COPPER THEFT PREVENTION – WHAT YOU NEED TO KNOW TO PROTECT YOUR BUSINESS

2020 PNM ENERGY SOLUTIONS WEBINAR SERIES
HOUSEKEEPING

• You will receive an email with a link to PNM.com/business-events, where you can access today’s recorded webinar and presentation.

• All participants will be on mute upon entering. We will address questions at the end of the webinar. Please raise your hand by selecting (*3) on your phone to be unmuted or use the chat icon if you have a question.

• We are committed to answering all submitted questions. If we are unable to get to them today, we will provide a response after the presentation.
ABOUT PNM

PUBLIC SERVICE COMPANY OF NEW MEXICO

• Founded in 1917
• New Mexico based energy company focused on clean energy transformation
• Over 500K retail customers
• 2,811 MW resource portfolio
• Over 15K miles transmission and distribution lines
TODAY’S SPEAKERS

Manuel Quintana
Sr. Strategic Account Manager

Armando Najera
Distribution Standards Engineer - PNM
COPPER THEFT AFFECTS US ALL

A look at Copper Theft in New Mexico
WHAT YOU’LL LEARN……

• A basic understanding of the electrical system supplying power to your property,
• A basic understanding of the underground layout of wires leading to and from the transformer,
• Identify “weak” areas in your property needing to be updated to prevent copper theft,
• Learn to look what the thieves are looking for as they pick their target,
• Learn what works and what doesn’t work,
• Working with PNM towards a common goal

Source: PBS.org
OVERHEAD CONFIGURATION, TYPICAL LAYOUT

- One of many configurations

- Primary Voltage, 12,470 Volts Phase to Phase, 7,200 Volts Phase to ground,
- Primary voltage is reduced, end use voltage of 120/240 volts,
- A transformer reduces the voltage, for commercial and residential use
A REAL-LIFE EXAMPLE

• Primary Voltage, 12,470 Volts Phase to Phase, 7,200 Volts Phase to ground,

• Primary voltage is reduced, end use voltage of 120/240 volts,

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A REAL-LIFE EXAMPLE (CUSTOMER SIDE)
NESC SECTION 38, RULE 381G 2, PAD-MOUNTED AND OTHER ABOVE-GROUND EQUIPMENT

* penta-head bolts and door latch

Section 38 – Equipment

381. Design

G. Pad-Mounted and Other Above-Ground Equipment

1. Pad-mounted equipment shall have an enclosure that is either locked or otherwise secured against unauthorized entry.

2. Access to exposed live parts in excess of 600 V shall require two separate conscious acts. The first shall be the opening of a door or barrier that is locked. The second act shall be either the opening of a door or the removal of a barrier.
A QUICK LOOK INSIDE A TRANSFORMER...

COMPONENTS OF A TRANSFORMER

Figure 5 This figure shows the basic anatomy of a 3-phase pad-mounted distribution transformer. The high-voltage compartment features dead-front bushings in a loop-feed configuration.
PNM MODIFYING PENTA-HEAD RETROFIT LOCK

• Retrofit lock redesign, door latch system of transformer

Existing transformer handle w/ pentahead as delivered by manufacturer

Original retrofit lock system

• ¾” steel instead of 10 gauge steel or 304 stainless steel
• Thicker edges
• Wider steel plate

New and improved design
PNM WORKING WITH STATE LEGISLATION

• PNM also actively works with Crime Stoppers

- Requiring photo identification for every retail transaction and recording the license plate
- Keeping good records so information can be provided on materials
- Keeping a list of suspicious materials
- When paying cash for a transaction, requiring the seller’s signature on a receipt
- Training employees on how to identify suspicious materials.
PROTECTING AND SECURING THE METER

• Thieves typically break into CT can first to see the conductors and because it’s easier than the transformer.

  * PNM Meter Dept will install CT can lock and hasp when copper theft occurs.
  * Installing a cage around the meter is great, but locks need be protected.
  * Please acquire approval from PNM prior to building enclosures.

* Protective cover suggested to protect both locks from being cut.
PROTECTING AND SECURING THE METER

• Thieves typically break into CT can first to see the conductors and because it’s easier than the transformer

* PNM does not permit high security magnetic contacts to be placed inside the CT can. They can be epoxied on the outer shell though.

* NEC 725.136 Separation from Electric Light, Power, Class 1, Non-Power-Limited Fire Alarm Circuit Conductors, and Medium-Power Network-Powered Broadband Communications Cables.

* The rules for separating the conductors of these power supplies from various other types of conductors are in NEC 725.136;

* Separation from Other Systems, NEC 725.55 Not allowed to house Class 2 or Class 3 circuit conductors in any enclosure, raceway or cable with conductors of power or Class 1 conductors

Within the enclosure
A CLOSER LOOK INSIDE A TRANSFORMER...

- Field examples of the inside of a transformer

- A larger volume of aluminum is necessary to conduct the same electricity as copper, so **typically you must upsize your conductor two sizes** to accommodate the same circuit ampacity.
COPPER THEFT MODUS OPERANDI

- Field examples of the inside of a transformer

- This is a single conduit, 4 wire 3φ power representation shown; with the fourth conductor (shown in white tape and connected to the HoXo lug) being the fourth wire. The neutral wire is designed to carry residual, unbalanced, or net current back and is the cable that is being stolen.
HOW DO YOU KNOW IF YOU’RE A VICTIM OF COPPER THEFT

• Signs to look for

First and foremost, **NEVER ever touch a transformer that has been tampered with, it may be energized!**
• Lights in your business are flickering,
• The more you turn on, the more power fluctuations,
• Opened electrical panel doors
• Seeing debris outside the transformer like stripped jacket cover from conductors or cut copper pieces.
THINGS TO LOOK FOR, KNOW YOUR RISK LEVEL

- Risk factors increasing chances for becoming a victim of copper theft

- Has your site been hit by copper theft before?
- Is the property in a less trafficked area, after hours?
- Type of building, dentist office, shopping centers,
- Is my property well lit, cameras in place?
- The longer the secondary conduit distance, the more desirable,
- The more conduits, the more likely it’ll be hit (tells the thief there are more than one),
- Damaged or compromised transformer / meter box, the more likely it’ll be hit
LESSONS LEARNED FROM BARRICADE INSTALLATION. WHAT’S WRONG WITH THIS PICTURE?

- One of the first barricade to be built Public Library on Juan Tabo NE

- This is an example of one of the first barricades to be installed
- Barricade Process
POSSIBLE FAILURE MODES IDENTIFIED

1. The barricade should be as close to the center as possible. There have been cases where the doors have been pulled open from the bottom when the barricade is so high up.

2. There should be a three-sided protection box around the lock to prevent any further cutting of the locks.

3. Large gaps are a weak point in the design. The closer you can get to the cabinet doors the better and there should not be a gap from the lock insert since in the past there have been cases where thieves cut this very small piece of metal to open the barricade.

4. Lastly but not least, the depth of the key box is too shallow, again there has been a case where bolt cutters could still fit, open, and able to cut the lock off.

Think
Like
A
Thief
LESSONS LEARNED ILLUSTRATED

- Barricade should be as close to the transformer as possible

Note: The “Copper replaced with Aluminum” label does not deter

Bollards are permanent

Lock access points should be no less than 6” deep

Protection Access for PNM lock

Barricade should be at center of transform

Doors need to open past 90°

Barricade design must be completely removable or able to swing completely open
IF YOU ARE A VICTIM OF COPPER THEFT

1. Contact PNM at our main number for Customer Service 246-5700 so that we can then send a trouble truck and make it safe.

2. The customer then needs to hire an electrician to do the work. That electrician will need to provide a) a copy of liability insurance, b) their EE98J license (journeyman license), and c) a completed “Access to PNM Equipment Form” which can be found at, https://www.pnm.com/energy-and-copper-theft

3. The customer needs to email all these documents to our general email account: metropermits@pnm.com

4. Lastly, the customer should follow up with call to ensure that we did indeed receive the information but also to discuss specifics of scheduling needs.

Additionally, I can send you supporting information if you need it.
WHAT SHOULDN’T BE DONE

- Violation of NESC code, NEC code, OSHA, and PNM’s Safety Rules

- Barricade can’t be removed. PNM Needs to have access

- No welding, cutting, or drilling is permitted

- PNM Needs to have access
WHAT SHOULDN’T BE DONE, CONT’D

• Unauthorized locks installed on equipment,
• Violation of NESC code, NEC code, OSHA, and PNM’s Safety Rules

• Non-PNM lock installed, not permitted

• No welding, cutting, or drilling is permitted
UNFORTUNATELY MORE EXAMPLES OF WHAT SHOULDN’T BE DONE

• Check with us before securing the transformer

Transformer doors need to open past the 90° mark so that the door latch can lock, making it safe for linemen to work on the transformer

PNM Needs to have access
Thank you for attending!

Please share your feedback with us via our survey after the webinar.

PNM Business Customers
Phone: (888) 245-3659
Hours: Weekdays, 7:30 a.m. to 6 p.m.