

BREAKING DOWN INDUSTRY JARGON, PART III



In this issue we continue our series of explanations about how the electric system works. Last month we talked about the poles and equipment at Northport that feed the Island. Those poles connect to both the old and the new submarine cables, which are our focus this month. Currently the old cable is energized, and in the last issue we talked about how each cable is connected to WPS at those poles at Northport.

The two cables are essentially the same in construction, with some material upgrades and three noteworthy differences. The old cable has 25KV insulation and unfilled conductor, and the

new cable has 35KV insulation and filled conductor. The new cable has fiber built into it and the old cable does not. Both cables have three 4/0 copper conductors. As noted above, the new cable has “filled conductor” and the old cable does not. “Filled” conductor essentially means that a tar/sticky substance is included with the copper strands that essentially “fills” the gaps between the round strands and prevents water infiltration should a fault or other damage occur. So long as we are talking about terminology, a fault means a short circuit to ground. It does not indicate blame, although I suppose you could say that a loss of power is the

“fault” of a short circuit!

The conductors on both cables are surrounded by a conductor shield, followed by Ethylene propylene-rubber (EPR) insulation, a semi-conductor shield, a copper tape bleed-off layer, and a final protective jacket. The copper tape bleed-off helps dissipate built-up capacitance and drain off currents that can travel on the outside of the conductor and damage the insulation long term.

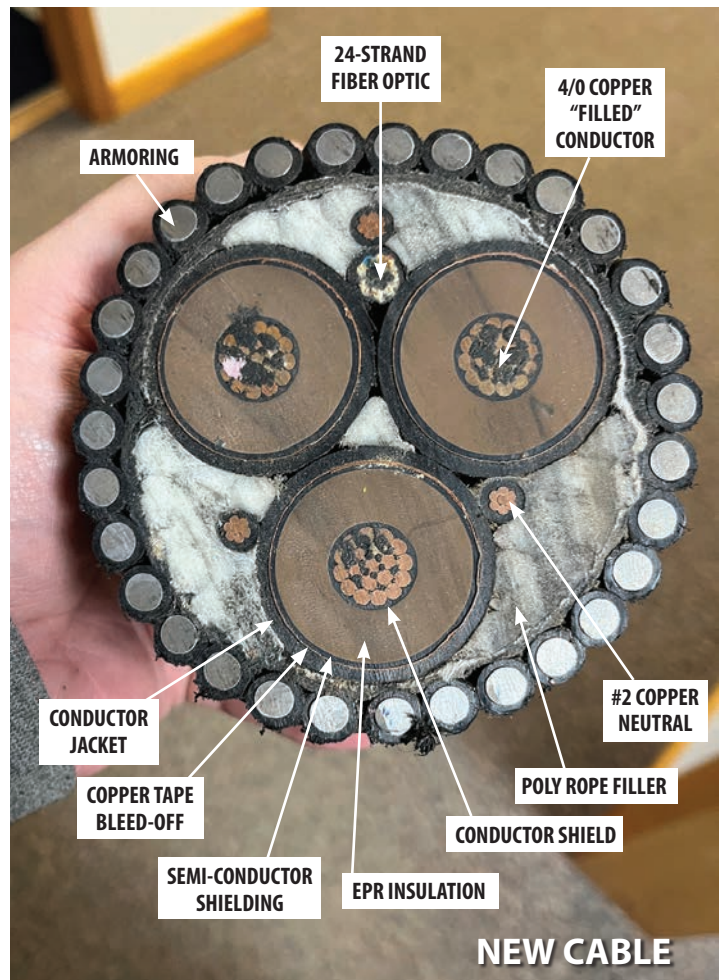
Both cables have three #2 copper neutral cables. All of this, and the 24-strand fiber optic cable that was built into the new cable, are contained in a filler material (jute for the old cable



OLD CABLE



\$4 MILLION HOLE



24-STRAND FIBER OPTIC

4/0 COPPER “FILLED” CONDUCTOR

ARMORING

#2 COPPER NEUTRAL

CONDUCTOR JACKET

COPPER TAPE BLEED-OFF

POLY ROPE FILLER

SEMI-CONDUCTOR SHIELDING

EPR INSULATION

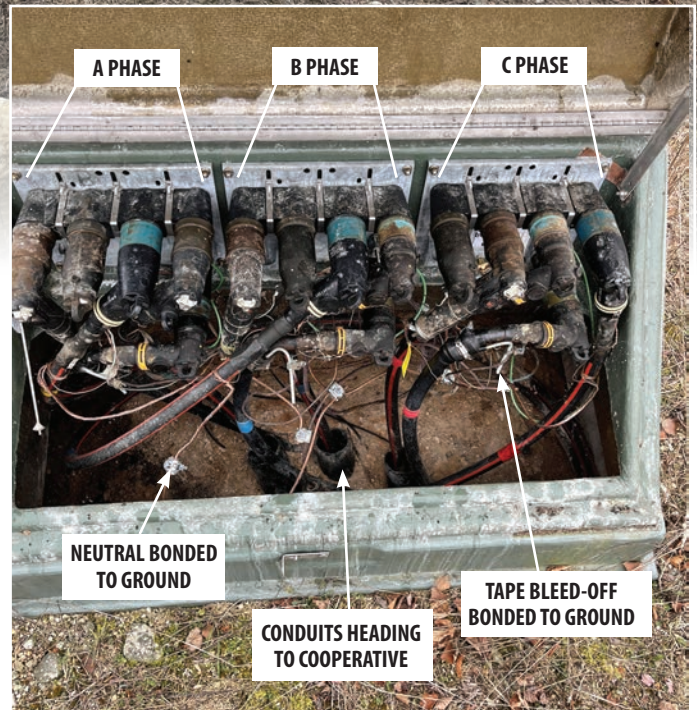
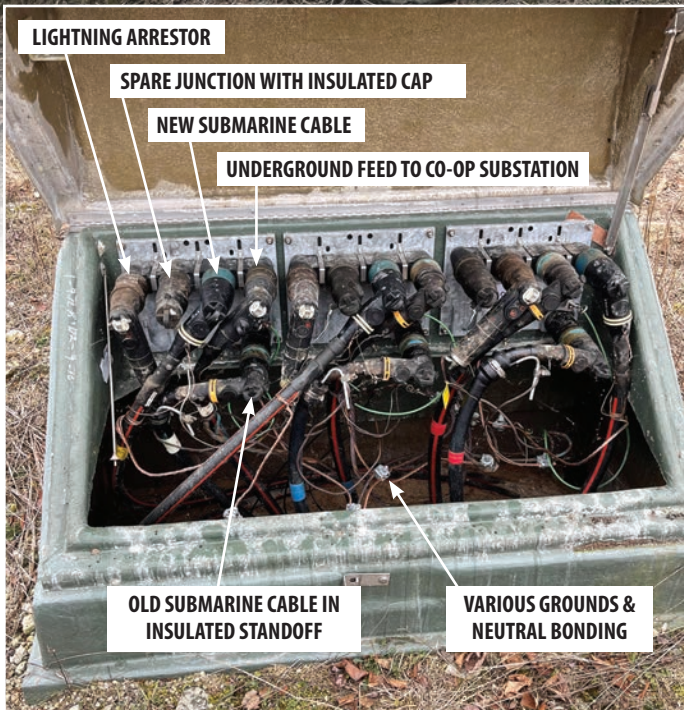
CONDUCTOR SHIELD

NEW CABLE



SECTIONALIZING CABINET WITH NEW CABLE

SECTIONALIZING CABINET WITH OLD CABLE AND FEED TO COOPERATIVE



and poly-rope for the new) and then are surrounded by steel armoring. On the new cable, this steel armoring is coated in plastic to help prevent rust and on the old cable, the entire cable was covered with tar-filled jute as a rust preventative.

These two cables both carry the Wisconsin Public Service standard primary voltage of 24,900 volts phase to phase and 14,400 volts phase to ground. Our primary voltages on the Island are 12,470 volts phase to phase and 7,200 volts phase to ground (more on that later).

The old cable follows a direct route from the poles to the cooperative property on Green Bay Road. As noted last

month, the north break-wall at Northport was actually built over the top of it. The new cable runs underground across the Ferry Line parking lot to the south side of the break-wall where it then runs to Plum Island, underground across Plum Island, and then to the cooperative property on Green Bay Road. The installation of this new cable is well documented on our website, www.wiccoop.com, and we don't need to go into that detail here.

Once it comes ashore on the Island, both cables are terminated in what is called a sectionalizing cabinet. Essentially the sectionalizing cabinet is a junction point to connect to the next segment of cable or a point where an

additional connection could be made in the future. In our case, the junction points are called "elbows" and they function like an electrical plug.

The marked-up photo at left is of the busiest cabinet on the Island as it not only has the new submarine cable terminated to the underground going to the cooperative, but also the energized old submarine cable in what are called "insulated standoffs" below.

From this sectionalizing cabinet, primary underground cable heads to the cooperative substation where it is distributed to the rest of the Island. The substation and its equipment is where we will pick this up next month!



FIBER AND LINE MAINTENANCE CONTINUES

Currently Quantum is on a brief break until the first week of March. They have worked later than we expected and when they return, they will have a full load as Karcz and Michels continue to work on overhead line placement. Michels is currently working on Detroit Harbor Road and will be moving to Range Line and then South Shore, first placing strand, then lashing backbone fiber, followed by distribution fiber and finally drops to the home.

We lost Michels for a bit after tornadoes went through the Evansville area in February as it was all-hands-on deck for them, not only to restore power, but also to get communication lines back up and repaired. ATC had around 50 transmission poles down, which affected utilities such as Rock Energy Cooperative as they had distribution lines under the transmission lines, and then communication companies had phone, cable, etc., under the distribution. We are glad to get Michels back, but we also have real-life understanding about all-hands-on-deck needs to get those without service up and running.

We continue to utilize opportunities afforded by the grant and the equipment we have been able to obtain to not only make space for fiber, but also to deal with some of our problem areas.

You probably have noted the work we have done between Mountain Road and East Side Road where the pines that were planted under the lines had grown up into them. This has been

a problematic area for us on numerous occasions and the source of a number of outages over the years. While we still have a bit of clean-up work to do in the area once spring arrives, this area will no longer be the cause of blinks and outages, and visibility at the corner has been improved for the Town where the oak, that was actually largely dead, has been removed.

In addition, along Detroit Harbor Road, we took a brief outage in order to remove a very tall dead pine that had fallen, bridging all three phases. A line was tied to the tree and we pulled it away from the lines with the bucket truck from the road. If it weren't removed, this fallen tree likely would have resulted in all three phases broken and possibly a broken pole.

In the same stretch, we took the opportunity to do a permanent repair on a pole that had had the top broken out of it during an earlier tree fall. We disconnected the lines, cut the top of the pole off below the break, and installed a pole extension with fiberglass arms. Because this is a straight-through pole with very little lateral loading, we were able to use the pole extension rather than replace the pole, and we were able to get the tree removed and make the pole repair in less than an hour rather than the many hours it would have taken to replace the entire pole.

Also, as you will see on the following page, we removed some problematic trees along Jackson Harbor Road that had grown into and around the lines.



Above: Mike and Mitch (from Karcz) trimming pines from the lines. Right: Mike installs a pole extension to replace a broken pole top on Detroit Harbor Road.



This is why you should look up BEFORE you plant trees

Believe it or not, these trees, which were planted beneath the lines, were trimmed below the power lines and even below the Frontier line that was installed in 2011. You can see here that the trees had grown well above the lines and in fact, one branch had actually grown around the Frontier line and a small chunk had to be left attached (see if you can find it the next time you are driving down Jackson Harbor Road).

In order to accomplish this, we took a very brief outage and with the help of Karcz personnel, removed the trees to the ground, and used our excavator mulcher to remove much of the stumps.

This is a good example of why you should always look up before planting trees, and we don't mean look up to make sure you are planting in a straight line.

MICHEL'S HELPING WITH UNDERGROUND WORK ON SOUTH SHORE DRIVE

The Michels underground crew is scheduled to arrive the week of February 19, which is after the deadline for this article so you will have to wait for the April edition to see photos of the work they are scheduled to do. Years ago, the primary lines on South Shore Drive that passed the Shipyard Marina were put underground in order to prevent mishaps with over-height boats and sailboats. This means that in order to extend the fiber beyond the Shipyard/Red Barn area, we have to install underground conduit.

Because of the mobilization costs to do this work and the horizontal boring that will be required for the road crossings, it is a prime opportunity to eliminate a problem area where the overhead lines run through the woods along this stretch of road. It also presents an opportunity to get further along with the work we started to eliminate the poles that run along the beach in the sand dunes area.

You may recall photos from early issues of these pages showing how these poles run through the water depending on the year. This can be and has been a huge problem when something goes wrong out on these poles. We have already run a new primary line along the road so the poles can be bypassed, but the homes along these lines have yet to be connected to the new primary. We have been considering—and also been a bit daunted by—the amount of tree removal we would need to accomplish in order to go overhead from South Shore Drive in to each of these homes.

Having the Michels equipment available and a crew to operate it will allow us to bore under the trees, much as we did on Lobdell Point Road, to not only get fiber to each of these homes, but also run conduit in preparation for power. All of this can be done (with the exception of material for power) under the grant as part of our matching. This is a huge advantage to us, and while pulling the actual power cable and terminating will take place at a later date (when we aren't quite so buried—bad pun there), it positions us not only to complete the fiber in this area, but to save a huge amount of labor going forward.



NEW ONLINE BILLING SYSTEM COMING

The online billing system we implemented a little over three years ago has been working well for the most part, but also has been problematic when it comes to people not receiving emailed bills, not being able to view accurate invoices online, and the fees that are charged for online payments. Over the next several months we will be working to get a new service operational that works hand in hand with our accounting/billing system a little more directly than the current system does. In addition, the costs to the cooperative will be less and member will be charged less in fees for online payments. Stay tuned for more information and, while we are hopeful that existing information will be importable to the new system, be prepared to respond to requests for current email information and for the possibility that you will have to re-enter any online payment information.

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