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Before
The Public Utilities Commission Of Ohio

Lawrence A. Boros P.E.)	
5883 Dornwood Drive)	
Mentor, Ohio 44060)	
440-257-1433)	
)	
Complainant)	Reference Case No. 05-1281-EL-CSS
)	
v.)	
)	
First Energy Corporation)	
aka The Illuminating Company)	
)	
Respondent)	

FINAL BRIEF FROM LAWRENCE A. BOROS. P. E.
COMPLAINANT

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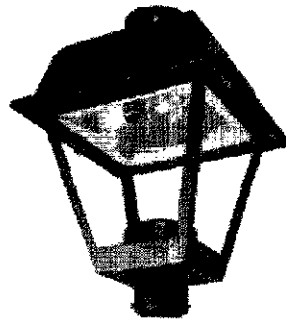
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1 My complaint to the Public Utilities Commission of Ohio asks for two very simple and
2 modest remedies by the First Energy/ Cleveland Electric Illuminating Company:

3

4 1. It requests that the GE Salem Model SEMT residential HID street light fixtures (or
5 other similar cutoff versions of residential post top street lighting fixtures) be made
6 available at a fair and reasonable cost under existing or amended tariffs.

7



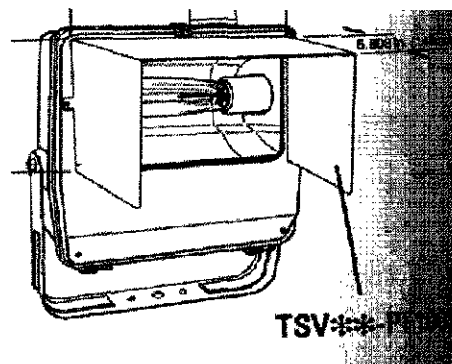
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9 and

10

11 2. That optional shielding on utility-supplied un-metered HID floodlights be made
12 available at a fair and reasonable cost under existing or amended tariffs. Such shielding
13 is available from floodlight manufacturers for most of the models they produce.

14



15

1 I am not requesting that all new lighting be cut off or shielded. I am not requesting that
2 all present lighting be immediately upgraded. I am simply asking that reasonable lighting
3 options that reduce glare and improve the quality of lighting be available at a fair cost to
4 those who request their installation.

5

6 I have a Welding Engineering degree from the Ohio State University. Part of the
7 Welding Engineering curriculum dealt with arc physics and provided me with a sufficient
8 starting background to work as an engineer who managed pilot production on advanced
9 (HID) arc lighting technologies at General Electric Lighting and at Advanced Lighting
10 Technologies in the Cleveland area.

11

12 High Intensity Discharge (HID) lamps emit very powerful light by using an electric arc to
13 generate a high temperature incandescent plasma inside a quartz tube instead of using a
14 relatively low temperature incandescent tungsten filament. HID lighting was developed
15 to illuminate large areas and it does so by generating four to seven times as much light as
16 an incandescent lamp of the same electrical wattage. Three primary forms of HID
17 lighting were developed over the years starting with Mercury Vapor, then High Pressure
18 Sodium (HPS), and finally Metal Halide (MH.)

19

20 We have a rational tradition of shielding the direct light from incandescent bulbs to
21 reduce glare in our homes and offices. We also have a rational tradition of shielding the
22 direct light from HID bulbs within indoor facilities such as offices, conference rooms,
23 retail stores, and arenas. At the same time we have an irrational tradition of not shielding

1 the direct light from outdoor HID bulbs at night. As a result much of our nighttime
2 lighting generates disability glare that compromises our ability to see effectively.
3 Disability glare takes the form of a bright halo around unshielded intense light sources.
4 This halo is caused by the diffraction and diffusion of light in the lenses and ocular media
5 of our eyes.

6
7 The HID cutoff post top fixtures and shielded floodlights that I am requesting do a better
8 job of shielding direct radiation from the bulbs and greatly reduce disability glare. Also
9 by design, none of the light is allowed to radiate above the horizon from cutoff fixtures.
10 Therefore cutoff fixtures put more of the light on the ground where it can be reflected
11 back at the observer. Cutoff or shielded fixtures do not in of themselves save electrical
12 energy. However because of the reduced glare and improved visibility, they may allow
13 lower wattages to be used. It should be noted that cutoff and shielded lighting prevent
14 direct light from radiating to un-allowed areas where the observers are located so that
15 reflected light can dominate their vision. The actual light intensity within the areas where
16 direct radiation is allowed is a separate issue because the light intensity follows a
17 distribution that is controlled by the design of the fixture reflector and lenses.

18
19 There are numerous examples (some of which have been provided in testimony) from the
20 Cleveland area, the state of Ohio and other U.S. locations where streetlights with cut-off
21 optics, and shielded floodlights are standard or required. It is a growing trend and I
22 believe that First Energy should consider updating its catalog and procedures to take that
23 trend into account.

1

2 Street lighting is provided at night in an attempt to reduce the number of vehicular
3 accidents that occur disproportionately at night and to improve pedestrian safety.

4 Unfortunately, most street lighting is unshielded and radiates direct light at the driver or
5 pedestrian which reduces visibility because of disability glare. Film, condensation, and
6 rain on windshields increases the glare effect for the driver. We have all experienced this
7 common result of unshielded lighting that makes driving more complicated, stressful, and
8 fatiguing. If glare dominates, vision is compromised.

9

10 As one example of compromised vision, driving on Route 20 from Painesville to Geneva,
11 Ohio is a treacherous endeavor at anytime because the four lanes are narrow and
12 oncoming traffic on the inside lanes is only a few feet apart with relative velocities of
13 about 100 miles per hour. Adding to the danger at night are numerous unshielded pole
14 mounted HID streetlights and floodlights that radiate direct light at motorists thereby
15 creating unnecessary disability glare. The unshielded floodlights are mounted obliquely
16 to the road or across the road and radiate direct intense light directly at motorists. In wet
17 weather visual difficulty is compounded by multiple reflections and refractions on the
18 road and windshield from all of this unshielded direct lighting. For long stretches, while
19 traveling at 45 to 50 miles per hour in wet weather at night on Route 20, my vision is
20 compromised and I cannot see the dividing lines, the curb, or any unlit hazards in the
21 roadway.

22

1 As another example of compromised vision, in 1999 while driving home from work after
2 dark, I approached a post top residential streetlight near my home that was brilliant and
3 generated a broad shield of disability glare that I could not see past. This streetlight was
4 on the left side of the residential street at a sharp left curve before a sharp right curve.
5 The glare blocked my vision of the street behind the streetlight. There was no centerline
6 in this residential street. I was tired from working an extremely long day and had driven
7 over thirty miles and was a block away from my home. Not seeing any approaching
8 vehicle headlights I drove as straight a line as I could through the curves. Immediately
9 upon having the streetlight on my left the glare went away and I could see a boy on a
10 skateboard just inches off of my left fender. I would have seen him in my headlights
11 much earlier without the glare from that streetlight. This near life- altering incident
12 convinced me that misapplied outdoor lighting can definitely be counterproductive and
13 compromise vision. Since I understood the technology, this incident provided the
14 incentive to eventually pursue better lighting through this PUCO complaint process.
15
16 Many people squint and tolerate glare from streetlights and flood lights not knowing that
17 this kind of lighting can be drastically improved. They know that they don't like the
18 glare but are unaware of the alternatives. They trust the lighting application experts
19 working in the electric utilities and in the commercial companies that install outdoor
20 lighting. What they don't know is that sometimes there aren't any lighting applications
21 experts working in electric utilities companies or in commercial lighting installation
22 companies and those assigned to lighting may have numerous other responsibilities.
23

1 Lighting technology has become more complex with the development of new lamps,
2 fixtures, controls and photometric application requirements. There is a revolution taking
3 place now with the development of new fluorescent and solid state (LED) light sources.
4 Surely, an electric utility such as First Energy must have a full time lighting specialist on
5 staff who works on lighting matters in order to keep abreast of these developments and to
6 make them available to their street and flood lighting customers in the interest of
7 improving lighting conditions, lowering costs, and saving energy. Logically, it
8 compromises the vision and safety of both drivers and pedestrians not to have competent,
9 professional designers involved in street lighting and flood lighting applications designs
10 provided by First Energy. Those designers, at a minimum, should have had outdoor
11 lighting training and be members of the Illuminating Engineering Society of North
12 America (IESNA) and have the "Lighting Certified" or "LC" credential which indicates a
13 basic understanding of current lighting technology and professional status. The
14 Illuminating Engineering Society of North America (IESNA) is the definitive American
15 National Standards Institute (ANSI) resource in setting standards and recommended
16 practices in the application of lighting.

17

18 Unfortunately, during all of the testimony and hearings, I did not hear that First Energy
19 had such a "lighting specialist" person on staff. Indeed, the testimony seemed to indicate
20 that street lighting and flood lighting designs were provided on a part-time basis by
21 personnel who had other major responsibilities and that while lighting designs were
22 somehow based upon "IESNA Standards", First Energy could not explain what those
23 standards were or how closely they were complied with. Surely, given the revenue

1 generated by First Energy's street lighting and floodlighting business and the safety
2 implications of that lighting, at least one full-time lighting certified specialist should be
3 on First Energy's staff.

4
5 In the 1960's soon after the development of the High Pressure Sodium (HPS) lamp by
6 General Electric at Nela Park in Cleveland, The Cleveland Electric Illuminating
7 Company seemed to be on the cutting edge of outdoor lighting technology having
8 engineered and installed the very first high pressure sodium HID street lights in the world
9 on Noble Road in East Cleveland and on Mayfield Road in Cleveland Heights. Now it
10 seems that through its parent company, First Energy, CEI now lags behind in lighting
11 technology and does not consider lighting applications technology as a valid priority. Yet
12 the need for that technology by First Energy customers has not diminished.

13
14 First Energy has stated that approximately 1600 top post fixtures and 440 floodlights
15 were installed since January 1, 2002 by the Cleveland Electric Illuminating Company.
16 Since CEI is only one of several electric utility companies within First Energy, the total
17 number of post top fixtures and floodlights installed throughout First Energy would
18 logically be a significant multiple of those numbers. Also, these numbers do not include
19 the quantity of pole mounted cobra head streetlights installed during that period.

20
21 The City of Mentor and the City of South Euclid, Ohio, among others in Northeastern
22 Ohio, have enacted lighting ordinances in response to citizen demands to reduce glare,
23 light trespass, and sky glow for the purpose of improving visibility and the nighttime

1 character of their communities. Such lighting ordinances are becoming more common.
2 The IESNA is presently developing a model lighting ordinance that will provide guidance
3 to the increasing number of communities that want to improve their nighttime
4 environments. Electric utilities will be servicing more customers that will have
5 requirements for better controlled light distributions. Shouldn't First Energy be
6 responsive to these developments?

7
8 Prior to the passage of the Mentor City Lighting Ordinance in May of 2000, CEI told the
9 City that it could not install shielded floodlights as required by the new ordinance
10 because shields were not covered under existing tariff rates. Prior to passage of the
11 Mentor City Lighting Ordinance in May of 2000, the Cleveland Electric Illuminating
12 Company installed pole mounted un-metered and unshielded floodlights at the Mentor
13 Avenue Charter One Bank parking lot and at the Fairfax Elementary School parking lot
14 in Mentor. Subsequent to passage of the Mentor Lighting Ordinance, the Charter One
15 Bank installed metered wall pack lighting on it's building in lieu of additional CEI
16 floodlighting. In 2004 with City of Mentor approval, the Fairfax Elementary School
17 requested a 400 watt pole mounted un-metered floodlight from CEI for an area of their
18 school grounds that was behind existing floodlighting pointing West and bordered by a
19 fence to the East that defined the backyards of five residential homes. The additional
20 floodlight was to be mounted on a pole near the fence line and pointing West. The
21 residents of the five homes signed approval forms requesting the additional floodlight to
22 light up the area to help prevent vandalism that was occurring after dark. (Refer to
23 Lawrence Boros testimony Exhibit 3 which is Fairfax Principal Dr. Heller's letter to the

1 five residents.) Subsequent to the November 9, 2004 letter (Refer to Lawrence Boros
2 testimony Exhibit 6 which is Dr. Heller's letter to Mr. Gary Lebzelter of First Energy),
3 the floodlight was never installed. Mr. Ralph Delligatti, Supervisor Regional
4 Engineering CEI stated during testimony that a "five year private outdoor lighting
5 contract" was provided which included a section signing off on a variance to the City
6 ordinance and was never returned by the "school board." There apparently was no
7 effective follow up from CEI on obtaining the agreement paperwork from the "school
8 board" and it seems odd that Dr. Heller of Fairfax Elementary was sufficiently motivated
9 to go through the process of making diagrams, obtaining resident and City approval and
10 never follow up on the paper work if he was aware that it existed. Mr Delligatti stated
11 that since enactment of the Mentor Lighting Ordinance, First Energy / CEI has not
12 installed any un-metered floodlights in Mentor because of daily fines that could be levied.
13 Wouldn't the addition of a shielded floodlight option be an easy and customer-serving
14 way for First Energy to respond instead?

15

16

17 Mr. Stephen Hadick, Senior Business Analyst First Energy Service Company, stated that
18 CEI is under an obligation through PUCO order in Docket No. 05-1125-EL-ATA not to
19 increase base distribution rates until April of 2009. When asked why this was he stated
20 that it was determined in a stipulation entered into in Case No. 05-1125. When asked
21 what was the reason for the stipulation, he stated that he did not know. He stated that the
22 stipulation did allow for certain costs to be passed along for security and other things like
23 that. When asked if there were any similar tariff freezes that he was aware of he stated

1 that Toledo Edison has a similar distribution rate freeze. Toledo Edison is also part of
2 First Energy. He stated that the tariffs are written by First Energy's rate department and
3 then submitted for approval. When asked if PUCO has approved anything since the
4 stipulation froze the rates Mr Hadick said that he did not know. He stated that CEI has
5 not had a rate case since 1995. It just seems odd that someone in Mr. Hadick's position
6 of analyzing costs and developing rates for a major electrical utility company that is part
7 of and serviced by the company he works for would not know the circumstances that
8 caused a major constraint to income generation and cost recovery.

9

10 General Electric Salem style post top fixtures are available in non-cutoff (SEML) and
11 cutoff (SEMT) versions. Consolidated Electrical Distributors (CED) several years ago
12 offered both versions at the same price. These two versions use the same mounting, the
13 same frame, the same electrical ballast and the same universal position bulb. The main
14 difference is that the SEML version has the bulb fully exposed by hanging vertically
15 down from the top while the SEMT has the bulb mounted horizontally and tucked in
16 under the top and in a reflector so that it is not exposed. According to Mr. Ralph
17 Delligatti, CEI has switched sources of post top fixtures from GE to Cooper Lighting. He
18 stated that the Cooper cutoff version costs twice as much as the non-cutoff version of the
19 post top colonial style fixture. Relative to the GE price equivalence between models, this
20 two times price differential also seems odd.

21

22 There are numerous organizations interested in efficient, economical and comfortable
23 outdoor lighting. The IESNA, of course, is well aware of poor outdoor lighting and its

1 Recommended Practices manuals increasingly refer to the design of lighting applications
2 to reduce the negative effects of glare and other forms of light pollution including light
3 trespass and sky glow. Lighting engineers appreciate well-designed lighting applications
4 that provide well-lit conspicuous pedestrian and vehicular environments free from
5 counterproductive disability glare. Many of these lighting engineers also belong to the
6 International Dark Sky Association (IDA.) The primary purpose of the IDA (11,000+
7 members) is to reduce light pollution which is defined as any adverse effect of artificial
8 light including sky glow, glare, light trespass, light clutter, decreased visibility at night,
9 and energy waste.

10

11 The Ohio Turnpike Commission has installed cutoff fixtures at many of its interchanges
12 and rest stops. If you travel around Ohio's urban areas, you will see numerous
13 installations of cut-off and shielded lighting. While Ohio appears to have comparatively
14 little cutoff street lighting as yet, just about all of the street lighting in California is cutoff.
15 Electric utilities such as Progress Energy of the Carolinas and Florida and the Long
16 Island Power Authority install and promote cutoff fixtures as the default configuration.
17 The Federal Aviation Administration mandates cut off street lights all around airports to
18 reduce up light that could make landing in fog much more dangerous.

19

20 The Federal Energy Policy Act of 2005 mandates that mercury lamp HID ballasts not be
21 sold as of 1/1/08. This means that there is a rare opportunity to change out thousands of
22 street lighting fixtures which use obsolete mercury vapor lamps and replace them with
23 modern more-efficient, less glaring fixtures that use high pressure sodium (HPS) lamps.

1 This change over to more efficient HPS lighting could yield significant energy savings
2 through the use of lower wattage fixtures. This is an excellent time to start planning the
3 conversion of those thousands of old, less efficient and obsolete mercury vapor
4 streetlights to less glaring, modern and more energy efficient high pressure sodium
5 streetlights.

6

7 In summary, it seems that without the intervention of the Public Utilities Commission of
8 Ohio First Energy/CEI will not provide the requested modest remedies of optional cutoff
9 post top residential street lighting and shields for floodlights which are the minimum
10 lighting option improvements that the Commission should be considering. And most
11 certainly without the intervention of the Public Utilities Commission First Energy/CEI
12 will never agree to update its catalog of street lighting fixtures and provide the necessary
13 resources to improve the lighting that it provides to its municipal and commercial
14 customers that directly affects the visibility and safety of our driving and pedestrian
15 environment.

16

17 Because the lenses and ocular media in our eyes become more occluded with age,
18 disability glare from unshielded HID lighting becomes more debilitating with age. This
19 is why many older drivers cannot drive at night. In the interests of reducing glare and
20 improving visibility – especially for older drivers like myself - I recommend that the
21 Commission at some point in time consider stipulations making low glare cutoff versions
22 of pole mounted and post top mounted streetlights and shielded floodlights the default
23 configurations for all new and replacement un-metered lighting in First Energy's service

1 area and perhaps in time throughout Ohio. Since existing lighting fixtures would be
2 upgraded as they fail and are naturally replaced, the additional costs over time, if any,
3 would be minimal.

4
5 I believe that for all of us the real issue is how can the knowledge, awareness, and
6 attitudes of the key people within First Energy be changed so that they naturally support
7 the consistent improvement of the lighting applications technology that First Energy
8 provides to the public in its service areas.

9
10 In closing, it is difficult for me to understand why an electric utilities that spends
11 considerable financial resources in media advertising creating the image of public service
12 would in fact object to such minor changes with logical beneficial results and, further,
13 why the utilities would respond with such a costly, long and drawn-out legal process as
14 we have been through.

Certificate of Service

I hereby certify that this written testimony was served by e-mail on January 13th, 2007 to Kathy J. Kolich at kjkolich@firstenergycorp.com and to Jeanne Kingery at Jeanne.kingery@puc.state.oh.us. Today, January 13th, 2007, eleven copies are being mailed to the Docketing Division and one copy is being mailed to Kathy J. Kolich at First Energy.



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