

Premier Utility Services LLC  
100 Marcus Blvd, Ste 3  
Hauppauge, NY, 11788  
(800) 262- 8600

Luly Massaro, Commission Clerk  
Rhode Island Public Utilities Commission  
89 Jefferson Boulevard  
Warwick, RI 02888

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PUBLIC UTILITIES COMMISSION

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12 September 2012

**Re: Docket 4237  
Commission Investigation Relating to Stray and Contact Voltage Occurring in  
Narragansett Electric Company Territories**

Dear Ms. Massaro,

The Rhode Island Public Utility Commission recently received a letter from Mr. and Mrs. Green petitioning for the rejection of the use of the NARDA 8950/10 mobile contact voltage detection system in the State of Rhode Island. Concurrently, the Maryland Public Service Commission received a technically identical request requesting the rejection of the NARDA 8950/10 for use in that State.

The Greens are to be commended in their ongoing efforts to increase public awareness of electrical potentials that may pose a shock or electrocution hazard and other safety issues. Because the Greens wrote their paper in the first person, it is hard to address certain topics and make constructive comments without appearing to confront them personally. Please understand that is truly not our intent to offend the Greens or the RIPUC.

As the sole firm that is actively using the NARDA 8950/10, we feel obligated to respond to the 5 major concerns addressed in their letter dated 31 August 2012. We have over 4 years experience with the NARDA 8950/10, and we were the first firm to use both the Sarnoff SVD-1000 voltage scanning trailer and the SVD-2000 truck mounted mobile detection systems. All told, we have 7 years experience in the mobile voltage detection industry- the longest and most diverse in the US. Additionally, we are the leading service firm to provide what is known as manual contact voltage testing, with over 100 (seasonal) techs working in the field testing a million+ objects annually. While we will

defend the NARDA 8950/10 system in this document, we are not authorized to speak on NARDAs' behalf.

We would like to point out that the Greens are on record as actively promoting the fact that the NARDA mobile detection systems existed. In their 26 March 2012 press release titled "Parents of Deanna Green Decry Maryland House of Delegates' Actions Regarding Bill Named After Their Late Daughter", the Greens emphasized competition to the SVD-2000 was readily available, and were pleased with a comparison test that PEPCO, a Maryland based utility, was attempting to set up at the time:

*"At the House of Delegates' Committee hearing on the bill, Maryland Public Service Commission (PSC) Chairman Douglas Nazarian, whose term there is nearing an end, offered extensive comments to the House Committee expressing his displeasure with it. Neither he nor the utility companies serving Maryland dispute the existence of the danger of contact voltage hazards in the state and Nazarian's testimony explicitly acknowledged that it is BGE's current standard practice to test all publicly accessible conductive surfaces within Baltimore City. Yet his comments were largely critical of the bill, based upon a purported lack of competition as well as minimal additional costs resulting from the testing required.*

*He began his lengthy testimony by erroneously stating that there is one company able to provide the contact voltage detection technology mandated by the bill as introduced. In reality, there are multiple vendors capable of providing voltage leak testing, which is being performed successfully by utilities in more than 40 cities across the United States. Earlier this month, PEPCO commenced the organization of a competitive demonstration of the various technologies and vendors capable of performing these tests and sent out an email solicitation seeking vendor participation."*

That full press release can be found at this URL:

<http://www.macreportmedia.com/ViewSubmission.aspx?submissionRequest=13383>

It should be noted that New Jersey based Power Survey Company declined to participate in that comparison project.<sup>1</sup> Premier Utility Services still welcomes the opportunity to demonstrate that the NARDA 8950/10 is competitive with the SVD-2000 in a true side by side test, and goes on record with that request.

We of course recognize that when presented with additional information, persons should adjust their thoughts and opinions to reflect those new facts. But in this particular instance, the Greens did not research their findings quite far enough to warrant the apparent 180 degree turn on this issue: at no time was Premier, NARDA, UL or myself contacted by the Greens to inquire further about the 5 concerns listed in the Green's recent letter. In fact, almost all their concerns are based upon information developed by Power Survey Company- the only other firm that is capable of performing mobile voltage testing services at this time.

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<sup>1</sup> Private conversation with PEPCO employee.

The Green's letter asserts "The NARDA Stray Voltage Detection System (NARDA System) has been repeatedly shown to be unreliable and ineffective in locating contact voltage hazards." Premier has used this system since its original purchase, and we have not found that to be the case. In fact, the NARDA System has done all the mobile stray voltage testing work in the State of New Jersey for this year with no issues as well as a number of demonstration surveys.

5 issues were presented by the Greens for consideration to the RIPUC. We are in a position where we have to defend ourselves and the technology, so please excuse us if we answer longer than we normally would. The Greens are presenting second hand information- they offer no new independent facts or data obtained in support of their positions. So absent a real side by side comparison of the two systems, this really boils down to a "he said-she said" discussion. Too, they give no analysis of the documents that respond to criticisms leveled against the NARDA mobile system and are on file with the NYSPSC as well.

#### **Their concerns:**

1. Field testing performed by Con Edison shows that the NARDA system misses more than 67% of known energized objects
2. A head-to-head trial of the NARDA system and the SVD-2000 shows that more than 80% of energized objects were missed by the NARDA system
3. After evaluating and field testing the NARDA system, New York Utilities will not use it
4. The NARDA system is not certified
5. National Grid has no further need to evaluate technologies, and cannot be trusted to do so

#### **Our rebuttals:**

##### **1) Field testing performed by Con Edison shows that the NARDA system misses more than 67% of known energized objects.**

First, it should be noted that one of the source documents<sup>1</sup> for this particular point was written partially or in whole by a former Consolidated Edison employee who was involved in their mobile survey program shortly before he began employment as a Senior Manager at Power Survey Company, so there is a direct conflict of interest here. This report was not previously available to the public until the Greens sent it as an attachment to this document. Rather, it was distributed selectively to a group of key utility decision makers who would be responsible for contact voltage program decisions. Another indication of the papers bias is, at no time did this ConEd employee contact experts at Premier to resolve the apparent problems they found during "research" into the system. As a public service company, ConEd has an obligation to seek out newer and more cost effective technologies. That a technology may not be perfect on the first try does not automatically call for its rejection. Elementary electronics troubleshooting call for noting the symptoms, observing the problem, replicating the problem, and making

appropriate corrections to see if you fixed the issues. None of this was done by ConEd in support of this paper. ConEd spent tens of millions of dollars in the development and refinement of the Sarnoff SVD-1000 and SVD-2000 systems. The fact that the SVD-2000 replaced the SVD-1000 shows that that first system had issues. Why wasn't this same procedure done for the NARDA 8950/10?

The Power Survey SVD-series of mobile scanning devices have undergone four major upgrades since its introduction that we are aware of. Often call the "benchmark" system, the fact that it has been upgraded every 2 years shows that it is not as perfect as people may think. Power Survey is now working on another major upgrade that will give the SVD-2000 the ability to perform what is known as harmonics analysis- an ability to remotely detect certain distortion of the 60Hz electrical waveform. This is a function that is already available on the NARDA 8950/10. How much more perfection can be added to a system that is perfect already?

This first point from the Greens was further broken down into:

- **Preliminary field tests indicated that there were objects that the NARDA 8950 was unable to detect.** *We cannot address that issue as we did not observe the testing, so are not sure if the system was being operated correctly by a properly trained technician. This system, like the SVD-2000, has a certain learning curve associated with it. We would have to review ConEd's operator training program on this system to see where their issues were.*
- **Objects at high voltage can have low field strengths and could be missed by the NARDA system.** *That is a factually incorrect statement when discussing electric fields. Electric field strengths are inverse cubed proportional to the applied fault voltage. There is no situation where a high voltage can have a lower electric field with all other factors being equal. Too, the paper says the NARDA detection of certain field strengths "could be missed", not "were missed". The very way the sentence is worded shows that it is speculation rather than factual.*
- **In Con Edison's field trials, the NARDA 8950 failed to detect electric fields at 67% of known locations that were detected with SVD-2000.** *This is based on the testing of just 6 objects.*
- **Power Survey has provided Con Edison with data on the electric field strengths of items that they [Power Survey] detect. More than 80% would be missed by NARDA.** *This is not information based upon actual field testing as in the point above. This was someone simply looking at a spreadsheet of electric field strengths supplied by Power Survey, and then performing an auto-sort function. An arbitrary field strength number was selected as being the cutoff point at which they deemed the NARDA could not detect. In previous submissions to the NY State PSC, confusion existed among filers over an audible alarm setting of the NARDA software with the actual signal detection*

levels of the 8950/10. The lowest ALARM setting of the NARDA 8950 is 2 volts per meter. The lowest field strength detection level is <0.02 volts per meter. Since most contact voltages emit a field strength of less than 1 volt per meter at 30 feet, the system alarm threshold cannot be used as the "cut off" as described in this point. Premier's training protocol is to never use the alarm function of the software as it has no real system operator value. Rather, our focus is on the shape of the wave being displayed on the computer screen as an indicator of contact voltage.

- **November 2010 NARDA indicated that they experienced difficulty detecting energized streetlights. Guilty as charged on this point- however, the Greens are incorrect in attributing this to NARDA- Premier was the contractor at that time. Premier mobile system operators had inadvertently damaged the fiber optic communications cable connecting the sensor to the laptop. On one night of surveying, a faulty street light was detected. The next night is when the problem was observed during a recheck procedure. Premier literally backed the sensor up physically touching the pole with no indication in the cab. After much frustration, and many hours troubleshooting, the damaged fiber optic cable was found to be the problem and replaced.**

**2) A head-to-head trial of the NARDA system and the SVD-2000 shows that more than 80% of energized objects were missed by the NARDA system.**

The Greens have made several errors here which we would like to correct first. The corrections are a professional courtesy only, and do not reflect our support their statements. I will paraphrase them here:

- a. That Premier/NARDA detected 40 objects during a 2010 mobile survey in Rochester, NY and Power Survey found over 300. *The actual numbers are Premier/NARDA found 40 objects, but Power Survey claims to have found 251, not over 300.*
- b. Shortly after the conclusion of that survey, RG&E developed concerns that the NARDA system had missed the majority of contact voltage hazards present at the time of contracted test. To address their concerns, RG&E retained Power Survey to conduct a re-scan of Rochester using the proven SVD-2000 technology. *This is simply a wrong statement. After losing the 2010 bid to Premier, Power Survey decided to conduct its own "shadow" survey without permission or authorization from RG&E. At no time did a contract exist for Power Survey to perform a re-scan of the Premier work for cause. Power Survey did land the 2011 bid for RG&E, but that work was performed months after the Premier/NARDA survey- but this was the normal annual survey, not a separate re-survey.*

What actually happened is described here<sup>ii</sup>:

*“On March 23, 2011 Power Survey filed a letter to the New York State Public Service Commission (“PSC”) expressing concerns they had on RG&E’s 2010 mobile testing effort and the specific testing equipment used. In their filing, Power Survey indicated they conducted an independent scan of the same area using their SVD 2000 equipment and claimed to have found 251 energized objects. In responding to Power Survey’s claim of finding 251 potentially energized objects, RG&E directed Power Survey to first re-scan these 251 energized objects before starting on the comprehensive scan of the City of Rochester.” (Please read referenced document for further explanation.)*

It was Power Survey that was concerned with the 2010 Premier/NARDA survey, not Rochester Gas and Electric.

Those 251 events, in the form of a spreadsheet, have never been seen by anyone at RE&E or the NYSPSC for actual verification.

Too, Power Survey uses a ‘proprietary confirmation’ protocol often running electrical test leads out 100 feet or more in some surveys. This introduces false readings on modern high impedance multimeters, even with a 500Ω shunt resistor. In that same report, RG&E observes on page 4 that:

*“In prior testing years 2009, as well as in 2010, mobile testing in the City of Rochester was performed following RG&E’s test procedure using a ground reference point within four (4) feet of the structure (touch potential). This year, Power Survey conducted mobile testing using their company test procedure which was based on using a ground reference point where ever a clean ground could be found. Power Survey did not believe in driving a reference ground within 4 feet of the energized object, or in testing for touch potential. They would search for a clean, un-energized reference ground to take a voltage read. In many cases, the ground references used were in varying distances up to 60 feet from the source, and more than one clean reference ground would be utilized per energized object. RG&E believes this ground reference procedure of utilizing long grounding conductors may actually increase the chances of picking up induced voltages from other sources. The majority of findings this year were in the 1-1.9 volt range, many in areas where induction may be probable. The effect of this procedure increases the number of findings, and can lead to misconceptions making it difficult to draw any substantial conclusions from year to year trending. This procedure would account for the significant amount of findings reported this year as compared to the previous 2 years.”*

So, it is incorrect to say or imply that a “head-to-head” trial took place in this instance. Too many variables were changed and too much time had elapsed between surveys.

**3) After evaluating and field testing the NARDA system, New York Utilities will not use it.**

“That the New York Utilities will not use it” is a true statement, but it is incorrect to cite evaluation and field testing as being the cause. Premier has done extensive work in NY over the past 2 years and the utilities are ready for an alternative mobile technology. The primary reason NY utilities do not use the NARDA system is that they have been actively fighting political challenges put forth by the Jodie S Lane Public Safety Foundation (JSLPSF) and Power Survey Company.

#### 4) The NARDA system is not certified

This is a factually incorrect statement. What the Greens mean to say is, it is not certified to their personal standards. Since Premier Utility Services is a user of the NARDA 8950/10 and not the manufacturer, we do not have rights to release the full UL certification- that is proprietary information of NARDA. Additional pages of technical data and the signatory certification page are in the full report.

The SVD-2000 was certified by Ergonomics Inc, based in Pennsylvania. Both systems MUST be certified in such a way as to reflect how they would be used in the real world. That is, a qualified technician MUST operate the vehicle to make determination if a test target was energized or not. When NARDA perform the certification, the only qualified system operator available was a NARDA employee. The technician then relayed the information to the person controlling the voltage on that object to see if it is an accurate detection or not. That NARDA technicians were involved in the certification process is true, just as Power Survey technicians were involved the certification of the SVD-2000. As stated in the NARDA/UL certification, “The witnessing engineer from UL was controlling the computer and made the ultimate decision whether or not the voltage was detected.” That NARDA may have assisted in erecting a simulated light pole or other object under test is irrelevant. The State of New York does not require an independent third party certification for the erection of a test apparatus- just the test.

We know from the NARDA/UL certification and the “Test Report on the SVD2000 Stray Voltage Detection System” (the SVD-2000 certification document) that the certification process of the two systems was virtually identical. A series of conductive objects were energized representing common items found along a roadway. Variations of vehicle speeds, distances from object, and applied voltages were tested for. Static (stationary) and dynamic (moving) test were performed. Additional testing was done on the SVD-2000 to verify the video capture function of that system, but the NARDA does not use cameras so those certification portions are not relevant.

A key difference is, Premier fosters the concept of public involvement and the free exchange of ideas. No critical examination has ever been made of the SVD-2000 certification because Power Survey does not release that information to the public.

The Greens are correct in that the NARDA system does not have a UL sticker (UL Mark), nor is it required. Only commercially available consumer goods receive UL stickers **FOR SAFETY** purposes to assist shoppers in making purchases. Specialized

expensive lab, one of a kind electronic devices and certain medical equipment are evaluated under witnessed tests programs. The NARDA did not undergo a consumer goods safety certification- it underwent an operational certification.

We have contacted UL directly. Specifically, the engineers involved in the testing/certification, and asked if they would clear this misunderstanding up for the Greens.

And, because this has been such a sticking point for so many lay persons to understand, Premier has obtained a second independent certification of the NARDA 8950/10. The system is now certified to detect 0.5 – 600 volts. We will make that certification available upon request to appropriate government representatives.

**5) National Grid has no further need to evaluate technologies, and cannot be trusted to do so.**

The Greens are overlooking the fact that, things change. We cannot speak for National Grid on this topic, and we were not asked to. But we can make general observations. Comparative testing and reevaluation is something we all do in many different areas of our personal and business lives every day. We are always looking for better and more cost effective solutions to life's daily problems. The fact that National Grid was asking for a comparison of the two technologies does not automatically imply they will reject the SVD-2000.

The Greens state *“National Grid has owned those systems for nearly three years, has evaluated them, and has **determined them to be unsuitable for testing in New York.**”* Why do they (the Greens) trust the opinion of National Grid to previously reject the NARDAs, but then don't have faith that they will reject them again?

We do agree 100% with the Greens that the testing must be open fair and honest. Let's bring in an outside engineering firm to perform that evaluation- that way the facts stand alone.

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The Greens conclude that “we wish to make clear that that we have no interest in the use of any particular commercial product.” But obviously they do as they have offered very little in hard, factual data here to support their claims. If this was a true independent filing the Greens would analyze and included the rebuttals NARDA provided in New York State.

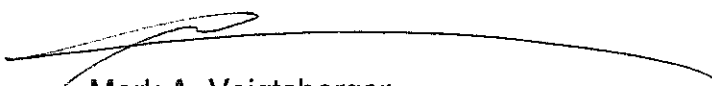
This document submitted by the Greens consists of Power Survey based claims only. We have attempted to set up a demonstration of the NARDA 8950/10 a handful of times with no response from the Greens or the Deanna's Lyric Foundation. Clearly, they have



no interest in examining any other technologies to compete with the SVD-2000. Just as in Point 5 above, the Greens “have no further need to evaluate technologies”- but it is not clear why or how they have come to that decision.

We respectfully request the Rhode Island Public Utility Commission reject the petition of the Greens for cause, and permit the utilities to allow an open and competitive bid process for their mobile contact voltage testing programs including the use of the 8950 if they so choose.

Respectfully,



Mark A. Voigtsberger  
Manager, Electric Field Services  
Premier Utility Services LLC  
100 Marcus Blvd, Ste 3  
Hauppauge, NY, 11788  
(800) 262-8600

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<sup>i</sup> Con Edison Report “*Factors Influencing Con Edison’s Current Position on the NARDA 8950 System*”

<sup>ii</sup> RGE “Report of Findings from the Mobile Detection Program, Case 10-E-0217”, filed 27 July 2011. Page 2

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12 September 2012

**Re: Docket 4237  
Commission Investigation Relating to Stray and Contact Voltage Occurring in  
Narragansett Electric Company Territories**

Dear Ms. Massaro,

Premier Utility Services respectfully submits comments to the Rhode Island Public Service Commission on the document titled "Factors Influencing Con Edison's Current Position on the NARDA 8950 System". This document was included as an attachment to a previously filed submission by Mr. & Mrs. Green, and referenced in a submission from Power Survey Company.

Premier would like to point out that, while we may use the terms Con Ed, Con Edison, and Consolidated Edison, we are not referring to that company as an entity. Rather, we are using these words to represent the author(s) of the specific document being discussed, and no other person(s).

We have attached a copy of that document, which was originally a 19 page PowerPoint presentation, for easy reference to readers of our comments.

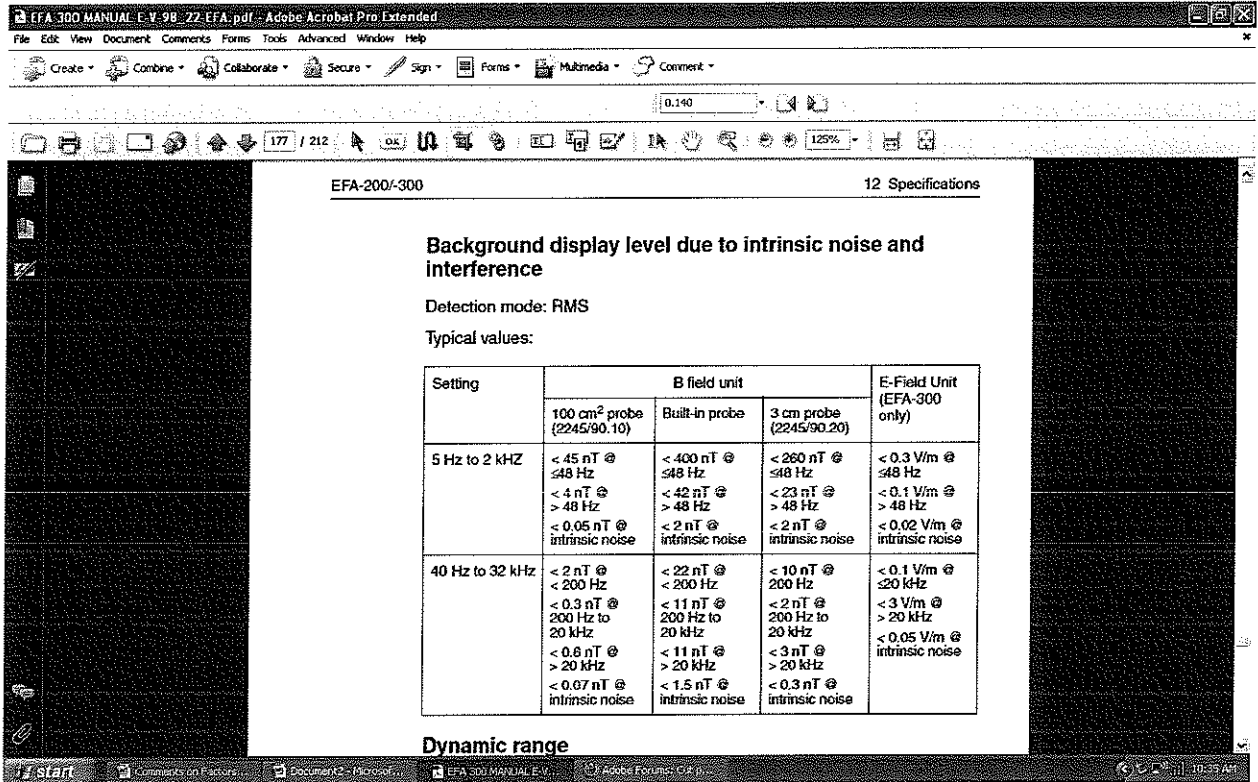
**Slide 1 to Slide 5-** no comments. This is portion of "Electric Field Detection Primer" is correct.

**Slide 6 and Slide 7**

The points

- NARDA EFA-300 sensor has a published floor noise of 0.140 V/m when the sensor is static
- NARDA 8950 System has noise floor, when moving, of approximately 2V/m based on charts from NARDA

are incorrect. In the NARDA EFA 200/300 EM Field Analyzer Operating Manual (BN 2245/98.22), page 12.13, the *official* NARDA Corporate published specification, for 60Hz signal detection, is <0.1 V/m at 60Hz and <0.02 V/m at intrinsic (static) noise. The NARDA 0.140 V/m number was simply a value selected for that particular paper for reasons unknown to Premier.

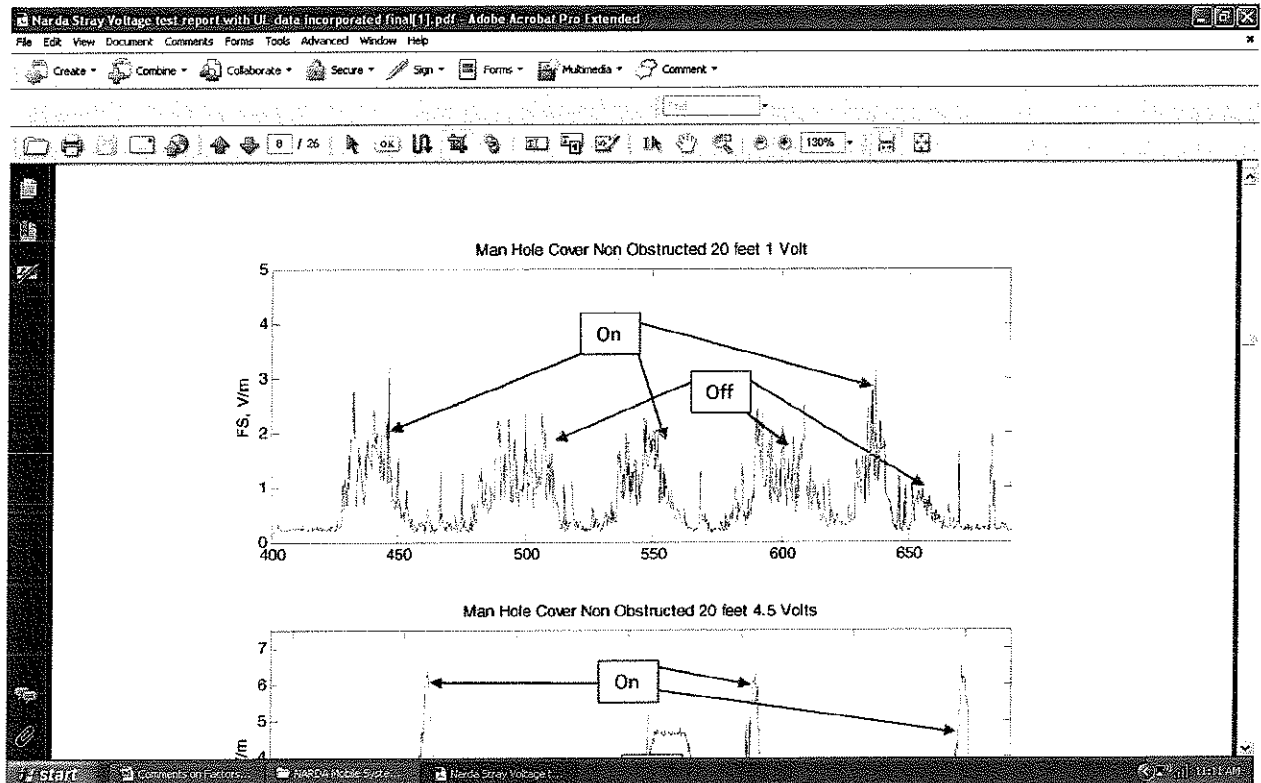


Too, data retrieved from the NARDA systems software logging function shows that the 0.070 V/m level, and by extrapolation the 0.140V/m level, is routinely surpassed by the 8950/10. A small selection of data retrieved from one recent mobile survey:

Date	Time	V/m
3/8/2012	7:57:48	0.065353
3/8/2012	8:18:07	0.069497
3/8/2012	8:47:08	0.069728
3/8/2012	9:13:52	0.062217
3/8/2012	9:41:16	0.065252
3/8/2012	10:39:17	0.068655
3/8/2012	10:52:26	0.067746
3/8/2012	11:02:49	0.064842
3/8/2012	11:25:49	0.061259

This file, which contains over 300,000 collected data points, will be made to any government official for review and confirmation of the claims made here.

The associated Slide 7 shows a line called the “Moving Noise Floor”. This was something added by the ConEd author(s) based upon their opinion as to what that level should be. As the image actually appears in NARDA documents:



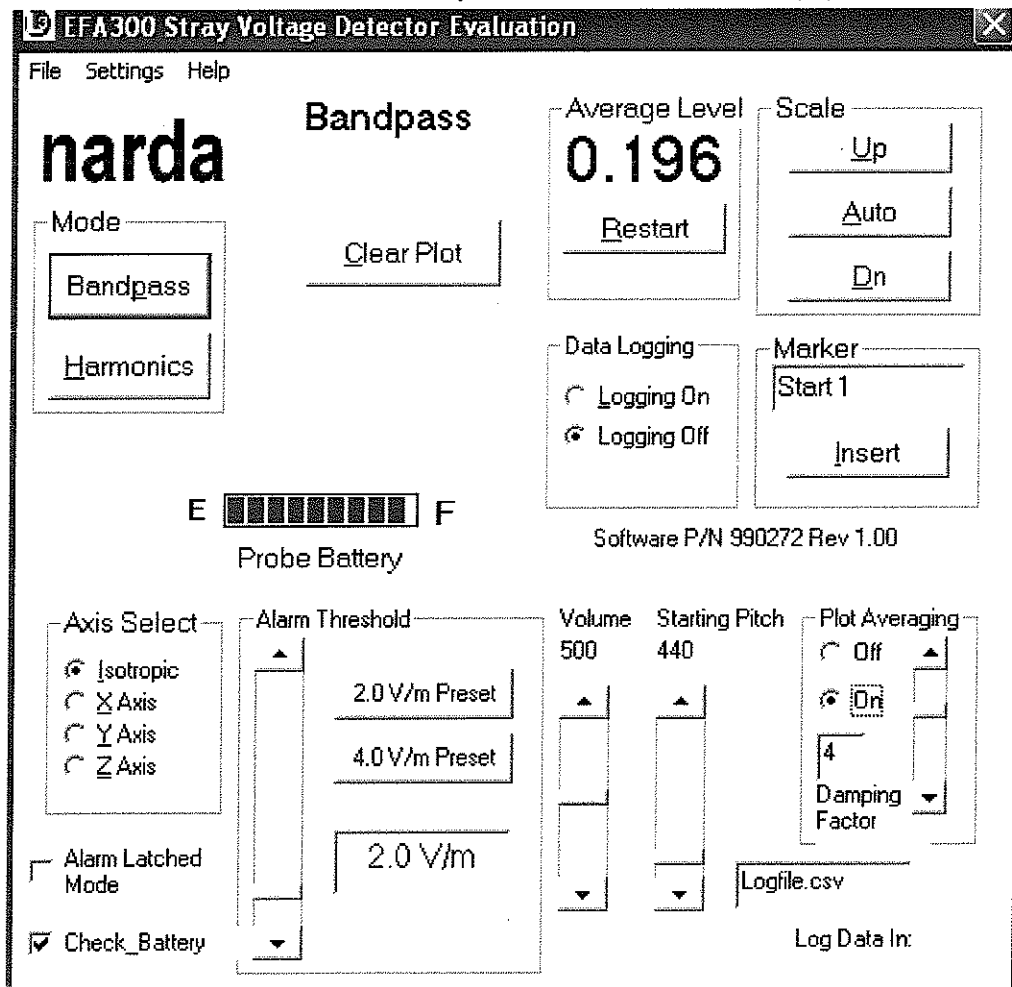
This chart represents 300 data points (400-700). At no point in the document does NARDA mention this concept termed “Moving Noise Floor”.

### Slide 8

- **NARDA sensor is sensitive to vibration from bumps and potholes on the road.** While not observed in Premiers operation of the NARDA 8950/10, ConEd may have experienced a problem called *microphonics*. This is a very simple problem to fix and is well described in the literature. Somewhere, ConEd had a loose mechanical connection, probably in the boom attachment on the back of the truck.
- **EPRI handheld sensor shows similar response to bumps and potholes.** This is irrelevant to the discussion of the NARDA system as the EPRI unit is not intended to be used as a mobile survey system.
- **SVD filters or dampens these events.** This is simply because the SVD has a different signal sampling rate than the NARDA 8950/10. The NARDA samples 12 times a second, and displays an

average of those readings on screen once every second. Too, any “blip” that may be associated with vibration/road bump will display as an instantaneous spike, where as true electric fields detected display on the screen with a certain distinctive run/rise pattern.

- **To avoid false positives from these events the user may opt to increase the detection threshold, reducing the number of detections.** This is fundamentally incorrect, and shows that ConEd did not fully understand how the system or software operates. The detection threshold on the NARDA 8950/10 is not adjustable. They are confusing the detection level with an alarm setting, which is adjustable. This is a screenshot of the NARDA software expanded Settings window. There is no detection level adjustment available on this equipment:



As you can see, the Alarm Threshold is set for 2.0 V/m, but in the Averaging Level display the system is still detecting 0.196 V/m in the upper right hand corner. **The Alarm setting does not control the detection level.**

**Slide 9-** no comments, other than NStar also owns a SVD-2000.

**Slide 10.** So, the comprehensive head-to-head testing between the two systems cited by both Power Survey and the Greens boils down to just the 6 objects listed on this slide. Giving ConEd the benefit of a

doubt, and presuming that they spent an hour at each specific location performing multiple passes in an attempt to detect a voltage, the head-to-head lasted less than a full nights work shift. We cannot believe that any independent evaluation of the facts would find that such a small sample immediately warrants a call to scrap any further testing and investigation between the two technologies.

**Slide 11.** We cannot comment on the actual data set supplied by Power Survey, and believe that is correct, but again, the error here is that ConEd is confusing the NARDA System alarm function setting of 2.0 V/m as the detection level. So, yes, using that incorrect number on this chart **would** show that the NARDA misses most objects. But, we have presented here that the NARDA does detect electric field strength of less than 0.1 V/m, so it would pick up every object on this chart. Why did ConEd miss 4 or the 6 objects? They were focusing solely on listening for an alarm rather than looking at what the screen was actually telling them.

**Slide 12-** no comments- private conversations we were not involved in.

**Slide 13-** Basically, ConEd is confirming here to us that they were not operating the NARDA 8950 correctly, and were using the Alarm Setting as a basis for all their pass/fail decisions.

**Slides 14-18** again, incorrect based on a wrong software assumption.

**Slides 19-** no comments as the Conclusion is based upon faulty information.

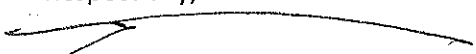
It is embarrassing for us to have to point out in public forums in both Rhode Island and Maryland, that the fundamental arguments against the NARDA 8950/10 are based on equipment operator error.

Premier believes that it has provided more than enough evidence in this document and other recent filings, to demonstrate that the NARDA technology is a viable equipment option for use.

We respectfully request, based on this information, that the Commission allow utilities to consider the use of the NARDA as an alternative testing technology for mobile voltage detection.

We emphasize again here that we are willing to participate in any TRUE side by side testing of these two technologies.

Respectfully,



Mark Voigtsberger  
Manager, Electric Field Services  
Premier Utility Services LLC  
100 Marcus Blvd, Ste 3  
Hauppauge, NY, 11788  
(800) 262-8600

# Factors influencing Con Edison's current position on the NARDA 8950 System

## **Four factors have driven our decision not to pursue further field testing of the NARDA 8950 System**

- The introduction of the system resulted in a price reduction for Con Edison
- Our preliminary field tests indicated that there were objects that the NARDA 8950 was unable to detect
- Power Survey has provided Con Edison with some data on the electric field strengths of items that they detect. More than 88% would be missed by NARDA
- On two occasions NARDA indicated that they had observed sensitivity issues relative to Power Survey

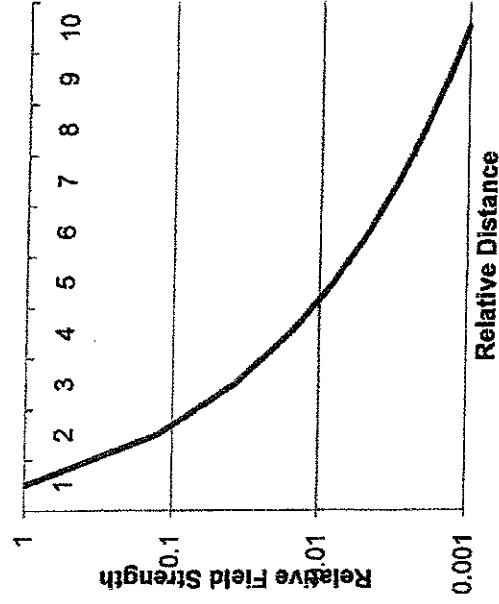
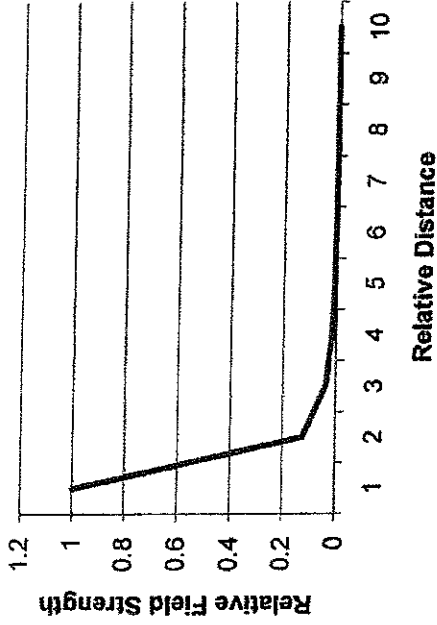


# Electric Field Primer

- Electric fields are measured in Volts/meter
- Electric field strength for a given object is a function of two things
  - Voltage
  - Distance<sup>3</sup>
- Object geometry also plays a major role

# Electric Field Primer

- Field strength falls off by the cube of distance, voltage is linear
  - Doubling the distance reduces signal strength by a factor of 8 (87.5% reduction)
  - At 5 times the distance signal is reduced by more than 99%
  - Half the voltage and the signal strength is reduced by 50%



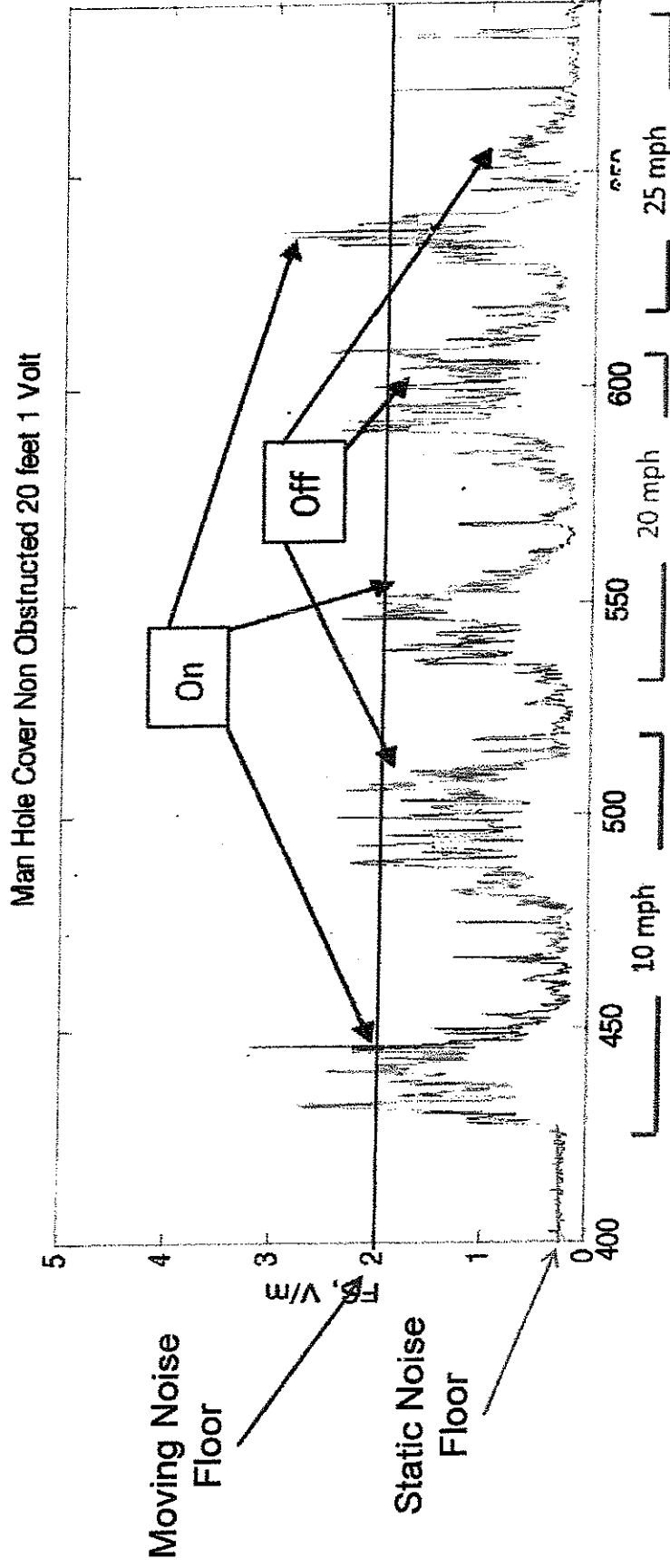
# Electric Field Detection Primer

- Both the SVD-2000 and the NARDA 8950 system are parallel plate electric field meters
- All detectors have a noise floor
- The noise floor is the measure of the signal created from the sum of all the noise sources and unwanted signals within a measurement system
  - Consider your ability to hear a whisper in a quiet room versus a loud stadium

# Electric Field Detection Primer

- Signals that are below the noise floor cannot be differentiated from noise
- SVD-2000 has unpublished noise floor but from data appears to be less than 0.070 V/m
- NARDA EFA-300 sensor has a published noise floor of 0.140 V/m when the sensor is static
- NARDA 8950 System has noise floor, when moving, of approximately 2 V/m based on charts from NARDA

# Estimating the NARDA Noise Floor



- Found by averaging noise level when the “target” was off

# Other observations on mobile detectors

- NARDA sensor is sensitive to vibration from bumps and potholes on the road
- EPRI handheld sensor shows similar response to bumps and potholes
- SVD filters or dampens these events
- To avoid false positives from these events the user may opt to increase the detection threshold, reducing the number of detections

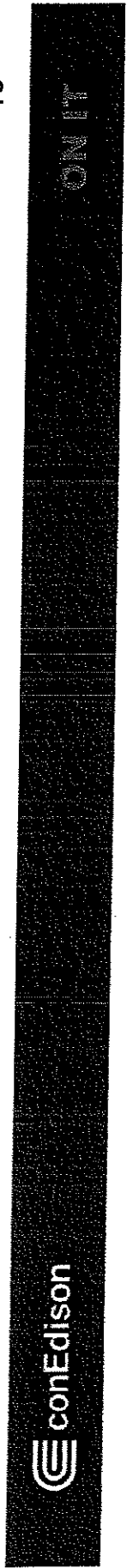
# Con Edison Pricing

- Con Edison is the only utility in the state that owns their own mobile contact voltage detectors
- Contract to operate and maintain vehicles is competitively bid
- Power Survey pricing is similar to Con Edison labor rate
- Pricing from other contractors to perform field trials of NARDA device were similar to Power Survey Pricing to operate SVD
- Market pressure from NARDA device helped to reduce cost of mobile testing for Con Edison

# Con Edison Field Trials

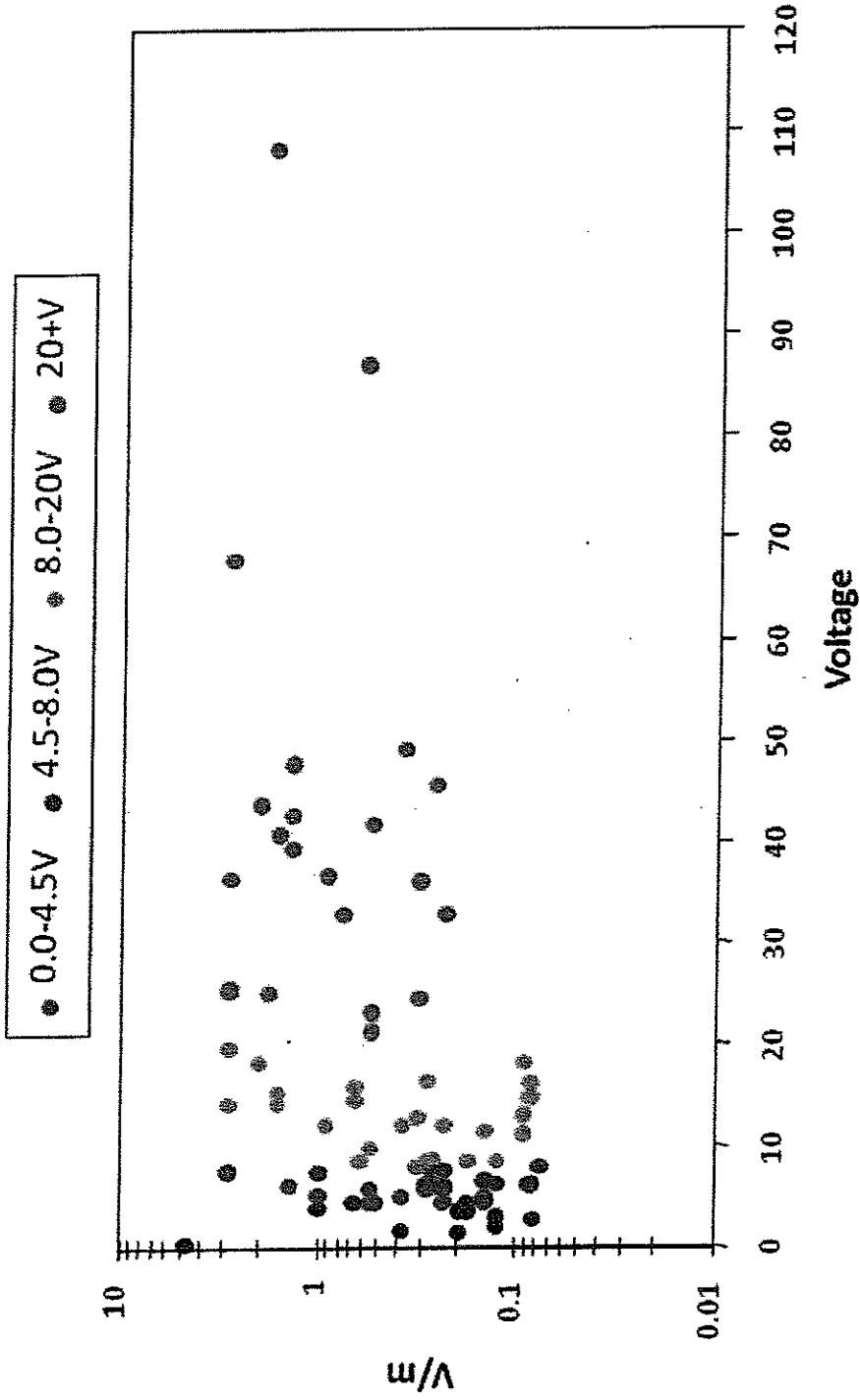
- Most recent field trials indicated that the NARDA 8950 failed to detect electric fields at 4 of 6 (67%) of known locations that were detected with SVD-2000.
- Searching for unknown locations is more difficult.

Location	Structure	Voltage	NARDA Confirmed	SVD 2000 Confirmed
Midtown	Traffic Light	1.7 Volts	No	Yes
E 59th St and 1st Ave	Transformer Grating	2.0 Volts	No	Yes
Westside	Metal Grate	1.4 Volts	No	Yes
Midtown	Scaffolding	6.0 Volts	Yes	Yes
Midtown	Bus Shelter	13 Volts	No	Yes
Queens	House Railing	2.1 Volts	Yes	Yes

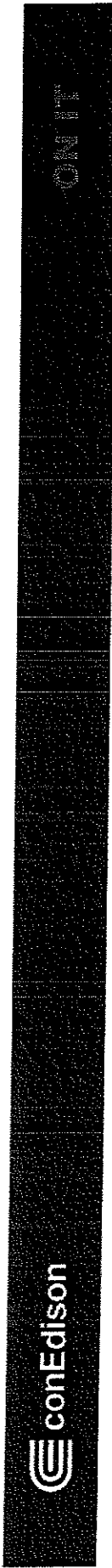




# Data from Power Survey



- Data collect by Power Survey indicates that many objects are below 2 V/m at all voltage levels



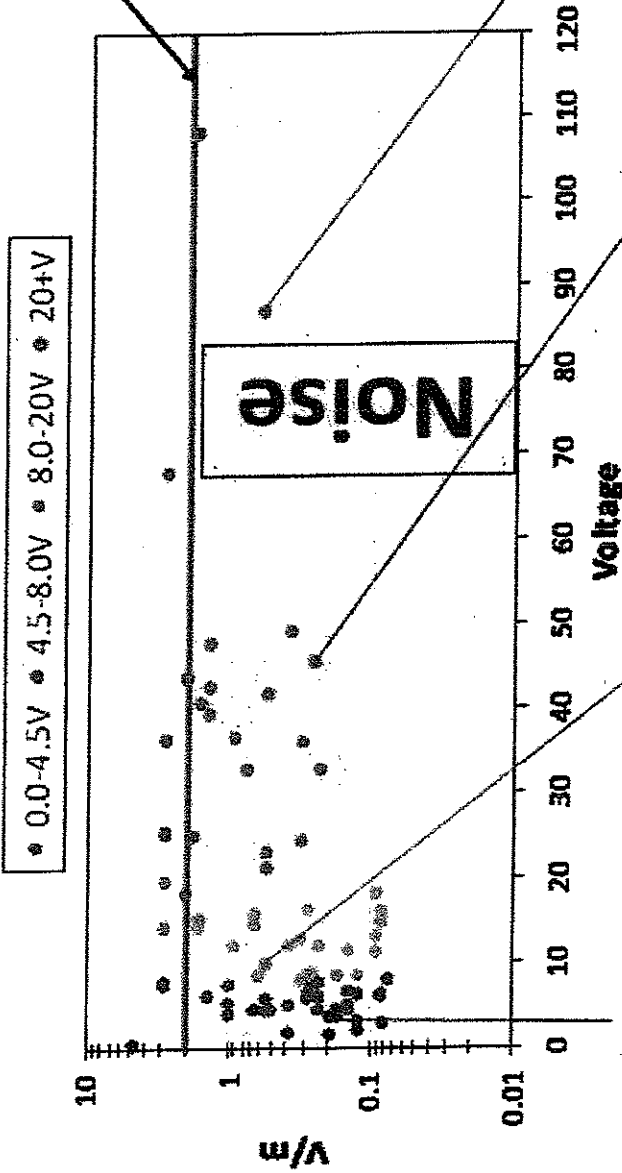
# Communications from NARDA

- November 2010 NARDA indicated that they experienced difficulty detecting energized streetlights (at 4V) in the field
- In Mid-April NARDA stated in their filing to the PSC that they supported the 0.070 v/m standard proposed in Maryland
- In Late-April NARDA communicated that the 8950 system could not meet the 0.070 v/m standard proposed in Maryland.

# Putting it together

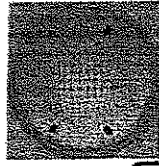
- 88% are below 2 V/m

- Undetectable objects at all voltage levels



Manhole

4V  
5ft



0.19 V/m

Scaffold

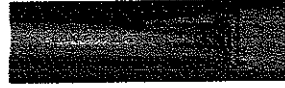
10V  
12ft



0.55 V/m

Streetlight

46V  
15ft



0.26 V/m

Sidewalk

86V  
17ft

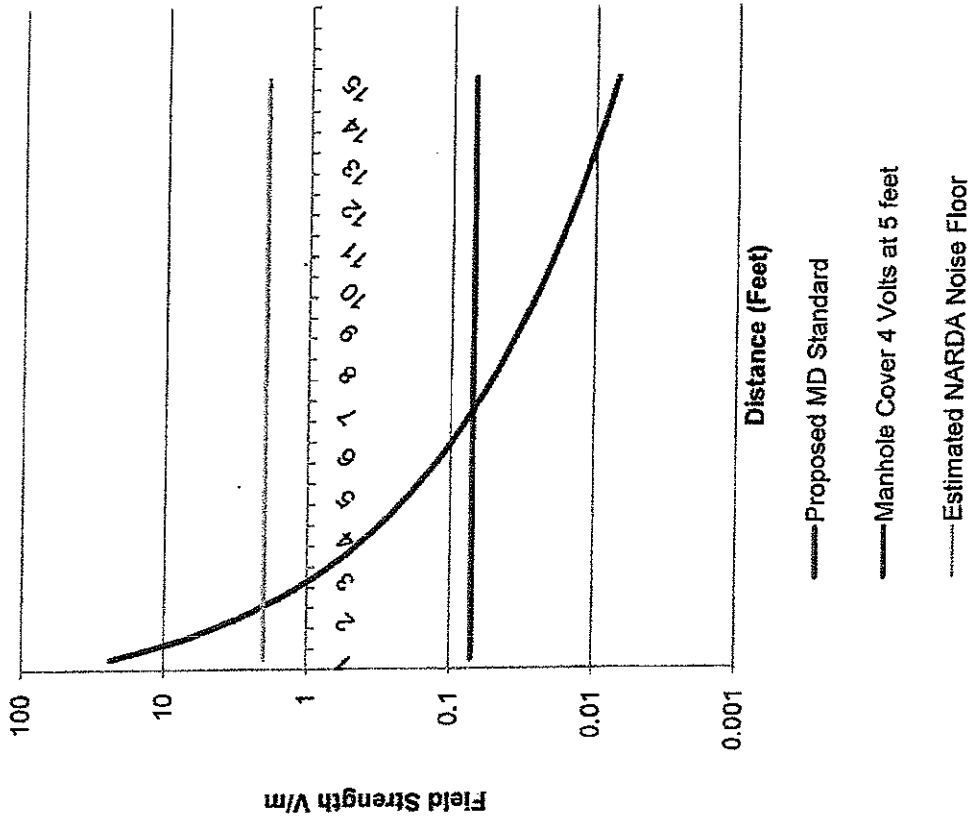


0.6 V/m

# Effect of distance on real world objects

## Manhole Cover Example

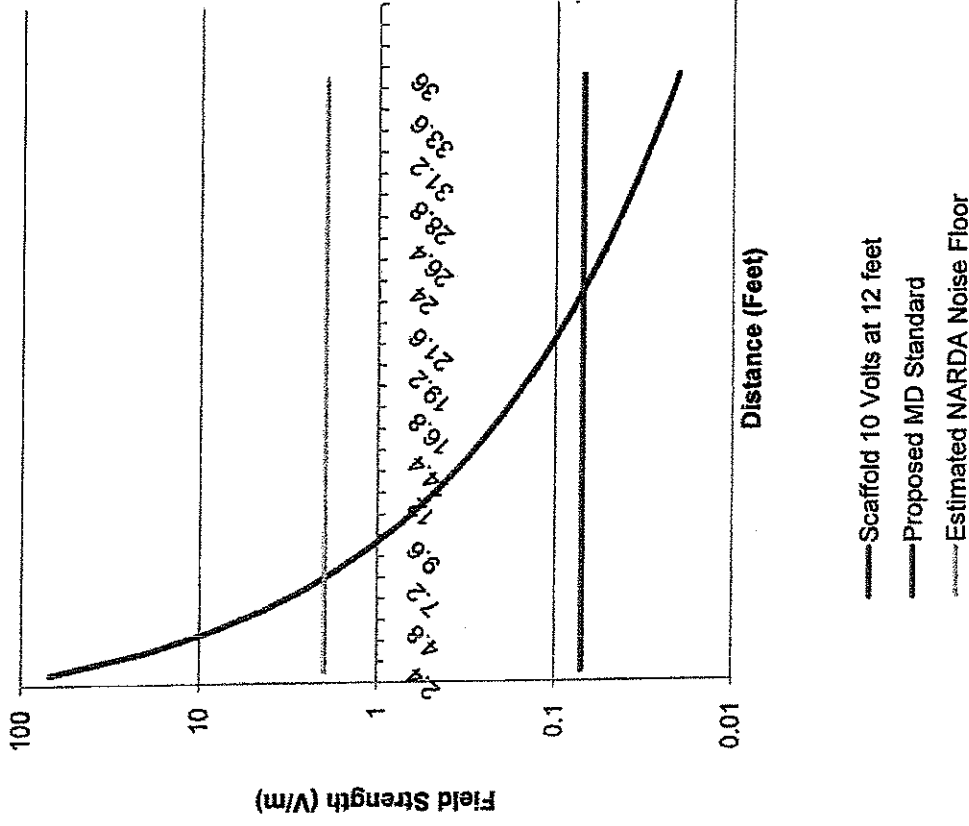
- Originally detected at 4 volts from 5 feet away
- At approximately 2.25 feet the e-field would be below the estimated 2.0 V/m NARDA noise floor
- Under MD Standard the e-field from this object would be below the noise floor at approximately 7 feet



# Effect of distance on real world objects

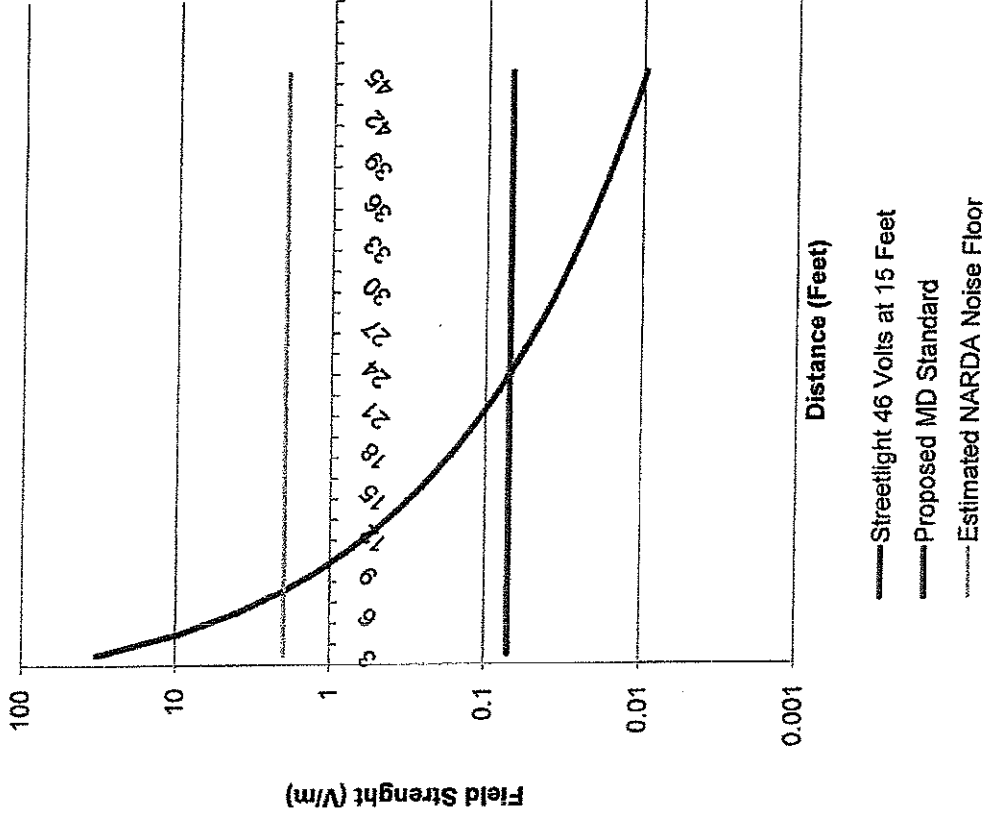
## Scaffold Example

- Originally detected at 10 volts from 12 feet away
- At approximately 8 feet the e-field would be below the estimated 2.0 V/m NARDA noise floor
- Under MD Standard the e-field from this object would be below the noise floor at approximately 24 feet



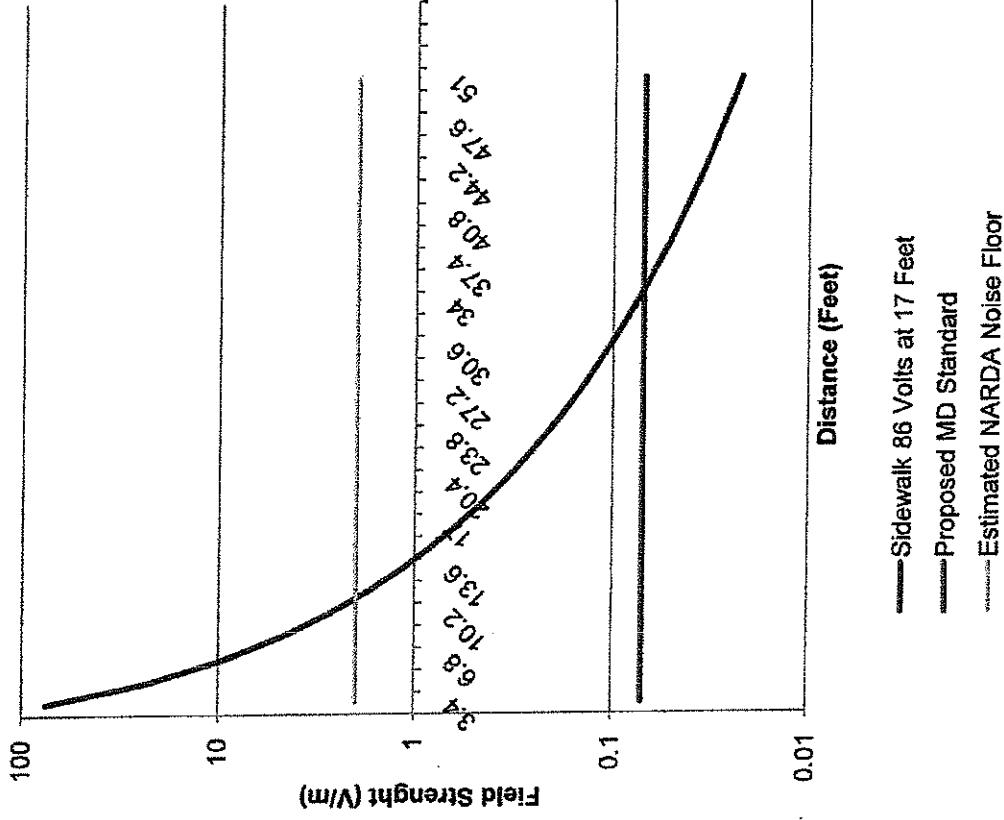
# Effect of distance on real world objects

- Streetlight Example
- Originally detected at 46 volts from 15 feet away
- At approximately 7.5 feet the e-field would be below the estimated 2.0 V/m NARDA noise floor
- Under MD Standard the e-field from this object would be below the noise floor at approximately 23 feet



# Effect of distance on real world objects

- Sidewalk Example
- Originally detected at 86 volts from 17 feet away
- At approximately 12 feet the e-field would be below the estimated 2.0 V/m NARDA noise floor
- Under MD Standard the e-field from this object would be below the noise floor at approximately 35 feet



## **Conclusion**

- No one has assembled a comprehensive set of data on field strengths of energized objects in the urban environment
- Distance is the most significant factor in field strength
- Even objects at high voltages can have low field strengths
- The 0.070 V/m standard proposed in Maryland is an arbitrary level and more data is required to determine if it is the proper threshold.



## Conclusion

- NARDA has indicated that they support the 0.070 V/m standard and that they cannot meet that specification
- Power Survey has provided data showing that at the current sensitivity the NARDA device misses 86% of the energized objects
- In a limited field trial Con Edison found that the NARDA device could not detect 67% of the **known and confirmed** energized objects
- Limited additional cost savings in near term with this technology for Con Edison
- Con Edison has observed a large difference in performance and felt this was enough evidence to cancel larger scale field trial