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1.0 Persons Affected

This Standard Operating Procedure (SOP) affect:

- All Power Line Technician within Distribution Services that work on primary radial underground cable.
- All SaskPower Contractors working under the direction of or coordination with Distribution Services.

2.0 Purpose

This SOP provides:

This Standard Operating Procedure is intended to reinforce the safe work procedures for working on primary radial underground cable.

3.0 Rationale

This SOP ensures the following:

1. This SOP will provide the end users with direction on how to safely perform work on primary radial underground cable.
2. This SOP will reduce the risk of serious injury or death from the hazard of working on primary radial underground cable.

4.0 Scope

In-the-Scope of the Procedure

- The procedure includes the following:
 - Working on primary radial underground cable

Out-of-the-Scope of the Procedure

- The procedure does not include the following:
 - Locating underground facilities
 - Ground Disturbance
 - Environmental Permit Requirements

5.0 Policies and Regulatory Requirements

This SOP is a result of the following policies, regulations, industry standards, and corporate directives and standards:

Policies:

- Personal Protective Equipment Policy
- Job Hazard Assessment Policy
- Hazard Controls Policy

Regulatory Requirement(s)

- *The Saskatchewan Employment Act, 2014*

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Other

- SaskPower Bonding and Grounding
- RUD switching manual - DOSEP (District Operators Skills Enhancement Program)
- SaskPower Standards and Processes in Support of Corporate Safety Policies
- SaskPower Standard Protection Code
- Best Practice Lock to Lock

6.0 Roles, Responsibilities and Prerequisites

| In-the-Scope of the Procedure Role(s) | Quantity Required | Responsibilities | Prerequisites |
|---------------------------------------|-------------------|---|--|
| Power Line Technician/ Contractor(s) | 1 or more | <ol style="list-style-type: none"> 1. Inspect tools prior to use 2. Test for absence of potential 3. Use appropriate bonding and grounding application | <ol style="list-style-type: none"> 1. Standard Protection Code 2. Bonding and Grounding Course |
| Issuing Authority | 1 | <ol style="list-style-type: none"> 1. Follow Standard Protection Code | <ol style="list-style-type: none"> 1. Standard Protection Code |

7.0 Tools and Equipment

Tools and Equipment and Quantity Required:

- Elbow puller is the preferred tool to remove elbow from the transformer insert
- Gripall hotstick (alternative tool)
- Class 2 rubber gloves
- Cable spear
- Proximity type potential tester
- Ground lead
- Temporary Electrode
- VCI-3 Cable Identification Device - Limited use when identifying Single Phase cables

8.0 Planning and Preparation Checklist

Things to Check Before Starting the Procedure:

Preparation to work on primary underground cable will include:

- Complete Hazard & Risk assessment

- Ensure line locates are completed prior to all/any mechanical excavation
- Applicable Personal Protective Equipment is available and in good condition
- Obtain SaskPower Standard Protection Code and other related permits.
- Ensure test dates on equipment and tools are current

9.0 Procedure

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Power Line
Technician/
Contractors

1.0
Working on
Primary Radial
Underground
Cables

Working on Primary Radial Underground Cables

1.1 Principles for working on Primary Radial Underground Cables

- 1.1.1 Power Line Technician/Contractor(s) shall ensure their job steps/work procedures to work on primary underground cable(s) include:
- ***Class 2 rubber gloves shall be worn lock to lock with underground apparatus/equipment***
 - *Isolating the cable(s) at each end*
 - *Verifying for the absence of potential at each end*
 - *Grounding each end of the cable(s), and*
 - *Before working on the cable at a remote location from possible feed locations, an electronic cable identification device (ie: VCI-3 for Three Phase cables) may be used to ensure the correct cable(s) has been identified prior to spearing the cable at the work location. **Refer to Section 2.0 for instructions on how to identify a single phase primary cable at a splice location.***
 - *spearing the cable(s) to verify the absence of potential prior to handling cable to be worked on.*

1.2 De-energize a Single Phase Radial Underground Primary Cable

- 1.2.1 Power Line Technician/Contractor(s) shall review the underground example below which illustrates the job steps to de-energize a single phase radial underground primary cable off of a Y-insert to splice in a new cable to reroute

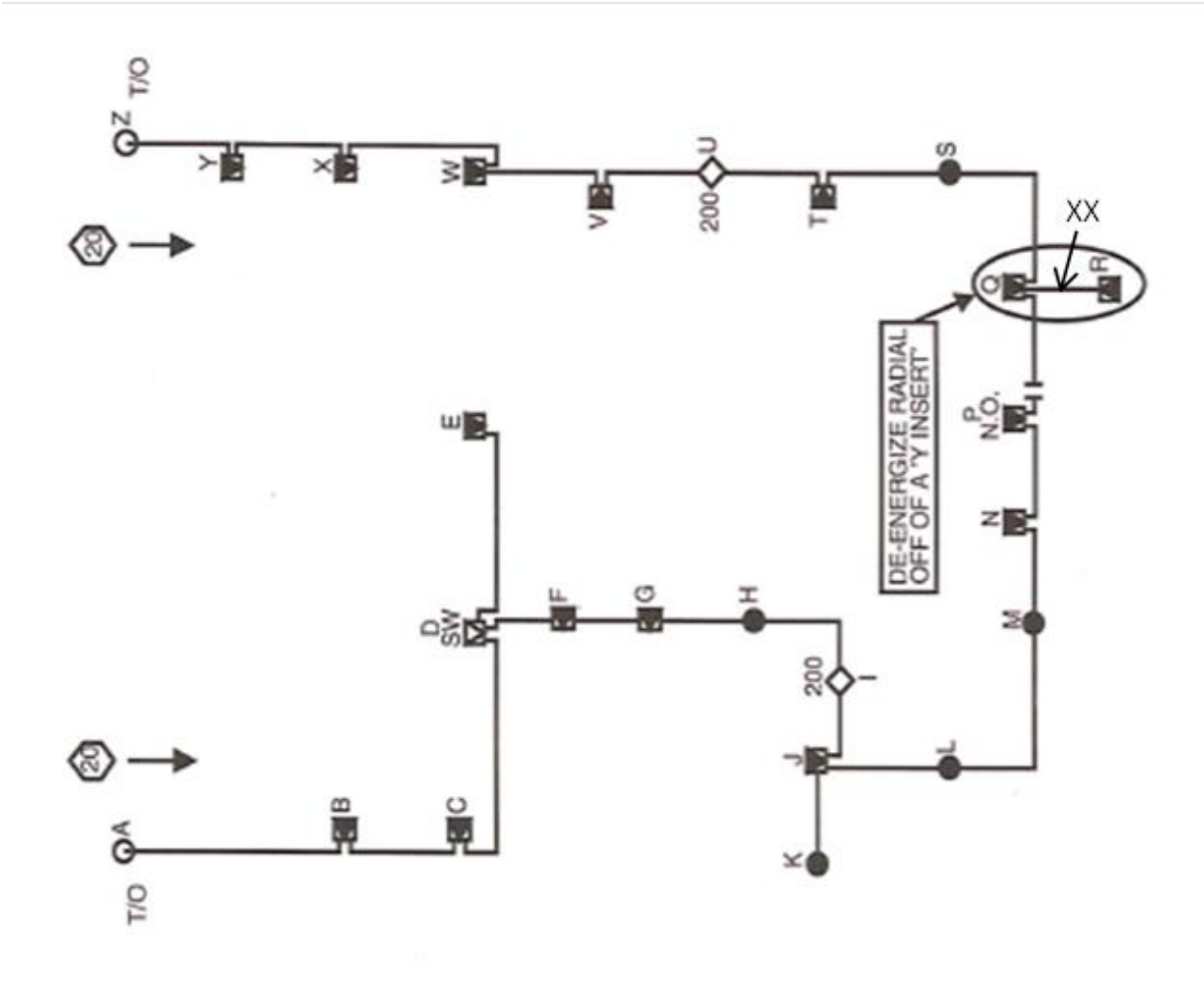
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it (see diagram 1). In this scenario the crew followed the safety absolutes (received a self-protection permit, completed a hazard and risk, etc.).

NOTE: Refer to Testing for Absence of Potential SOP:

- The Operator shall consider the use of a Proximity type potential tester with a URD setting to check for absence of potential at the capacitive potential test point on an underground elbow.
- Ensure the appropriate Standard Protection Code permit is in place

| # | LOCATION | PROCEDURE/COMMENT |
|---|-------------|--|
| 1 | R & Q | PARK CABLE AT BOTH ENDS 2. Class 2 Rubber Gloves to be worn Lock to Lock 3. Install feedthru @ R - Q 4. Remove elbow & install on feedthru. 5. Install insulated cap on H bushing 6. Repeat steps at other end of cable R -Q |
| 2 | | 1. Permit in effect. |
| 3 | R & Q | GROUND CABLE AT BOTH ENDS 7. Test for absence of potential using a Proximity type tester (i.e. Modiewark) on the capacitive test point. Where capacitive test point is not available, install test rod (probe) into the feedthru 8. Remove test rod (probe) from feedthru 9. Install grounds into feedthru 10. Repeat steps at opposite end |
| 4 | XX | FOR SPLICING OPERATIONS – A CABLE IDENTIFICATION DEVICE (Ie:VCI3 for Three Phase) MAY BE USED TO ENSURE THE REQUIRED CABLE HAS BEEN IDENTIFIED PRIOR TO SPEARING THE CABLE. Refer to Section 2.0 for Single Phase cable identification option |
| 5 | | SPEAR CABLE AT WORK LOCATION BEFORE WORKING ON IT |



NOTE: Company policies shall apply when the above conditions cannot be met.

1.3 Approved Alternative Work Methods

1.3.1 The Power Line Technician/Contractor(s) shall use APPROVED alternative work methods ensuring worker safety shall be identified, communicated to all affected workers, implemented and documented as part of the Hazard & Risk assessment process.

2.0 VCI-3 Cable Identification

2.1 The use of the VCI-3 to verify the correct cable(s) are identified prior to Splicing

2.1.1 3 Phase Identification – Use as directed. The VCI-3 was developed specifically for 3 Phase Cable Identification

2.1.2 1 Phase use – There can be no concentric in the way for the sensor to work properly on single phase. The only application that the VCI-3 will work is at a location such as a splice where the concentric is no going to impede the sensors abilities.

- *Must be de-energized and grounded at both ends (Same as three Phase Set-up)*
- *There can be no concentric in the way for this to work properly. It will cause a phantom signal and will not be dependable at all because half the signal goes down each (Primary and Concentric).*
- *Do not use the Alligator Clip to connect to the primary conductor. Use the Injection "Clamp on" set. Use Phase 'A' directly on the exposed conductor, and lay the other two aside (Keeping them apart).*
- *Then Operate the detector and sensor the same as would be done on the Three Phase Application.*

10.0 Acronyms, Definitions and Symbols

Acronyms and Abbreviations

URD - Underground

RUD - Rural Underground

PLT - Power Line Technician

Definitions

Lock to Lock - The term "Lock-to-Lock" is used to describe the utilization of class 2 rubber gloves, when required, prior to the time the pad mounted equipment is unlocked until work is complete and the pad mounted equipment is relocked.

Symbols

N/A

11.0 Components

The following is a list of components for this SOP which can be accessed through the SOP System:

| Component Name | Component Type | Component Description | Location of Component |
|---|----------------|---|--|
| Working on Primary Radial Underground Cable Flowchart | Flowchart | A high level and mid-level flowchart for this procedure | SOP Online - SOP Bundle: Working on Primary Radial Underground Cable |



Splicing Operations on Primary Radial Underground Cables

Standard Operating Procedure

12.0 Owner

Owner

Operations and Maintenance Director - Kevin Schwing

13.0 References

References

Location of Resource

Master Incident #: 68463

- Safety Net

Testing for Absence of Potential SOP

SOP Online

RUD Switching Training

- Level III Apprenticeship Training

VCI-3 Cable Identification SOP

SOP Online