

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

2020 PNM ENERGY SOLUTIONS WEBINAR SERIES

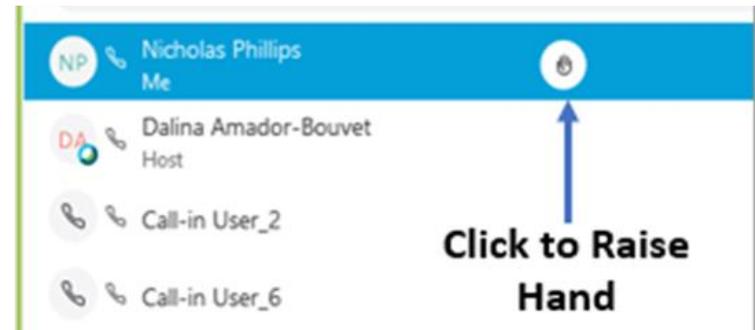


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## HOUSEKEEPING

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- You will receive an email with a link to [PNM.com/business-events](https://www.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



Talk to us.



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## TODAY'S SPEAKERS

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**Manuel Quintana**  
Sr. Strategic Account Manager



**Armando Najera**  
Distribution Standards Engineer - PNM



Talk to us.



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# COPPER THEFT AFFECTS US ALL

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## A look at Copper Theft in New Mexico



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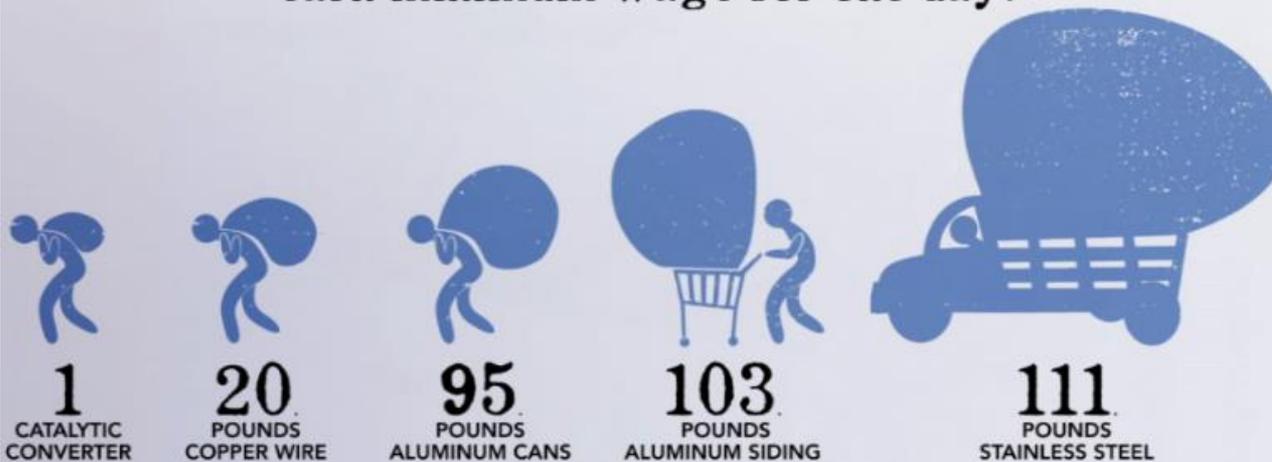
## WHAT YOU'LL LEARN.....

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- 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

### Scrapping for Minimum Wage

How much metal does a scrapper need to collect to earn minimum wage for one day?



Source: [PBS.org](https://www.pbs.org)

Based on the federal minimum wage and an eight-hour work day, a scrapper would need to earn \$58.

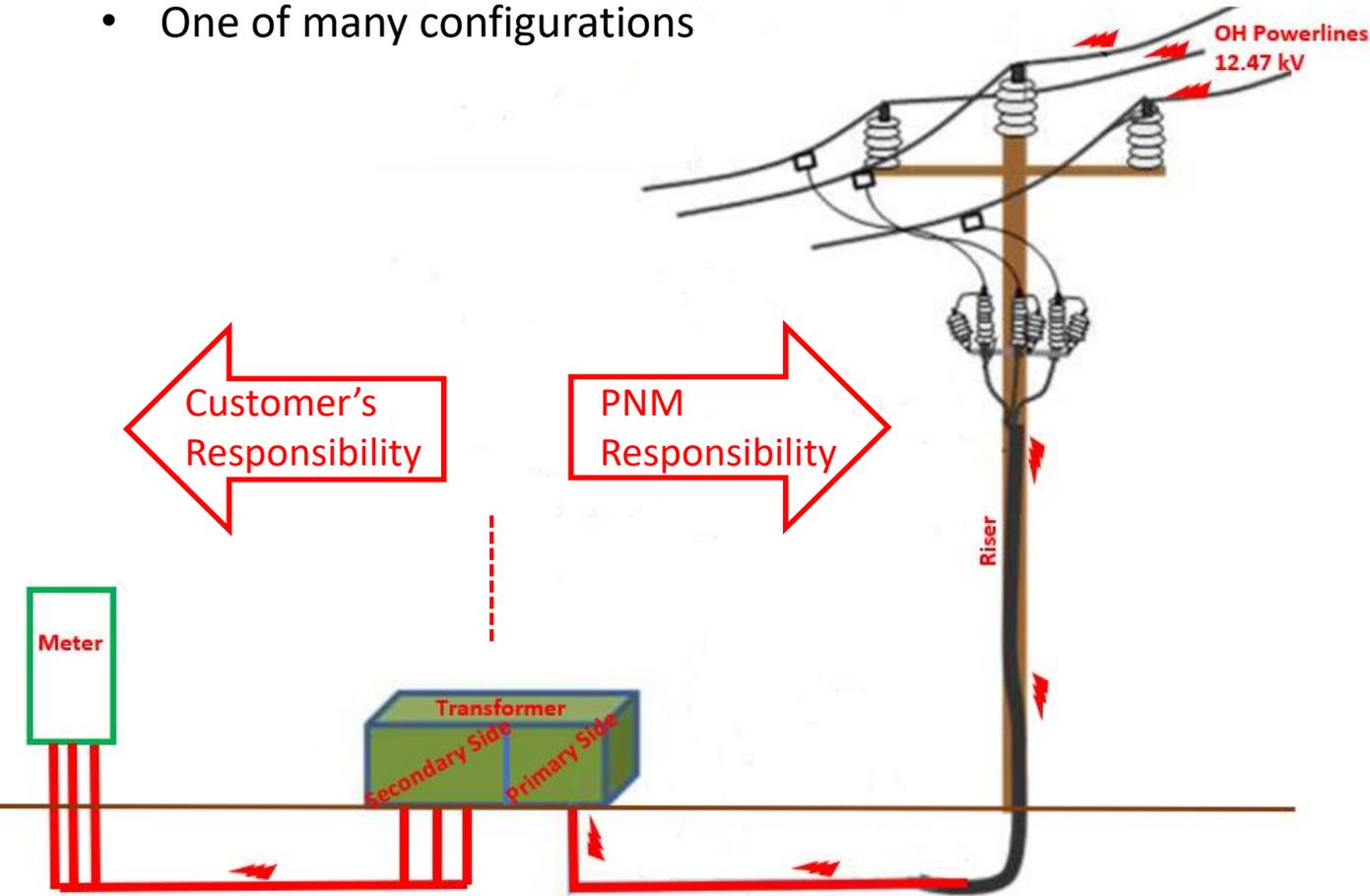


Talk to us.



# 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

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# A REAL-LIFE EXAMPLE (CUSTOMER SIDE)

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# 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.

Note the door latch system of the transformer

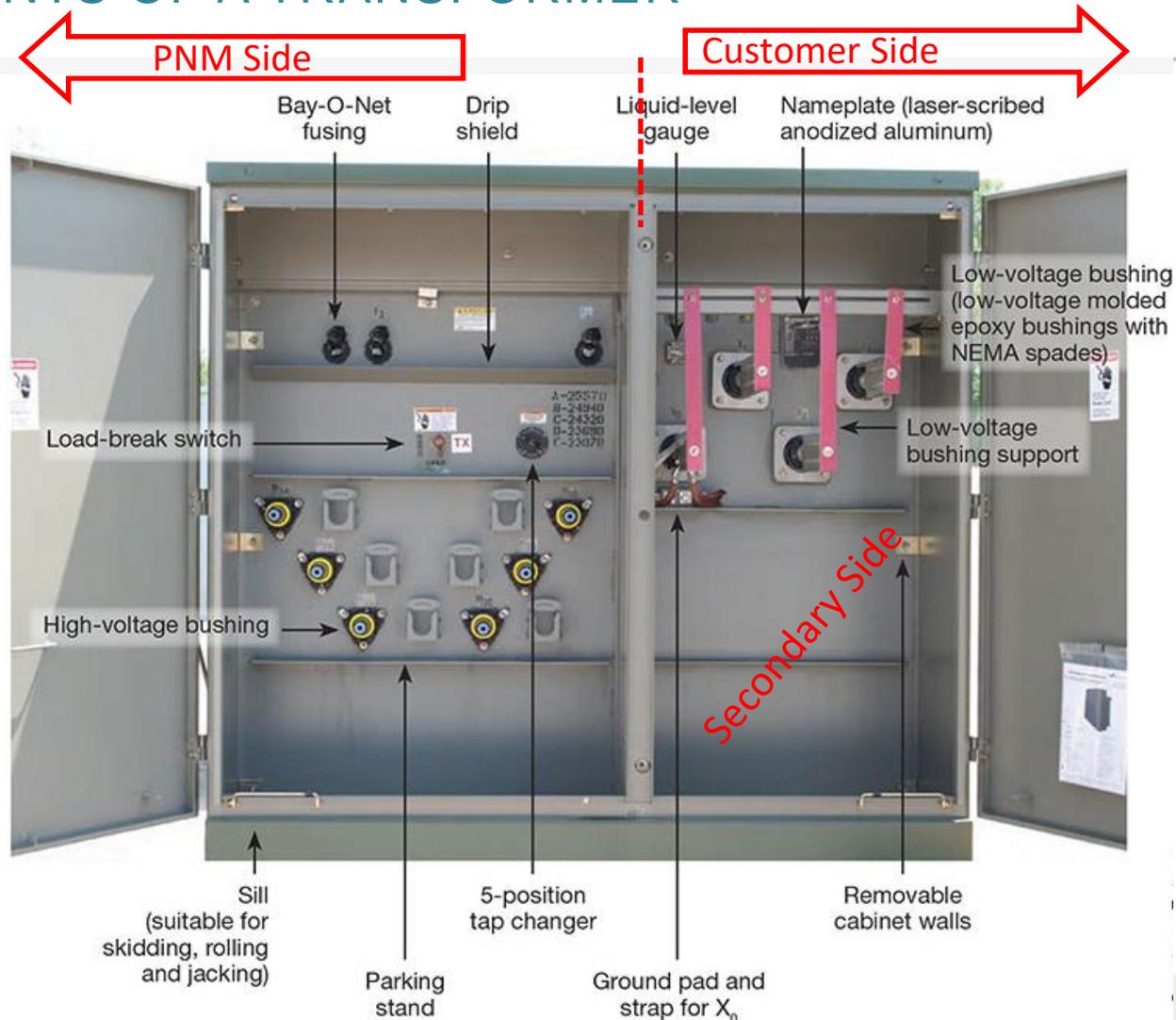


Retrofit door latch system for the transformer by PNM

# 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.

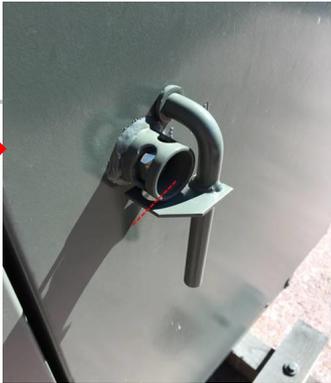


# PNM MODIFYING PENTA-HEAD RETROFIT LOCK

- Retrofit lock redesign, door latch system of transformer



Existing transformer handle w/ pentahead as delivered by manufacturer



Original retrofit lock system



- $\frac{3}{4}$ " 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

Figure 4. State Copper Theft Legislation, January 2006 – August 2010



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Content, mapping and direction data © 2008 NAVTEQ. All rights reserved. This Data for states of Canada includes information (openly) permission from Canadian authorities, including ID Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario, NAVTEQ and NAVTEQ ON (2008) are trademarks of NAVTEQ. © 2008 Tele Atlas North America, Inc. All rights reserved. This Web and Tele Atlas North America and trademarks of Tele Atlas, Inc. © 2008 by Applied Geographics Systems. All rights reserved.

Sources: National Conference of State Legislatures, State Penal Codes, and press reports.

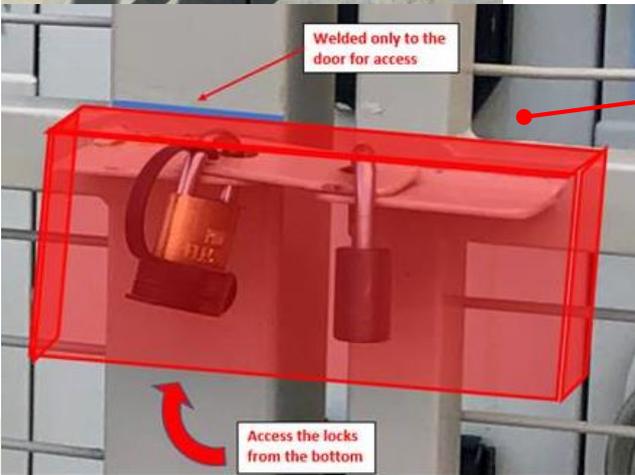
- Requiring photo identification for every retail transaction and recording the license plate
- Keeping good records so information can be provided on materials
- Keeping a list of suspicious materials
- When paying cash for a transaction, requiring the seller's signature on a receipt
- Training employees 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

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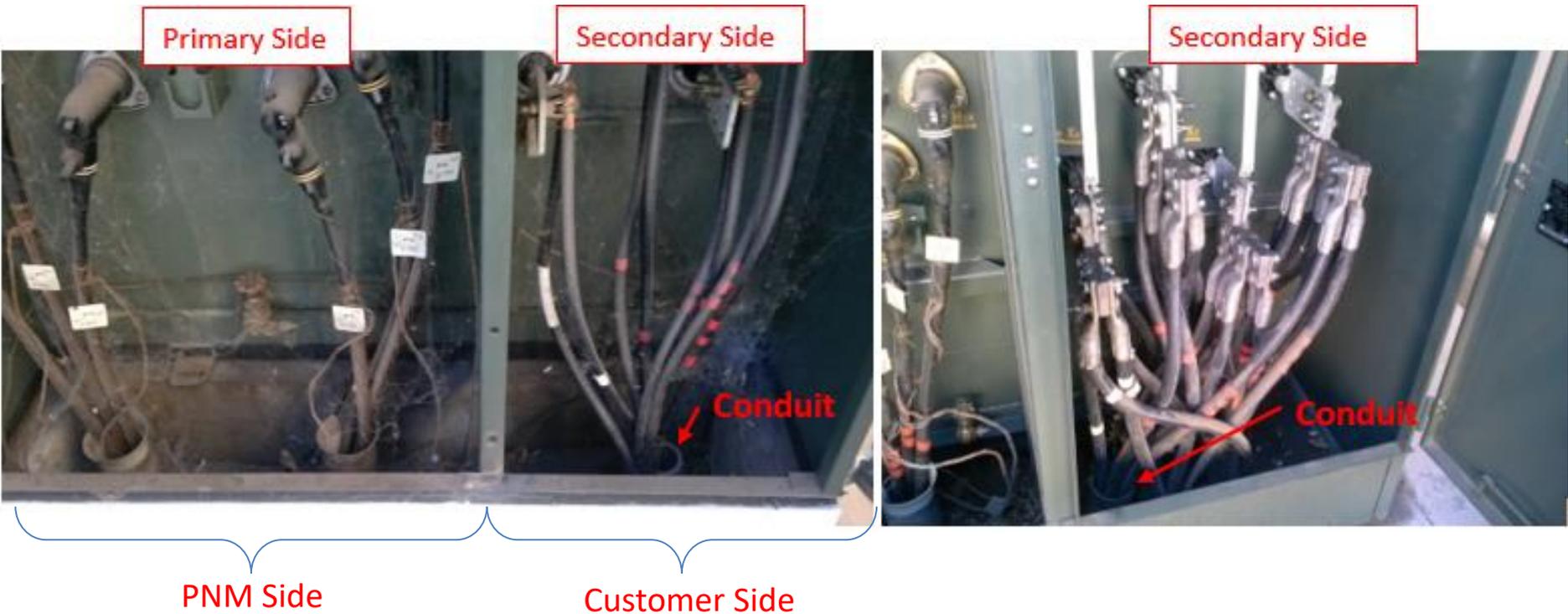
- \* PNM does not permit high security magnetic contacts to be placed inside the CT can. They can be epoxied on the outer shell though.
- \* NEC 725.136 **Separation from Electric Light, Power, Class 1, Non-Power-Limited Fire Alarm Circuit Conductors, and Medium-Power Network-Powered Broadband Communications 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...

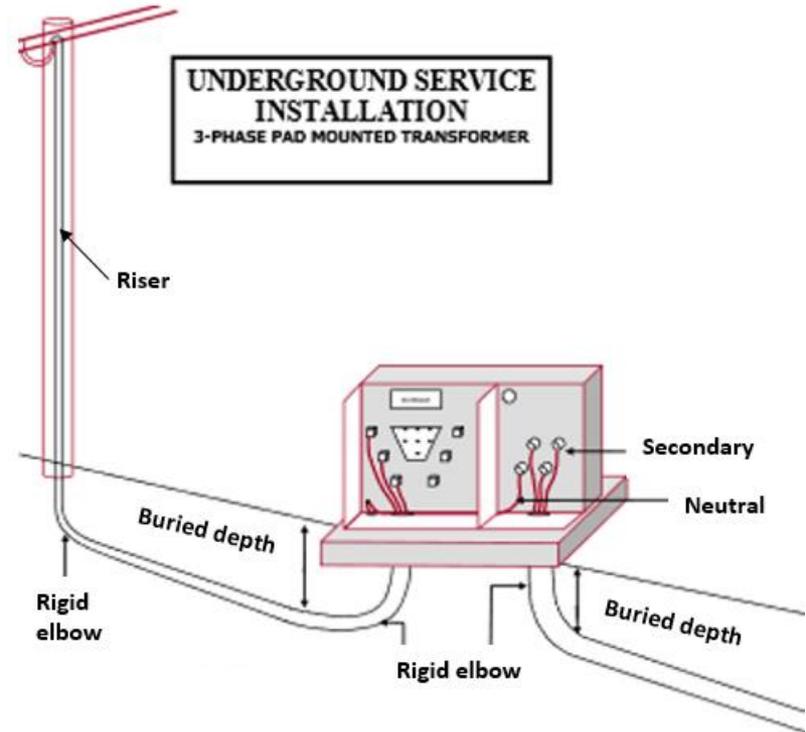
- Field examples of the inside of a transformer



- 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 3 $\phi$  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



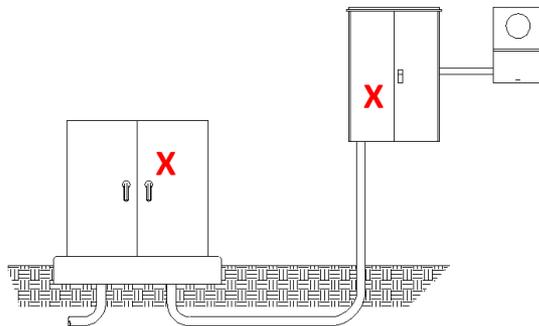
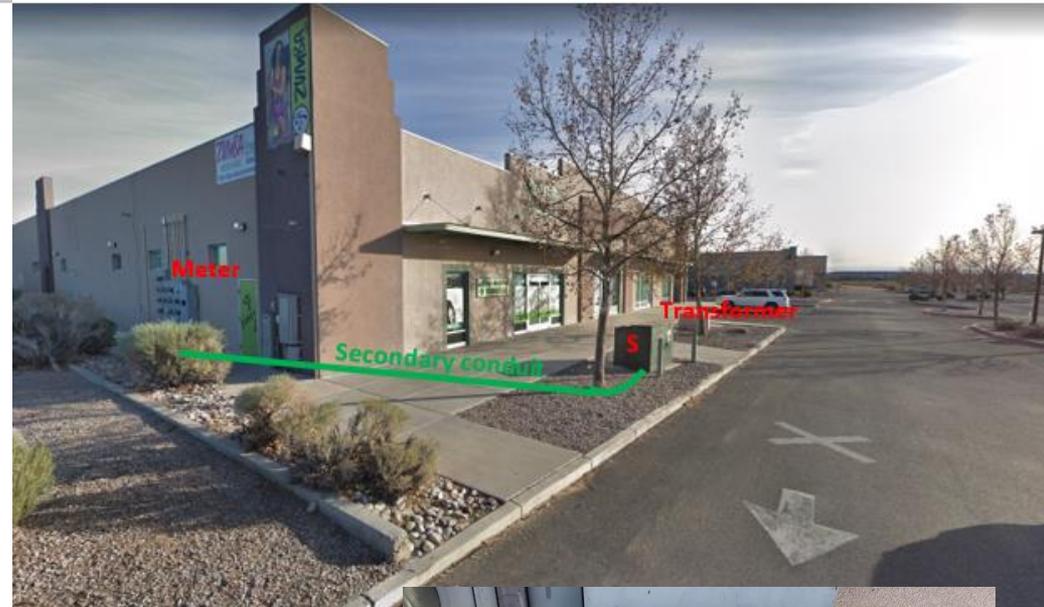
- First and foremost, **NEVER ever touch a transformer that has been tampered with, it may be energized!**
- Lights in your business are flickering,
- The more you turn on, the more power fluctuations,
- Opened electrical panel doors
- Seeing debris outside the transformer like stripped jacket cover 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



Typical Customer Underground Configuration



# 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



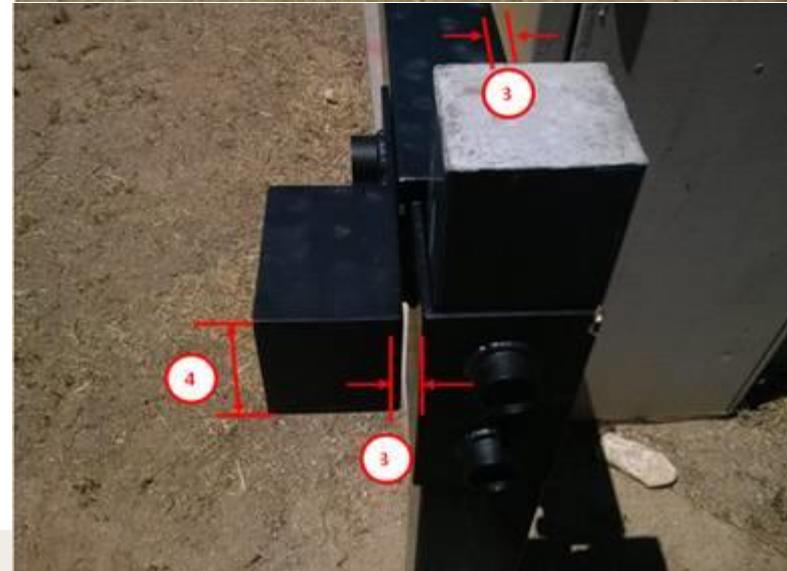
- This is an example of one of the first barricades to be installed
- Barricade Process

# SHARING OF LESSONS LEARNED

## 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.

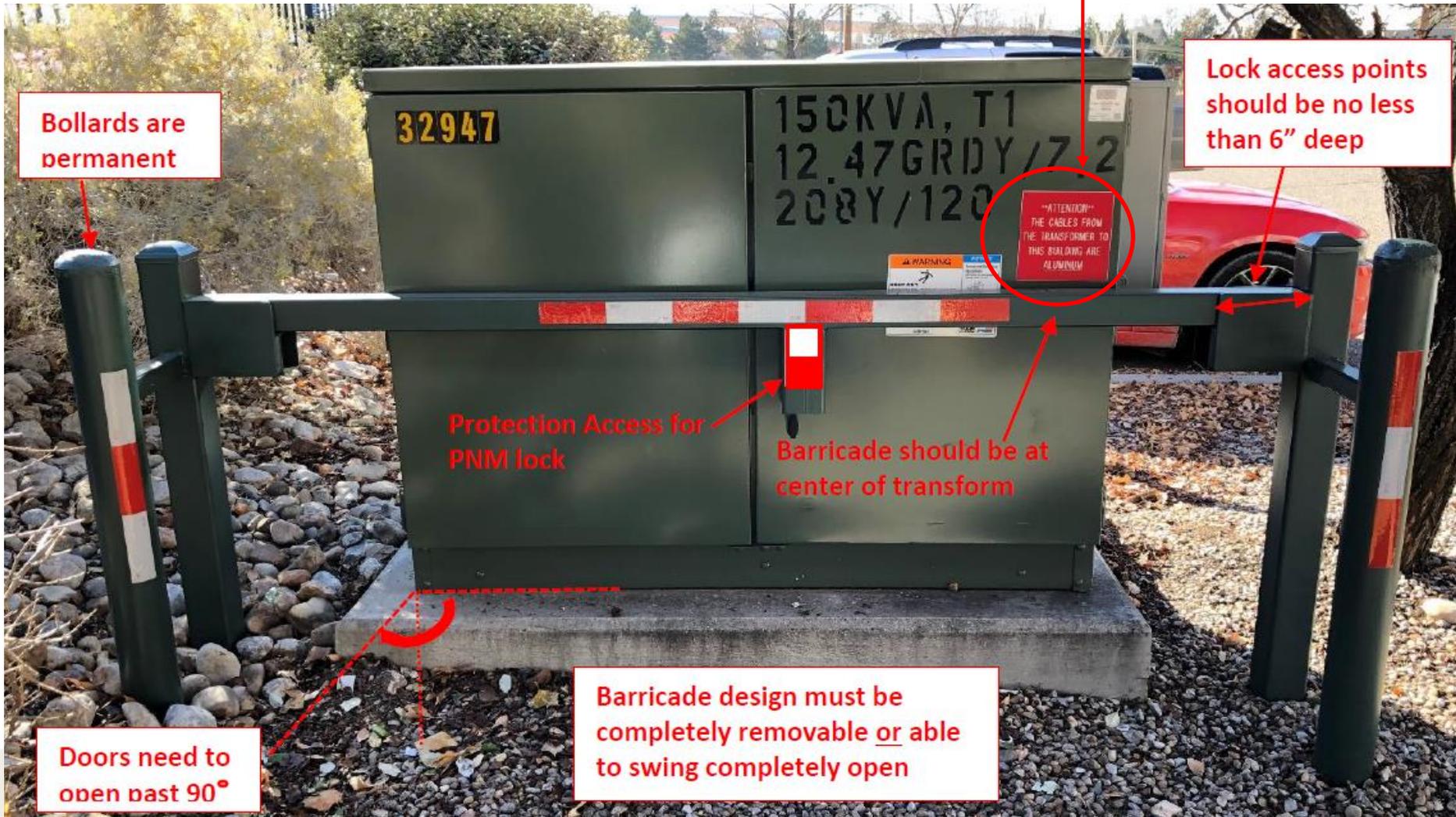
**Think  
Like  
A  
Thief**



# LESSONS LEARNED ILLUSTRATED

- Barricade should be as close to the transformer as possible

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



# IF YOU ARE A VICTIM OF COPPER THEFT

- What needs to happen when a customer has been hit with 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](mailto: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



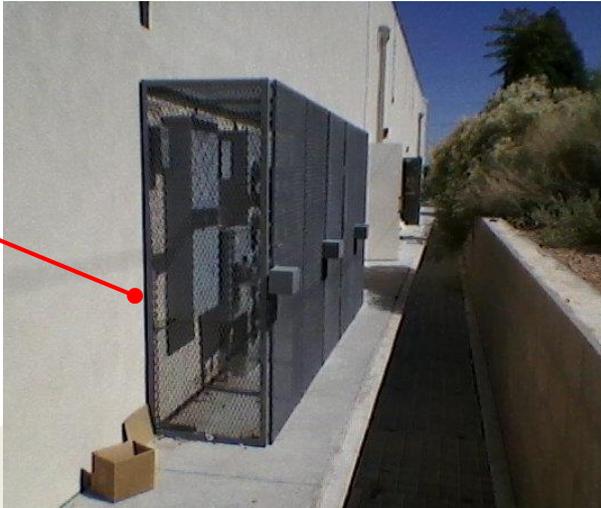
**Barricade can't be removed.  
PNM Needs to have access**



**PNM Needs to have access**



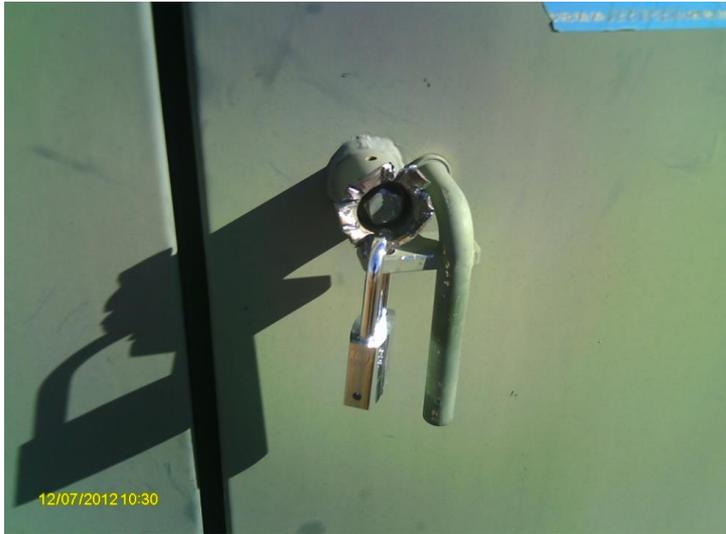
**No welding, cutting, or drilling  
is permitted**



**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**

# QUESTIONS ??

## THANK YOU FOR YOUR TIME



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# QUESTIONS AND ANSWERS

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# 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.



Talk to us.

