PCARA Update

Volume 13, Issue 12 Peekskill / Cortlandt Amateur Radio Association Inc. December 2012

Prepare for the worst, hope for the best

I hope this edition of the *PCARA Update* finds everyone well and recovering from the devastating effects of Superstorm Sandy. The preparations that I had made for Sandy, those that I wrote of in last month's article, were not in vain. I was most fortunate to only lose power for five days and experience the loss of a 50 foot pine tree that held up one end of my G5RV. Unfortunately, there are those that are still in need of our help and prayers almost an entire month after the storm. Please help in whatever way you can.

Just a reminder that the Annual PCARA Holiday Dinner is to be held at 5:00 pm on December 2nd at the newly renovated Table 9 (formerly *At the Reef*) on Annsville Circle. The cost is $29.95 per person, plus gratuity and tax. Items on the menu can be found in November's edition of the *PCARA Update* courtesy of Malcolm, NM9J. During the course of the evening we will conduct some club business including the Election of Officers. **ALL are Welcome**!

Venue for the PCARA Holiday Dinner on Sunday Dec 2 is the revamped "Table 9" restaurant, located on Annsville Circle, at the junction of Route 9 and Route 6/202.

What would January be without the traditional PCARA Bring and Buy Auction?! Bring all of your no-longer wanted treasures to the January 6, 2013 meeting, and maybe go home with some new treasures of your own. Our auctioneer Malcolm, NM9J will surely once again whip the crowd into multiple bidding wars!

Our next regularly scheduled meeting will be Sunday January 6, 2013 at 3:00 pm at Hudson Valley Hospital Center in Cortlandt Manor, NY. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

PCARA Officers

President:
Greg Appleyard, KB2CQE, kb2cqe *at* arrl.net
Vice President:
Joe Calabrese, WA2MCR; wa2mcr *at* arrl.net

Contents

Prepare for the worst - KB2CQE	1
Net night	1
Two meter repeater	1
Adventures in DXing - N2KZ	2
Field Day results	4
Power trip - NM9J	5

Net night

Peekskill/Cortlandt Amateur Radio Association holds a weekly net on the 146.67 MHz W2NYW repeater on Thursdays at 8:00 p.m. Join net control Karl, N2KZ for news and neighborly information.

Two meter repeater

The W2NYW two meter repeater on 146.67 MHz has been having receive problems recently, with weak and medium-strength signals suffering from a loud buzzing noise. Bob, N2CBH visited the repeater site on Wednesday Nov 21 and diagnosed a possible problem with the power supply. At the time of writing, Bob was hoping to fix the problem shortly.

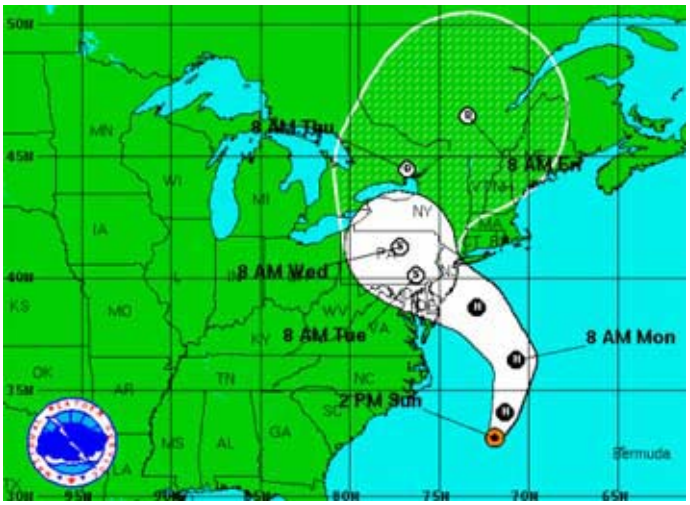
Meanwhile, the club's 449.925 and 448.725 MHz repeaters are still on the air.

Adventures in DXing

– N2KZ

Powerful Lessons

An evil stepmother must be casting her spell over October 29th. Last year, a ferocious ice and snow storm brought us endless damage and peril as we sat in the dark for seven days without power. Exactly 365 days later, Hurricane Sandy demolished our area like never before. Its severe floods and wind damage crippled modern civilization. Some neighbors are still waiting for power to be restored. Homes and livelihoods were literally blown away. Will severe weather become 'the new normal?'



Projected path of Hurricane Sandy crossed the New Jersey Shore on the night of Monday October 29, 2012.

The night of the hurricane was troubled and dark. Power cut off at dusk, long before the storm fully raged. Little sleep was had as the powerful winds roared. I could hear my roof tearing apart, highlighted by startling bangs and booms. Rain flew by horizontally and the trees wildly bent and swayed for hours. A memorable moment came at 8:30 pm. Looking out our back window, my wife asked: 'Where's the pine tree?' The 70 foot behemoth had broken apart leaving a 15 foot high stump and three huge pieces now lying across our hill.

The morning of October 30th brought up familiar memories. Again, we would experience a wet and muddy world filled with the smell of fresh tree sap from numerous felled maple and pine trees. Broken branches and limbs were scattered everywhere. Shingles littered lawns and debris torn from nearby houses surrounded us. Listen carefully and you'd still hear a large branch or limb fall, hopefully in the distance. Other sounds combined to create a multi-voiced harmony for the next ten dark days: the whirring of gasoline engines and the rip of power saws. This time recovery would be longer and harder than ever.

This 70 foot pine tree at Karl's location was broken off by Sandy.

Hurricane Sandy was the third event in one calendar year that brought week-long power outages. In the aftermath, many families made the best of a bad situation, migrating to friends' and relatives' homes that still had electrical service. Hotel rooms were cherished and usually impossible to find. Others subsisted by huddling in warm cars and mini-vans and using their workplaces as havens to maintain sanity. One item was on everyone's most-wanted list: generators!

The smell of gasoline once again annoyed our noses. Hauling five-gallon jugs back and forth from the gas station became part of many daily routines.

Pouring the gas, especially without a funnel, only heightened the aroma. Wear gloves or your hands will stink forever!

Our area did not suffer too badly from long gas lines. New Jersey was another story. Miles and miles of cars idled along highway shoulders waiting for the gas considered nearly unavailable. This madness seemed to be the result of media hype. Travel a few exits down the parkway and you would find gas available for immediate purchase without waiting.

The storm left its signature everywhere. One neighbor had an enormous pine tree fall across her driveway violently tearing power, telephone and cable TV lines away from her house. She subsisted on gas generator power, via an octopus of extension cords through a window, for over three weeks. Cable TV was replaced by connecting up her old trusty roof-mounted TV antenna. She delighted watching good old over-the-air TV! With very little power draw, all she needed was a twice-daily fill-up of her generator gas tank and life was good.

Don't Do This!

Out of necessity, I became acquainted with the world of generators. Having managed the power of many, many TV remote trucks and a few amateur radio Field Days and a lifetime of household repairs, I was not a stranger to how to properly proceed when handling electrical hook-ups. I had one moment of complete horror. A good friend had purchased a generator at a local Home Depot. After trying to use it with just a few extension cords, he decided his basic design was inadequate. He recruited a local electrician who provided a quick fix to his problem. I was mortified to see what he had done!

I called the electrician on the phone and simply asked: 'Is this really up to code?' Even after he said 'yes,' I found it hard to believe. He added: 'Just remember to keep your main breaker open. It's your responsibility!' What he had done was unconscionable. The electrician had wired in a standard male 3-prong plug to one breaker of my friend's power panel. You could then use an everyday single A/C extension cord to connect the generator to the power panel and backfeed it bringing power to all the circuits in his house. Oh my God!

As a public service announcement, I beg you to never do this! You may think you are achieving great results, but great danger can result. Using this jury-rigged arrangement, if you do leave your main breaker closed you could be feeding your generator's electricity up to your streetside utility pole or farther. This could be life-threatening to workers trying to restore power to your neighborhood. Should your regular power be energized unexpectedly, it would directly hit your generator causing permanent damage, fires or explosions. In simplest terms, don't do this!

To add to the peril, backfeeding power also stresses the extension cord that is probably not rated for a full 20 or 30 amps of power. Applying one phase 120 volt A/C to circuits looking for 240 volt power is another bad idea. Stressing household wiring runs inside walls can produce fires and other chaos. It isn't difficult to install generator power correctly. Please do!

Transfer switch.

It's inexpensive and easy to do the job right. All you need is a transfer switch. Now you will be able to switch back and forth from generator power with safety and grace. It allows you to manage your power distribution to each discreet circuit. I recommend using a 10 or 12 circuit switch adequate to feed all the essential power needs of your home.

A transfer switch is not a master A/B switch between your generator and utility power. It switches each household circuit on or off individually. This also aids installation. If it were designed as a true master switch, the power feed from your utility pole would need to be turned off during installation. Using the individual circuit method, all power management remains at a serviceable level. Many transfer switches include ammeters so you can monitor exactly how much your generator is providing at any given moment.

The transfer switch is energized via a special weather-proof 4-prong A/C outlet usually mounted outside your house. A single heavy-duty 4 conductor twist-lock power cord connects the generator to the transfer switch. The power cord is a short length of four large diameter conductors rated beyond what your generator can provide. Each individual circuit of the transfer switch is independently protected by its own circuit breaker. Now you can operate with safety and confidence!

If you decide to purchase a generator, auto-throttle is a feature that should not be overlooked. This circuit monitors the amount of current draw at any given moment and adjusts the generator's idle speed to match. This one feature will minimize your gasoline usage and maximize the amount of time your generator will run before another fill-up. It also makes the generator run very, very quietly. What a pleasure not having a mechanical roar going on outside your house 24 hours a day. Don't forget wheels! Two wheels make moving generators so much easier to do!

Honda EB5000X commercial-grade generator provides 5000 watts at 120/240V AC with iAVR (intelligent Auto Voltage Regulator).

Another invaluable feature is an intelligent voltage regulator. Sensitive electronic gear, like your computer or HF transceiver, won't appreciate a delivery of 140 or 150 volts! Good generators also closely regulate the amount of alternation to exactly 60 cycles. Remember: Safety first! Ground your generator to a good earth ground. Operate the generator outside, not indoors or in an enclosed space!

Creating your own electrical oasis has all sorts of fringe benefits. Not only will you live in luxury when utility power goes off, you'll be very popular with your friends (especially if they are in the dark!) Keep your generator well-maintained throughout the year and it will also serve as a perfect addition to your Field Day efforts. All power to you!

New Year's Glow

Don't forget that Straight Key Night is coming up fast! From 7 pm New Year's Eve through 7 pm New Year's day hams all over the country and beyond get out their straight keys and vintage gear and pay homage to the good old days of CW. This is a great opportunity to try using code! No keyers or computers will be on the air. Everyone will be sending much slower than usual, carefully using their straight keys. Even if you don't understand Morse, tune in to hear the sounds of yesteryear. Probably the best place to look will be between 7000 and 7125 kHz on the 40 meter band. What a great way to start you new year!

Until next month, 73s and dit dit de N2KZ – The Old Goat

Field Day results

Full results from Field Day 2012 appeared in December's *QST* and on the ARRL web site. See http://www.arrl.org/results-database?event_id=37444. PCARA's results were in line with the provisional total score reported in the July newsletter (in bold below):

Peekskill/Cortlandt ARA, W2NYW

	2001	2002	2003	2004	2005	2007	2008	2009	2011	**2012**
QSOs:	450	718	733	968	853	1019	1109	694	879	**968**
Power				2 (<150W)						
Particips:	16	15	11	12	10	14	10	10	14	**15**
Score:	1,540	2,096	2,328	2,996	2,798	2,906	3,460	2,746	2,602	**2,920**

This was a significant improvement over last year, though still not quite as good as some of our top-scoring years. As President Greg KB2CQE reported, this was a relatively stress-free and enjoyable event. Publication of the complete results by ARRL allows a comparison of our score with neighboring groups in both the ENY section and Hudson Division. Compared with 2011, we improved our position in all of these categories. In Field Day 2012, PCARA was...

- **First** out of 2 entries in Category 2A, ENY section.
- **Twelfth** out of 27 entries in the entire ENY section.
- **Sixth** out of 13 in Category 2A, Hudson Division.
- **30th** out of 88 in the entire Hudson Division.
- **142nd** out of 408 in category 2A nationwide.
- **643rd** out of 2617 entries total.

Lovji, N2CKD and Malcolm, NM9J operating HF and 6 meters during Field Day 2012.

Here's how PCARA fared compared with some of our friends and neighbors in the East New York (ENY) section of ARRL's Hudson Division:

#	Call	Points	Cat	QSOs	Club
1	K2CT	8984	3A	2580	Albany
2	N2SF	6754	4A	1848	WECA
3	W2YRC	5544	3A	1327	Yonkers
4	K2DLL	4672	3A	1431	Saratoga Cty
5	K2AE	3822	5A	727	Schenectady
6	K2QS	3698	3A	798	QSY Society
7	NQ2W	3610	1E	336	(Low power mult)
8	W2HO	3522	5A	838	Orange County
9	K2ENY	3218	3A	538	Overlook Mtn
10	WD2K	3208	4A	589	Rip Van Winkle
11	K2PUT	3162	3A	610	PEARL
12	**W2NYW**	**2920**	**2A**	**968**	**PCARA**
13	W2EGB	2166	2A	708	East Greenbush
14	W1BAA	2126	3A	316	Southn Berkshire
15	N2TY	2056	4A	443	Troy

Compared with our previous entry in 2011, we had more contacts – up from 879 QSOs to 968 – and our score improved from 2602 to 2920. Neighboring clubs generally reduced their score, so we rose from 14th to 12th position in ENY. Nearly everyone had more participants than PCARA with many entries in Class 3A and other classes higher than PCARA's 2A.

Seven higher-scoring neighbors had fewer contacts than PCARA, but accumulated more total points, suggesting a lot more attention to GOTA stations and other bonus points.

So, all in all a pretty good performance for a Field Day where there was no undue strain, the weather stayed dry, and most people seemed to be enjoying themselves.

ARRL reports that compared with 2011, Field Day 2012 saw a small drop in the entries to 2657 and in participants to 37,567. PCARA increased both participants and score. With a few more bonus points maybe we can push our score even higher next time.

– NM9J

Power trip

The electrical supply in our area was interrupted by Hurricane Sandy on October 29, followed by the subsequent Nor'easter on November 7. My street had two weather-related electrical outages in 2011, and almost had another outage in 2012 when Sandy caused a large pine tree to settle on the power lines close to Route 202. This all raises interest in our power distribution system.

After Sandy, this large conifer lay across the power lines and telecom cables at the bottom of my street.

Chats with neighbors about what's what on the utility poles made me think a little enlightenment might be helpful. I have to say I'm no expert on power distribution — so these notes are mostly based on material from ConEdison and IEEE. They describe the situation in PCARA's immediate part of the world — Peekskill/Cortlandt in northwest Westchester, where the electrical supply is provided by ConEdison. If you live in northern Westchester, roughly east of FDR Park, then your electricity comes from NYSEG. And in western Putnam County, just north of Peekskill, the supply is provided by Central Hudson Gas and Electric.

First, generation

Most electrical power is created at generating stations, which can be fossil fuel-fired, hydroelectric or nuclear. Since the industry was deregulated in the late 1990s, the supply companies have divested their generating plants. For example, Consolidated Edison sold its nuclear-powered station Indian Point 2 to Entergy in 2000, while Entergy bought Indian Point 3 from the New York Power Authority in 2001.

Some generating plants can be a great distance from consumers. In this case, electrical energy from the generator is stepped up in voltage using a transformer, then transferred to ConEdison over high voltage AC transmission lines at 69 kV, 138 kV and 345 kV. As the AC voltage is raised, the current through the wire falls, reducing ohmic losses (I^2R) in the transmission line.

HV transmission lines.

You can make an educated guess at the voltage on high voltage transmission lines by inspecting the insulators that hold the overhead cables in the air. Air is a wonderful insulator, but every so often, you need a solid insulator to suspend the wire. The suspension insulators on HV towers consist of a series of cap and pin insulator disks, with each disk rated at 10-15 kV. Count the disks, multiply by 10 to 15kV and that's likely to be the line voltage.

High voltage insulator for 275 kV line.

Those high voltage transmission lines run to an area substation, where the voltage is lowered through transformers to a more suitable voltage for area distribution. In our own area there is a ConEdison area substation at Buchanan and a NYSEG substation in Yorktown Heights at Amawalk.

The area substations step down the very high voltage to ConEdison's primary distribution voltage, which is either 27 kV, 33 kV or 13 kV. In Westchester County, most ConEdison primary distribution takes place at **13 kilovolts**. This primary 13,800 volt supply is what we are familiar with, suspended at the top of utility poles.

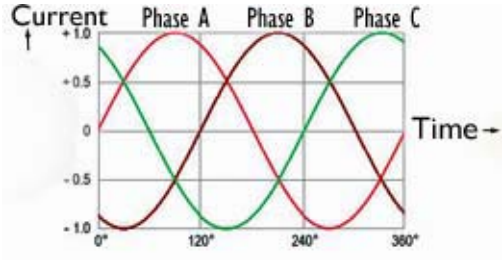
This ConEdison utility pole is clearly marked with the primary voltage.

Primary phases

What you will see of the high voltage supply on a main road is a group of **three** high voltage cables, plus – if you look hard enough – a fourth wire providing neutral/ground return. The three high voltage wires provide a **three-phase supply** of alternating current with the

Utility pole carrying three high voltage wires for three phase primary.

60 Hz waveform in the second wire lagging the first wire by 120 degrees, and with the third wire lagging behind by 240 degrees.



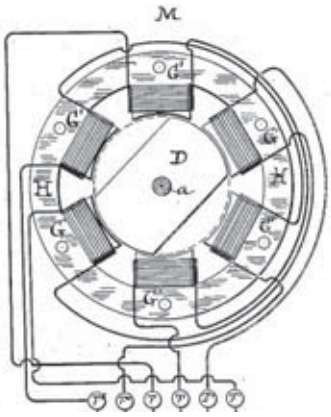
Graph shows the angular relationship of the components of a three-phase alternating current.

Electronic warfare

The reason for this three-wire, three-phase arrangement lies in the "War of the Currents", conducted in the late 1880s between Thomas Edison and George Westinghouse. Edison favored direct current (DC) while Westinghouse's company promoted alternating current (AC) for power distribution. AC was also being supported by Sebastian de Ferranti in England.

In Edison's DC system, power had to be generated close to his consumers, otherwise transmission loss in the relatively low-voltage cables would be too high. With alternating current, efficient power transformers can be used to step up then step down the voltage required for transmission over longer distances — something that could not be done easily with direct current. High voltage AC transmission allows large power stations to be located much further away from consumers than with direct current.

At the time, direct current was still holding its own because efficient electric motors required DC. That was until Nikola Tesla came along and invented the polyphase induction motor in 1887. Westinghouse licensed Tesla's patents for polyphase electric motors plus transformers — and the battle of the currents was decided in favor of AC. A few applications still needed direct current — for example electric locomotives — but DC for this type of application could be generated from Westinghouse's alternating current using a motor-generator set, or using the mercury arc rectifier, invented in 1902.



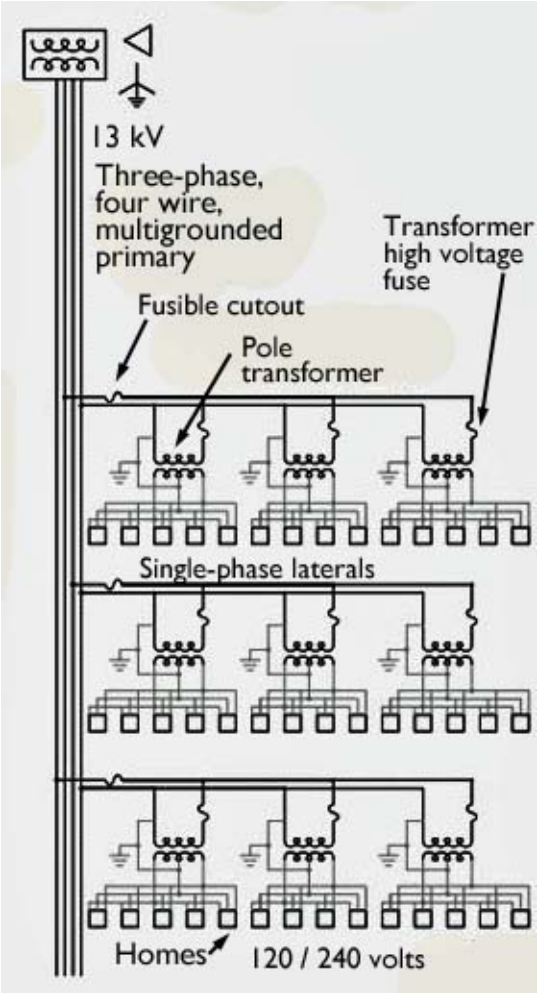
Three-phase electric motor as described in Nikola Tesla's US Patent 381,968 of 1887.

These days, large motors are fed directly with 3-phase power from the public electricity supply, and we see groups of three heavy conductors on the steel distribution towers that cross the countryside. Utility poles alongside main roads carry three conductors plus a neutral/ground. Industrial premises with heavy loads are provided with a three-phase supply of their own.

Branch line

If your side street is like mine, without heavy industry, then there is no need for a three phase supply. Instead, Con Edison connects a single 13kV primary wire to just one of the 3-phase conductors passing the end of the street. This single-phase primary feed to the street passes through a fusible cutout to take care of overloads.

13kV is still far too high a voltage to distribute to domestic premises, so every so often a transformer is mounted on one of the utility poles. These "pole pigs" have their primary winding connected to the 13kV supply and to a neutral/ground wire, which is also grounded at the individual pole. The secondary winding of the transformer steps the voltage down to 240 volts, center tapped. The center tap is also grounded, so the voltage between each "hot" wire and neutral/ground is 120 volts. 240 volts is available for heavy loads such as



Primary and secondary power distribution. 13 kV three-phase primary with neutral/ground return passes down main road. Each side street is connected to one phase of the 13 kV primary. Along the street, pole-mounted transformers have their primary windings connected between the 13kV line and ground. The secondary winding of each transformer provides 120–0–120V for drop connection to 3-15 homes. [Adapted from electrical-engineering-portal.]

ranges, driers, air conditioners and linear amplifiers between the two 'hot' conductors.

The neutral conductor is supposed to be grounded at the utility pole, and at the customer premises. I have seen broken ground wires at the foot of utility poles, probably caused by one too many collisions with a lawn mower. This is not a good idea, as it may cause unexpected current from neighbors' equipment to flow through *your* ground.

Broken ground wire at the foot of a utility pole.

Pole-mounted transformer steps down the 13 kV primary to 120–0–120 volt, center tapped, for distribution to nearby homes.

Each pole-mounted transformer can serve several homes, typically from 3 to 15 homes maximum. Modern transformers can have a high voltage expulsion fuse as well as a low voltage circuit breaker which detects problems, cuts off the 120V supply and lights a lamp to indicate where the problem lies. The transformer has a ribbed bushing on top to insulate its high voltage connection. If there is another ribbed insulator visible on the side of the transformer, it is likely to be a high voltage lightning arrester.

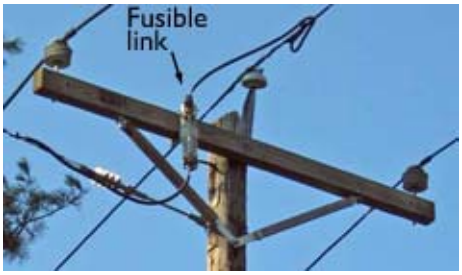
The insulators for the 13kV line at the top of the utility pole are not a simple glass design as used for low-voltage telegraph circuits. Instead they are like a set of nested, upturned ceramic cups. The aim is to keep part of the insulating path dry during wet weather, making sure that the insulation is not compromised by arcing/tracking over a damp surface.

Porcelain "pin" insulator on utility pole supports 13 kV primary conductor. Extended surface under insulator stays dry in rain and snow.

The dark side

So what could go wrong? Occasionally, an errant motorist will hit a utility pole or an overload will occur. This is where the low voltage circuit breaker in the transformer can come into action, removing the supply for several houses. The indicator lamp will then assist ConEdison's crew to locate the problem.

In times of bad weather, the most likely problem is that a tree branch, or an entire tree will fall down. If it falls on the secondary feeder, between the utility pole and the house, it can pull down the 120 volt wires and disrupt the supply to the home. If a tree falls onto the primary 13kV feeder, this is more serious. The aluminum conductor steel-reinforced (ACSR) cable could break, touch the ground, arc and cause the fusible cutout at the end of the street to open. The entire street then loses electrical power until ConEdison can isolate the problem, get the tree removed, and repair the primary.



Fusible link on 13kV primary will hang down when fuse has blown.

If the circuit breaker does not open, then homes as far as the broken primary might still have electrical service. But that broken primary hanging down is a serious problem. 13 kV at as many amps as you like is a life-threatening hazard to man and beast, so vehicles, humans and pets need to be kept well away.

Better design?

The USA's 120 volt system with overhead power distribution via pole-mounted transformers is quite different from electrical distribution in Europe. The main limitation of a 120V supply is that the distance between pole transformer and the furthest consumer is limited to a few hundred feet, otherwise the voltage drop ($= I \times R$) will be excessive.

In Europe, the secondary supply voltage is twice as high as in North America — 230 to 240 volts, 50 Hz AC. The distribution system relies on transformer substations, with each transformer serving a greater number of houses spread over a wider area than in the USA. In most cities and suburbs in the UK, the primary high voltage and the 240 volt AC secondary supply are both fed *underground* rather than overhead. Overhead supply is only used for rural areas. In my experience, this makes the whole power distribution chain more reliable than in the USA, especially during lightning storms, wind, ice or snow. Voltage sag due to heavy current draw is also less of a problem when *all* domestic appliances are fed from the 240 volt AC supply.

- NM9J

Peekskill / Cortlandt Amateur Radio Association

Mail: PCARA, PO Box 146, Crompond, NY 10517
E-Mail: w2nyw@arrl.net
Web site: http://www.pcara.org

PCARA Update Editor: Malcolm Pritchard, NM9J
E-mail: NM9J @ arrl.net
Newsletter contributions are always very welcome!
Archive: http://home.computer.net/~pcara/newslett.htm

PCARA Information

PCARA is a **Non-Profit Community Service Organization.** PCARA meetings take place the first Sunday of each month* at 3:00 p.m. in Dining Room B of the Hudson Valley Hospital Center, Route 202, Cortlandt Manor, NY 10567. Drive round behind the main hospital building and enter from the rear (look for the oxygen tanks). Talk-in is available on the 146.67 repeater. *Apart from holidays.

PCARA Repeaters

W2NYW:	146.67 MHz -0.6, PL 156.7Hz
KB2CQE:	449.925MHz -5.0, PL 179.9Hz
N2CBH:	448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

Sun Dec 2: PCARA holiday dinner, "Table 9" Restaurant, 92 Roa Hook Road, Cortlandt Manor, NY. 5:00 p.m.
Sun Jan 6: PCARA Annual Bring and Buy Auction, Hudson Valley Hospital Center. 3:00 p.m.

Hamfests

Sat Dec 1: Boy Scout Troop 139/Venture Crew 7373 Hamfest, Conlon Hall, 19 N William St, Bergenfield NJ. 7:00 am
Sun Jan 6: New York City/Long Island Section Convention (Ham Radio University 2013), Briarcliffe College, Bethpage, NY.

VE Test Sessions

Dec 1: PEARL VE Test Session, Putnam Co. BES Training and Operations Center, 112 Old Route 6, Carmel, NY. 10:00 am. Contact NM9J.
Dec 1: Yonkers PAL Ham Radio Club, 127 N Broadway, Yonkers NY. 2:00 pm. Contact: M Rapp, 914 907-6482.
Dec 2: Yonkers ARC, Yonkers PD, Grassy Sprain Rd, Yonkers. 8:30 am Contact D Calabrese, 914 667-0587.
Dec 13: WECA, Westchester Co Fire Trg Cen, 4 Dana Rd., Valhalla, NY. 7:00 p.m. S. Rothman, 914 8313258.
Dec 17: Columbia Univ VE Team ARC, 2960 Broadway, Columbia University, 115 Havemeyer Hall, New York NY. 6:30 pm. Contact Alan Crosswell, 212 854-3754.

Peekskill / Cortlandt Amateur Radio Association Inc.
PO Box 146
Crompond, NY 10517