

**Magnesium  
Sacrificial  
Anode**

**novinium**  
masters of reliability

**Rejuvenation  
Instructions  
Power Cables  
Neutral  
Corrosion  
Repair**

The contents of this document are the property of Novinium, Inc. and may not be duplicated or distributed without the express written consent of Novinium. Novinium®, Ultrinium™, Tailored Injection™, Tailored Formulation™, Perficio™, N-Rex™, N-Ter™ and Single visit – single switch™ are trademarks of Novinium. Novinium has patents granted or pending on many of the technologies described by these instructions including but not limited to:

- Ultrinium™ sustained pressure injection method (U.S. Patent 7,615,247)
- Ultrinium™ formulation optimization injection method (U.S. Patent 7,611,748)
- Injection Adaptor (U.S. Patents 7,195,504, 7,538,274 and 7,683,260)
- Perfectium™ single visit, single switch injection (U.S. Patent 7,353,601)
- Formulation of Ultrinium™ & Perficio™ components (U.S. Patent 7,658,808, 7,700,871 and other patents pending)
- Predicting performance of Electrical Power cables (U.S. Patent 7,643,977 and 7,848,912)
- N-Rex™ submarine cable injection process (U.S. Patent 7,976,747)
- N-Ter™ injection or Novinium thermally enhanced rejuvenation (patent pending)
- Reticular Flash Preventer (RFP) provides safer operation of conventional injection elbows

Version 20120125

## Neutral Corrosion Repair

**All cables must be deenergized, tested dead, and grounded before any of these instructions may be executed. All switching operations must cease. 100% of the personnel on the site must verbally concur that it is safe to handle the cable. The ground must be connected to the termination to be handled, or in the case of a spiking operation at a cable midpoint (e.g. a splice or fault), the ground must be immediately adjacent (i.e. the connection can be confirmed by an unobstructed view of the cable between the spike and the work area) to the portion of the cable to be worked. The individual who executes these neutral corrosion repair instructions must be present when the ground is put in place and must witness and concur with the temporary removal of any ground connections. The ground connections should be left in place until their removal is required and put back in place as soon as possible. Any individual who touches an un-spiked cable at mid-span must be within an equipotential zone established with a non-corroded portion of the cable concentric neutral.**



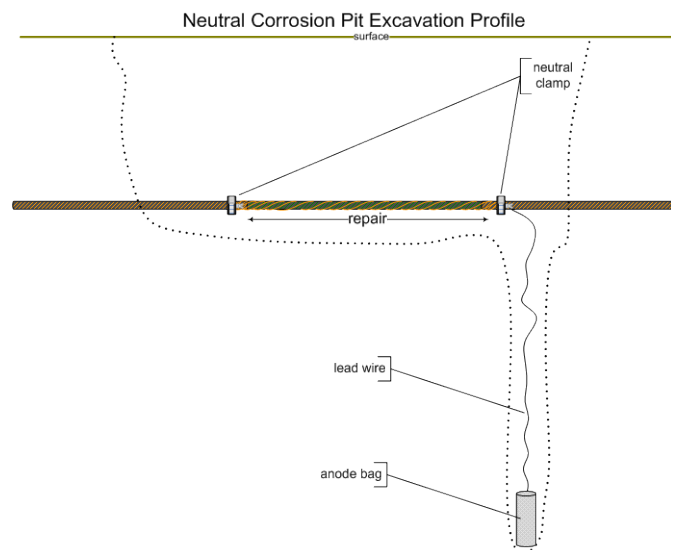
**Caution: Working around energized high-voltage systems may cause serious injury or death. The procedures in these instructions should be performed by personnel familiar with good safety practice in handling high-voltage electrical equipment. De-energize, test and ground all electrical systems before proceeding.**

1. Excavate the neutral corrosion site pinpointed by [NRI 12, "Electronic Cable Diagnosis and Pinpointing"](#) until solid neutrals are exposed on both ends of the corrosion site.



NRI 12: Electronic Cable Diagnosis & Pinpointing

2. Excavate a 9" (229mm) diameter hole perpendicular to the cable axis to receive a sacrificial magnesium anode. The end of the hole should terminate no less than 6 feet (2 meters) from the cable. The hole may be vertical, horizontal, or anywhere in between.



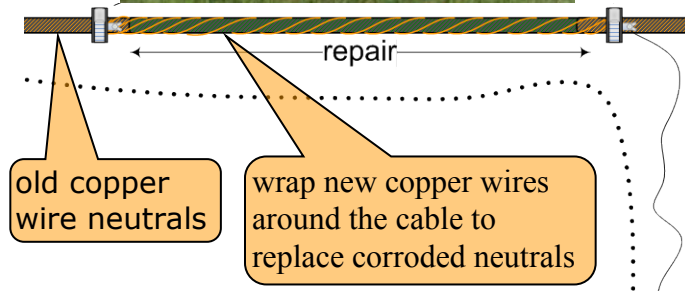
3. Attach an equipotential grounding mat such as the Basic EQUI-MAT™ Personal Protective Ground Grid (C600-2850) available from Chance (Hubbell Power Systems) to a good system neutral. Place the mat in a location so that anyone executing the following instructions can remain on the mat at all times when in contact with the cable.



4. Clean embedded soil from the neutrals and gently wire brush the clean copper on either side of the damaged neutral wires.



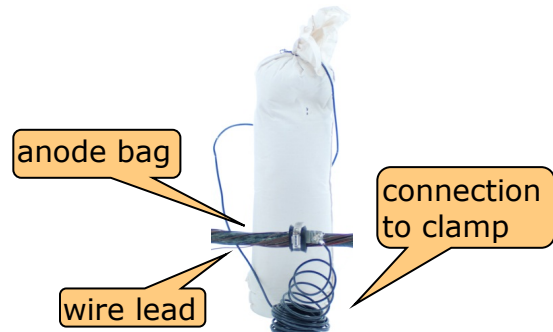
5. Concentrically wrap new copper wires with a total rated ampacity greater than the original neutral over the corroded length. Use zip ties every 6 inches (15 cm) to hold the neutrals in place and hold the neutrals in tight contact with the cable's insulation shield.



6. Attach a neutral clamp (npn: 1-NC-Nclamp) at both ends of the new copper such that both the old and new copper are in direct electrical contact with the tinned-copper inner sleeve. Tighten the hose clamp snug, but do not over tighten.



7. Place a sacrificial anode (NPN: 1-NC-ANODE09) into the bottom end of the hole excavated in step 2. Connect the wire lead from the anode to one or both of the neutral clamps. Crimp or solder the connection to make it permanent.



8. Fill in and pack soil into the hole with the magnesium anode. Fill in the excavated pit.