of-Way: The entire width of the Transmission corridor including access.
- 3.14. Severity Rating: Condition rating scale utilized to define a priority as specified in Section 5.1, "Evaluation Criteria".
- 3.15. Structures: All wood, steel, concrete and composite poles, lattice towers and underground vaults.
- 3.16. Task Tracker: Web-based application used to facilitate and document two-way communication between TCM and external departments.
- 3.17. Transmission Construction and Maintenance (TCM): The SDG&E department responsible for coordinating inspections/patrols, condition assessment and follow up maintenance activities for the electric transmission system.
- 3.18. Transmission System: SDG&E's transmission system is comprised of electric overhead & underground 69kV, 138kV, 230kV and 500kV tielines.
- 3.19. TRMMRS: Transmission Maintenance Management and Reporting System. A database application utilized to track all maintenance activity and generate reports.
- 3.20. VMS: Vegetation Management System. A computerized database management system that provides automated tools to control and manage all aspects of SDG&E's Vegetation Management Program (VMP). These include, but are not limited to, inspection schedules, location listing, vegetation type, growth rate, trimming/brushing schedules and report generation. The VMP is under the operational control of the Vegetation Management Section of the Wildfire Mitigation and Vegetation Management Department.

- 3.21. WPGLIT: Wood Pole Groundline Inspection, Treatment and Reinforcement/Replacement Program. A Maintenance program to conduct ground line and below ground line visual inspections, intrusive tests, detailed wood pole assessments, treatments and restoration or replacements.

#### 4. OVERHEAD & UNDERGROUND TRANSMISSION SYSTEM INSPECTION

- 4.1. Purpose: All SDG&E overhead and underground transmission system facilities covered by these practices are routinely inspected visually and utilizing an infrared camera. Inspections are completed by both ground and air. Non-routine inspections are scheduled depending on operational need.
- 4.1.1. Inspections/patrols of all structures, attachments and conductor spans are performed to identify facilities and equipment that may not meet Public Resource Codes 4292 and 4293 or GO 95 and GO 128 rules. Separate Wood Pole Ground Line and Vegetation Inspection programs are administered and coordinated through the Vegetation Management **Department** and are separate from the inspections/patrols described in this section. See Section 6.5.8, "Vegetation Management" and Section 7. "WPGLIT".
  - 4.1.2. Documentation of results from these inspections/patrols and subsequent follow-up maintenance shall be made available to the CAISO upon request, consistent with the CAISO Transmission Maintenance Standards.
- 4.2. Inspection/Patrol Types: SDG&E conducts a variety of inspection types to ensure the safety of the general public and personnel engaged in the maintenance and operation of overhead and underground electrical facilities while maintaining transmission system reliability. Inspections/patrols are prioritized based on safety, reliability and operational need. The following table outlines each inspection type.

- 4.2.1. Transmission System Inspection Frequency: This table lists all inspection types conducted.

Inspection Types	Inspection Cycle (Yrs)
Fault/Safety Patrol	As Needed
Detailed Overhead & Underground Inspection/Patrol	Three
Visual and Infrared Overhead Inspection/Patrol	Annual
Special Inspection	As Needed
Climbing Inspection	As Needed
Wood Pole Ground Line Inspection and Treatment	Eight
Miscellaneous Inspection	As Needed
Aerial Patrol - 69kV in HFTD Tier 3	Annual - prior to Sept. 1 <sup>st</sup> .

- 4.2.2. Fault/Safety Patrol: Fault/Safety patrols are usually requested by Grid Operations and are given priority over routine patrols. In general, fault patrols are completed as soon as practical. Fault patrols are conducted for one of two reasons:

- The tieline has relayed and does not hold when reclosing is attempted.
- The tieline has relayed and reclosed successfully, but the cause is unknown.

- 4.2.2.1. The cause of the fault is reported to Grid Operations immediately following determination, utilizing CAISO outage cause codes. If the cause of the fault cannot be identified, it is reported as being undetermined.

4.2.2.2. CAISO Outage Causes and Codes:4.2.2.2.1. Primary Causes:

CODE	DESCRIPTION
AIR	Aircraft
ANIM	Animal Contact
CB	Circuit Breaker Trouble
CNTM	Contamination
DIST	System Disturbance
FIRE	Fire
GEN	Generation Trouble
LATE	Late Notification
LIGT	Lightning
LEQP	Line Equipment Trouble
MB	Mylar Balloon
ND	Natural Disasters
OPER	Operation Error
OTHER	Other
PROT	Protection
SEQP	Other Substation Equipment Trouble
SCHD	Scheduled Outage
UNKN	Unknown
UC	Utility Contact
VEGA	Vegetation
VEH	Vehicles
WEAT	Weather

4.2.2.2.2. Secondary Causes:

CODE	DESCRIPTON
ARRS	Arrestors
AUX	Station Auxiliary Equipment
BATT	Battery Systems
BUSH	Bushings
CB	Circuit Breakers/Circuit Switches
COMM	Communication Facilities
COND	Conductor, Shield Wire and Splices
RELY	Control and Relay System
DC	Direct Current Transmission
DISC	Disconnects
ENCR	Encroachments/Unauthorized Attachments
GUYS	Guys and Anchors
HDWR	Hardware, Fittings and Accessories
INSL	Insulators
LS	Line Switches
NONE	None
OTHER	Other
PROC	Work Procedure/Human Error
REAC	Reactive Devices
REG	Regulator
STRU	Structures/Foundation
UG	Underground Transmission Components
UNKN	Unknown

- 4.2.3. Detailed Overhead & Underground Inspection/Patrol: Inspections are completed every three years. Inspection cycles maybe adjusted to meet operational needs provided the new target date does not exceed original 3 year date. This detailed inspection of overhead and underground structures and attachments is performed to identify possible safety hazards and system defects while ensuring compliance with Public Resource Codes 4292 and 4293, GO 95 and GO 128. These inspections also include an assessment of access roads, vegetation, right-of-way encroachment and vandalism.
- 4.2.4. Visual and Infrared Overhead Inspection/Patrol: Once per year, visual and infrared helicopter inspections are conducted on overhead tielines. Visual inspections conducted by helicopter allow for an aerial perspective of overhead structures, conductor spans and right-of-way encroachments. These inspections are designed to identify obvious structural problems and hazards. Infrared helicopter inspections, with the use of specialized camera equipment, are performed to identify potential equipment failures. Structures that cannot be accessed by helicopter (structures in FAA air space) are driven for visual and infrared patrol.
- 4.2.5. Special Inspection/Patrol: There are a variety of special inspections/patrols that occur on a non-routine, but planned or pre-arranged basis. Special inspections/patrols of particular tielines and/or structures are sometimes required when preparing for planned outages associated with construction and/or maintenance projects. Special inspections/patrols may also be conducted before a line is initially energized after construction or re-energized after an extended outage. Special security patrols on critical tielines are conducted during or after major holidays or events in areas frequented by off road enthusiasts or as needed for security reasons.
- 4.2.6. Climbing Inspection: Climbing inspections are performed on an as-needed basis, when a more detailed assessment of a possible component/condition is required.
- 4.2.7. WPGLIT: Wood Pole Ground Line Inspections are conducted on an eight-year cycle. (Cycle changed from ten years to eight years for start of 2021. Full implementation of eight-year cycle by 2029.) The inspection portion of this program is managed by the Vegetation Management Department. See Section 7, "WPGLIT".
- 4.2.8. Miscellaneous Inspection: Any inspection not defined above. For instance, in the course of performing other company business, a condition found would be reported as a miscellaneous inspection.
- 4.2.9. Aerial Patrol – 69kV in HFTD Tier 3: In addition to the annual Visual and Infrared Overhead Inspection/Patrol, an additional patrol of the 69kV structures located in Tier 3 of the HFTD is performed prior to September 1<sup>st</sup> each year. Similar to the yearly inspection noted, these

inspections are designed to identify obvious structure problems and hazards prior to the fire season.

4.3. Detailed Overhead & Underground Inspection/Patrol: Inspections/Patrols scheduled on the frequencies outlined in Section 4.2.1, "Transmission System Inspection Frequency". All scheduled inspections will be completed within ninety days before or after the target date. A qualified Inspector/Patrolman performs visual inspections of various attributes of the transmission lines. These inspections/patrols allow for identification of deteriorated/damaged external component/conditions such as flashed insulators, rust, wood rot and conductor damage in the overhead system. In the underground system, visual and infrared inspection occurs in all vaults, manholes and exposed facilities. Inspection is to include cable terminations and splices to identify deteriorated/damaged external component/conditions such as corrosion, leaks, racking and conductor damage.

4.3.1. TCM Procedure:

- 4.3.1.1. Plan and coordinate scheduling of inspections by qualified Inspector/Patrolman to comply with cycles outlined in Section 4.2.1, "Transmission System Inspection Frequency".
- 4.3.1.2. Process results of routine overhead patrols by exporting inspection data from PowerWorkz Field units into the centralized database. All reported component/conditions are migrated into TRMMRS. Results of other patrol types may be entered into TRMMRS by TCM office personnel.
- 4.3.1.3. Inspection results are issued for secondary assessment procedures.

4.3.2. Inspector/Patrolman Procedure:

- 4.3.2.1. In the overhead system, visually inspect/patrol assigned tielines, structures, conductors, right-of-way and their components. In the underground system, perform visual and infrared inspection of all exposed facilities in vaults and manholes associated with extruded dielectric cable.
- 4.3.2.2. Record all inspection information and conditions found while inspecting overhead transmission system facilities using PowerWorkz inspection software and codes from the Overhead and Underground Components/Conditions lists. See 10.3. Attachment C – "Transmission Overhead & Underground Components" and 10.4. Attachment D – "Transmission Overhead & Underground Conditions".
- 4.3.2.3. Identify possible Public Resource Codes 4292 and 4293 or GO 95 and GO 128 infractions and report component/conditions for field assessment by Foreman/Supervisor, as outlined in Section 5.2, "Condition Assessment Procedure".



- 4.3.2.4. Assign a severity rating in PowerWorkz to each component/condition identified during inspection. The severity of the condition dictates the timeline in which secondary assessment should be performed. See Section 4.3.3, “Severity Rating Definitions”.
- 4.3.2.5. Correct minor component/conditions on-site, when practical.
- 4.3.3. Severity Rating Definitions: Outlines timeline required for secondary assessment to occur based on the severity rating assigned to the component/condition when identified in the field.

Severity	Timeline for Field Assessment
5	Immediate Response
4	3 Months from Inspection Date
3	6 Months from Inspection Date
2	12 Months from Inspection Date
1	Monitor Component/Condition
0	Component/Condition completed during inspection

## 5. CONDITION ASSESSMENT

- 5.1. Evaluation Criteria: When an Inspector/Patrolman identifies a condition, a severity rating is assigned, which triggers the secondary assessment date. All component/conditions found during routine ground and aerial inspections are collected in PowerWorkz and exported to TRMMRS for follow-up. Component/conditions found during other inspections or identified through other means are entered into TRMMRS by TCM office personnel. See Section 10.5 Attachment E – “Condition Assessment Fielding Form”.
- 5.1.1. Severity Rating 5: Conditions are considered critical, possibly requiring immediate assessment. These critical conditions are considered to be a threat to the transmission system reliability or public safety and are to be assessed by a Foreman/Supervisor immediately. If work is required, the job is scheduled as soon as possible within the CAISO scheduling criteria for Planned or Forced outages.
- 5.1.2. Severity Rating 4: Conditions are considered non-critical and are to be assessed by a Foreman/Supervisor within 3 months from the date identified. Nonconformances that create a fire risk located in Tier 3 of the High Fire-Threat District.

- 5.1.3. Severity Rating 3: Conditions are considered non-critical and are to be assessed by a Foreman/Supervisor within six months from the date identified.
  - 5.1.4. Severity Rating 2: Conditions are considered non-critical and are to be assessed by a Foreman/Supervisor within twelve months from the date identified.
  - 5.1.5. Severity Rating 1: Conditions are to be monitored and does not require condition assessment by a Foreman/Supervisor. This rating is used as a reminder for the Inspector/Patrolman during the next inspection cycle to check on a minor condition that may be in an obscure location. While condition assessment is not required, it may be performed at the discretion of TCM Management.
  - 5.1.6. Severity Rating 0: Conditions are minor corrective maintenance completed by the Inspector/Patrolman during the inspection.
- 5.2. Condition Assessment Procedure: The Foreman/Supervisor may either evaluate the component/condition utilizing electronic inspection data and digital photos or conducting a field assessment. Certain component/conditions, such as vegetation clearing are automatically forwarded to other departments for completion. Once the component/condition has been assessed, the Foreman/Supervisor may determine any of the following actions:
- 5.2.1. The component/condition is to be COMPLETED in the database because no maintenance is required (NMR).
  - 5.2.2. The component/condition is to be DEFERRED. The Foreman/Supervisor will specify the date for follow up.
  - 5.2.3. The component/condition is to be monitored by the Inspector/Patrolman during the next regularly schedule inspection cycle. The severity rating of this record is changed to a "1" to ensure proper follow up. See Section 5.1 "Evaluation Criteria", for details regarding a "Monitor" status.
  - 5.2.4. The component/condition is to be FORWARDED to another department for them to perform a more specialized assessment and determine if any follow-up action is required. All forwarded conditions will be opened in Task Tracker to facilitate two-way communication between TCM and external departments. When the other department completes their specialized assessment, they will provide TCM with the results of their assessment. If they determine no follow-up action is required, the condition will be COMPLETED in the database. If they determine maintenance or other action is required they will write a job, establish a complete by date, notify TCM of actual completion date and provide an "As-Built" copy of the job for TCM files.
  - 5.2.5. The component/condition is to be repaired by TCM crews. The Foreman/Supervisor will prepare a Transmission Field Memo. See

Section 10.6, Attachment F – “Transmission Field Memo”, which includes a complete by date and any special priority or instructions for scheduling the job.

- 5.2.6. All assessments/re-assessment dates and results of these assessments are recorded in TRMMRS.

## 6. OVERHEAD & UNDERGROUND TRANSMISSION SYSTEM MAINTENANCE

6.1. The Overhead and Underground Transmission System Maintenance Program provides for preventive and corrective maintenance of transmission system structures, conductors, right-of-way and their components. Maintenance is performed to correct Public Resource Code 4292 and 4293 or GO 95 and GO128 infractions and to ensure public safety and transmission system reliability. All maintenance activities are subject to military, environmental, cultural and grid restrictions which may hinder the ability to complete work in the specified timeline. Condition of right-of-way (access roads or helicopter only sites) can also limit access to any particular location, at any given time. Any maintenance activities that cannot be completed in the specified timeline due to the above listed issues are assigned a HOLD or DEFERRED code in TRMMRS to properly track the status.

6.1.1. SDG&E intends to complete all corrective maintenance no later than date specified by the Supervisor, Engineer, or Consultant (default 12 months\* or DEFERRED date initially provided). However, SDG&E may put a component/condition on HOLD when the work is located in sensitive areas with environmental or cultural issues, requires coordination with third parties, is located in areas that require permits or Land Services to resolve legal issues.

6.1.2. SDG&E intends to complete all corrective maintenance no later than date specified by the Supervisor, Engineer, or Consultant (default 12 months\* or DEFERRED date initially provided). However, a Supervisor, Engineer or Consultant may reassess the component for changes in condition prior to the date initially provided and revise the date for the corrective action, if deemed safe to do so.

\* 6 months as specified in GO 95, Rule 18, “Nonconformances that create a fire risk located in Tier 3 of the High Fire-Threat District”

6.2. TCM Corrective Maintenance Procedures: TCM will schedule corrective maintenance for overhead and underground transmission system structures, conductors, right-of-ways and their components reported to have conditions in need of corrective action.

6.2.1. Plan and schedule corrective maintenance. Prioritize work orders based on safety, transmission system reliability and load restrictions; then scheduled accordingly.

6.2.2. Forward component/conditions and deteriorated/damaged equipment requiring action by other SDG&E departments via Task Tracker to

initiate follow-up action requests. External department's roles in supporting maintenance activity are outlined in Section 6.5, "Maintenance Activity Completed by External Departments". Changes in status are recorded in Task Tracker.

- 6.2.3. Utilize TRMMRS to track status of maintenance activity. TRMMRS database reflects component/conditions that are pending, on HOLD, DEFERRED, COMPLETED, or completed Waiting On Paperwork (WOP).
- 6.2.4. Prepare reports relating to maintenance in accordance with CAISO Transmission Maintenance Standards.

### 6.3. Overhead Preventative Maintenance:

- 6.3.1. Insulator Wash Program: The transmission system insulator wash program is conducted on ceramic-type insulators in coastal zones and coastal valleys that experience salt-fog conditions. See Section 10.7, Attachment G – "Wash Zones". Insulator washing is performed as required by local environmental conditions and is based on operating experience. Tielines that have a history of insulator contamination or contamination related flashovers are also candidates for insulator washing.
  - 6.3.1.1. Intervals between insulator washing cycles are based on historical tieline performance and are determined by the responsible Transmission Supervisor. Wash cycles can vary from 91 to 365 days. Some tielines are scheduled as needed, which are categorized as "Wash on Request". Wash cycles are to be completed within the guidelines in Section 6.3.2, "Compliance Window for Insulator Wash Program".
  - 6.3.1.2. SDG&E intends to complete all scheduled insulator washing by the date specified by the wash schedule. However, a Transmission Supervisor may at any time reassess the condition of the insulators on a tieline prior to the established due date and defer the date for washing.
  - 6.3.1.3. Washing is performed by field crews in accordance with Good Utility Practices for Overhead Transmission Systems. See Section 3.5, "Good Utility Practices".
  - 6.3.1.4. Heavy rain may qualify as a transmission wash. These washes are based on rainfall and the condition of the insulators as determined by a Transmission Supervisor.
  - 6.3.1.5. Completed wash activity is recorded in the PowerWorkz database.

6.3.2. Compliance Window for Insulator Wash Program:

Target Date	Due Date
Less than 6 months	1 month beyond target date
Greater than or equal to 6 months and less than 12 months	2 months beyond target date

6.4. Road Right-of-Way Maintenance Procedures: SDG&E maintains approximately 1,500 miles of road right-of-way to access transmission infrastructure. These roads are monitored by the Contracting Administrator of ROW Maintenance and also inspected according to Section 4.0, "Overhead & Underground Transmission System Inspection" during inspection/patrols of the electric facilities. Right of Way maintenance is completed either by SDG&E Equipment Operations Department or a contractor. All right of way maintenance is overseen by the Contracting Administrator of ROW Maintenance. Many of SDG&E's road segments are maintained bi-annually due to environmental constraints.

- 6.4.1. TCM personnel coordinate with Land Services and Environmental/Cultural Resources to screen for potential issues. See Sections 6.5.7, "Land Services Procedures for Easement Issues" and 6.5.6, "Environmental/Cultural Services Procedures".
- 6.4.2. TCM provides map packages to Equipment Operations or a contractor for grading of specified access roads.
- 6.4.3. Equipment Operations and/or a contractor perform the authorized roadwork. Completed right of way maintenance is recorded in Powerworkz.
- 6.4.4. Upon completion of work, road right-of-way component/conditions are closed in TRMMRS based on data submitted from the work orders.

6.5. Maintenance Activity Completed by External Departments: Results from routine inspections/patrols are entered into TRMMRS database as outlined in Section 4, "Overhead and Underground Transmission System Inspection". Certain component/conditions are forwarded to external departments via Task Tracker to support the Transmission Maintenance Program.

- 6.5.1. External Departments Procedures:
  - 6.5.1.1. Assess the component/condition.
  - 6.5.1.2. Complete or coordinate necessary repairs or resolve the access issues.
  - 6.5.1.3. Update the status of the issue or work being performed in Task Tracker.
  - 6.5.1.4. Notify TCM when issue is resolved, or work completed.

### 6.5.2. Departments that Support Transmission Maintenance Activity:

Department	Responsibilities
Civil Engineering	<ul style="list-style-type: none"> <li>– Assess structural and erosion issues</li> <li>– Coordinate repairs when necessary</li> </ul>
Compliance Management	<ul style="list-style-type: none"> <li>– Notify Communication Infrastructure Provider (CIP) of non-conformance/safety hazards impacting SDG&amp;E facilities and work to remedy issues.</li> </ul>
Design & Construction Management	<ul style="list-style-type: none"> <li>– Coordinate and schedule pole replacements and other work to be completed by contract crews</li> <li>– Periodically support TCM by providing contract crews to conduct maintenance.</li> </ul>
Environmental & Cultural Services	<ul style="list-style-type: none"> <li>– Coordinate the acquisition of environmental permits</li> <li>– Provide Biological/Cultural Monitor when required</li> </ul>
Land Services	<ul style="list-style-type: none"> <li>– Remedy all right-of-way encroachment and customer land issues.</li> </ul>
Street Repair	<ul style="list-style-type: none"> <li>– Uncover vault lids that have been paved over</li> </ul>
Transmission Engineering	<ul style="list-style-type: none"> <li>– Design pole replacements and other component replacements requiring engineering assessments</li> <li>– Coordinate engineering analysis for WPGLIT rejects with engineering contractor</li> </ul>
Vegetation Management	<ul style="list-style-type: none"> <li>– Remedy all vegetation encroachments</li> <li>– Administer WPGLIT program</li> </ul>

6.5.3. Civil Engineering (CE) Procedures: CE supports issues regarding civil/structural including corrosion and ground erosion, pertaining to insulators, structures/towers and roads.

6.5.4. Compliance Management Procedures: Under certain circumstances, inspection of facilities and equipment repairs cannot be accomplished within the company because of Communication Infrastructure Provider (CIP) involvement. These occurrences require notification to the CIP. Compliance Management notifies CIP to remedy the issue.

6.5.5. Design & Construction Management Procedures: Administer work to be performed by outside contractors.

6.5.6. Environmental/Cultural Services (ES) Procedures: SDG&E complies with all Local, State and Federal Laws pertaining to Environmental and Cultural Resource preservation. These laws apply to all sensitive and endangered plant/animal species, water quality and archaeological sites. To ensure compliance, TCM and ES personnel interact to perform the following:

- 6.5.6.1. ES prescreens maintenance activity to alert TCM of any work that may have environmental or cultural impacts.
  - 6.5.6.2. If work is identified with an environmental or cultural issue, TCM enters the record into Task Tracker for communication and tracking of environmental status. ES updates Task Tracker when there is a change in status or when permits have been received.
  - 6.5.6.3. TCM will place all maintenance activity with outstanding environmental issues on HOLD in TRMMRS.
  - 6.5.6.4. Once permits are received, ES to update Task Tracker with guidelines of the permit. TCM will DEFER the date in TRMMRS based on the scope of work, severity of the condition and system constraints.
- 6.5.7. Land Services (LS) Procedures for Easement Issues:
- 6.5.7.1. Resolve problems regarding access, gates, locks, or other obstructions to easements.
  - 6.5.7.2. Obtain permission to enter private or public lands for the purpose of completing required maintenance or emergency repairs.
  - 6.5.7.3. Provide SDG&E's access requirements to private developers as they develop land within and around SDG&E's transmission system. Document agreements of access and easement uses.
  - 6.5.7.4. Contact affected customers prior to or during TCM construction and maintenance projects when necessary. Handle public agency contact as required for these types of projects.
- 6.5.8. Vegetation Management (VM) Procedures: Vegetation inspection, trimming and removals in transmission corridors are coordinated under the operational control of the Vegetation Management Section of the Mitigation and Vegetation Management Department. VM personnel:
- 6.5.8.1. Manage contractors to perform routine vegetation inspection, trimming and removal programs in accordance with SDG&E's adopted Vegetation Management Program. The routine vegetation maintenance program is separate from the maintenance activity described in Section 6, "Overhead and Underground Transmission System Maintenance" and is performed outside the scope of this practice.
  - 6.5.8.2. Enter tree trim/removal orders electronically into VMS.
  - 6.5.8.3. Coordinate and schedule contract crews to complete routine and non-routine vegetation clearing, tree trim/removal.

- 6.5.9. Street Repair Procedures: Street repairs uncover vault lids that have been paved over to provide access.
- 6.5.10. Transmission Engineering Procedures: Provide design and engineering services related to transmission tielines.
  - 6.5.10.1. Coordinate engineering analysis with engineering contractor to determine timeline to replace component or structure.
    - 6.5.10.1.1. Any structure located within Tier 3 of the High Fire-Threat District will be analyzed as soon as possible.
  - 6.5.10.2. Communicate with TCM when an assessor is unable to access the structure. Document access issues in the Task Tracker for the original engineering analysis.
  - 6.5.10.3. Coordinate follow-up analysis for structures deferred for reassessment by the engineering contractor
  - 6.5.10.4. Task Tracker will be updated once analysis is completed.
  - 6.5.10.5. Specify criteria for reinforcement or replacement to meet GO 95 requirements.
  - 6.5.10.6. Generate SDG&E Work Orders for pole replacements and provide TCM with a list of structures requiring replacement with replace by dates. Per GO-95 Rule 18, structures or components that create at least a moderate potential impact to safety or reliability within Tier 3 of the High Fire-Threat District will be assigned a 6-month replace by date.
  - 6.5.10.7. Update Task Tracker and prepare job package for pole replacements.
  - 6.5.10.8. Report to TCM in Task Tracker when the work is issued for construction.
  - 6.5.10.9. Provide HOLD/Deferral eligibility per maintenance practice and GO-95 Rule 18 priority levels.

## **7. WOOD POLE GROUNDLINE INSPECTION, TREATMENT AND REINFORCEMENT/REPLACEMENT PROGRAM (WPGLIT)**

- 7.1. Purpose: The Wood Pole Groundline Inspection, Treatment and Reinforcement/Replacement Program (WPGLIT) provides inspection, treatment and reinforcement/replacement of transmission wood poles. These inspections identify facilities and equipment that may not comply with GO 95 rules relating to pole-strength requirements. Wood poles that do not meet GO 95 strength requirements are restored through reinforcement or replaced. Inspections occur on an 8-year cycle, as listed in Table 4.2.1. All inspections are to be completed within the calendar year in which they



are due. WPGLIT is administered in conjunction with SDG&E's "Transmission Engineering and Electric Distribution Standards, Equipment, Materials and Services Specification, Inspection, Treatment and Reinforcement of In-Service Wood Poles Specification No. TE-0108 and Specification No. 337", under custody of Transmission Engineering.

7.1.1. TCM Procedure:

- 7.1.1.1. Provide a list of structures to be inspected for a given year. Data is imported into EPOCH Field for a contractor under Vegetation Management Department for inspection.
- 7.1.1.2. Review inspection results submitted by the contractor and process data into TRMMRS database to verify that each structure was inspected and recommended repairs were completed.
- 7.1.1.3. Record structures recommended for reinforcement into TRMMRS. Forward these conditions to Veg Management for contractor to complete reinforcement. Structures located within Tier 3 of the High Fire-Threat District requiring reinforcement will be assigned a 6-month reinforce by date.
- 7.1.1.4. Record structures recommended for replacement into TRMMRS, and forward to TED for engineering analysis. Structures located within Tier 3 of the High Fire-Threat District requiring reinforcement will be assigned a 6-month replace by date.
- 7.1.1.5. Track structures that have been DEFERRED or on HOLD to ensure proper follow up.
- 7.1.1.6. Track structures that the Inspector was unable to inspect due to access issues. Coordinate with external departments to remedy access issue and re-deploy inspection when issue is remedied.
- 7.1.1.7. Any condition not resolved by a contractor during the calendar year is recorded in TRMMRS database and Task Tracker for proper tracking and follow up. See Section 6.5 "Maintenance Activity Completed by External Departments".

7.1.2. Transmission Engineering (TE) Procedure:

- 7.1.2.1. Provide design and engineering services per Section 6.5.10 "Maintenance Activity Completed by External Departments".

7.1.3. Inspector Procedure:

- 7.1.3.1. Conduct visual, groundline and below-groundline inspections, reinforcements and treatments of wood poles as specified in SDG&E's "Transmission Engineering and Electric Distribution Standards Equipment, Materials and Services Specification,

Inspection, Treatment and Reinforcement of In-Service Wood Poles Specification No. TE-0108 and Specification No. 337”.

- 7.1.3.2. Immediately notify Vegetation Management of poles that may pose a public safety hazard.
  - 7.1.3.3. Determine per specifications referenced above, poles that are candidates for reinforcement or replacement and report these poles to Vegetation Management.
  - 7.1.3.4. Ensure that pole reinforcement candidates are reinforced by techniques per specifications.
  - 7.1.3.5. Tag inspected poles per specifications referenced above.
  - 7.1.3.6. Collect all inspection, reinforcement and treatment data. Record results, repairs and treatments in the WPGLIT database.
  - 7.1.3.7. Report and transmit all data electronically to Vegetation Management.
- 7.1.4. Vegetation Management Procedure:
- 7.1.4.1. Ensure that all Supervisors, Foremen and personnel are qualified to conduct inspections, reinforcement and treatment.
  - 7.1.4.2. Ensure that all crews are supervised in a manner acceptable to SDG&E and that all work is performed safely, without damage to property.
  - 7.1.4.3. Administer and conduct quality control checks of visual, groundline and below-groundline inspections performed by Inspector.
  - 7.1.4.4. Ensure that inspections are completed by year-end.
  - 7.1.4.5. Conduct quality checks to ensure all data is received from Inspector.
  - 7.1.4.6. Inspection results will be sent to TCM through EPOCH Field. These inspection results will be provided to TCM on a monthly basis for any transmission poles inspected that month.
  - 7.1.4.7. Forward reports from Inspector, concerning poles that are candidates for reinforcement or replacement, to TCM for final determination.
  - 7.1.4.8. TCM will forward Veg Management the poles that are to be reinforced in Task Tracker. Veg Management will deploy reinforcements to contractor and will ensure reinforcements are

completed by their due date. Task Tracker will be updated with the reinforcement results.

7.1.4.9. Immediately notify TCM and Transmission Engineering of poles that may pose a public safety hazard.

7.1.4.10. Notify TCM of any structures that were not able to be inspected due to access issues.

7.1.5. Design & Construction Management Procedure:

7.1.5.1. Receive pole replacement packages from TE and schedule construction accordingly.

7.1.5.2. Report to TCM via Task Tracker when the work is completed.

## 8. REPORTS

8.1. TCM generates and reviews a variety of reports to ensure compliance with the Maintenance Practices. These reports include, but are not limited to patrols, condition assessments, internal pending maintenance and external department reports for PENDING, DEFERRED and on HOLD work.

8.2. TCM Inspection and Maintenance program is administered per CAISO Transmission Maintenance Standards Section 5.0, "Maintenance Practices" and Section 6.0, "Maintenance Record Keeping and Reporting".

## 9. RESTORATION PLAN

9.1. Once TCM is notified of an abnormality on the system, an inspection/patrol is initiated to determine the exact location and cause of the problem. Any problem resulting in loss of customer load or considered a risk to public safety will be addressed immediately, no matter the weather conditions. Work is prioritized based on grid constraints and field assessment(s). The severity and scope of the incident determines the level of Incident Command System (ICS) principles to be applied. ICS is a method of creating a hierarchy command structure to organize people and resources during an incident.

9.2. SDG&E maintains a stock of emergency materials, poles, structures and specialized equipment, to allow for timely restoration. SDG&E also maintains a stock of Emergency Restoration Structures for instances when the structure stock has been depleted or a temporary solution is needed. Based on the severity of the event, SDG&E will commit resources from multiple departments, contract crews and mutual aid from other utility companies.

## 10. ATTACHMENTS

- 10.1. Attachment A – PowerWorkz Inspection Screen: Inspection screen where Inspector/Patrolman log the transmission structure inspected, inspection date, component/conditions, severity ratings and span inspected for transmission structures. Insulator wash data is also recorded on this screen.

The screenshot shows a web application interface for inspecting overhead structures. The main window is titled "TCM Overhead Structure - Z479397 (663)". On the left, there is a sidebar with the following information:

- Asset Registry Code**
- Asset Registry ID**: 393057
- Ceramic Indicator**: N
- COMMENTS**: ---TCM--- / 80'-H3 cut to 71'-H3
- Construction Status**: A
- Creation User**: INFOTECH
- Customer Name**
- Date Created**: 3/26/2010 12:00:00 AM
- Date Modified**: 5/3/2019 10:07:43 AM
- Descriptive Location**: Rear of 9453 Goodwick Ct, 1st pole W

The main form area has two tabs: "Form" and "Insulators". The "Form" tab is active and contains the following fields:

- OH Tie Line**: 663
- UG Tie Line**: ...
- Inspection Type**: ...
- Severity**: ...
- Span Inspected**: ...
- Tag Color**: ...
- Structure Type**: Non Wood

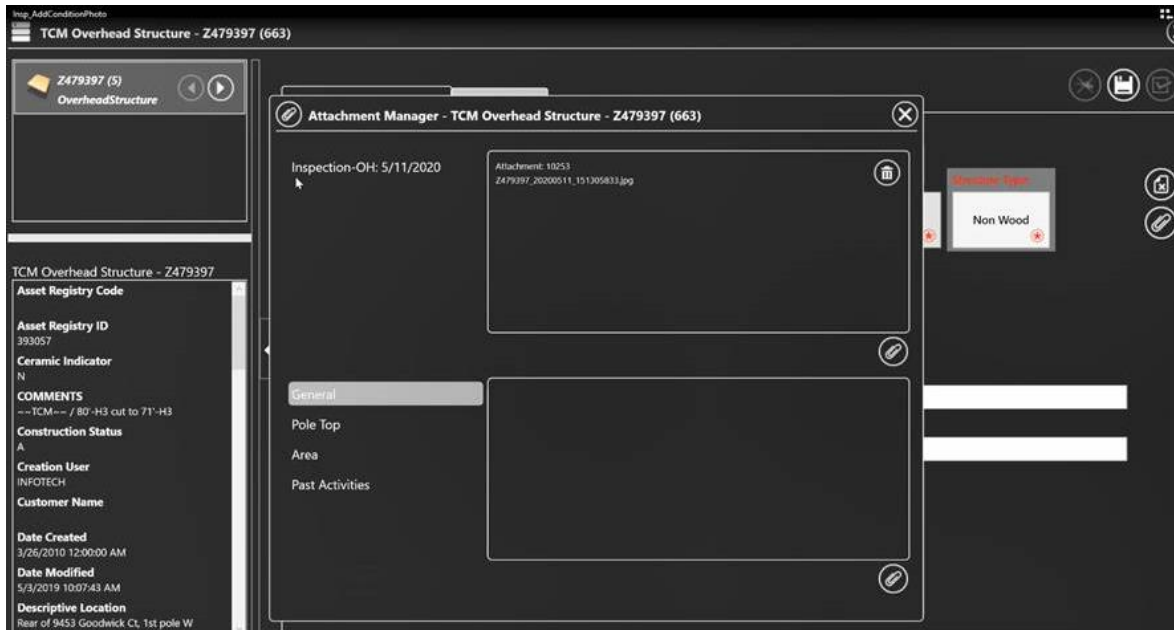
Below these fields is a table with the following columns:

Area	Component	Comp UNFILTERED	Condition	Cond UNFILTERED
...	...	...	...	...

At the bottom of the form, there are text input fields for:

- Tag year**
- Structure Location**: Rear of 9453 Goodwick Ct, 1st pole W
- Structure Comments**
- Condition Comments**

10.2. Attachment B – PowerWorkz: Attachments screen where Inspector/Patrolman attach photos to assets or inspections.




## 10.3. Attachment C - Transmission Overhead &amp; Underground Components.

<b>Transmission Overhead &amp; Underground Components</b>			
Access Road	Aerial Light(s)	Aerial Marker Sphere(s)	Aerial Number Bracket(s)
Aerial Number(s)	Anchor Rod Extensions	Anchor Rod Ground Wire	Anchor Rods
Anti-Climb Barrier	Area Around Footer(s)	Area Around Span	Area Around Structure
Area Underneath Span	Area Underneath Structure	Armor Rod	Armor Rod - Shieldwire
Armor Rod End(s)	Armor Rod Strand(s)	Armor Rod/Preform End	Armor Rod/Preform Splice
Armor Rod/Preform Strand	Bird Discourager	Bolt(s)	Bolted Spacer
Bond (Specify)	Bond Wire	Brace(s)	Bridge
Cable (Complete)	Cable Supports	Cer Term-138kv	Cer Term-69kv
Coated Glass 30K	Coated Glass 40K	Coated Glass 50K	Cold End Bolt(s)
Cold End Clevis Pin	Cold End Clevis/Shackle	Cold End Cotter Key(s)	Cold End Link(s)
Cold End Nut(s)	Cold End Pin(s)	Comm Cable	Complete Concrete Pole
Complete Steel Pole	Complete Tower	Complete Wood Pole	Concrete
Conductor (Complete)	Conductor Strand(s)	Conductor Weight(s)	Conduit
Connectors	Corona Ring(s)	CP Aerial Light(s)	Crimp Connector
Cross Arms	Crown/Cap	C-Truss	Customer Complaint
Damper (Complete)	FAA Light(s)	Fence	Fiber Optic
Fiberglass Rod	Footings (Complete)	Full-Tension Splice	Gate(s)
Ground Connection	Ground Grid Taps	Ground Link Box	Ground Rod Bond Wire
Guy Wire - Anchor	Guy Wire - OH	Guy Wire Guards	Hairpin Spacer
Hairpin Strand End(s)	Hairpin Strand(s)	Hardware	Hot End Clevis /Shackle
Hot End Clevis Pin	Hot End Cotter Key(s)	Hot End Link(s)	Hot End Pin(s)
Hot End Yoke Plate	Ins-Shieldwire-Deadend	Ins-Shieldwire-Suspension	Insulators-Ceramic, Fog, 20K
Insulators-Ceramic, Pin/Clevis, 15K	Insulators-Ceramic, Post, 138kv	Insulators-Ceramic, Post, 230kv	Insulators-Ceramic, Post, 69kv
Insulators-Ceramic, Standard, 20K	Insulators-Ceramic, Standard, 30K	Insulators-Ceramic, Standard, 40K	Insulators-Ceramic, Standard, 50K
Insulators-NCI, 138kv	Insulators-NCI, 230kv	Insulators-NCI, 69kv	Insulators-Post, NCI, 138kv
Insulators-Post, NCI, 230kv	Insulators-Post, NCI, 69kv, Long	Insulators-Post, NCI, 69kv, Short	Jumper - Connector
Jumper (Complete)	Jumper Bolt(S)/Nut(s)	Jumper Strand(s)	Ladders
Lightening Arrestors	Locks	Manhole Cover	Member (Steel Tower)
NCI Term-138kv	NCI Term-230kv	NCI Term-69kv	Nuts
Other (Specify)	Pin(s)	Pole Butt	Pole Ground (Wire)
Pole Top	Pole Top Ext.	Post Ins. Clamp (Angle) Bolt	Post Ins. Clamp (Angle) Nut(s)
Post Insulator Clamp Bolt	Post Insulator Clamp Nut(s)	Preform	Preform D-End
Preform Strand End(s)	Preform Strand(s)	Reflectors - Bottom Set	Reflectors - Middle Set
Reflectors - Top Set	Repair (Split Sleeve)	Repair Kit	Right-Of-Way (Total)
Shield Wire (Complete)	Shieldwire Attachment Point	Shoe (Complete)	Shoe Cotter Key
Shoe Nut(s)	Shoe Pin/Bolt	Shoe U-Bolt(s)	Shoe/Clevis Cotter Key
Shoe/Clevis Pin/Bolt	Sign Warning (With Man)	Signs-Danger	Signs-High Voltage-At Top
Soil Barrier	Splice Cover	Splices	Step Bolt(s)
Steps (Wood Pole)	Storm Guy(s)	Strain Clamp Complete	Strain Clamp U-Bolt
Strain Clamp U-Bolt(s)	Structure (Complete)	Structure Number	Stub Angles
Stub Pole - Anchor Guy	Stub Pole - Steel	Stub Pole - Wood	Suspension Assembly
Suspension Shoe (Complete)	Suspension Shoe Nut(s)	Suspension Shoe U-Bolt	Switch - Arcing Horn
Switch - Contacts	Switch - Control (SCADA)	Switch (Complete)	Switch Handle
Tangent Clamp	Tieline Identification Tags	Tower-Batter Plate(s)	Tower-Body
Tower-Bridge	Tower-Goathead	Tower-K Section	Tower-Leg(s)
Vault	Vault Gasket	Vault Lid	X Marker

## 10.4. Attachment D - Transmission Overhead &amp; Underground Conditions.

Transmission Overhead & Underground Conditions			Action Required
3 Guys/1Rod	Abrasion	Airplane	Assessment Required
Backed Out/Off	Balloon-Mylar	Balloon-Rubber	Brushing Assessment Required
Bent	Bird	Bird Droppings	Clear Vegetation From Access Road
Bird Nest	Birdcaged	Blackening	Climbing Insp. Needed
Blocked, No Access	Blown	Broken	Flagger Required
Bulb Burned Out	Cable Creepage	Chipped	GIS Update Needed
Clearance-Insufficient	Contamination (Specify)	Corona Damage	Grading Required
Cracked	Crane	Crew Contact	Greasing Needed
Damaged	Danger (Specify)	Deformed	Ground Line Insp Required
Deterioration	Dig In	Disconnected	Grounding Assessment Required
Drainage	Earth - Covered With	Earth - Washed Out	HRFA Assessment Required
Encroachment (Specify)	Evidence Of Tracking	Exposed	Installation Assessment Required
Faded	Fallen	Faulty Equipment	Isolating Insulators-Install
Fire Damage	Flashed	Foreign Object (Bird's Nest)	Isolating Insulators-Remove
Foreign Object (Specify)	Gunshot	Hands-On Recommended	Key Override Required
Heat Damage	Improper Sag	Installation-Improper	Maintenance Required
Installation-Non Standard	Kite	Leaking	Mowing Assessment Required
Leaning/Tilted	Lightning Strike	Loaded Improperly	Painting Assessment Required
Loose	Mis-Aligned/Pulled	Missing	Patrol Insp Required
Moved/Slid	Nicked/Scarred	No Problem Found	Raising Required
Non Standard Lock	Not Fully Closed	Not Seated	Reinforcing Assessment Required
Not Sheared	Not Visible	On Bottom (Facing Down)	Removal Assessment Required
Open	Other (Specify)	Out Of Adjustment	Replacement Assessment Required
Paint/Paint Droppings	Pinched	plugged	Requires--GPS
Punctured	Rotten	Rust (Heavy)	Tagging Required
Rust (Light)	Rust (Medium)	Shield Wire-Broken	Tree Removal Assessment Required
Spacer-Induced Damage	Splice Failure	Split	Trim For Inspection
Stripped Threads	Submerged	Trash/Debris	Trim Vegetation Away From Transmission Lines
Trees Too Close	Twisted	Unreadable	Trimming Required
Unwrapping	Vandalism	Vegetation Overgrown	Walking Path Required
Vehicle Contact	Very Tight (No Movement)	Vibration	Washing Needed
Vines	Warped	Water In Vault	
Wire Contact	Woodpecker Hole(S)	Worn	
Wrong Size			

10.5. Attachment E – Condition Assessment Fielding Form: Form utilized during condition assessment. Information included on the document includes, the transmission system facility inspected, Inspector/Patrolman, inspection date, component/condition, severity rating and fielding due date.


10/9/2020

### TCM Fielding Form

A Sempra Energy utility

Structure #	Aerial #	Structure Type	Class	HT	Installed	12kV	Cable	Telco	Comm	Fiber	A Light	Ins Type	Insp #
222462	494	Tower-Vertical				N						LR	73007

Structure Comments:  
Inspection Comments:

TieLine	Bundled	Greased	Description	Stub Pole
23006		N	Split Phase - V String	

Patrolman: Young  
Patrol Date: 5/4/2020

Location: 6 twrs N/E El Camino Real, E/SONGS. CP Grid 497-923

Region	Lat	Long	ThosBros	County	City	District	Bucket	Condor	Restricted
<input type="checkbox"/>	33° 22' 10.53"	-117° 32' 32.87"	1023-H5	SD	SC	OC	Y	Y	N

Located In:

Tier 3:

CNF:

Tier 2:

Cultural:

State Fed:

Sunrise:

Fly In:

CC_ID	Component	Condition	Condition Comments	Sev	Field by
119737	Anti-Climb Barrier	Broken	Barb wire broken.	2	5/4/2021

NMR  
  NMR - Note  
  Job Written  
  Rule 18 - 6 mo

FWD >  TE  
  VM  
  CE  
  LM  
  MP  
 Fielded by \_\_\_\_\_  
 Date Fielded: \_\_\_\_\_  
 MM / DD / YY

Comments \_\_\_\_\_

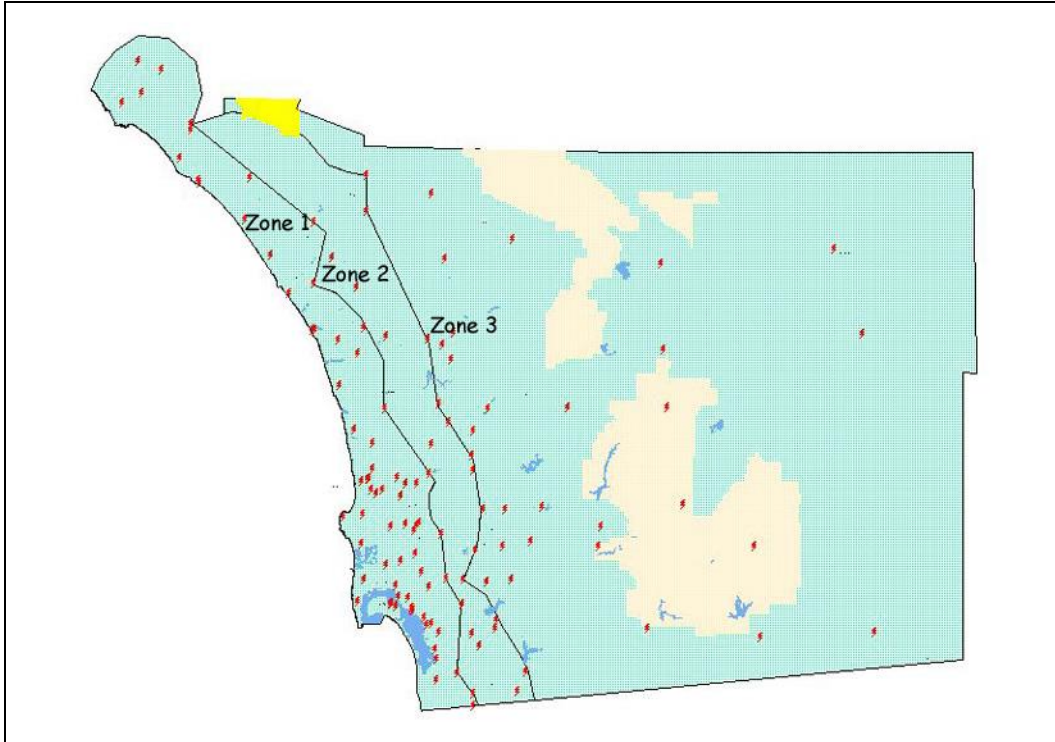
Completed in Field By \_\_\_\_\_  
 Date \_\_\_\_\_  
 Photos Taken \_\_\_\_\_

Print Name \_\_\_\_\_  
 Crew Size \_\_\_\_\_ x Elapsed Hrs \_\_\_\_\_ = Man Hrs \_\_\_\_\_





- 10.7. Attachment G – Wash Zones: The “Zones” were developed to establish insulation contamination districts. Zones may be adjusted as determined by the responsible Transmission Supervisor in accordance with Good Utility Practices.



10.8. Attachment H - WECC Transfer Path Equipment List: List of equipment included on WECC Paths 45 and 46.

Path 45: SDG&E – CFE			
Equipment	Line/Station	Equipment Description	Voltage
<b>Tie Line</b>	TL23040	TL23040 from Otay Mesa Substation to where the conductor span crosses the USA/Mexico International Border	230kV
<b>Disconnects</b>	Otay Mesa	4E Bus Disc	230kV
	Otay Mesa	TL23040 4E Line Disc	230kV
	Otay Mesa	TL23040 4T Grd Disc	230kV
	Otay Mesa	TL23040 4T Line Disc	230kV
	Otay Mesa	OMG3 4T Line Disc	230kV
<b>Circuit Breakers</b>	Otay Mesa	4E GCB	230kV
	Otay Mesa	4T GCB	230kV
<b>Tie Line</b>	TL23050	TL23050 from phase shifter at Imperial Valley Substation to where the conductor span crosses the USA/Mexico International Border	230kV
<b>Disconnects</b>	Imperial Valley	TL23050 10S Line Disc	230kV
	Imperial Valley	TL23050 10BP Line Disc	230kV
	Imperial Valley	TL23050 9S Line Disc	230kV
<b>Tie Line</b>	TL23082	From 230KV Rack at Imperial Valley Substation to the phase shifting transformer	230kV
<b>Disconnects</b>	Imperial Valley	TL23082 10N Line Disc	230kV
	Imperial Valley	TL23082 10BP Line Disc	230kV
	Imperial Valley	TL23082 9N Line Disc	230kV
	Imperial Valley	TL23066 11T Line Disc	230kV
	Imperial Valley	TL23082 11T Line Disc	230kV
	Imperial Valley	TL 23082 11S Line Disc	230kV
	Imperial Valley	11S Bus Disc	230kV
<b>Circuit Breakers</b>	Imperial Valley	10S	230kV
	Imperial Valley	10N	230kV
	Imperial Valley	10BP	230kV
	Imperial Valley	9S	230kV
	Imperial Valley	9N	230kV

Path 45: SDG&E – CFE, cont.			
Equipment	Line/Station	Equipment Description	Voltage
Circuit Breakers	Imperial Valley	11T	230kV
	Imperial Valley	11S	230kV
Phase Shifter	Imperial Valley	Phase Shifting Transformer 1	230kV
	Imperial Valley	Phase Shifting Transformer 2	230kV
Series Reactor	Otay Mesa	3-1 $\phi$ Series Reactor	230kV
Other Equipment	Otay Mesa	Wave Trap - B & C Phase	230kV
	Otay Mesa	Current Limiting Reactor	230kV

Path 46: West of Colorado River (WOR)			
Equipment	Line/Station	Equipment Description	Voltage
Tie Line	TL50002	TL50002 from Imperial Valley Substation up to the first Structure on the Arizona side of the Border	500kV
Disconnects	Imperial Valley	TL50002 E Cap Bk Grd Disc	500kV
	Imperial Valley	TL50002 Grd Disc	500kV
	Imperial Valley	TL50002 W Cap Bk Grd Disc	500kV
	Imperial Valley	MOD 8021	500kV
	Imperial Valley	MOD 8023	500kV
	Imperial Valley	MOD 9021	500kV
	Imperial Valley	MOD 9023	500kV
	Imperial Valley	MOD 9024	500kV
	Imperial Valley	MOD 9025	500kV
	Imperial Valley	MOD 9026	500kV
	Imperial Valley	MOD 9027	500kV
	Imperial Valley	MOD 9028	500kV
Circuit Breakers	Imperial Valley	TL50002 Capacitor Bypass GCB	500kV
	Imperial Valley	TL50002 Capacitor Maintenance Breaker	500kV
	Imperial Valley	TL50002 Reactor Switcher	500kV
	Imperial Valley	9022 GCB	500kV
	Imperial Valley	8022 GCB	500kV
Shunt Reactors	Imperial Valley	TL50002 A $\emptyset$	500kV
	Imperial Valley	TL50002 B $\emptyset$	500kV
	Imperial Valley	TL50002 C $\emptyset$	500kV

<b>Tie Line</b>	TL230S (S-Line)	Tieline owned and maintained by IID	230kV
<b>Disconnects</b>	Imperial Valley	GCB 14N TL230S Disc	230kV
	Imperial Valley	GCB 14N Bus Disc	230kV
	Imperial Valley	GCB 14T TL230S Disc	230kV
	Imperial Valley	GCB 14T TL23048 Disc	230kV
<b>Circuit Breakers</b>	Imperial Valley	14N GCB	230kV
	Imperial Valley	14T GCB	230kV

Titles	Name	Date
Approved By:	Monica Curry, Transmission Construction & Maintenance Manager Sneha Parmar, Kearny Maintenance Operations, Director	12/10/2021
Authored By:	Kevin Galloway, Transmission Construction & Maintenance Team Lead	12/10/2021