



Underground Inspection

TD-2305M-JA03

Publication Date: 3/2013 Rev: 3

This job aid is designed to assist compliance inspectors in evaluating and prioritizing abnormal conditions on underground and pad-mounted facilities during inspections. It is meant to provide guidance on issues that inspectors may most frequently encounter during an inspection and is not intended to be a comprehensive listing of all abnormal conditions or corrective actions. If a compliance inspector encounters an abnormal condition listed in the table below with an "X" in its minor work column, the inspector should make every effort to correct that condition if it can be safely accomplished prior to leaving the work site.

An asterisk (*) next to an abnormal condition indicates that the condition must be remediated before the underlying facility can be considered inspected.

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Abnormal Condition	Guidance to Compliance Inspector	Related Documents	Minor Work
General			
Barrier Post Missing Visibility Strips	All barrier posts require visibility strips. Install visibility strips if they are missing.	Greenbook, 051122	X
Removable Barrier Post Missing Lock	Install a lock if the post has a locking ring.	051122	X
Barrier Post Broken/Damaged or Missing - or inadequate protection	<p>To evaluate whether there is inadequate protection, ask:</p> <ul style="list-style-type: none"> Is the facility exposed to vehicular traffic? Does the facility have any evidence of vehicular contact? Is there a high risk of vehicular contact? <p>If the inspector answers yes to any of these questions, protection may not be adequate. Consider whether remediation requires a Third-Party Notification.</p>	051122	
Retaining Wall Broken/Deteriorated/Missing	<p>To evaluate whether the facility is missing a retaining wall, ask:</p> <ul style="list-style-type: none"> Would events such as landslides, drainage wash or drifting sands threaten the facility? <p>If yes, the facility may require a retaining wall. Consider whether remediation requires a Third-Party Notification.</p>	051122	



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Water, Dirt/Debris That Prohibits Inspection of an Enclosure/Vault*	<p>Inspectors must remove water from an enclosure if it prevents inspection.</p> <p>When removing water from enclosures, complete a Vault Discharge Report (VDR) Form when required.</p> <p>Inspectors must also remove dirt or debris from the enclosure that prevents proper ventilation of or safe operation of the equipment.</p>	062000, 028028, Dewatering form Utility S0010	X
Vegetation/Structure Is Obstructing Covers/Doors, and prohibits inspection*	<p>Trim all vegetation and remove all obstacles to ensure that:</p> <ul style="list-style-type: none"> Each entire exterior side of the enclosure/pad-mount can be visually inspected. The interior of the enclosure /pad-mount can be thoroughly inspected <p>For obstructions that cannot be cleared immediately, consider whether remediation requires a Third-Party Notification.</p>	051122	X



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Insufficient Working Space to Safely Operate Equipment	<p>Evaluate whether there is adequate working space:</p> <p><u>Pad-mounts:</u></p> <ul style="list-style-type: none"> There must be 8 ft. of clearance in front of all operable doors (for hot stick and equipment replacement work). <ul style="list-style-type: none"> Use judgment when writing up encroachments in front of operable doors, e.g. a fire hydrant within the working space is not a concern if it does not adversely affect hot stick work or impede a worker from vacating the area in case of emergency. There must be 3 ft. of clearance from all non-operable sides. <ul style="list-style-type: none"> Landscaping up to 1 ft. wide and 2 ft. tall can be placed next to non-operable sides. Clearance can be reduced to 2 ft. from inoperable back OR two sides if the clearance is from a non-combustible surface (e.g. a brick wall). <p><u>Ensure that the pad-mount doors can be fully opened.</u></p> <p>Consider whether remediation requires a Third-Party Notification.</p>	051122, 063422	
Ground Rod, Ring Bus, and/or Connectors Disconnected	<p>Ensure that all grounds are installed correctly and are not damaged.</p> <p>Note: 750 KVA three-phase or larger transformers require two connections to the ground wire at each ground pad.</p>	060462, 013109	
Fault Indicator Broken/Damaged*	<p>Inspectors must inspect fault indicators during inspections.</p> <p>Note: <u>Always</u> create an EC when repairing all three fault indicators, even if done as minor work.</p> <p>Note: Only repair/replace existing fault indicators. New fault indicator installations are done under a different program.</p>	TD-2302S, 61683	X
Unable to Locate Primary Facilities*	<p>If the Inspector is unable to locate a primary facility:</p> <p><u>Subsurface enclosures:</u></p> <p>Create an EC to locate the facility. If unable to locate during an inspection, the EC notification should also be to inspect the facility. Assign these EC notifications a completion date before 12/31 that ensures that the facility is not inspected late.</p> <p><u>Pad-mounts:</u></p> <p>Consider a map correction form.</p>		



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Graffiti	Paint over the graffiti.		X
Internal, Insulated Barriers with Obvious Localized Discoloration, Tracking, or Arcing		D-S0314	
Cables/Splices/Terminations			
Damaged/Broken Cable	Visually check for damaged insulation (cracked, deteriorated) and damaged conductor (frayed, deteriorated wire).	D-G0015, 061324, 062288	
Cable Placing Excessive Stress on Bushings	External pressure or tension on the cable (e.g. from backfill or if the cable was cut too short) can stress the bushings. Weeping oil around the gaskets or misaligned bushings may indicate stress.		
Cable Placing Excessive Stress on Secondary Terminals	Ensure that there is not excessive stress on secondary spades or bushings due to excessive weight or strain from attached secondary cables. Symptoms of stress include oil seepage and misaligned terminations.	045290	
Exposed Ground Rod Outside of Pad-mounted Equipment	If the rod can be covered permanently as minor work, do so. If not, create an EC notification and temporarily cover the rod (e.g. with a cone) so that it is not a tripping hazard or exposed to the public.		X
Bleeder (Drain) Wire Broken	Create an EC notification for broken bleeder wires.	039081, 053732	
Swollen Cable, Splice, or Termination		035314	
Overheating Discovered by Infrared Check	With a properly set up IR camera or heat tracer (see the "Infrared Inspections" section in the EDPM manual), check the temperatures of the splice, the cable, and any components immediately adjacent to the splice/termination. If there are differentials between the cable/splice or splice/component, refer to Table 1 in the EDPM Manual, "Infrared Inspections" Section for evaluation.	068178	
Capacitance Test Points Missing Caps	Replace missing capacitor test point caps as minor work.	035314	X
Bail on D.B. Elbow Missing or Not Secure	Replace or secure the bail as minor work if possible. Best practice is to have two people with hot sticks perform the work - one holds the elbow in place while the other replaces the bail. Create an EC notification if minor work is not possible.	035314	X
Stress-Cone Dust-Cover Tape (Silicone) w/ Significant Deterioration	Create an EC notification if there is evidence of arcing or tracking around the stress cone or tape.	065332	

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Secondary: Multi-Tap Bus-Bar Covers; or Insulation Open or Missing Caps or Plugs		036640	
Enclosures / Vaults			
Covers Not Secured or Missing Bolts	<p><u>Primary Enclosure Covers:</u> Make every effort to install bolts in all available bolting locations. If not all bolt locations are in working order, and if it would require more than minor work to repair them, there must be, at a minimum, two bolts, properly installed, on opposite corners of the enclosure cover. Refer to the Assessing Underground Enclosure Covers (TD-2305M-JA_08) job aid for more details.</p> <p><u>Secondary Enclosure Covers:</u> Secondary enclosures must be covered.</p>	028028, 062000, TD-2305M-JA_08	X
Enclosure/Vault is Damaged/Not of Sufficient Strength for the Location	<p>To evaluate whether the enclosure is of sufficient strength, check if there is deformation or damage to the enclosure due to external forces. Example: A wood enclosure is caving in because vehicles are continually parked on top of it.</p> <p>If there appears to be damage:</p> <ol style="list-style-type: none"> 1) Create an EC notification to replace the enclosure. 2) Notify your supervisor so that a civil engineering evaluation can be arranged. 3) Consider whether to also issue a Third Party notification or a damage claim form. 	028028, 062000	
Broken/Damaged Sump Pump		054438	
Equipment			
Pad-mounted equipment needs lock	Install a lock as minor work to prevent unauthorized entry.		X
Pad Broken/Deteriorated, or under-sized	Ensure that the pad-mount equipment sits completely on top of the pad and that it can be secured to the pad. If not, the pad may be under-sized.	062000, 028028	
Pad-mounted Equipment Needs Caulking	Ensure that gaps between the enclosure frame and pad are not larger than the diameter of 18 gauge wire. If they are, fill the gap with caulk. Consider alternative repair methods if caulking is not sufficient to close the gap.		X



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Pad-mounted Equipment not secured to Pad	Ensure that pad-mounted equipment is bolted onto the pad.		X
Overheating Discovered by Infrared Check, or gauge	<p>To evaluate the temperature by gauge:</p> <ol style="list-style-type: none"> 1. Check the temperatures indicated by the gauge's white hand and red drag hand. If these temperatures exceed the "overloaded" or "extreme overload" temperatures in 068178, create an EC notification. 2. Reset the red drag hand after the inspection. 	068178	
Corrosion/Rust	<p>Assess corrosion based on severity.</p> <p>Refer to the Corrosion Evaluation Job Aid for a visual guide to assessing and prioritizing corrosion.</p>	G12020, TD-2305M-JA_04	X
Oil: Leaking/Weeping, Stain	Refer to the PCB/Oil Spill Response Job Aid	Utility S2320, TD-2305M-JA_05	
Low/No oil in sight glass	<p>Inspectors must check oil levels on all oil filled pad-mounted transformers, subsurface transformers, and switches that have oil gauges or sight glasses.</p> <p>Inspectors should use the pressure relief valve (if present) before checking the oil level. If there is no oil in the sight glass, create an EC notification.</p>		
Idle Facility			
Energized Electric Line Facility No Longer Used to Serve Customer Load (<i>Update based on UG requirements vs. OH</i>)	<p>It may be necessary to de-energize the idle facility in order to prevent hazards.</p> <p>If de-energization is necessary, create a 0-3 month Priority 'E' EC notification.</p> <p>If it is not necessary to de-energize the idle facility, create a Priority 'F' EC notification. If there is a blue sticker on oil filled equipment, note it in the EC comments.</p>	TD-2459P-01	
De-Energized Electric Line Facility No Longer Used to Serve Customer Load		TD-2459P-01	



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De-Energized Electric Line Facility already identified on an EC notification but not mapped	Create a map change request if the idle facility is not mapped as idle.	TD-2459P-01	
Idle Line / Facility with significant safety or reliability issue	<p>If there is a compelling condition on an idle facility and:</p> <ol style="list-style-type: none"> 1. The condition needs to be addressed before the idle facility investigation is completed OR 2. The idle facility is not going to be removed <p>Create an EC notification for the facility.</p>	TD-2459P-01	
Lid/Frame			
Anti-Skid Surface Damaged or necessary based on high public exposure	<p>If anti-skid is needed due to high public exposure, apply as minor work if possible. If not possible, create an EC notification with the "high public exposure" box checked.</p> <p>Note: Inspectors should carry common lid types for both primary & secondary enclosures on their trucks so that they perform these repairs as minor work.</p>	028028, 062000	X
Lid/Frame is Broken/Deteriorated/Missing or causing a Tripping Hazard	<p>Repair or replace the lid as minor work if possible. If not possible, make safe (e.g. place cones) and create an EC notification to repair the lid with duration based on public exposure.</p> <p>Note: Inspectors should carry common lid types for both primary & secondary enclosures on their trucks so that they perform these repairs as minor work.</p>	028028, 062000	X
Marking			
High-Voltage Sign Not Installed (Interior)	High voltage signs must be installed on an interior surface or barrier, if present, inside the entrance of vaults, manholes, hand holes, pad-mounted transformer compartments, and other above ground enclosures containing exposed live parts above 750 volts.	033582	X



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"High Voltage/Maintain 8' Clearance" Combination Decal Missing (Exterior)	<p>A "High Voltage/Maintain 8' Clearance" label is required on:</p> <ul style="list-style-type: none"> The front door of all pad-mounted transformers, switches, capacitors, and other primary equipment. The rear door of capacitors and switches, and any other primary equipment that has rear doors. <p>The label is not required on small side doors that open only to controls – e.g. side doors to switch operating handles, capacitor control doors, thermometer dial door on tie autotransformers, etc.</p>	033582	X
Operating Number Missing/Illegible/Incorrect	<p>If the operating number on field equipment does not match the operating number printed on the inspection map, contact the local DO to confirm the discrepancy and to get further instructions. Complete a map correction form if required per the DO or if the DO cannot confirm the operating number.</p> <p>Note: Alpha characters may differ between divisions. Be sure to confirm the "number" with the local DO and PS&R Supervisor.</p>	033582	X
Voltage Tag Missing/Illegible/Incorrect	<p>Ensure that, at a minimum, each cable operating at more than 750 volts ins tagged or marked with its operating voltage and circuit. Replace tags that are missing or illegible.</p> <p>If the voltage cannot be determined, create an EC notification for further investigation.</p>	033582	X
Ownership not Identified	Ensure that manholes, subsurface enclosures, and pad-mounted equipment are marked to indicate PG&E ownership. Use decals whenever possible.	03358, 051768	X
SmartMeter/SCADA Equipment			
Broken/Damaged SmartMeter Relay/Access Point/Data Collector Unit or SCADA Equipment	If, through visual inspection, an inspector sees broken or damaged SmartMeter or SCADA equipment, create an EC notification.	072145, 072150, 068190, SMRT-9000WBT	



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Transformers			
Clean Vents/Baffle on Transformer Enclosures	Clean vents/baffles on transformer enclosures to ensure proper ventilation.	062000	X
High Voltage Barricade not locked on Live Front	Install lock if a locking mechanism exists		X
High Voltage Barricade signage missing on Live Front	Install high voltage signage on barricade		X

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