



# Underground Inspection

TD-2305M-JA03

Publication Date: 10/2012 Rev: 2

This job aid is designed to assist compliance inspectors in evaluating and prioritizing abnormal conditions on underground and padmounted 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 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.

Underground Inspection Job Aid

Abnormal Condition	Guidance to Compliance Inspector	Related Documents	Minor Work
<b>General</b>			
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"> <li>Is the facility exposed to vehicular traffic?</li> <li>Does the facility have any evidence of vehicular contact?</li> <li>Is there a high risk of vehicular contact?</li> </ul> <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"> <li>Would events such as landslides, drainage wash or drifting sands threaten the facility?</li> </ul> <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>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"> <li>Each entire exterior side of the enclosure can be visually inspected</li> <li>The entire enclosure interior can be inspected</li> </ul> <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>Padmounts:</u></p> <ul style="list-style-type: none"> <li>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"> <li>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 does not adversely affect hot stick work.</li> </ul> </li> <li>There must be 3 ft. of clearance from all non-operable sides.               <ul style="list-style-type: none"> <li>Landscaping up to 1 ft. wide and 2 ft. tall can be placed next to non-operable sides.</li> <li>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).</li> </ul> </li> </ul> <p><u>Ensure that the padmount 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	For three-phase transformers 750kVA and larger, ensure that the connectors on the grounding pad each have separate connections to the ground wire.	060462, 13109	
Fault Indicator Broken/Damaged*	Inspectors must inspect fault indicators during inspections. Create an EC only when it is necessary to replace all three indicators.	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> Create an EC to locate the facility. If unable to locate during an inspection, the EC should also be to inspect the facility. Assign these ECs a completion date before 12/31 to ensure that the facility is not inspected late.</p> <p><u>Padmounts:</u> 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	
<b>Cables/Splices/Terminations</b>			
Damaged/Broken Cable	Ensure that there are no conditions that would prevent operation of the cable.	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 PM Equipment			
Bleeder (Drain) Wire Broken or Missing		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		035314	X
Bail on D.B. Elbow Missing or Not Secure		035314	X
Stress-Cone Dust-Cover Tape (Silicone) w/ Significant Deterioration		065332	



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Secondary: Multi-Tap Bus-Bar Covers; or Insulation Open or Missing Caps or Plugs		036640	
<b>Enclosures / Vaults</b>			
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, create an EC to replace the enclosure. Consider whether to also issue a third party notification or a damage claim form.</p>	028028, 062000	
Broken/Damaged Sump Pump		054438	
<b>Equipment</b>			
Pad-mounted equipment needs lock	Install a lock as minor work to preven unauthorized entry.		X
Pad Broken/Deteriorated, or under-sized	Ensure that the enclosure sits completely on top of the pad and that it can be secured to the pad. If not, the enclosure 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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Overheating Discovered by Infrared Check, or gauge	<p>To evaluate the temperature by gauge:</p> <ol style="list-style-type: none"> <li>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.</li> <li>2. Reset the red drag hand after the inspection.</li> </ol>	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 padmounted 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>		
<b>Idle Facility</b>			
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"> <li>1. The condition needs to be addressed before the idle facility investigation is completed OR</li> <li>2. The idle facility is not going to be removed</li> </ol> <p>Create an EC notification for the facility.</p>	TD-2459P-01	
<b>Lid/Frame</b>			
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 lids types for both primary &amp; 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 lids types for both primary &amp; secondary enclosures on their trucks so that they perform these repairs as minor work.</p>	028028, 062000	X
<b>Marking</b>			
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"> <li>The front door of all pad-mounted transformers, switches, capacitors, and other primary equipment.</li> <li>The rear door of capacitors and switches, and any other primary equipment that has rear doors.</li> </ul> <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.</p> <p>Note: Alpha characters may differ between divisions. Be sure to confirm the "number" with the local DO and PS&amp;R supervisor.</p>	033582	X
Voltage Tag Missing/Illegible/Incorrect	<p>Voltage tags are required when multiple circuits exist in a padmount or enclosure.</p> <p>Ensure each cable operating at more than 750 volts is tagged or marked with its operating voltage and circuit. Replace tags that are missing or illegible.</p> <p><u>This requirement does not apply where there is only one circuit.</u></p>	033582	X
Ownership not Identified	Ensure that manholes, subsurface enclosures, and padmounted equipment are marked to indicate PG&E ownership. Use decals whenever possible.	03358, 051768	X
<b>SmartMeter/SCADA Equipment</b>			
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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<b>Transformers</b>			
Clean Vents/Baffle on Transformer Enclosures	To ensure proper ventilation, make sure that at least 50% of the vent/baffle openings are clear of debris.	062000	X
HV Barricade not locked on Live Front	Install lock if a locking mechanism exists		X
HV Barricade signage missing on Live Front	Install high voltage signage on barricade		X

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