

R14-10 Petitioner's Post Hearing Brief Exhibits**Exhibit List**

Exhibit Number	Name/Citation	Description
1	Ex. 1, Public Comments Summary	Summary of Testimony Supporting the Variance Offered at September 17, 2013 Hearing
2	Ex. 2, Bilicic Affidavit	Affidavit of George W. Bilicic
3	Ex. 3, Thompson Affidavit	Affidavit of Daniel J. Thompson
4	Ex. 4, AER MPS Group Emission Control Technologies Chart	AER MPS Group Emission Control Technologies Chart
5	Ex. 5, Dynegy Emission Control Technologies Chart	Dynegy Chart of Emission Control Technologies
6	Ex. 6, Post Hearing Comments of Dr. Lisa Bradley	Post Hearing Comments of Dr. Lisa Bradley
6 Attachment A	Ex. 6 Attachment A, AECOM Technical Critique	AECOM's Technical Critique of Recent Air Quality Modeling Analyses of the Edwards, Joppa and Newton Plants
6 Attachment B	Ex. 6 Attachment B, AECOM Analysis of PM _{2.5} NAAQS Compliance Issues	AECOM's Analysis of PM _{2.5} NAAQS Compliance Issues for Monitors in the Vicinity of the Edwards, Joppa, and Newton Plants

Exhibit 1

Public Comments Summary

Summary of Testimony Supporting the Variance
Offered at the Hearing before the Pollution Control Board
On September 17, 2013 for PCB Docket Number 14-10

Brandon Phelps

Page 43

- State Representative, 118th District (Southern Illinois)
- In 2002 IPCB granted AER a variance from the MPS which was considered to be a “net benefit to air quality” and recognized the associated economic benefits
- Variances materially the same as the one granted by the Board in AER last Fall
- Uncertainty related to the future of Joppa plant is “causing enormous amounts of distress to individuals and also to their families”
- District “hit hard with state facility closings that the Governor did, especially Tamms”
- Unemployment rate very high
- Lack of investment to support the needs of the community
- Local school districts and municipalities struggling
- Joppa Energy Center total economic impact to the state of \$193.5 M, \$46 M in annual household earnings for Illinois residence, \$850,000 in local property tax
- Everybody is for jobs
- We all love clean air
- 400 Union jobs in the Joppa area
- Vital to my District
- Benefits will be lost if a similar variance is not granted to Dynegy and IPH
- Cannot afford to lose these jobs
- Best path forward to improve air quality while protecting jobs and sustaining economic vitality

Senator Forby

Page 46

- State Senator, 59th District (Southern Illinois)
- Joppa is in his District
- To put people out of work in the highest unemployment part of the state would be terrible

Wayne Rosenthal

Page 47

- State Representative, 95th District (Central Illinois)
- In full support of the variance petition filed by IPH
- A Dynegy subsidiary currently pending
- If petition is granted, IPH will provide certainty to employees and communities throughout southern and central Illinois that count on many economic benefit of continued operation of the AER Energy Center
- Without this variance, AER will be forced to pursue other options for its energy centers creating uncertainty for the future of the plants and those who depend on them - - individuals, families, business and communities not only within my district by all across the state

- Coffeen Energy is in Montgomery County which has one of the highest unemployment rates in the state
- Its livelihood is critical as demonstrated by its total economic impact of \$535 M for the State of Illinois
- Facility generates more than \$123.2 M in annual household earnings for Illinois residents and in turn supports schools, municipalities, emergency response organizations, and city governments across the state
- Pays \$3.8 M in annual local property taxes
- Supports 1,513 jobs in our local area including the men and women from the operating engineers Local 148
- Overall Coffeen supports 2,481 jobs in the State of Illinois
- My District, as well as the State of Illinois, will lose countless benefits should the IPCB not grant IPH's request
- Dynegy has stepped up to support much needed Union jobs and economic activity throughout Illinois
- Through proposed sale "committing to do what they can to help AER plants operating within Illinois and have already spent approximately \$1 billion on environmental controls"
- Last year, this Board saw fit to grant AER's variance request recognizing both the environmental and economic benefits of doing so
- I would urge that the Board continue to do the same for IPH's petition so that the many benefits provided by the AER facilities in my District are not lost
- Considering the importance of this petition, I fully support the IPH Petition for Temporary Relief as "the best path forward for improving air quality while protecting the much needed jobs and the economic benefits we depend on"

Senator Andy Manar

Page 50

- State Senator, 48th District (Central Illinois)
- Coffeen is located in my District, southern Montgomery County
- Coffeen provides an "immense level of economic security to individuals, families and communities situated within my District and across the region and downstate"
- Last year this Board saw fit to grant AER's variance request recognizing both the environmental and economic benefits of doing so. I'm here to urge the Board to do the same for IPH
- July 2013, unemployment rate in our state is 9.2%
- Montgomery County has traditionally been the county in the state with the highest unemployment rate
- Losing this private employer would be detrimental not only to Montgomery County but to the entire state
- All 5 plants provide "certainty to the employees and the communities in the central and southern portions of our state that count on economic benefit of the continued operation of these facilities"

- When I was on the County Board (Chairman in Macoupin County) we lost two coal mines in 2007 and 2008 and that corresponded to “25 cents on every \$1 of our revenue to county government”
- We had to manage our way through that crisis: services suffered, local businesses suffered, and things took a spiraling path towards the bad side
- A vibrant business climate is essential for the residents in our communities and even the prospects of potential shut-downs could stifle economic growth in the further development of the industry in both central and southern Illinois
- I’ve met with Dynegy many times and “they have given me their commitment that they are doing what they can to keep AER plants operating within the state. Already they have spent approximately \$1 billion on environmental controls.”
- “I’ve reviewed the request, and I believe that it is both economically and environmentally responsible.”
- Variance “ensures reduced emissions and high environmental standards that are in place while also protecting the economic livelihoods of Illinois families in a place that needs it desperately.”
- As the State Senator of Illinois’ 48th District, I pledge my support for the request and believe that it is the best path forward to improve air quality while protecting jobs and sustaining economic vitality in the state

Brad Halbrook

Page 54

- State Representative, 110th District (in East Central Illinois)
- Coles, Cumberland, Clark, Crawford, Lawrence and Edgar
- Expresses support for variance to the MPS standard
- Seeks similarly relief to that granted Ameren in 2012
- Committed to complying and fulfilling the obligations under that variance
- Urge the Board to grand the same relief to IPH so that the many benefits provided by its facility are not lost in the state
- The 5 energy plants provide an immense level of economic security to individuals, families and communities situated within some of the most economically devastated areas of the state
- Newton Energy Center in Jasper County adjoins my District on the west
- The individuals, families and businesses within my District have not been “immune to the trying economic times dealing with the high unemployment, now new job opportunities, and the lack of investments supporting these people within the community, especially in regards to the local schools and municipalities.”
- Livelihood of individuals and families within my District depend on survival of the new energy center whose total annual economic impact is over \$288 M
- Facility generates over \$72 M in household earnings for Illinois residents which them supports local schools, municipalities, emergency response organizations and city governments
- Pays over \$7.5 M in local property tax
- Supports 738 local jobs and 1300 jobs in the state
- Job security and job creation

- “A successful transfer of these plants to IPH offers the best opportunity for the workers, their families and our communities.”
- Without the variance, Ameren will be forced to pursue other options for the AER centers creating uncertainty for individuals, families and businesses within my District as well as those around and throughout central and southern Illinois
- Dynegy is committed to doing what it can to create plants operating within Illinois
- Dynegy is “an Illinois employer with a strong environmental track record”
- Spent nearly \$1 billion in environmental controls, while AER has also contributed \$1 billion on environmental controls
- Continue to pledge my full support for IPH’s request

David Reis

Page 57

- State Representative, 109th District (Southeastern Illinois)
- “We were here last year to offer the same support for variance for Ameren. It made sense then. It makes sense now.”
- They’re not trying to get out of installing anything, they just want more time to cash flow it and make sure it gets put in right
- U.S. is 4% of the world’s population
- Here in America we are doing things right but it has to make economic sense as well
- The electric rates have gone down a lot. It’s harder to cash flow these things.
- I live about 10-12 miles from the Newton power plant, I see how much money has been invested in the scrubber and they still got a ways to go and that’s why they’re asking for this variance, to allow time to get it installed, but we’re going to get there, and it’s going to be a very efficient and clean burning coal fired power plant.
- Newton is the third newest coal fired power plant in the State of Illinois
- We have to be careful if we start shuttering or mothballing power plants as to where exactly we’re going to get our power, so there’s people from the County Board, the School District, to talk about the importance and give you more numbers

Mark Bolander

Page 59

- Mayor of Newton
- Mayor for 8 ½ years
- Newton is county seat of Jasper County
- 2 ½ hours from here, Southeastern Illinois
- Population of 3,000
- Jasper County has a population of 10,000
- Newton Energy Center next to one of the best bass fishing lakes in the Midwest
- Rely heavily on its presence in our area
- Rely on the good paying jobs, property tax revenue and positive economic impact the Newton plant brings to our city and county
- School district, fire protection district, ambulance service, law enforcement groups are effected very directly from property tax revenue provided by the Newton Energy Center and the type of services and programs they’re able to provide and at what cost

- Losing Newton would not only cripple Newton and Jasper but have a huge impact regionally as well
- Total economic impact on the State of Illinois \$288,339,000
- Total annual earnings \$72,371,000
- Local property tax \$7,384,000
- Total supported Illinois jobs in local area 739
- Total supported jobs for Illinois residents 1,292
- Direct jobs 142
- This is just Newton. I'm not talking about the other plants. I'm not qualified to talk about the other areas.
- If they would come downstate and visit our area they would "see Mother Nature in her finest"

Ed Mitchell

Page 62

- Chairman, Jasper County Board
- Board voted to support the variance
- Understands importance of air quality
- Ameren working in good faith
- Anticipate same with Dynegy
- Jasper: 495 sq miles; 9698 residents
- It is a farming community
- Plant is second largest employer – second only to schools
- Over ½ of EAV of the county
- School districts: 50 percent; county 20 percent
- Eastern Community College 16 percent
- Rest to townships, fire districts, library, U of I extension
- Impact of not granting the variance would be to devastating and destabilizing to the entire community
- \$55 M generated through this plant
- County board did its part with cuts – 84 FTE – 50 in ambulance, police and fire, health dep. ("we're heavy on health and safety")
- We ask you to weigh to options and consider "what impact would happen to the county and the community if the variance is not granted" -- again ask support

Dan Cox

Page 65

- Superintendent of Schools, Jasper Unit 1
- Largest geographic school district in state – 462 square miles. 1400 students
- Buses travel 3436 miles per day – 1200 further than from New York to San Diego – each day
- Newton Power Station "a valuable neighbor" "Vital to the financial health of our schools" -- ½ of tax base at \$4 M
- Largest employer (school) 200 employees
- Since 2008, lost \$2.1 M in combined revenue

- Potential closure of plant as a result of variance not being granted would be “devastating”
- Representing our most precious natural resource, our children
- Variance is crucial “so our children may too someday be leaders of our communities and function as democratic citizens”

Mayor Pethel

Page 67

- Mayor of Robinson
- Representing city and city council
- Recognizes 2012 IPCB-granted extension to Ameren for pollution control from Jan 1 2015 through Jan 1 2020
- Best interest to transfer variance from Ameren to Dynegy for so many people/families
- Was employed at Hutsonville...was able to retire. Others transferred to Newton and Coffeen... now in jeopardy. “So it’s very close to me .. My friends work there. It’s just not people that live in Robinson. They’re my friends”

Bob Berty

Page 69

- Executive Director, Crawford County Development
- Job is to bring jobs to Illinois. “Bringing jobs to Illinois is tough. It’s tough.”
- Many of the learned people up here have taken the entire view. I am looking at it just from our standpoint.
- In Crawford County, Hutsonville closed in 2011 – adverse effects to employment and taxes.
- Large industries depend upon Newton power plant now.

Michael Carrigan

Page 95

- President of Illinois AFL-CIO
- Expressed continued support for IPH their petition for variance from the Illinois MPS which the board found to be “a net benefit to air quality” and urges them to “recognize the associated and economic benefits.”
- IPH variance is materially the same as the one granted by the board to AER last fall and is a closing condition, a stipulation, a term of the sale from AER to IPH.
- AFL is committed to fighting for worker’s rights.
- AER is a key employer
- AER energy centers economic benefits to the State of Illinois and local communities are critical during this economic downturn
- AER’s energy centers total economic impact \$1.4 billion, \$338 M in annual household earnings
- P plants paid \$13.3 M in annual local property taxes and they support 6,294 Illinois jobs
- Critical to keep these employees working in that we keep these economies afloat during these rough times
- Local economies and families not alone in economic struggle “corporations like AER and IPH are also feeling the effects of operating in today’s environment.”

- Stakes are especially high for companies such as IPH due to the immense capital expenditures necessary to comply with state and environmental laws.

James Luckey

Page 101

- Manager, Edwards Energy Station, Bartonville
- 2,200 Comments in Support presented
- Similar to the request the Board granted last year
- Critically needed for central and southern Illinois
- Our people, communities, and thousands across Illinois dependent on energy centers
- Diversity of people
- Haven't seen the recovery from the recession that northern Illinois and Chicago seem to enjoy
- "We are real people... We're leaders, we're organizations who care about our communities, our environment and our economy and our supporters include: Boilermakers Local 60 and 363, Bricklayers and Allied Craft Workers Local 8, Congressman Davis, Congressman Enyart, Congressman Kinzinger, Congressman Shock, Congressman Shimkus, the Crawford County Development Association, Harry Roland who is CEO and administrator of the Mason District Hospital, the Hennepin Business and Betterment Association, the IBEW Sixth District, IBEW Local 51, IBEW Local 649, the Jasper County Board, the Illinois AFL-CIO, the Illinois Chamber of Commerce, the Illinois Energy Association, the Illinois Manufacturers Association, the Illinois Valley Area Chamber of Commerce and Economic Development, the Illinois Valley Building and Construction Trades Council, the Illinois Association of Heat and Frost Insulators and Allied Workers Local 1, the Illinois Association of Sheet Metal, Air, Rail and Transportation Workers, the International Union Operating Engineers Local 148, the Iron Workers Local 392, Jonathan Tollman, Superintendent of the Red Bud School District, the Laborers International Union of North America Local 338 and Local 1084, the Leadership Council from southwestern Illinois, and Lewis & Clark Community College.

James McKinney

Page 105

- Director of Operations, Hayes PMC in Belleville
- Union General Contractor specializing in maintenance/capital projects for coal-fired power plants
- Works for both Dynegy and Ameren
- Typical employment in-house 21 – 1,500 during large outage
- In 18 years, 13 M hours and over one billion in revenue within the State of Illinois
- "The issue that brought us all here is extremely important. It should not be taken lightly. Either the variance that had previously been approved for Ameren at their coal-fired facilities is approved for Dynegy or we should be prepared for even more economic problems for our state."
- "Without the variance, power generation capacity will be eliminated and thousands of jobs across the state lost. The economic crater created will not be easy to climb out of for the towns and communities impacted. Loss in power generation could lead to

blackouts and hear-related illnesses and even deaths that can accompany such events. The overall impact will be far reaching.”

- Degree in chemical engineering and understand the environmental concerns presented by the opposition. Dynegy has proven to be a good steward of the environment. They spent a billion dollars on installing pollution control equipment at various sites, 11 baghouses and eight scrubbers to name a portion.
- Taken on the responsibility to lower emissions and to improve our communities.

Albert Martos

Page 107

- Ameren Employee, Morton
- Edwards for four years; Duck Creek for three and one half years
- Veteran
- Blessed to have worked for Ameren – looking forward to working for Dynegy
- “consider this variance for our sakes and for our families and communities”

Brian Smith

Page 108

- Dunlap, General Supervisor, Duck Creek
- In industry for 19 years
- “You made a very good decision in the last variance decision, and I’m asking that you weigh the options and make a good decision this time. It is going to be for the betterment of our environment as well as for the betterment of our jobs and our communities in Illinois.”

Prentice Carter

Page 109

- Peoria
- Started with CIPS in 1987 – through a number of mergers ...became part of Ameren
- Worked in engineering and operations
- Personally involved in the installation, startup, and operation of pollution control equipment including low NOx burners, over fire air, selective catalytic reduction, scrubbers, so I’ve been there through the years where we’ve made these improvements to our plants, and in recent years, I’ve had the opportunity to actually work at all of our facilities in Illinois and meet the people there, and I just want to assure you that everybody I’ve worked with is dedicated to the work, to the environment, and the communities in which we live, and I respectfully request that the Board grant approval of the petition.

Tom Ruschmeyer

Page 110

- Ameren Edwards Plant employee
- Associated with power plants in Central Illinois for 32 years
- Seven years in union, 25 years in management

- Hired in 1981 specifically to clean the scrubber, monitor SO2 scrubber modules, and keep these things compliant “with the regulations of the day”
- We continue that process of staying in compliance, and we’ve continuously gotten better at it, so we’ve been in the business a long time so I’d like to make that clear.

Dennis Morgan

Page 111

- General Supervisor – Edwards
- 19 years in this position at Edwards; 22 years in industry
- Seen first-hand economic benefit of having facility in Havana
- Strong school district
- It’s my hope that my grandchildren are afforded the same, so I please ask you to support the variance, to support central and southern Illinois jobs.

Alan Bogardus

Page 112

- Ameren Edwards, Seven Years- Production Superintendent
- Veteran
- Last year I came where you listened to me ... a lot of great things have happened, but the most important thing that I want to talk to the Board about was after that day, after that hearing, the trust that you put into me is the same trust that has been put into me for 23 years in the military. It was an exception. We went back and we carried that out every day with integrity and honor. We take your rule and we hold it very dearly, and it’s very important to all of us and the people out there.
- We recreate in these areas. We live in these areas, and it’s of the utmost importance that we value your decision and carry it forward with integrity and honor, and we’ve done that, and we will continue to do that if you grant this variance.

Pat Foley

Page 113

- Ameren employee for 7 years in Peoria
- Joined military in 1984. Retired from the navy in 2006.
- Captain Maurice Joyce: whatever comes up, whatever decision you have to make, do the right thing, you know, and it fits here because there’s a couple of things you can do.
- You can grant the variance and get a better net benefit in atmospheric air and a cleaner environment and still maintain the economic vitality of the communities
- Or you could not grant the variance and destroy all these communities and the schools around Newton that I was listening to, and I’m sure it would really hurt them bad, but you wouldn’t get any net benefit in the atmosphere or the environment.
- A net benefit against really no benefit, economic vitality or economic destruction. DO the right thing.

Tom Hart

Page 115

- Lives in Orland Park (apartment in Peoria) – Ameren Employee

- Perception of business community is that the State of Illinois...not conducive to do business here because of your rules and regulations.
- Grant the variance here to demonstrate the willingness of the State of Illinois to work with businesses and develop the economic environmental reasons.

Greg Russell

Page 116

- Director, Duck Creek Energy Center
- In industry for 25 years, locally for the last 13, originally from the East Coast
- You can look out into the audience and see all the hard working men and women of these facilities
- We talked and heard a lot about the economic impacts these facilities have in the communities we serve from schools, businesses, the overall local economy, tax bases, and other things.
- It's no different in the Canton area for Duck Creek
- A "devastating impact to the local community if these were not allowed to continue to operate in some form or fashion."
- Like Allen Bogardus mentioned earlier, we take our jobs serious and our commitment serious
- You have that commitment from me and all the people that work at Duck Creek day in and day out, 24 hours a day, 7 days a week, that's our job, that's our commitment, we take it serious
- Families count on what we do, the payroll and everything that goes on in Canton from the local community and schools, we do provide the necessary benefit to the area, and we ask that you do grant the variance request

Kevin Largent

Page 117

- Worked with Ameren and its predecessor company since 1989 (24 years)
- The last 14 years at the Duck Creek facility
- Company has allowed me to further my education through education matching
- Allowed me to raise my two sons that are 17 and 14 and support my family
- I would encourage the Board to review all options and support the variance

Curt Kooken

Page 118

- 34 year employee of the Edwards station
- Been in operations my entire career, all of it at Edwards
- "I am the person inside...running the equipment, maintaining the compliances that have been established."
- Half of my department will be there, in there, on Christmas Day working to provide electricity for our community
- Our communities rely on this plant for tax dollars or for the school
- Please consider the variance and give it to Dynegy

Roger Look

Page 119

- Supervisor, Ameren Duck Creek
- The reality is that Ameren really is not going to keep these plants and the second reality is that Dynegy wants these plants, and to keep these plants viable and running and people in jobs we're going to have to allow this variance to go through
- People don't realize what it takes to run a power plant, they have no idea
- Invites Board to tour power plant
- People work in rough difficult conditions next to boilers that can be 165 degrees, do this day in and day out and don't do it because they want to put pollution out into the system and hurt people. They do it because when you go over to the light switch on the wall, you have electricity.
- I appreciate the Sierra Club, but there are times when I feel they go too far.
- "If we take away the coal fired plants in this country, none of us are going to be using our electric instruments. We won't be using the lights, and we won't have our air conditioners and our furnaces because you'll see the same thing California had back a few years ago."

James Klenke

Page 120

- Ameren employee for 13 years
- Lifelong resident of Bond County
- Bachelor's degree in Science and Environmental Biology
- Involved in environmental complaints, monitoring, reporting and permitting
- Operations lead in placing two wet flu gas de-sulfurization units into service in Coffeen
- The wet flu gas de-sulfurization units scrubbed the flu gas to remove sulfur dioxide
- Our FTDs must be in service for our boilers to be operational and our FTDs have proven to continuously remove greater than 98.9% of the sulfur dioxide
- Proud to be part of this organization that takes this environmental stewardship seriously
- I ask the Board to grant this variance that they have already determined that will result in an environmental benefit and will sustain jobs, environment, communities and families

Joyce Lipe

Page 125

- Hillsboro resident in Montgomery County
- Coffeen power station employee for 32 years
- My father was a supervisor at Coffeen so "I have power plant in my blood"
- This employment gave me a good college education, nice career
- I've been able to do the same for my two sons and I was able to provide them with a college education
- Rowlett power station is administrative function
- I get involved in the hiring process and we recruit a lot of young talent into our organization, many of them who went to Illinois schools and participated in power plant technology programs
- My goal would be to see them have the same opportunities as I have had

John Broder

Page 127

- Electric Energy, Inc. employee at the Joppa Plant
- Variance needs to be given Dynegy for several reasons, first I'd like to keep my job and second, I have a 17 year old I promised I'd send to school

Joe Lockett

Page 127

- Hillsboro, Illinois
- Employee of Coffeen
- Safety supervisor for the last 16 years, been there 31 years
- My family has been blessed, my grandpa worked for the old retired money power
- He moved to Hutsonville power station
- This room does impact us greatly. You know I look around and my wife is an administrator in Montgomery County and the funding, the tax revenue, is just basically shrinking up. They have to have volunteer efforts in groups like Seratoma, Lyons, Kewanee, to supply many of the shoes, gloves, and clothing for the children.
- Our state economy "is very bad right now"
- A negative decision here would just really push a lot of these small communities over the edge
- Please, please again support this variance
- All you have to do is drive through there (southern Illinois small towns) and where the buildings are empty, if they're still standing - - oftentimes, my daughter refers to them as missing teeth. The downtown districts are really just getting very depressed and we really need this.

Rich Speraneo

Page 129

- Employee at Coffeen energy center, worked there 21 years, started as an engineer and still works in the engineering department
- Lives in Hillsboro, Montgomery County
- Over the last 13 years "a significant portion of that work has been on environmental projects, primarily air emissions"
- It is good to have the support in our community of the energy center, and I would ask for your support for the variance
- The plan laid out by Ameren and Dynegy is the best solution – it provides good environmental benefit and economic benefits for the area

Mike McSperritt

Page 131

- Works at Coffeen
- Lives in Hillsboro, Montgomery County – 6 miles from Coffeen energy center
- 2nd generation Coffeen worker

- “My dad was able to raise a whole family, and nice healthy kids within the shadows of the plant.”
- I’m also living within, you know, a few miles of the plant. Got three kids: healthy, active, no health issues
- Coffeen has got a scrubber, one of the cleanest in the state, if not the nation
- We are not economically viable without the other plants
- Just because we get 99% of our SO₂ out doesn’t mean we can survive in the economy without the other stations
- So that’s why it’s very important to me for you to pass the variance today

Jeff Coyle

Page 132

- Employee at Coffeen energy center
- Born and raised in central Illinois
- In 30 years, worked in engineering, maintenance, in environmental and presently is plant manager of Coffeen
- Proud to have been part of the \$1 billion worth of investment that we’ve made in air quality improvement
- Points to the chart and shows: “we’ve done a really nice job with that investment”
- I ask the Board to vote for the variance to preserve jobs, to preserve our communities and to preserve downstate Illinois

MC King

Page 134

- “As I sat here and listened to the opening testimony and the expert testimony of some personnel that had “very impressive credentials” and “the emotional testimony of my co-workers and other individuals that are here and the special interest groups” I ask myself what would the IPCB do”
- Let’s look at the facts – there are 2 categories: I guess my job would be to ensure that MPS are held and the spirit of it is justified
- We have proven back in September 2012 the net benefit is approved by approving the variance – conditions have not changed
- Second portion: economic importance of this decision
- The data is there – everybody knows when you lose jobs, there’s no tax money, the economy is going to get worse, the school system is going to get worse, multiple jobs get lost, that’s just economics 101.
- So if I step back and look at the environmental decision I’m going to make now, it hasn’t changed since 2012. The economy is sluggish, the market prices are still in the depression mode, and nothing has changed.
- So if I know that I have the environmental side of the house that I’m concerned with, it’s not like I’m making it worse, it’s an improvement, so it’s a win-win situation
- Solidifies the integrity of the MPS
- Solidifies jobs, helps the economy, helps the communities around it, it’s a win-win situation

Scott Bell

Page 136

- Lives in Chatham
- Worked for AER for over 25 years at various power stations
- Currently works at Coffeen
- The environment is one of the cornerstones of all of the discussion and decisions made at that facility, we do this on a daily basis
- Coffeen has recently built two scrubbers, two new SCRs, a new precipitator, and upgraded another precipitator
- AER's spent over \$1 billion in pollution control equipment
- Supporting the variance means "we will continue to do SO₂ and NO_x during this timeframe"
- We will be "keeping well paying jobs at our local communities and it means keeping taxes in our area which support our schools and communities, a win-win for our state and local communities

John Romang

Page 137

- Lives in Rochester, with most of his life in Springfield
- Worked for CIPS and then Ameren for the last 33 years
- Newton power station, then Coffeen
- Serves as the local Village as the Zoning Board of Appeals Chairman
- One of the reasons we got here today is because of Illinois de-regulation
- Energy centers now expected to stand on their own and compete in the marketplace
- Power stations across the rivers are still regulated and costs can be passed through regulatory compliance
- These energy centers at an economic disadvantage and an economic hardship for us to survive in the marketplace
- "Local and sustainable": I would offer you folks that these local communities that we've heard about, the school districts taxing base, they will not be sustainable in these small communities without these energy centers producing the tax revenue that they do

Bill Mulconnery

Page 141

- Resides in Evansville, Illinois
- Business manager of Boilermakers Local 363 in Belleville
- Boilermakers Local 363 covers 57 counties in southern Illinois; represents 620 Union members and families
- We build and repair power houses, old refineries and steel mills
- We install the pollution control equipment at these facilities
- Denial of a variance will impact my membership through not only loss of jobs, but also loss of future projects
- Dynegy should be allowed this variance because they have been and will continue to be a "great partner in the power industry by employing local Illinois labor and showing good stewardship to the local environment."

Bernie Wicklein

Page 143

- President of Neuter Construction Company, St. Louis, MO
- Industrial contractor, works all over the United States
- Services power plants, petro chemical facilities, the industrial facilities and other refining and chemical plants in southern Illinois
- Employee Union laborer
- Ameren and Dynegy are our customers
- Worked with Dynegy in Havana and Baldwin on the scrubber project; we built the large vessels, and we built all the major vessels for those jobs, four units
- We got to see “Dynegy’s commitment to safety, quality, the community, and the environment. They are a very conscientious customer.”
- Lifelong resident from St. Clair County
- Central and southern Illinois communities and economics desperately need these jobs
- Product of the electric power industry, my dad worked for Illinois Power for 30 years

Dale Steward

Page 145

- Executive secretary/treasurer of Southwestern Illinois Buildings and Construction Trades Council
- Ameren energy resources and Dynegy are very important employers
- They employ highly skilled Illinois workers with collective bargaining agreements and with both companies provide strong economic benefits to the State of Illinois and their local communities
- Support working families and local economies particularly important during these trying economic times, which remain especially harsh in central and southern Illinois
- AER energy centers are important economic well-being of the Illinois economy, collectively have a total economic impact of \$1.4 billion on the State of Illinois
- Facilities additionally generate more than \$338 M in annual household earnings, pay \$13.3 M in annual local property taxes, and support 6,294 jobs in Illinois
- Dynegy has stepped up to help support much needed Union jobs and activity in Illinois through IPH’s proposed acquisition of AER
- With this transition, Dynegy plans to double its operations and invest in Illinois as a responsible neighbor and major employer offering high skilled and well paying Union jobs
- Successful transfer of these energy centers to IPH “offers the best opportunity for hard working members, their families and for our communities as stable tax base that provides critical support for our local schools, emergency response organizations and countless local governments.”
- Without the variance, Ameren will be forced to pursue other options “creating uncertainty for the future of the plants and those who depend on them.”

Tom Wolf

Page 148

- Illinois Chamber of Commerce
- Sites letter he sent the Board in July
- Focus on the decision in front of you, don't be distracted by superfluous grandstanding
- Environmental community was here last year and they are here again today because of one thing – coal and they hate coal. They know that these plants will shut down if you say no.
- We don't believe the Board's goal is to hate coal or close plants but to make sure we are finding ways to create the electricity our economy and quality of life relies on with the least economic and environmental impact
- A tough balance for sure but one we though you found when you passed this variance for Ameren last year
- It's obvious to us that the petitioners before you are making every attempt to meet those challenges (cost competitive market challenges related to electric generation)
- Actions have consequences
- If denied, "it showcases another reason why Illinois is a tough place to do business, something we fight all the time"
- When mergers and acquisitions occur, companies should have the right to assume that the assets and debts associated with the new acquisition are included in the package, which they transfer to the new owner, and they should have every right to assume that this would include environmental regulatory agreements and obligations as found appropriate by the regulators.
- A very big part of due diligence performed in making decisions related to purchases: no one would have thought that the variance order granted by this group of plants would not rationally and logically be allowed to be assumed by the new owners. Good public policy requires it.
- If you say no, chilling future effect on business opportunities
- Regulatory certainty and belief state will act in a rational manner are cornerstones of economic development decisions
- If Ameren had not determined it needed to sell its assets and Dynege had not decided to acquire them we wouldn't be here: they'd be working hard ensuring they met the regulations as they were determined to be appropriate last year
- IPH is here to assume the obligations inherent in the previous order and they ought to be allowed to do so
- Wise people who said the following "there is no adverse environmental impact with this variance"

Jim Monk

Page 152

- President of Illinois Energy Association
- Trade association representing all of the investor owned electric utilities, natural gas utilities, power generators in the state
- Believe the request is reasonable
- Continued operation of AER's energy center is important to the future of the electric industry in Illinois

- Two key points: the energy industry, in particular electric power plants is a “very very capital intense industry”; investment is the lifeblood of that industry, a positive signal on investment such as would be given by granting the variance would go a long way toward providing the kind of certainty that not only this particular acquisition deals with but also would help in terms of providing positive investments signals going forward
- On the contrary, a negative decision would in essence be a very negative step in providing that kind of investment certainty and that very capital intensive environment that this company and these companies operate in
- Second thing: one of the things our industry deals with on a daily basis is reliability, very very complex system known as the electric grid
- It would be extremely challenging given our future where several major energy centers around the state are not participating in putting electricity on that grid.
- Reliability is a key factor
- We all pretty much take for granted when we go over to flip that switch that the light is going to come on, that’s not something you can take for granted, that the environment we operate in as an industry in terms of reliability gets more and more challenging by less and less supply
- Talks about competitive energy market

Mark Denzler

Page 155

- Vice President, Chief Operating Officer IMA
- Largest and oldest statewide manufacturing association in the country
- We represent 4,000 member companies
- Energy is critical to the manufacturing center
- One of the largest cost components go into manufacturing
- It’s critical that the Board approve this variance
- It’s important for the business communities to send a consistent message
- Ruling one way in one year and then reversing the ruling in the later years sends a chilling message to the community, those companies looking to expand or locate in the State of Illinois

Kirk Cooper

Page 157

- President of Boilermakers Lodge local 60 Morton Illinois
- Represents just over 600 members
- Local 60 includes Peoria county where Duckcreek power station is located and Fulton county where Edward station is located
- If variance is denied high-paying jobs will be lost
- Job losses not isolated boilermakers
- State unemployment is high and State should attempt to create jobs not remove them
- Boilermakers Local 60 currently maintains two Dynegy power plants - Hennepin Station in Putnam County and Havana power station in Mason County
- Dynegy has completed and attained clean air standards at both of those stations
- Closing stations may lead to the inability to meet electricity demands

Evan Wooding

Page 159

- Steamfitters local 353 Peoria, Illinois
- President of United Association of Pipe Trades District Council 34 in Peoria
- Resides in Tazewell County
- Members maintain and repair plants
- Members are highly skilled and trained employees who earned good salaries and shutting down the plants would have ripple effect throughout the local economy
- Similar effects have already been felt in the shuttering of coal generating facilities in northern Illinois
- Variances are a commonsense approach to provide clean air and power

Deanna Wubben

Page 164

- Works at Edwards power Plant – 23 year employee
- U.S. Navy Veteran
- Single parent who wants to make sure they have a house to live in
- Works a 10 day week with 5 on and 5 off
- She watches grandson on 5 off days while the parents work the second shift at the same plant

John Baker

Page 199

- Dynegy employee at Baldwin Station for 30 years.
- Responsible for maintenance on electrostatic precipitators.
- Dynegy entered into a consent decree in 2005 to clean things up.
- Helped check out and commission the scrubbers.
- Dynegy installed the scrubbers voluntarily.
- Dynegy is a responsible corporate citizen
- Dynegy is trying to do the right thing here, and just needs a little more time to make it happen

James Kipp

Page 201

- Dynegy employee at O'Fallon Office for 29 years.
- Proud of Dynegy accomplishments in environmental area.
- We just need time to come into the compliance.

Kathy Roemmel

Page 202

- Manager at the Dynegy Wood River Power Station in Alton.
- Dynegy employee for 34 years
- Plants will be successful under Dynegy.

Deb Koenig

Page 203

- Administrative Manager at Dynegy Wood River Power Station in Alton.
- Dynegy employee for 34 years
- Dynegy has shown its command for wanting to be a good corporate citizen; they want to have the time to make the new plants complaint.

Joe Lloyd

Page 204

- Managing Director of Health and Safety for Dynegy for over seven years
- Variance will permit others to have good working opportunities like his
- Variance impacts families, schools, and local property tax revenues.

Debbie Lewis

Page 206

- Worked at Baldwin Energy Complex for over 39 years.
- When Dynegy says they will do the right thing, they will.

Randy Short

Page 207

- Plant Manager at Baldwin Station
- Worked for Dynegy for 22 years.
- Proud of the record there
- 250 employees work at Baldwin Station, where Dynegy supports the community, and they are a large taxpayer.

Greg Robert

Page 208

- Director of Maintenance for the Dynegy coal fleet
- Worked for Dynegy for 35 years.
- As shown with the Havana Power Station, by putting the scrubbers and baghouse along with the Baldwin Power Station with three scrubbers and three baghouses, and I know that our company will do the right thing.

Joe Kimlinger

Page 209

- Worked for Illinois Power and Dynegy for 22 years.
- Project manager over the scrubbers installed at Havana and Baldwin
- Loss of jobs would be a detriment to our town (Waterloo)

Dave Glosecki

Page 210

- Worked for Illinois Power and Dynegy for 28 years.
- Director of Maintenance at Baldwin Plant
- Dynegy has a passion about doing the right thing

Rachel Casey

Page 214

- Operation support for Ameren Energy Resources since 2008
- Please grant the variance like you did last year.

Winston Freund

Page 216

- Works for Ameren in the Collinsville Office, been with Ameren for 33 years
- When Ameren says they are going to do something they do it.
- Dynegy is the same way.
- Variance will help save jobs and the communities those jobs are in.

Steve Richard

Page 217

- Works for Ameren in the Collinsville Office, been with Ameren for 32 years
- Helped build scrubbers at Coffeen and Duck Creek
- Vote for the variance to save communities

Tom Gannon

Page 218

- Works for Ameren in the Collinsville Office
- Support the variance

Al Toennies

Page 218

- Works for Ameren in the Collinsville Office, been with Ameren for 26 years
- Ameren tries to be good corporate citizens, but economic circumstances are unavoidable
- We just need a little more time

Tamika Cole

Page 220

- Sales Rep for Ameren Energy Marketing in the Collinsville Office
- The plants mean a lot to the people in the communities
- This is a delay and not a denial
- If the plants have to be shut down, who's going to pay for the necessary electricity and upgrades?

Carrie Smith

Page 222

- Sales Rep for Ameren Energy Marketing in the Collinsville Office
- Environment is important to all of us, and we just need some time to make the necessary changes
- The approval was already given to Ameren and the same market conditions stand today for Dynegy.

Mike Apple

Page 223

- Worked at Newton Power Station for almost 35 years
- We do our best to protect the environment.

Tim Dion

Page 223

- Works at the Newton Power Plant as operations supervisor
- Economic benefits of the plant are unimaginable to Jasper County
- We take a lot of pride in limiting our emissions

Lance Farmer

Page 225

- Works at the Newton Power Plant
- Over 25 years in industry he has seen a lot of change as an environmental steward
- If the variance is denied the economic impact on the communities will be huge

Paul Hardiek

Page 226

- Works at the Newton Power Plant as production superintendent where he's been for the last 15 years.
- I was here when you granted the variance for AER last year.
- Newton does an excellent job in compliance
- Dynegy does the same.
- Already elected to implement mercury control
- We must move forward in a balanced way.

John Marschewski

Page 228

- Worked at Newton Plant for over 6 years
- This variance will just maintain the status quo
- This will actually result in a net positive environmentally.
- Variances will provide more certainty for jobs

Jim Marshall

Page 229

- Technical Services Superintendant at Newton facility
- Facility impacts a number of communities around the facility
- A shut down would lead people to leave the communities
- Support the variance

Roy Moore

Page 231

- Worked at Newton for 36 years

- Chairman of the IBEW Local 702 bargaining unit – who supports the variance
- Facility is a good environmental steward

Larry Quick

Page 231

- 34 year employee at Newton, works in the storeroom
- We spend a lot of money to comply and clean the emissions
- The scrubber is under construction, with Ameren already spending hundreds of millions on it.
- Dynege just needs more time to complete it.
- Plants provide a good living for the people that work there
- Plants are large charitable contributors

Lance Stanley

Page 235

- Works in the electrical department of Newton facility, been there over 21 years
- Newton has committed to meet all standards and the variance will lead to an overall reduction in emissions.
- The variance will effect jobs in southern Illinois

Keith Trimble

Page 236

- Employee at Newton
- The closing would have a devastating impact on Jasper County
- Air is cleaner now in Newton than it was when he was a kid.

John Cooley

Page 237

- Director of the Newton facility
- There has been a substantial investment in providing a clean environment at Newton
- The facility has a big impact on the surrounding areas
- Our facility is very clean and organized
- Please help us continue to provide electricity and an economic benefit to southern Illinois

Mike Kollerg

Page 239

- Worked at Joppa plant for 6 years
- No variance would be devastating to his family and community

Nate McCuan

Page 240

- Employee at Joppa Plant for 5 years
- If he loses his job, he can find another one, but it probably won't be in Illinois

Chris Goebel

Page 241

- Employee at Joppa Plant for 8 years
- Please grant variance

Bruce Parker

Page 242

- Environmental engineer at the Joppa, been there for 24 years
- In 2012 AER got a variance
- Dynege is just seeking the same variance with the same economic and environmental benefits but under different ownership
- His sole job at Joppa is to ensure environmental compliance
- Significant reductions in SO2 have been made already
- Without the variance Joppa will be closed starting in 2015
- This would devastate the community
- Schools will suffer if the plant is shut down

Sam Freeman

Page 244

- Joppa environmental engineer
- Schools will close without the variance
- We are good stewards to the environment

Mike Pierson

Page 245

- Joppa employee since 2004
- Managers are constantly asking questions about why things occur the way they do at the plant
- Variance should be granted because it is the same as the one granted last year.
- All we are doing is changing the name

Mickey Jacobs

Page 246

- EEI employee at Joppa Plant
- Grandpa worked there for 30 years – now 82 years old in great health
- His son doesn't have asthma.
- We need the variance so we can stay open.

Mike Pullen

Page 247

- Joppa employee
- School Board President
- Drove 5 hours this morning because this is important to me and the 47 others who came with him
- We employees take our environmental responsibility seriously

- We don't sacrifice the environment for production
- We support many local community functions and charities through our plant contributions committee
- Schools will suffer if the plant is shut down

Kent Quertermous

Page 249

- Worked at Joppa for a year.
- Electrician, Member of the Local 148 Operators and IBEW 816
- Coal plants are reliable
- People need power, and coal fired plants can produce it

Rob Faglier

Page 255

- Joppa employee
- If we don't get the variance, I won't have a job
- There are not that many jobs and I would have to relocate if I lost mine.
- His wife would also move who is the only neurological psychologist in southern Illinois who brings in millions in grant dollars to SIU

Everett Ramage

Page 258

- Union employee at Joppa for 10 years. US Navy Veteran
- 59 years old and never healthier in his life.
- Approve the variance so that people can get cheap power and Dynegy can invest the money to improve efficiency and cleanliness

David Helton

Page 259

- Employee of Joppa for 23 years
- Has three sons who don't have asthma
- Millions of dollars and thousands of man-hours have been spent on the plant
- Generation has been sacrificed to meet NOx levels
- Dynegy is just asking for the same thing Ameren got last year

Chris Gates

Page 263

- Joppa employee for 20 years, before that he was with Southern Company.
- My son has asthma, and as a chemist I see the pollution control data, and you better believe I wouldn't have any son there in the shadow of the plant if I thought that our emissions were harming his asthma.
- There has been no causal link scientifically between asthma and pollutants from power plants
- Shutting down the plants is not the cure because it's not the cause
- Rolling blackouts like in Europe will happen if the plants are shut down

- Renewable energy is not consistent to feed the grid
- James Hansen also said, he likened coal trains going into power plants to the trains going to Auschwitz, so I'm not sure I want to use James Hansen as my standard there for logical reasoning.

Eric Deasel

Page 265

- Electrician at Joppa for 3 years
- His great grandfather helped build the plant
- His grandmother worked there
- Approve the variance so he can keep working there

Ronnie Douglas

Page 266

- Worked at Joppa for almost 26 years
- The plant is committed to environmental compliance, and there are rules and procedures in place to maintain compliance.
- Failure to grant the variance will result in the plant closing with a negative impact on the economy
- It is already hard to find a good job
- My son's serious medical problem is covered by the insurance from the plant
- The variance would support environmental standards and result in a net benefit to air quality

Mark Jones

Page 270

- Supervising Engineer at Joppa, been there 11 years
- Part of AER's improvement team that strives to increase plant efficiency and reduce emissions
- The plant benefits the community and provides good jobs, with over \$50, 000 from the 170 employees going to local organizations.
- The organizations locally rely on the plant for financial support

Roger Kerley

Page 275

- Joppa employee, chief union steward for Operating Engineers Local 148
- Been a plant mechanic for almost 25 years
- We are good stewards of pollution problems
- If the plant closed it would affect the community in big vast ways
- Grant the variance so we can continue operating

Anthony Jones

Page 278

- Union Officer with Operating Engineers Local 148, and maintenance welder at Joppa
- If the plant closes, his son's school will also likely close

- If Joppa closes, the only good jobs there will be gone

Lucas Schneider

Page 280

- Joppa Electric Energy employee for 7 years
- Job is to look at emissions, and ensure that air emissions monitoring equipment is working
- Grandfather was a pipefitter for the water plants that create steam to run the turbines
- Father was a pipefitter and engineer that consulted to Electric Energy
- Joppa does a lot of charity work - Boy scouts come to plant
- Played on Electric Energy's little league team as a kid
- If this variance is granted, it's a homerun because it reduces emissions

Daniel Jeffords

Page 283

- Joppa employee, IUOE Local 148
- Dinegy isn't asking for anything more than Ameren had, and we are on the right track, so please grant the variance.

Victor Holland

Page 284

- 31 year, second generation employee at Joppa – plant mechanic and member of Local 148 IUOE
- Unemployment in southern Illinois is high, and we need this variance to stay in operation

Michael Clark

Page 285

- Left TN to come to Illinois for work, and would hate to lose his job here
- Support the variance

John Johnson

Page 285

- Joppa employee for 5 years as a plant mechanic
- None of his family has asthma
- Pass the variance

Darin Gray

Page 286

- Joppa employee
- We drop everything to address environmental and safety issues at the plant
- We do compromise production for environmental and safety issues
- Please grant the variance

Julie Wilke

Page 287

- Joppa employee, supervisor of HR administrative services, been there 10 years
- Joppa is vital to the community
- Support the variance

Tom Werner

Page 288

- Joppa employee
- Joppa is a good steward of the environment
- Lots of people have had two or three generations of their family that worked there
- The area is depressed with high unemployment
- Consider the variance

Philip Tune

Page 290

- Joppa employee for over 5 years as an operator
- Wife's family lives next to plant and they are healthy
- If the plant closed he would have to move his family
- Lots of charity work is done by plant and employees
- Please approve the variance

Chris Wheat

Page 291

- Joppa employee, mechanic, welder, and machinist
- I'll survive if the plant closes, but Alexander and Massac County will not
- Support the variance

Manny Ebert

Page 292

- Union electrician at Joppa for 11 years
- German immigrant
- He has no health problems
- The impact of the plant closing would be very bad for the area
- The 125 deaths attributable to the variance is not a proven fact
- The plant is still viable even though it is old
- To build a solar farm that produces what Joppa does, it would take 90 square miles, and it is not reliable.
- Please grant the variance.

Kevin Bell

Page 295

- Joppa employee for 5 years
- Both sons just started college
- Please pass the variance.

Justin Partridge

Page 295

- Joppa Employee
- Please support the variance

Todd Mowery

Page 295

- Joppa employee, member Union Local 148 Operating Engineers, worked there for about 5 years
- Family wellbeing would be in jeopardy without the variance.
- We are good stewards of the environment
- Please grant the variance

Carl Will

Page 299

- Newton Employee, local IBEW 702 member
- The plant is very efficient and impressive
- There has been a lot of progress on the scrubber, and it should get there
- Please grant the variance

Steve Fox

Page 299

- Newton employee for 33 years
- Second generation employee there
- Been around power plants his whole life and does not have asthma
- Newton has always been in compliance
- The variance is not a denial, just a delay, and we need it so we can have our jobs
- Discussed the tax ramifications of the plant closing
- Please grant the variance

Greg Musch

Page 301

- Newton employee, engineer
- Worked in industry for 21 years
- Works on emissions reductions
- The variance actually provides an emissions reduction
- The decision today will impact jobs, schools, families, and the environment
- Support the variance

Exhibit 2

Bilicic Affidavit

AFFIDAVIT OF GEORGE W. BILICIC

I. BACKGROUND AND QUALIFICATIONS

1. My name is George Bilicic. I am employed by Lazard Frères & Co. LLC (“Lazard” or the “Firm”) in the Financial Advisory practice. Lazard is an independent financial advisory and asset management firm. With over 160 years of history, Lazard, together with its affiliates, operates in 26 countries and employs approximately 2,500 people. Lazard’s Financial Advisory practice provides advice to corporate, institutional, government, sovereign and individual clients on a broad array of strategic and financial matters.

2. I am currently a Managing Director and Vice Chairman of Investment Banking at Lazard, and head the Firm’s global efforts in Power, Energy and Infrastructure. I serve as a member of the Firm’s Investment Banking Committee and Deputy Chairman Committee. I have worked extensively on a variety of transactional, strategic and financial advisory assignments in the power, utility, alternative energy and infrastructure sectors for over 20 years. I have a B.A. from DeSales University and a J.D. from Georgetown University Law Center. Additional information in respect of my background is included in Exhibit A.

3. In my testimony, I will refer to the following: Ameren Corporation (“Ameren”); Ameren Energy Resources Company (“AER”); a newly formed limited liability company that is a direct wholly owned subsidiary of AER (“New AER”); Ameren Energy Generating Company (“GENCO”); AmerenEnergy Resources Generating Company (“AERG”); Ameren Energy Marketing Company (“AEM”); Illinois Power Holdings, LLC (“IPH”), and Dynegy Inc. (“Dynegy” or the “Company”).

4. The purpose of my testimony is to respond to the Expert Commentary Report (“Report”) authored by ACM Partners (“ACM”), dated September 12, 2013. Specifically, my

testimony will address my beliefs regarding 1) the transaction structure, which is normal and customary in the power and utility industry and many other industries, 2) the capitalization of New AER upon closing and how the transaction improves the business and financial prospects of New AER relative to AER under Ameren, and 3) the risks and potential adverse consequences to Dynegy if it were to financially support IPH.

II. DISCUSSION ON TRANSACTION STRUCTURE

5. In the transaction, as structured, IPH would acquire 100 percent of Ameren's equity interest in New AER. As is normal and customary in corporate transactional practice, Dynegy structured the acquisition such that New AER would be independent, self-sustaining, self-funding and economically viable on its own. As a non-recourse entity, IPH would maintain corporate separateness from Dynegy and all of Dynegy's existing subsidiaries. This is typically done to separate the risks and benefits of an acquired business from the buyer's other businesses, and so that the benefits of the transaction can be separately evaluated.

6. Requiring businesses to "stand on their own" is common practice in the power and utility industry and many other industries, including banking, finance and insurance, as a way to manage the credit risk of the acquiring parent company and its existing subsidiaries from the risks of the acquired entity. Recent notable examples of transactions with non-recourse structures include Energy Capital Partners' acquisition of a portfolio of merchant generation facilities from Dominion Resources and GenOn Energy's combination with NRG Energy, in which GenOn, upon closing, became an excluded project subsidiary of NRG (and NRG a non-guarantor of GenOn).

7. More generally, the transaction structure in this case is similar to traditional project finance, a commonly-used financing structure in the power and utility industry and

other industries. Under such a structure, a project is financed based on its own cash flows, rather than the balance sheet or credit profile of the developer. A separate holding company is typically created for each project, thereby protecting other assets owned by the project developer from risks associated with the project.

8. As supported in my affidavit filed on July 22, 2013 in this proceeding (PCB 14-10), certain credit rating agencies and equity analysts have cited the structural separateness of IPH as an important consideration in evaluating the merits of the transaction and the associated impact on Dynegy's own credit and valuation. The non-recourse nature of the acquisition is particularly important for Dynegy, as subjecting its balance sheet to additional risks would likely have negative consequences to its credit rating and, thus, its own access to capital. Such risks and related adverse consequences may be significant, especially given the ongoing challenging commodity price environment.

9. Importantly, IPH's proposed structure is consistent with Ameren's view of AER as a separate, self-sustaining business at the time of the original variance petition (PCB 12-126). As stated in Gary Rygh's affidavit filed on May 3, 2012, "the increasingly negative view of AER by credit rating agencies, Ameren shareholders, current bondholders and equity research analysts not only severely limits AER from accessing additional third-party capital but also inhibits Ameren from further investing in AER without the risk of severe negative investor reaction that could adversely impact cost and access to capital."

10. In short, the proposed transaction structure is common in corporate practice and effectively changes very little for AER.

III. DISCUSSION ON THE CAPITALIZATION OF NEW AER

11. In its Report, ACM claims that the transaction structure "leaves IPH

undercapitalized and in financial distress from the outset.” However, the Report fails to recognize that the transaction, in fact, improves the business and financial prospects of New AER relative to AER under Ameren. Importantly, given the depressed commodity markets and volatile nature of the merchant energy business, the transaction was designed to provide New AER with enough liquidity to satisfy its projected funding needs, operating and otherwise, over the next several years. In that regard, the transaction is structured such that, at closing, IPH, New AER and its consolidated subsidiaries will have approximately \$220 million in cash, of which \$203 million will be at GENCO and approximately \$17 million at AERG and AEM. Additionally, at closing, IPH, New AER and its consolidated subsidiaries will have \$160 million of non-cash net working capital, or assets of the business required to conduct operations on a day-to-day basis (e.g., coal inventory, materials/supplies, etc.).

12. Based on Dynegey’s view, the \$220 million in cash at closing, combined with the approximately \$75 million in annual operational synergies that the Company estimates it will realize in this transaction (the majority of which will be realized by IPH), would be sufficient to fund operations over the next several years. This view is based, in part, on the thesis of a recovery in MISO power prices in the 2016/2017 timeframe, which would have a positive impact on New AER’s cash flows. While it is difficult to forecast power prices over the long term, MISO Independent Market Monitor analysis suggests that demand growth and coal retirements over the 2013 – 2016 period could create a capacity shortfall by 2016, which could lead to higher power prices over time. With such a recovery in power prices (and the associated positive impact on New AER cash flows), Dynegey’s view that IPH would be sufficiently capitalized at closing appears to be reasonable.

13. Furthermore (and importantly), as compared to AER’s circumstances without the transaction, New AER’s business and financial prospects would improve as a result of the

transaction, given the enhanced capitalization of New AER at closing, as well as the benefit of approximately \$75 million in annual operational synergies that Dynegey expects to realize. New AER should also benefit from its affiliation with one of the largest merchant generation operators in the U.S., as well as the enhanced scale and diversification of the combined portfolio.

14. Quite simply, and contrary to what the ACM Report may suggest, New AER would, in fact, be a stronger, more viable business relative to AER under Ameren.

IV. DISCUSSION ON DYNEGEY'S ABILITY TO FINANCIALLY SUPPORT IPH

15. In its Report, ACM claims that Dynegey has the "financial resources necessary to properly capitalize IPH in connection with its acquisition of the Coal Plants if it chooses to." ACM concludes, therefore, that Dynegey's decision not to financially support IPH is based on its realization "that the economic prospects for IPH post-acquisition are not good." ACM's conclusion ignores the risks and potential adverse consequences to Dynegey if it were to financially support IPH, which, in fact, would be similar to those cited by Ameren in explaining its reluctance to further invest in AER at the time of its original variance petition (see Paragraph 9 above).

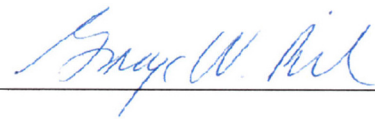
16. While ACM alludes to Dynegey's "financial strength" (by pointing out, for example, that Dynegey is "coming off an impressively profitable year in which it managed to show superior profitability despite a decline in revenue"), the Company generated negative net income in 2012, a year in which it emerged from bankruptcy, and continues to face meaningful near-term financial challenges, in light of the depressed commodity price environment. For example, in its most recent quarterly filing, Dynegey lowered its 2013 Coal Segment Adjusted EBITDA guidance by \$70 million (from \$60 – \$85 million to \$(10) – \$15 million), citing lower realized power pricing and lower capacity revenues, among other factors.

17. While accurately highlighting Dynegy's "strengthened balance sheet" following its recent refinancing, ACM fails to appreciate that the currently challenging commodity price environment requires Dynegy to maintain strong credit metrics to support its current credit rating and preserve its access to affordable capital. While Dynegy has taken significant steps to "shore up" its balance sheet following its emergence from bankruptcy in 2012, its decision not to provide financial support to IPH is based primarily on its own need for liquidity at a time of critical recovery and with IPH positioned for ultimate recovery.

18. In fact, feedback received by Dynegy from credit rating agencies was that the agencies would likely view any Dynegy provision of financial support for IPH negatively. Both S&P and Moody's (two credit rating agencies) agreed that, as structured, the transaction was a credit neutral event because of the non-recourse nature of IPH. A Dynegy credit downgrade would adversely affect the Company's access to capital, given that it could materially increase its cost of capital (and thus the interest rate that applies to its future borrowings). The potential consequences of reduced access to cost-effective capital would be significant for Dynegy, particularly given the ongoing challenging commodity price environment.

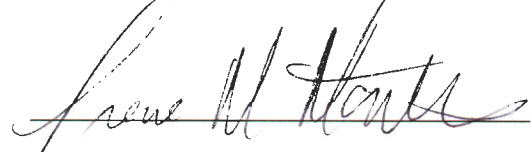
19. Importantly, a stronger Dynegy should ultimately benefit IPH, by allowing the Company to manage the supply chain more effectively and secure better terms for the entire enterprise, and by providing for work force stability, which should help the Company achieve greater synergies over time.

FURTHER, Affiant sayeth not.



George W. Bilicic

Subscribed and swore to before me
this 7 day of October, 2013


Notary Public

IRENE M. MONTERO
Notary Public, State of New York
No. 01MO6270607
Qualified in Queens County
Commission Expires October 22, 2016

Exhibit A

George W. Bilicic

Vice Chairman of Investment Banking

Mr. Bilicic heads the Firm's Midwest investment banking business and global efforts in power, energy and infrastructure. In addition, he serves as a member of the Firm's Investment Banking Committee and Deputy Chairman Committee. Other than his time at KKR (see below), Mr. Bilicic has been at Lazard since March 2002.

Most recently, Mr. Bilicic has advised on the following matters, among others (client in parentheses): strategic advisory in respect of First Solar (First Solar), proposed sale of NV Energy to MidAmerican (NV Energy), proposed sale of Ameren Energy Resources to Dynegy (Dynegy), strategic advisory in respect of Long Island Electric T&D System (New York State), proposed sale of Equitable Gas and asset exchange with SteelRiver (EQT), sale of CH Energy to Fortis (CH Energy), sale of stake in Vespucio Norte Express to Brookfield (HOCHTIEF), Dynegy restructuring and strategic advisory (Dynegy), merger of Exelon and Constellation Energy (EDF), sale of Central Vermont Public Service to Gaz Métro (Central Vermont Public Service), sale of Landys + Gyr to Toshiba (Landys + Gyr), merger of Progress Energy and Duke Energy (Progress Energy), merger of Northeast Utilities and NSTAR (Northeast Utilities), Solyndra restructuring (U.S. Department of Energy), potential sale of PGW (City of Philadelphia), potential stadium financing/partnerships for the San Diego Chargers (City of San Diego), resolution of joint venture and related matters between EDF and Constellation Energy (EDF), sale of the trading business of RBS/Sempra (RBS and Sempra), sale of Autopista Central toll road (Skanska), potential privatization of Long Island Electric T&D System (LIPA), exchange offer by Exelon for NRG (Exelon), leveraged buy-out of TXU led by KKR and TPG (TXU), Duke Energy spin-off transaction (Duke), National Grid acquisition of KeySpan (KeySpan), PlaNYC (City of New York), Duke Energy merger with Cinergy (Duke) and various alternative energy financings.

From May 2008 to October 2008, Mr. Bilicic served as a Managing Director and Head of Infrastructure at KKR. At KKR, Mr. Bilicic was responsible for initiating and leading KKR's global infrastructure investing efforts and contributing to other areas, especially alternative energy and power. During his time at KKR, Mr. Bilicic served on the Infrastructure Investment Committee and led teams that considered investments in airports, ports, surface transportation, utilities and power, alternative energy, midstream infrastructure, social infrastructure and infrastructure conglomerates.

Previously, Mr. Bilicic had been a Partner in the law firm of Cravath, Swaine & Moore from 1995. He joined Cravath as an associate in 1989. Mr. Bilicic's diverse corporate practice at Cravath primarily focused on mergers and acquisitions, but also included bank financings, joint ventures, public offerings, project finance and swaps and other derivatives. Mr. Bilicic left the Cravath partnership, effective January 2001, to begin his investment banking career at Merrill Lynch where he was a Managing Director in the Mergers & Acquisitions Department focused on power and energy clients.

After graduation from Georgetown University Law Center, Mr. Bilicic served in a clerkship with the Hon. Murray M. Schwartz (Chief Judge, U.S. District Court for the District of Delaware). Mr. Bilicic was an Articles Editor of the Law Journal at Georgetown University Law Center.

Mr. Bilicic developed a strong interest in the infrastructure area beginning at DeSales University where his senior thesis was entitled "The Federal Role in Infrastructure Revitalization," and, among other things, recommended a national capital budget as a fiscally

prudent measure to address the nation's decaying infrastructure. At DeSales University, Mr. Bilicic also played varsity basketball and was co-captain for two years along with serving as the editor of the school's newspaper.

Mr. Bilicic has been involved in a number of community and other not-for-profit organizations including the following as a member of the Board of Directors (or equivalent), unless otherwise indicated: American Ballet Theater, Brookings Metropolitan Policy Program, Family Justice, Georgetown University Law School (current), Grenville Baker Boys & Girls Club, Hofstra University, MFY Legal Services, NY Team Elite AAU basketball program (founder and team sponsor), Refugees International and YMCA of Greater New York. Mr. Bilicic is also a member of The Commercial Club of Chicago.

Mr. Bilicic and his wife, Laura, reside in Chicago with their four sons, William (16), Christopher (16), Henry (12) and Peter (7).

DeSales University, *B.A. summa cum laude*, Georgetown University Law Center, *J.D. magna cum laude*, *Order of the Coif*

Exhibit 3

Thompson Affidavit

AFFIDAVIT OF DANIEL P. THOMPSON

1. My name is Daniel P. Thompson. I am Vice President and General Manager for Dynegy Midwest Generation, LLC (“DMG”), an indirect, wholly owned subsidiary of Dynegy Inc. (“Dynegy”). I also serve as Vice President of Illinois Power Holdings, LLC (“IPH”), which is also an indirect, wholly owned subsidiary of Dynegy. My business address is 604 Pierce Blvd., O’Fallon, Illinois, 62269. I make this affidavit based on personal knowledge or on knowledge I have obtained through inquiry of individuals employed by Dynegy or its affiliates and communications with Ameren Energy Resources (“AER”) personnel.

2. As Vice President of DMG, I am responsible for the safe and efficient operation of Dynegy’s coal-fired electric generating fleet in Illinois. My responsibilities include oversight of environmental compliance at Dynegy’s Illinois coal fleet. Subject to the IPH-Ameren transaction closing, this responsibility will include the five operating plants in the Ameren MPS Group that are the subject of the requested variance.

3. The purpose of my affidavit is to respond to certain public comments on the requested variance petition, specifically: (I) a proposal by Foresight Energy, LLC to fund completion of the Newton flue gas desulfurization (“FGD”) project (i.e., scrubber) in exchange for a long-term Illinois coal contract; and (II) comments filed by the Illinois Attorney General’s Office supporting annual mass emission caps as an additional condition to the requested variance.

I. Foresight Energy Proposal

4. At the September 17, 2013 public hearing on the variance petition in PCB 14-10, Michael Beyer, President and CEO of Foresight Energy, LLC (“Foresight”), a producer of

Illinois coal, proposed without details that Foresight fund completion of the scrubber project at the Newton energy center and recoup the investment with an embedded cost in a long-term coal supply agreement with Foresight Energy for Illinois basin high-sulfur coal. Foresight's supplemental written comments dated September 24, 2013, as submitted to the Docket in PCB 14-10 (PC #2000), suggest that its proposal involves supplying Illinois coal with 3.5 percent sulfur content to the scrubbed Coffeen and Duck Creek energy centers and the Newton energy center when its scrubbers are completed.

5. Foresight's proposal to finance the Newton scrubber through a surcharge on Foresight's Illinois basin high-sulfur coal is not a viable alternative for operational, commercial, and financial reasons.

6. To date, more than \$250 million has been spent on the engineering, design and construction of the Newton flue gas desulfurization (i.e., scrubber) system and engineering is approximately 90 percent complete. As configured, the Newton scrubber system is designed and guaranteed to remove 98 percent of SO₂ emissions from the flue gas when coal with a sulfur content of up to 1.3 pounds per million Btu ("lbs/mmBtu") is burned (i.e., remove approximately 8,400 pounds of SO₂ per hour from the flue gas). However, Foresight's high-sulfur Illinois coal has a sulfur content of approximately 6.3 lbs SO₂/mmBtu (i.e., at an assumed heat content of approximately 10,800 Btu/lb, 3.5 percent sulfur content would be 6.3 lbs SO₂/mmBtu). As a result, burning Foresight Energy's high-sulfur Illinois coal would produce over 40,000 pounds of SO₂ per hour or nearly five times the amount of SO₂ the Newton scrubbers are configured to treat. In fact, as currently configured in engineering plans, the Newton scrubbers would achieve an SO₂ removal efficiency of only 20 percent, instead of the 98 percent removal rate the Newton scrubbers would be able to achieve with low sulfur Powder River Basin ("PRB") coal.

7. In order to achieve the 98 percent removal design value with high sulfur Illinois coal, the configuration of the Newton scrubber system would have to be modified significantly to include an additional absorber tower (and associated equipment) for each generating unit. The additional absorber towers would be needed to allow the injection of more limestone slurry and area for the slurry to react with the increased volume of SO₂. The preliminary estimated cost to construct two additional absorber towers at Newton is \$150 million, not including the material additional costs associated with adding and operating the two additional absorber towers (e.g., limestone storage systems, gypsum handling and disposal equipment). In addition, modifying configuration of the scrubbers at this time materially would escalate the engineering and construction costs to complete the Newton scrubber project and likely extend the time needed to achieve commercial operation startup of the scrubbers.

8. Coffeen Energy Center performed a test burn on 100 percent high sulfur Illinois coal from the Foresight Energy Deer Run Mine in March 2013. This test was conceived and executed by AER personnel and was unrelated to the IPH-Ameren acquisition. The test was well planned and staffed but was not successful due to the quick onset of boiler pluggage that occurred after introducing the high sulfur coal to the boilers. Within a few days both units experienced significant pluggage in the pendant sections and within 10 days both units were inoperable and forced off line resulting in lengthy outages and high repair costs. Although these boilers were originally designed to operate on bituminous coal, all coal has differences which cause it to react differently in different boilers. Additionally, both Coffeen boilers have received changes in equipment and controls since last burning exclusively high sulfur coal and this has an impact on suitability of various coals in a boiler. Test burns are performed to identify these issues. Approximately five years ago, Duck Creek attempted a 100 percent high sulfur coal test

burn, which also resulted in significant operating issues and increased costs and had to be stopped.

9. Beyond the ability to successfully burn the coal, the much higher sulfur content of Illinois coal generates significantly greater levels of corrosive products than lower sulfur PRB coal, which creates short-term and long-term damage to boiler and gas path systems. Both Coffeen boiler systems would require lengthy outages and significant upfront capital investment in order to operate on only high sulfur coal. In addition, the Newton and Duck Creek boilers have undergone changes, more extensive than those at Coffeen, to burn low sulfur coal. These boilers would also require lengthy outages and very large capital investments before they could operate burning only high sulfur coal.

10. Foresight's proposal ignores the fact that AER, as part of the compliance plan in the existing variance, committed to burn ultra-low sulfur PRB coal at the Newton, Edwards and Joppa energy centers and has entered contracts for such coal. If the Foresight proposal were accepted, several low sulfur PRB coal supply contracts for 2014 would need to be terminated, thereby incurring financial penalties. In addition, Coffeen, Duck Creek and Newton each has an existing long-term multi-year rail agreement to transport coal. These rail transportation agreements are destination specific and, thus, cannot be assigned, and cannot be terminated without significant financial penalties.

11. The use of high-sulfur Illinois coal would increase annual operation and maintenance ("O&M") expenses associated with the Newton, Coffeen and Duck Creek scrubbers. Using high-sulfur Illinois coal would require much larger quantities of limestone at each to the three scrubber plants to remove the higher quantities of SO₂ in the coal. Using high-sulfur Illinois coal at Newton would be expected to produce approximately 10 times the quantity

of calcium sulfate waste (i.e., scrubber sludge) as ultra-low sulfur PRB coal, thereby increasing annual waste management and disposal costs.

12. Switching to high-sulfur Illinois coal also would increase nitrogen oxide (“NOx”) emission and cause IPH to lose the low NOx benefit of PRB coal. PRB coal produces lower NOx emissions than Illinois coal because PRB coal has a higher reactivity, lower nitrogen content, and a greater percentage of fuel nitrogen in the volatile fraction of the coal. Under staged combustion, the volatiles are released early in the combustion process and are burned in the overfire air zone where there is a lower potential to form fuel NOx. Illinois coal, with lower volatiles, causes the nitrogen to be released outside the overfire air zone where there is a potential to form more NOx emissions. Higher NOx emissions due to Illinois coal would make compliance with the Multi-Pollutant Standard (“MPS”) system-wide NOx limit significantly more difficult, if not impossible without significant capital investment in additional NOx emission controls, and increase the MPS Group’s annual O&M expenses associated with NOx compliance.

13. Foresight’s proposal appears to be in the form of sale-leaseback transaction, under which Foresight would essentially lend money primarily to Ameren Energy Generating Company (i.e., “GENCO,” the owner of Newton and Coffeen) for completion of the Newton scrubber project. The embedded cost of the investment would be charged back to GENCO through above market coal prices. However, GENCO’s debt covenants currently prohibit GENCO from borrowing funds from a third party because the company’s interest coverage ratio has fallen below the specified minimum level required for external borrowings. Thus, the Foresight proposal, if accepted, would violate GENCO’s debt covenants and place GENCO into default.

14. In addition, the commercial aspects of the Foresight proposal are not economically reasonable. Delivered PRB coal is cheaper on a dollar per mmBtu basis than high sulfur Illinois basin coal. In fact, the anticipated increase in costs associated with Illinois coal would be approximately \$4.13 per megawatt hour (i.e., approximately a 20 percent increase in cost), which would have a significant adverse impact on operating margins of the scrubbed plants.

15. Finally, compliance with the MPS SO₂ rate limit would not be achieved if high-sulfur Illinois basin coal were burned at the scrubbed Newton, Coffeen and Duck Creek energy centers. Without considering delays needed to reconfigure the Newton scrubber system to accommodate use of high-sulfur Illinois coal, it will take approximately two years to complete construction of the Newton scrubbers once construction activities ramp up. Under Foresight's proposal, the MPS Group would not be able to comply with the 2015 MPS SO₂ limit: because the Newton scrubbers could not be operational by January 1, 2015, all units at the Edwards and Joppa energy centers would need to be mothballed/shutdown for all, or at least a significant part, of 2015, and likely longer, until the Newton scrubbers are operating.

16. Furthermore, even after the Newton scrubbers start operating with Illinois coal and assuming all of the engineering, operational and commercial obstacles associated with burning high-sulfur Illinois coal at Newton, Coffeen and Duck Creek could be overcome in a reasonable manner, the MPS Group could not meet the MPS SO₂ rate limit applicable in 2016 (i.e., 0.25 lbs SO₂/mmBtu) or the final MPS SO₂ rate limit (i.e., 0.23 lbs SO₂/mmBtu) applicable in 2017 and beyond without shutting down units or significantly curtailing operations. In IPH's analysis, to comply with the MPS SO₂ rate limit in 2016, the combined heat input equivalent of Edwards Unit 1 and approximately one-quarter of Edwards Unit 2 would need to be shut down.

Furthermore, to comply with the final MPS SO₂ rate limit in 2017 and thereafter, the combined heat input equivalent of Edwards Units 1 and 2 and approximately one-quarter to one-half of Edwards Unit 3 would need to be shut down. If Illinois coal with a sulfur content higher than 3.5 percent were burned, additional shutdowns or curtailments would be needed.

17. IPH understands that Foresight has the ability to provide Illinois coal with a sulfur content of approximately 4.75 lbs SO₂/mmBtu. However, even assuming Foresight's proposal were limited to supplying 4.75 lbs SO₂/mmBtu Illinois coal, and further assuming that such high-sulfur Illinois coal was burned only at a scrubbed Newton plant and the scrubbed Coffeen plant, in IPH's analysis, the MPS Group could not meet the final MPS SO₂ rate limit in 2017 and thereafter without shutting down the combined heat input equivalent of Edwards Unit 1 and at least one-third of Edwards Unit 2.

II. Annual Mass Emission Caps

18. The Comments of the Illinois Attorney General's Office, PC #2336 (Sept. 24, 2013) at p. 7, support the use of annual mass emission caps. For several reasons, IPH does not support the imposition of annual mass emission caps in the requested variance order.

19. First, annual mass emissions caps were not part of the existing variance granted to AER in PCB I2-126. As a result, IPH did not evaluate the transaction in terms of annual emission caps. Instead, IPH entered its transaction agreement with Ameren with the understanding that the MPS Group's applicable SO₂ emission limits would remain annual system-wide emission rates and that relief had been granted by the Illinois Pollution Control Board in a manner that would allow a reasonable and necessary period of time for market conditions to recover prior to required completion of the Newton FGD Project.

20. Second, a tonnage cap on annual SO₂ mass emissions is contrary to intent of the

MPS regulatory structure. The MPS regulatory approach establishes numeric calendar year system-wide SO₂ emission rates in pounds per million Btu or emission rates based on a percent reduction. This approach, which was adopted after much negotiation between Illinois Environmental Protection Agency (“IEPA”) and affected industry, was intended to allow sources compliance flexibility. Thus, the MPS SO₂ rule allows affected units to operate more or less in any given year in response to market demand and other forces (e.g., weather, unit availability), so long as the MPS SO₂ emissions rate limit is achieved at the end of the calendar year. Imposing annual mass emission caps would eliminate the operating flexibility intrinsic in the rate-based MPS regulatory structure. As such, an annual mass emission cap could significantly curtail plant and or unit operations and, thereby, restrict the ability of IPH to generate sufficient revenues to fund timely completion of the Newton FGD Project.

21. IPH recognizes that annual mass emission caps were part of Midwest Generation’s compliance plan in PCB 13-24. However, Midwest Generation proposed mass SO₂ emissions caps for its own reasons and could plan its requested relief and operations in conjunction with its proposed caps.

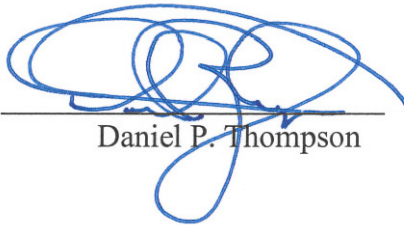
22. IPH believes that its proposed compliance plan, which includes a cap on SO₂ mass emissions over the 4th quarter 2013-2020 period, other conditions recommended by the IEPA and as further enhanced by the commitments in the Memorandum of Agreement with the IEPA, is a more appropriate and workable approach to ensure environmental benefit. As indicated in Petitioners’ Responses to the Illinois Pollution Control Board’s Questions for Petitioners (dated Sept. 5, 2013), IPH will accept as a condition of its proposed variance order a requirement to report the annual SO₂ mass emissions for the five operating power plants.

III. Conclusion

23. I have reviewed the Petitioners' Post-Hearing Brief and, to the best of my knowledge and belief, the facts contained therein are true and correct.

FURTHER, Affiant sayeth not.

DATED: 10/7/2013



Daniel P. Thompson

Subscribed and sworn to before me
this 7th day of October, 2013



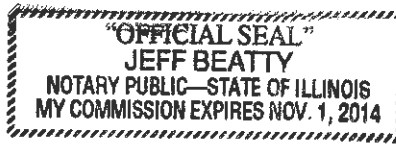


Exhibit 4

AER MPS Group Emission Control Technologies Chart

AER MPS GROUP EMISSION CONTROL TECHNOLOGIES

	CATEGORY	UNIT	CONTROL TECHNOLOGY	DATE INSTALL ED
COFFEEN	SO₂ Control	U1	WFGD	Nov 2009
		U2	WFGD	Mar 2010
	NO_x Control	U1	OFA	2001
			Comb. Opt.	2002
			SCR	2003
		U2	OFA	2000
			Comb. Opt.	2002
			SCR	2002
	Mercury Control	U1	WFGD cobenefit for mecury control	2009
			AER uses refined fuel for enhancement for mercury removal.	2012
		U2	WFGD cobenefit for mecury control	2010
			AER uses refined fuel for enhancement for mercury removal.	2012
		U1/U2	Mercury Sorbent Traps	2012
	Particulate Matter	U1	ESP / Upgrade	1973
			FGC (SO ₃ Inj.)	2001
			ESP / Upgrade	2010
		U2	ESP / Upgrade	1972
			FGC (SO ₃ Inj.)	2001
			New ESP	Mar 2010
	DUCK CREEK	SO₂ Control	U1	
			WFGD Replacement	Mar 2009
NO_x Control		U1	LNB	2002 /
			LNB	2003 2009
			SCR	2003
Mercury Control	U1	WFGD cobenefit for mecury control	July, 2009	

	CATEGORY	UNIT	CONTROL TECHNOLOGY	DATE INSTALL ED	
			AER uses refined Fuel for oxidation enhancement for mercury removal.	2011	
			Mercury Sorbent Traps	2012	
	Particulate Matter	U1	ESP / Upgrade	1976 /	
			New ESP	2009	
	SO ₂ Control	U1 – U3	PRB fuel conversion	2005	
EDWARDS	NO _x Control	U1	LNB	1998	
		U2	LNB	1993	
			LNB / OFA upgrade	2008	
		U3	LNB	1994	
			SCR	2003	
			LNB / OFA upgrade	2008	
		EDWARDS (cont'd)	Mercury Control	U1	ACI
U2	ACI			Jul 2009	
U3	ACI			Jul 2009	
Particulate Matter	U1				
			FGC (SO ₃ Inj) / Upgrade for ESP Performance	1979 / 2003	
	U2		FGC (SO ₃ Inj) / Upgrade for ESP performance Power Supply Upgrade	1979 / 2003 2009	
		ESP upgrade for SO ₃ injection Elimination	2012-2013		
	U3	ESP	1972		
FGC (SO ₃ Inj)		1979			
NEWTON	SO ₂ Control	U1 & U2 U1	PRB Fuel Conversion WFGD	1997 In Progress	

	CATEGORY	UNIT	CONTROL TECHNOLOGY	DATE INSTALL ED
		U2	WFGD	In Progress
	NO_x Control	U1	LNB / OFA	1994
			Comb. Opt.	2003
		U2	LNB / OFA	2001
			Comb. Opt.	2003
	Mercury Control	U1	ACI with optimization by CaBr ₂	2009
		U2	ACI with optimization by CaBr ₂	2009
	Particulate Matter	U1	ESP	1977
			FGC (SO ₃ Inj) / Upgrade	1995 / 2001
		U2	ESP	1982
			FGC (SO ₃ Inj) / Upgrade	1987 / 2001
			Upgrade	2012
	JOPPA	SO₂ Control	U1 - 6	PRB Fuel Conversion
NO_x Control		U1	LNB	1993
			Comb. Opt.	2002
			SOFA	2008
		U2	LNB	1994
			Comb. Opt.	2002
		U3	LNB	1993
			Comb. Opt.	2003
			SOFA	2007
		U4	LNB	1993
			Comb. Opt.	2002
			SOFA	2009
		U5	LNB	1995
			Comb. Opt.	2002
SOFA	2006			
JOPPA (cont'd)	NO_x Control	U6	LNB	1994

	CATEGORY	UNIT	CONTROL TECHNOLOGY	DATE INSTALL ED
	(cont'd)		Comb. Opt.	2001
			SOFA	2005
	Mercury Control	U1	ACI	2009
		U2	ACI	Jul 2009
		U3	ACI	Jul 2009
		U4	ACI	Jul 2009
		U5	ACI	Jul 2009
		U6	ACI	Jul 2009
		U1-6	Mercury Sorbent Traps stacks 1-3	2007 - 2008
	Particulate Matter	U1	ESP Upgrades	1994
			FGC (SO ₃ inj)	1994
		U2	ESP Upgrades	1994
			FGC (SO ₃ inj)	1994
		U3	ESP Upgrades	1994
			FGC (SO ₃ inj)	1993
		U4	ESP Upgrades	1994
			FGC (SO ₃ inj)	1993
		U5	ESP Upgrades	1994
			FGC (SO ₃ inj)	1994
	U6	ESP Upgrades	1994	
		FGC (SO ₃ inj)	1994	

Exhibit 5

Dynegy Emission Control Technologies Chart

**Dynegy Midwest Generation, LLC
Emission Control Technologies**

	CATEGORY	UNIT	CONTROL TECHNOLOGY	DATE INSTALLED
BALDWIN	SO₂ Control	1	Dry FGD	2011
		2	Dry FGD	2012
		3	Dry FGD	2010
	NO_x Control	1	OFA	1999
			SCR	2001
		2	OFA	1999
			SCR	2001
		3	LNB	1994
			OFA	1999
	Mercury Control	1	CaBr	2012
		2	CaBr	2012
		3	ACI	2010
			CaBr	2013
	Particulate Matter Control	1	ESP	1970
			FF	2011
		2	ESP	1973
			FF	2012
		3	ESP	1975
FF			2010	
HAVANA	SO₂ Control	6	Dry FGD	2012
	NO_x Control	6	LNB	2000
			OFA	2002
			SCR	2003
	Mercury Control	6	ACI	2009
	Particulate Matter Control	6	ESP	1978
			FF	2009

	CATEGORY	UNIT	CONTROL TECHNOLOGY	DATE INSTALLED
HENNEPIN	SO₂ Control	1-2	Ultra low sulfur coal	1999
	NO_x Control	1-2	LNB	2004 (U1) 2003 (U2)
			OFA	2004 (U1) 2003 (U2)
	Mercury Control	1-2	ACI	2009
			CaBr	2013
	Particulate Matter Control	1-2	ESP	1972 (U1) 1974 (U2)
			FF	2008
	WOOD RIVER	SO₂ Control	4	Ultra low sulfur coal
5			Ultra low sulfur coal	2002
NO_x Control		4	LNB	2002
			OFA	2002
		5	LNB	2002
			OFA	2002
Mercury Control		4	ACI	2012
			CaBr	2012
		5	ACI	2009
			CaBr	2012
Particulate Matter Control	4	ESP	1972	
	5	ESP	2002	

Exhibit 6

Post Hearing Comments of Dr. Lisa Bradley

Post-Hearing Comments of Lisa JN Bradley, Ph.D., DABT

Docket No. PCB 2014-010 (Variance – Air)

Response to Post-Hearing Comments of Environmental Law & Policy Center, Natural Resources Defense Council, Respiratory Health Association, and Sierra Club

The purpose of this report is to provide responses to the Post-Hearing Comments submitted by the above referenced groups (Citizen Groups) dated September 24, 2013, on the Petition for Variance sought by Illinois Power Holdings, LLC (IPH) and AmerenEnergy Medina Valley Cogen, LLC (Medina Valley) (collectively, "the Petitioners"), along with Ameren Energy Resources, LLC (AER) as a Co-Petitioner (PCB 2014-010).

My responses are based on my testimony at the September 17, 2013 hearing before the Illinois Pollution Control Board (Board), my report dated July 18, 2013 that was filed in support of the variance petition, my professional and technical knowledge concerning health effects as they relate to levels of exposure to sulfur dioxide (SO₂) and particulate matter (PM), and build upon the variance from the Illinois SO₂ Multi-Pollutant Standard (MPS) sought by AER and granted by the Board on September 20, 2012.

The Citizen Groups' comments misconstrue both my testimony and my responses to questions posed by the Board by not providing the full context of each quote. They also ignore the fact that my testimony began with an overview of the adverse effects of SO₂ on sensitive populations. My testimony should be reviewed in full and not selectively.

There are three overarching issues to be addressed in the Citizen Groups' comments: the SO₂ air modeling report submitted and discussed in testimony and comparison of those results to the National Ambient Air Quality Standard (NAAQS) for SO₂, the basis for that standard and the relationship between exposure to SO₂ and health effects, and particulate matter.

The Citizen Groups' air model is inappropriate and cannot be relied upon for decision-making

The Citizen Groups submitted and provided testimony on three air modeling reports that predicted concentrations of SO₂ for the E.D. Edwards, Joppa, and Newton plants, respectively. The approach used for that modeling is not consistent with acceptable practice, such that the results greatly overestimate SO₂ concentrations in the environs of the plants. A detailed evaluation of the air modeling report is provided in **Attachment A**. The Citizen Groups' models used the maximum allowable 1-hour emissions rate as the model input for each plant, an approach that is not condoned by most recent USEPA guidance. In testimony it was asserted that measured emission rates were also used in the evaluation; while this is not technically an incorrect statement, the emission rate used

was the single highest maximum peak 1-hour emission rate measured -- the modeling did not use actual hourly emissions monitoring data. This single highest maximum emission rate value was used to evaluate ALL hours of operation, which is clearly unrealistic. At best, the modeled results could be considered a conservative screening but not evidence of an air quality violation. The Citizen Groups' air model results should not, therefore, be relied upon for decision-making.

The Citizen Groups did not provide the files underlying the analysis, so it is difficult to know if other such unrealistic assumptions were used for model inputs. However, applying appropriate emissions estimates and proper stack height corrections to the Citizen Groups' air model will result in modeled compliance at all three of the plants (details provided in **Attachment A**).

The NAAQS Does Not Represent a Threshold for Adverse Health Effects

The Citizen Groups have interpreted the existence of the NAAQS for SO₂ as demonstrating that any air concentration above that level will result in adverse health effects, without any consideration of the concentration-response relationship. The Citizen Groups assert:

Pursuant to its statutory mandate to set a SO₂ standard "requisite to protect the public health"—including specifically the health of particularly sensitive subgroups—U.S. EPA promulgated a maximum hourly standard of 75 parts per billion. Exceedances of this standard now must be regarded as constituting a threat to the health of the public exposed to heightened levels of SO₂.

This statement reflects a fundamental lack of understanding on the part of the Citizen Groups of the concept of the concentration-response relationship and the difference between a regulatory standard and a biological threshold for adverse effects.

The Citizen Groups also assert in their comments (page 9):

The excess SO₂ emissions permitted by the variance would cause..... local health impacts in the communities around unscrubbed AER plants through direct short-term exposure to SO₂...

To demonstrate why this is incorrect, I review the following below: the concentration-response relationship for SO₂ in the sensitive subpopulation of interest, asthmatics; the basis of the NAAQS for SO₂; and the recent data on 1-hour SO₂ concentrations in Illinois.

Concentration-Response Relationship for SO₂ in the Sensitive Subpopulation, Asthmatics

As noted in my report submitted to the Board as part of the variance petition and again in my testimony, asthmatics are considered to be a sensitive population for exposure to SO₂. Controlled studies of the exposure of sensitive individuals with mild to moderate asthma to SO₂ while exercising indicate that a threshold for statistically significant adverse effects on lung function in sensitive individuals occurs at approximately 400 ppb (Goodman, et al., 2010). Even at this high exposure level, the effects in sensitive individuals such as those with asthma are:

- reversible (recovery occurs after exposure to SO₂ ceases),
- transient (recovery occurs when exercise ceases even with continued exposure to SO₂), and

- of low severity (bronchoconstriction occurs, which in these cases is reversible upon cessation of SO₂ exposure or upon cessation of exercise).

It must be kept in mind that asthma symptoms can range from mild to life threatening, and the level of severity is dependent on the specific trigger (such as allergens, tobacco smoke, exercise, or changes in the weather). For people with asthma and their families, severe attacks can be traumatic.

However, the clinical studies show us that the bronchoconstriction associated with exposure by exercising asthmatics to SO₂ above 400 ppb is mild, reversible and transient, and not likely to lead to severe attacks.

Basis of the NAAQS for SO₂

While there are differences of opinion about the data and methods used to set the NAAQS, it can be agreed that the NAAQS for SO₂ is an exposure level below which no adverse health outcomes would be expected to occur. However, the converse is not true – an air concentration above the NAAQS does not necessarily result in adverse health effects. The specific concentration and the duration of exposure along with the receptor's health status determine the health outcome.

In its Final Rule (75 FR 119:35527), USEPA identified two short-term health benchmarks for SO₂:

- 400 ppb SO₂, which “represents the lowest concentration in free-breathing controlled human exposure studies where moderate or greater lung function decrements occurred which were often statistically significant at the group mean level and were frequently accompanied by respiratory symptoms.”
- 200 ppb SO₂, a lower benchmark that USEPA describes as “the lowest level at which moderate or greater decrements in lung function in free-breathing controlled human exposure studies were found in some individuals, although these lung function changes were not statistically significant at the group mean level.” (Emphasis added.)

In setting the NAAQS, USEPA used a model correlating 1-hour measurements to 5 minute measurements to calculate the NAAQS of 75 ppb SO₂ that is meant to be protective of exposures at the 400 ppb and 200 ppb benchmark levels. As stated in the Final Rule:

“Thus, a 1-hour daily maximum standard at a level of 75 ppb would be estimated to protect > 99% of asthmatic children at moderate or greater exertion in St. Louis from experiencing at least one exposure ≥ 400 ppb per year, and about 97% to > 99% of these children from experiencing at least one exposure ≥ 200ppb per year.” (75 FR 119:35542)

Thus, it is very clear from USEPA's language that the regulatory level of 75 ppb is not a health benchmark, and it cannot be interpreted or represented to mean that it is a level above which adverse effects would be expected to occur.

USEPA concluded that the results of clinical studies, again in which humans are exposed to SO₂ concentrations much higher than those found in ambient air, support a causal relationship between adverse respiratory effects and short-term exposure to SO₂. USEPA also used the results from ten epidemiological studies to support the derivation of the NAAQS for SO₂. However, as I noted in

responding to questions from Chairman Glosser in my September 17, 2013 testimony before the Board, nine of the 10 primary epidemiology studies attempting to correlate short-term exposure to asthma-related emergency room visits or hospitalizations relied upon by USEPA found either no association or very small positive associations, and only one showed a statistically significant positive association. This statement should not be misconstrued, as the Citizen Groups do, that I am suggesting that USEPA relied only upon one study in its development of the NAAQS. In fact, USEPA itself acknowledges the lack of strong statistical significance in many of these studies in the Final Rule (75 FR 119:35547):

“Ten studies (some conducted in multiple locations) reported mostly positive, and sometimes statistically significant, associations between ambient SO₂ concentrations and emergency department visit and hospital admissions in locations where 99th percentile 1-hour daily maximum SO₂ levels ranged from approximately 50–460 ppb.” (Emphasis added.)

This information is provided here not to refute the NAAQS, but rather to provide the proper context for understanding the basis of the NAAQS and to demonstrate that, contrary to the Citizen Groups' assertion, the NAAQS is a regulatory standard, not a biological threshold value.

SO₂ Concentrations in Illinois

To provide additional context, in 2011, the ambient 24-hour air concentration of SO₂ in Illinois was 15 ppb, as reported by the Illinois Environmental Protection Agency (IEPA, 2012). The state average of the highest 1-hour SO₂ readings over a 3-year period (2009 – 2011) is 63 ppb. The IEPA reports the top four 1-hour SO₂ readings for each of the 15 SO₂ air monitors in the state. Over the three-year period 2009 to 2011, all readings were below 400 ppb, and only two readings were above 200 ppb (and less than 300 ppb) (IEPA, 2012, Table B-16). Thus, current SO₂ air quality in the State of Illinois is protective of even the most sensitive members of the population.

SO₂ emissions by the MPS Group will not increase over current levels during the period of the requested variance. As the current levels of SO₂ emissions in the state of Illinois have not resulted in any measured 1-hour SO₂ concentrations near the biological threshold of 400 ppb, a threshold where only mild, transient and reversible effects are seen in sensitive exercising asthmatics, emissions of SO₂ by the MPS group during the period of the variance will not result in any adverse health effects – even for sensitive individuals.

At the end of the variance period, the MPS emission rate standards for SO₂ would be met. As noted above, SO₂ emissions would not increase above current levels during the variance period. Thus, the Citizen Groups' assertion (at II.B., page 16) that “The Proposed Variance Would Negatively Impact State and Regional Air Quality By Allowing More Fleetwide SO₂ Emissions” is misleading, and inaccurate.

Particulate Matter (PM) is Trending Downward

The Citizen Groups also assert in their comments (page 9):

The excess SO₂ emissions permitted by the variance would cause.... degradation of air quality throughout the State (and region) through transformation of SO₂ into fine particulate matter ("PM_{2.5}").

As stated in my report dated July 18, 2013 filed in support of the variance petition, "epidemiological data do indicate that particulate matter is a stronger causal agent for mortality and morbidity (i.e., effects other than mortality) than gaseous SO₂, and gaseous SO₂ is usually found in association with particulate matter, as SO₂ is a precursor for fine sulfate particles." To summarize the findings in my report, as data become available on the components of PM_{2.5} from ambient air monitoring locations, and as multi-pollutant models are used to evaluate correlations between health outcomes and PM_{2.5} components, carbon (also referred to as organic carbon, elemental carbon and black carbon) -- an indicator of traffic emissions -- is consistently associated with adverse health outcomes in the studies where speciation of the components of PM_{2.5} is conducted. Where SO₂ and/or sulfate (the PM_{2.5} component) are measured, significant adverse health outcome associations are rarely demonstrated (Grahame, 2009).

An evaluation of PM_{2.5} data from air monitors in the closest vicinity of the MPS Group plants was provided as part of my report dated July 18, 2013. That analysis has been expanded to evaluate PM_{2.5} data from all such monitors in Illinois and in relevant areas of Missouri, Kentucky, Wisconsin, and Indiana. The evaluation is provided here as **Attachment B**. The PM_{2.5} NAAQS is 12 ug/m³. Of over 70 monitors in the region, 19 have a 3-year (2010-2012) annual average concentration greater than the NAAQS. Of these, eight have 2012 annual average concentrations above the NAAQS; however, with the exception of two monitors (one in Lake County, Indiana, and one in Cook County, Illinois) the monitors are showing decreasing trends year-to-year.

Speciated PM_{2.5} data are available for seven of the monitors where the 3-year average concentration of total PM_{2.5} is above the NAAQS. These data are presented graphically in Figure 3 of **Attachment B**. As can be seen, SO₂-related particulates make up a minor component of the total, and organic and elemental carbon make up the majority of the PM_{2.5} in all of the monitors. It is interesting to note that there is a strong crustal component in the two monitors closest to St. Louis.

As SO₂ emissions will not increase over current levels during the variance period, increases in PM_{2.5} will not occur due to the operation of these facilities.

Conclusion

In summary, SO₂ emissions by the MPS Group will not increase over current levels during the period of the requested variance. As the current levels of SO₂ emissions in the state of Illinois have not resulted in any measured 1-hour SO₂ concentrations near the biological threshold of 400 ppb, a threshold where only mild, transient and reversible effects are seen in sensitive exercising asthmatics, and where in fact all but two 1-hour SO₂ values are below 200 ppb, emissions of SO₂ by the MPS Group during the period of the variance will not result in adverse health effects – even for sensitive individuals.

The NAAQS for SO₂ of 75 ppb is a regulatory standard statistically derived to be protective of short-term exposures to sensitive individual to levels of SO₂ at health-based thresholds of 200 ppb and 400

ppb. Thus, while the NAAQS can be viewed as a level below which no adverse health outcomes would be expected to occur, it is not itself a health-based threshold.

While SO₂ is a precursor to PM_{2.5} formation, the PM_{2.5} data for Illinois indicate that sulfates comprise only a minor component of total PM_{2.5}. Again, as SO₂ emissions will not increase over current levels during the period of the requested variance for the MPS Group, sulfate-derived PM_{2.5} levels will also not increase over this time frame.

Finally, the Citizen Groups air model results are contrary to the available measurement data; this is not surprising as they did not use appropriate model inputs. Leaving all else constant in their models, the use of site-specific emissions estimates and stack heights would result in no areas with predicted exceedances of the 1-hour NAAQS for SO₂.

Thus, the proposed variance is protective of human health, and will not result in adverse health effects, even in our most sensitive populations.

References

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- Grahame, T.J. 2009. Does improved exposure information for PM_{2.5} constituents explain differing results among epidemiological studies? *Inhalation Toxicology*, April 2009; 21(5);381-393.
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Exhibit 6 – Attachment A

AECOM Technical Critique



Technical Critique of Recent Air Quality Modeling Analyses of the Edward, Joppa, and Newton Plants

Robert Paine, AECOM

September 30, 2013

Introduction

In 2010, the United States Environmental Protection Agency (EPA) promulgated¹ a stringent National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO₂) with a 1-hour averaging time. EPA's implementation of this new standard has considered both monitoring and modeling approaches, and the agency plans to address large SO₂ sources over the next few years with a hybrid approach that could include a combination of modeling and/or monitoring. In many cases, the use of modeling and the failure to consider actual emission levels can lead to a distorted assessment of air quality.

Various environmental groups have performed modeling exercises for the 1-hour SO₂ NAAQS compliance demonstrations to support their contentions of alleged nonattainment. One such demonstration² conducted by Mr. Steven Klafka of Wingra Engineering involves three coal-fired power plants in Illinois: the Edwards Power Plant, the Joppa Electric Steam Station, and the Newton Power Station. This modeling utilized both allowable emission rates as well as peak actual emission rates to demonstrate their contention that SO₂ concentrations would be above the NAAQS by a large margin. In reality, such an approach grossly overstates actual emissions from these facilities, as well as their impact on ambient air quality. As explained below, the Klafka modeling represents a very conservative analysis that does not present credible results.

EPA's Implementation of the 1-Hour SO₂ NAAQS

EPA's 2010 revision to the National Ambient Air Quality Standards (NAAQS) for SO₂ signaled a significant change in the agency's historical regulatory approach to implementation by indicating its consideration of reliance upon modeling rather than monitoring when designating areas' NAAQS compliance status. At the same time, EPA suggested that modeling might become a requirement for SO₂ infrastructure State Implementation Plans (SIP) submittals.

¹ 75 FR 35520, Jun 22, 2010.

² http://action.sierraclub.org/site/DocServer/Air_Pollution_Modeling_Joppa_Newton_Edwards.pdf. While the Sierra Club has provided regulators and public officials a report of their findings, the underlying data and modeling inputs have not been made publically available for independent review and verification.



EPA issued draft guidance³ in September 2011 on SO₂ NAAQS implementation that covered modeling issues among other topics, for which many comments were received. The comments relayed a significant concern for reliance upon modeling only, instead of or in combination with monitoring, for assessing NAAQS compliance, especially regarding the accuracy of modeling for this purpose. In April 2012, partly as a result of these comments and as a result of the large burden to states that the NAAQS implementation would have, EPA issued letters⁴ to each state that significantly changed the momentum and focus on modeling for the initial steps of SO₂ NAAQS implementation. These letters removed the immediate requirement for State Implementation Plan (SIP) submittals to show, via modeling, that SO₂ sources will not cause or contribute to a violation of the standard. Instead, EPA recommended that states should focus their June 2013 SIP submittal on traditional infrastructure requirements. After issuing a "white paper" in May 2012 with proposed approaches⁵ for demonstrating NAAQS compliance around significant SO₂ sources or groups of sources, EPA held stakeholder meetings in May and June 2012 to ask for input on monitoring, modeling, and NAAQS implementation issues.

On February 7, 2013, EPA issued another white paper⁶, considering comments it received on the May 2012 SO₂ white paper and subsequent stakeholder meetings, which proposed a new strategy for implementing the 1-hour SO₂ NAAQS. Important features mentioned in this white paper are:

- EPA will focus on priority sources based on the magnitude of emissions and populations in proximity of emissions, with recognition of resource limitations.
- EPA will provide sufficient time for agencies to develop the appropriate data to characterize air quality.
- The starting point for future SO₂ designations should be a monitoring network to adequately characterize air quality in areas of concern.
- Although the focus will be on monitoring, there will be flexibility to consider modeling as well using actual hourly emissions, actual stack heights, and concurrent meteorological data from recent years to characterize current air quality. This change reflects a realization that this more reasonable modeling approach could more accurately estimate the actual ambient air quality that would be measured by monitors.

In May 2013, EPA released⁷ draft versions of the SO₂ NAAQS Designations Modeling Technical Assistance Document and the Source-Oriented SO₂ Monitoring Technical

³ U.S. EPA. Guidance for 1-Hour SO₂ NAAQS SIP Submissions. Available at http://www.epa.gov/airquality/sulfurdioxide/pdfs/DraftSO2Guidance_9-22-11.pdf. 2011.

⁴ A sample letter is available at <http://www.epa.gov/air/sulfurdioxide/pdfs/20120413SECLetter.pdf>.

⁵ Available at <http://www.epa.gov/oaqps001/sulfurdioxide/pdfs/20120522whitepaper.pdf>.

⁶ Available at <http://www.epa.gov/airquality/sulfurdioxide/pdfs/20130207SO2StrategyPaper.pdf>.

⁷ Available at <http://www.epa.gov/oaqps001/sulfurdioxide/pdfs/SO2ModelingTAD.pdf> and <http://www.epa.gov/oaqps001/sulfurdioxide/pdfs/SO2MonitoringTAD.pdf>.



Assistance Document (TADs) for public review and comment. EPA developed these documents to assist state, local, and tribal air agencies to characterize ambient SO₂ air quality through modeling or monitoring in areas near emission sources. EPA expects to establish further requirements for monitoring and modeling data used for designations in a future rule, probably later in 2013.

The draft modeling TAD also noted that “other parties” may wish to accelerate the pace of the NAAQS review and submit their own “credible” modeling information without consulting the sources being modeled. However, such modeling information should not be considered “credible” until a source-specific protocol for modeling is submitted and approved by a regulatory agency. This approval should not be granted unless and until the owner or operator of the source has an opportunity to review and comment on the proposed modeling approach.

In many cases, such third-party modeling could have the following limitations:

- Input stack information is incorrect
- Fenceline information is not accurate or is not considered
- Actual hourly emissions data is not used, which is a key issue in the Sierra Club modeling, as noted below
- A more accurate version of AERMOD, utilizing updated low wind speed beta options, is not used.

Any of these issues could lead to incorrect and misleading modeling results that would disqualify them as being credible evidence of NAAQS “violations.”

SO₂ Monitoring Data Contradicts the Sierra Club’s Modeling Results for the Edwards Power Plant

The level of the SO₂ 1-hour NAAQS is 75 ppb, and the form of the standard is the 99th percentile peak daily 1-hour maximum value, averaged over 5 years of modeling. Modeling results are characterized in terms of “design concentrations”; that is, the concentration expressed in the form noted above that is compared with the NAAQS. The result of the comparison can affect the “design” of emission controls needed to meet the NAAQS, hence the term “design concentration”.

Whenever possible, modeling demonstrations to determine NAAQS compliance should be challenged by reviewing available monitoring data. There are two SO₂ monitors in the vicinity of the Edwards plant (located south of Peoria, Illinois), as shown in Figure 1 in an Illinois EPA Technical Support Document (TSD)⁸. As shown in the figure, and verified by a pollution rose from the Illinois EPA TSD, the monitor to the south (“Pekin”) is impacted by other nearby

⁸ From Illinois EPA’s “Technical Support Document: Recommended Attainment/Nonattainment Designations in Illinois for the 2010 Revised Primary 1-Hour SO₂ National Ambient Air Quality Standard”, available at http://www.epa.gov/so2designations/reletters/R5_IL_rec_wtechanalysis.pdf.



Figure 1 Sources and Monitors near the Edwards Power Plant

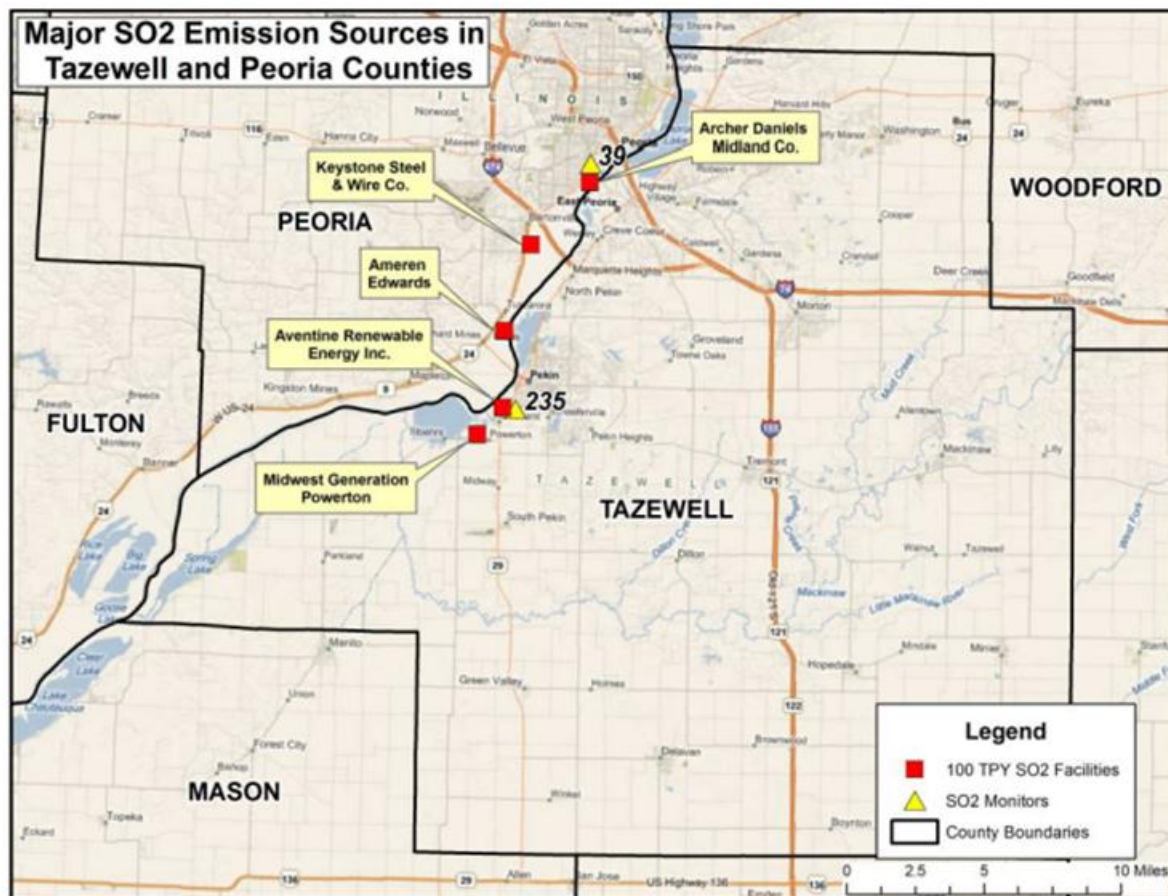
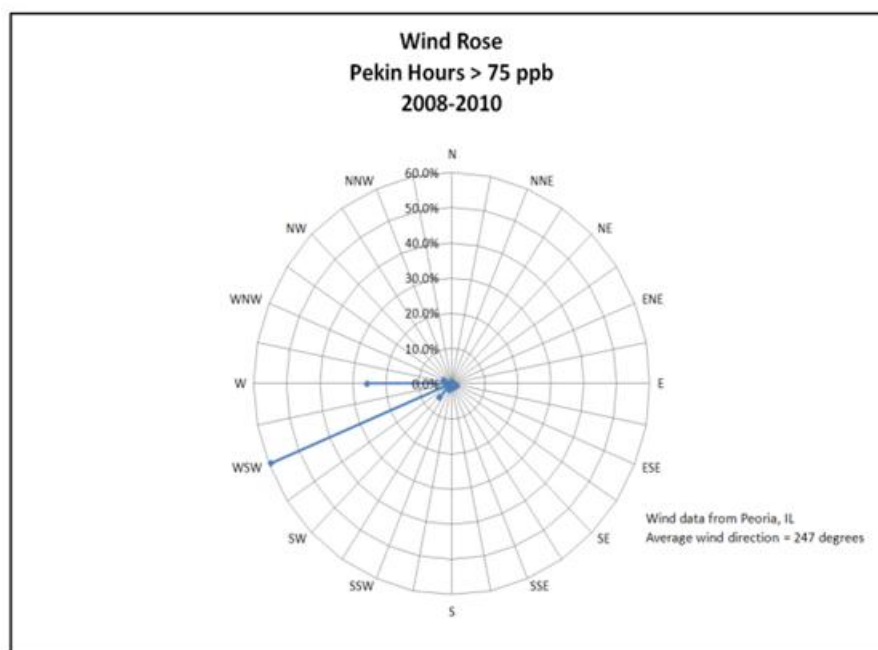


Figure 2 Pekin Monitor Pollution Rose

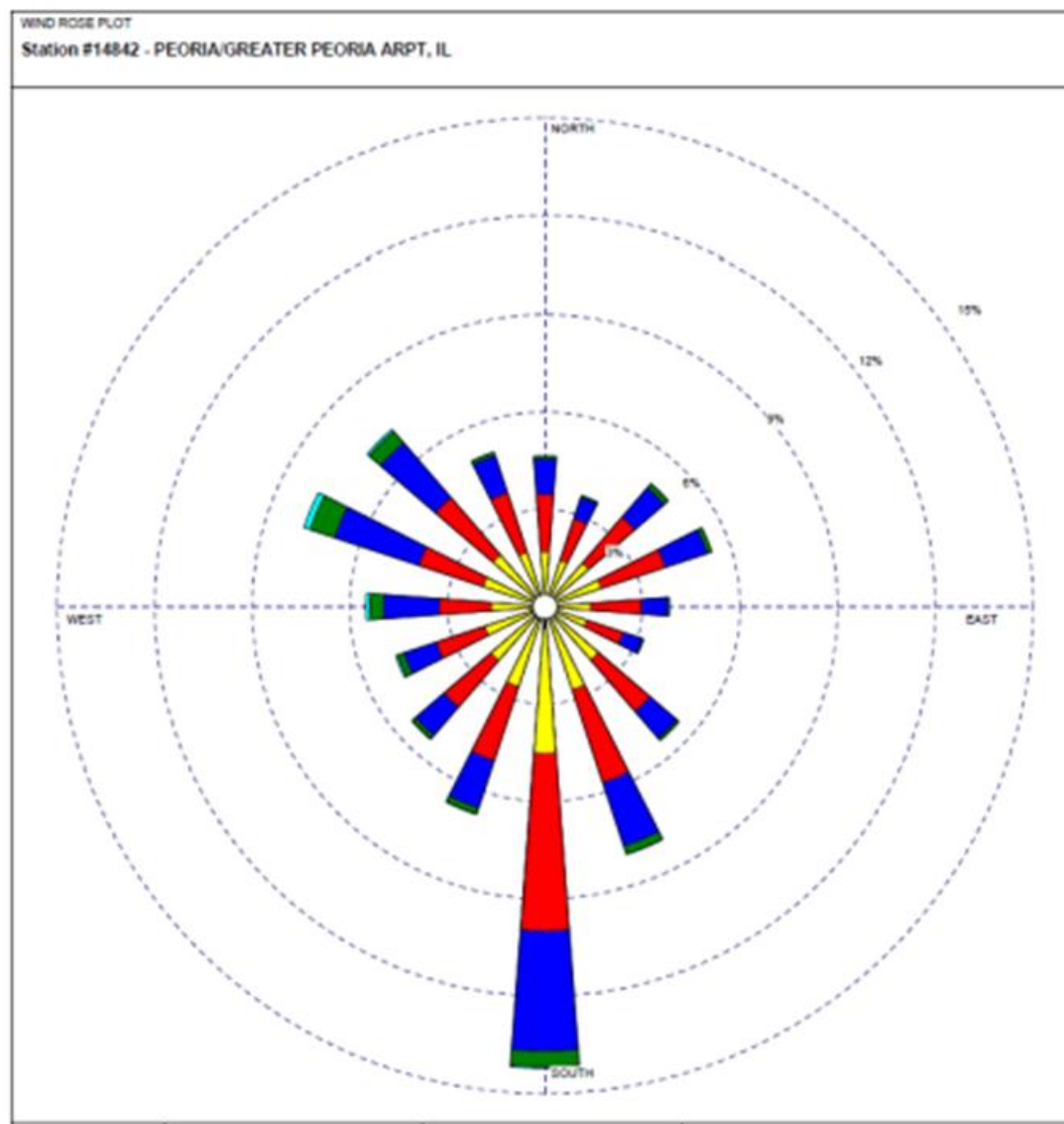




sources, and winds rarely advect the Edwards Power Plant emissions to the monitor south of the plant. A second monitor to the north ("Peoria") more likely to be affected by the Edwards plant and other smaller sources even closer to the monitor (see the Peoria wind rose⁹ in Figure 3), but the design concentration shown in the Illinois EPA TSD is only 39 ppb, slightly more than 50% of the NAAQS.

The modeled design concentration at this monitoring location presented in the Klafka report is over 300 ppb. This comparison shows how distorted and misleading the Klafka modeling results are in representing real-world SO₂ concentrations in the vicinity of the Edwards Power Plant. Any modeling demonstration that is this far off from reality cannot be credible.

Figure 3 Peoria, Illinois Wind Rose



⁹ As taken from the Illinois EPA SO₂ NAAQS TSD for nonattainment / attainment designations.



The proximity of the Archer Daniels Midland plant to the Peoria monitor could account for the background concentration of about 10 ppb as noted in the Klafka report). Of the remaining approximately 30 ppb attributable to the Edwards plant, the Klafka modeling prediction is about a factor of 10 too high. If this factor is applied as a correction to the reported Klafka report peak modeled result of about $1500 \mu\text{g}/\text{m}^3$, the adjusted plant-only contribution is about $150 \mu\text{g}/\text{m}^3$, or about 57 ppb. After the background of 10 ppb is added, the result is about 67 ppb, which is below the SO_2 NAAQS of 75 ppb.

Sierra Club Modeling is not Credible for Testing Compliance Against the NAAQS

At a minimum, any credible modeling to be used in lieu of monitoring to show NAAQS compliance must use actual hourly emissions data and actual stack heights. This is evident from the EPA's Modeling TAD issued in May 2013, and it is simply common sense. It is also noteworthy that the extensive evaluation¹⁰ of AERMOD, EPA's preferred short-range model, used actual hourly emissions. However, the Sierra Club's modeling used both allowable emission rates and peak actual emission rates. Both sets of these emission rates are often much higher than actual hourly emissions, and can only be regarded at best as a conservative screening analysis. If such a modeling analysis results in NAAQS compliance, then results can be presented as clear evidence of NAAQS compliance with a substantial margin. Otherwise, if NAAQS violations are modeled with such a conservative approach, it is prudent to proceed to a refined analysis. Instead, Klafka has misleadingly decreed these results as "evidence" of NAAQS violations.

The limited time available for review of the Klafka report and EPA's failure to release by the end of September 2013 an updated version of AERMOD with coding bugs fixed has made it infeasible to conduct new AERMOD modeling with actual hourly emissions. Instead, a review of the actual SO_2 emissions during the period 2008- 2012 is another way to indicate how the Klafka modeling results should be adjusted (scaled downward) to better reflect reality. Recent comparisons¹¹ of AERMOD modeling using peak actual emissions versus actual hourly emissions by Paine at the 10th EPA Modeling Conference indicate that a fixed emission rate that produces modeling results similar to those using actual hourly emissions is a ranking on the order of about the 60th percentile (depending upon the distribution). An example is shown in Figures 4 and 5 from the Paine presentation noted above for the Lovett Power Plant, one of the databases evaluated with AERMOD by EPA. Figure 4 shows the cumulative emissions distribution, and Figure 5 shows, among other results, the modeled 99th percentile peak daily 1-hour maximum (the "design concentration" to be compared to the SO_2 NAAQS). Figure 5 shows that the design concentration that results from the use of the maximum actual hourly emission rate is about $540 \mu\text{g}/\text{m}^3$, while that using actual hourly emissions is about $215 \mu\text{g}/\text{m}^3$. The ratio of these two concentrations is about 2.5. From Figure 4, it is evident that the emission percentile computed from the peak emission rate (about 330 g/s) divided by 2.5 is at the 60th percentile level. The other cases in the Paine presentation yield similar results.

¹⁰ Available at http://www.epa.gov/ttn/scram/7thconf/aermod/aermod_mep.pdf.

¹¹ See the EMVAP presentation made by Robert Paine at EPA's 10th Modeling Conference, available at http://www.epa.gov/ttn/scram/10thmodconf/presentations/2-11-EMVAP_Emissions_Processor.pdf.



Figure 4 Lovett Evaluation Database SO₂ Emissions Distribution

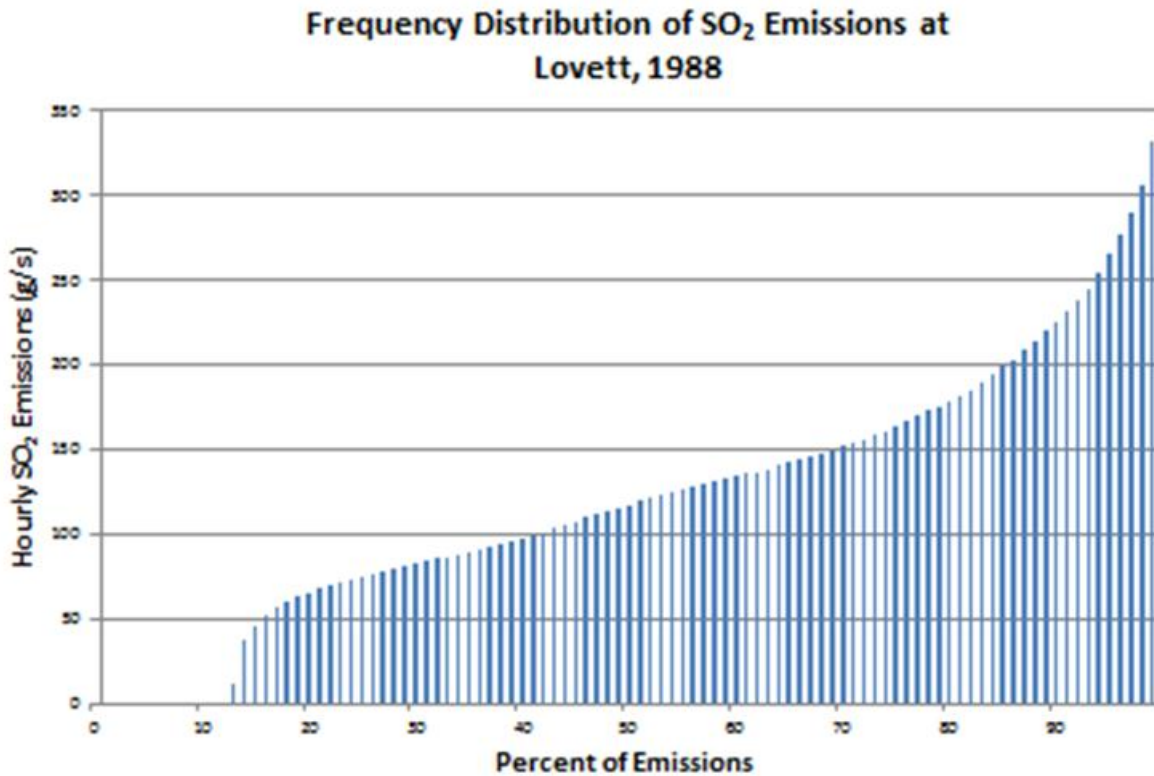
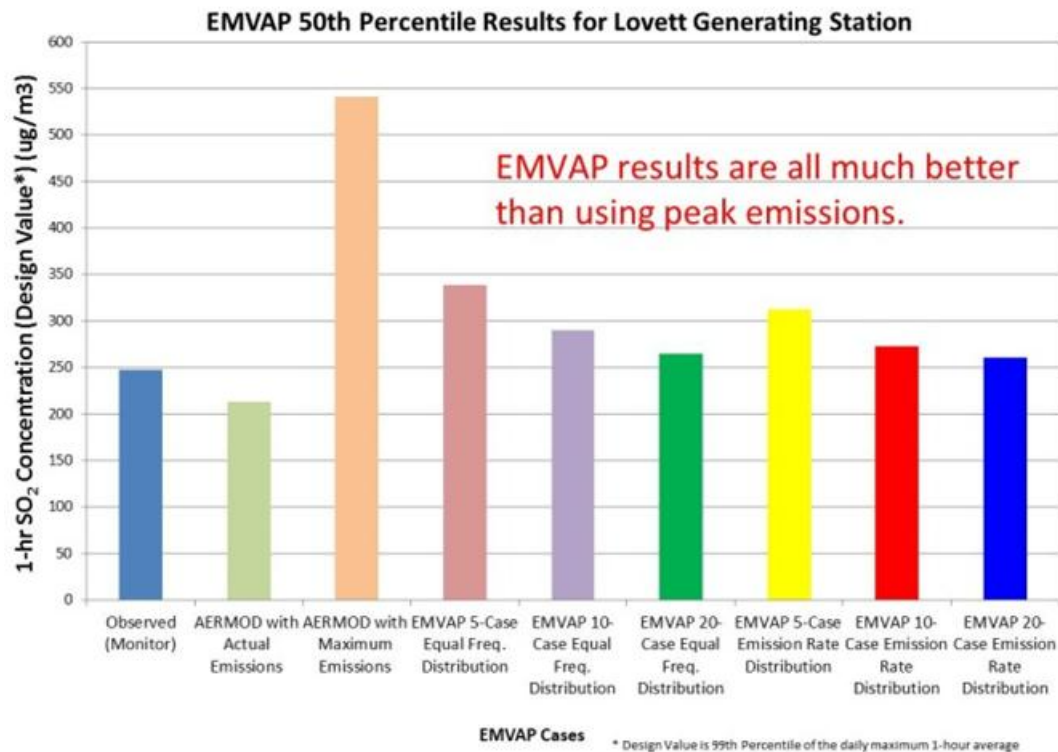


Figure 5 Modeling Results for Lovett





This type of analysis can be used to scale the results from the Klafka modeling to estimate a realistic modeling outcome that would occur with the use of actual hourly emission input to AERMOD. Figures 6 and 7 show the cumulative frequency distribution of hourly SO₂ emission rates from Edwards Units 1 and 2 combined, and Edwards Unit 3, respectively. It is evident that the emissions at the 60th percentile range ("typical emissions") are less than 10% of the allowable emissions modeled by Klafka: about 1,600 lb/hr for typical emissions vs. 17,763 lb/hr for allowable emissions on Units 1 and 2 combined, and about 1,500 lb/hr for typical emissions vs. 16,846 lb/hr for allowable emissions. This factor-of-10 or more adjustment due to emission rate input to the modeling is consistent with the same adjustment noted above to correct the Klafka overprediction at the Peoria monitor.

Figure 6 Edwards Units 1 and 2 Emissions Distribution

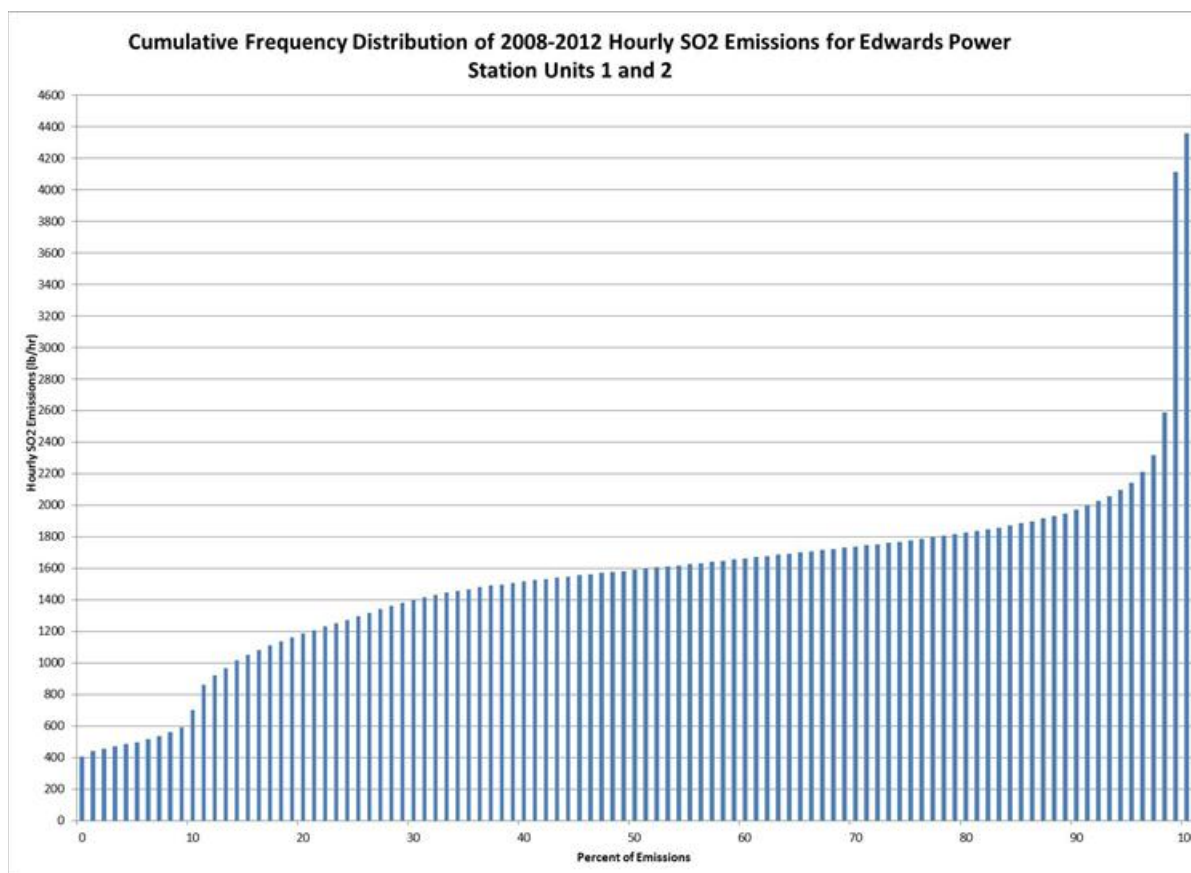
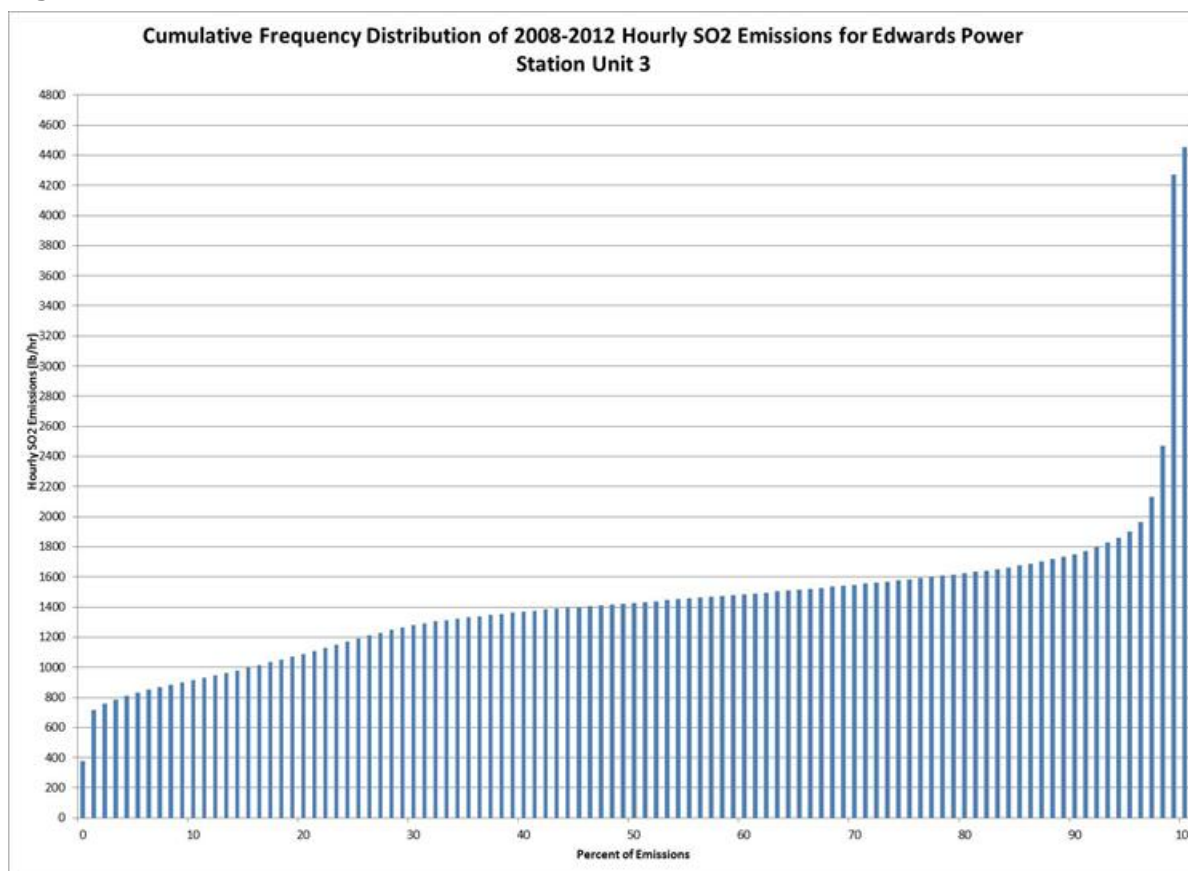




Figure 7 Edwards Unit 3 Emissions Distribution



Additional Modeling Issues for Edwards Power Plant

Any new modeling of the Edwards Power Plant, when EPA issues its modeling guidance and any pending updates to AERMOD, will need to consider the following issues.

- Actual hourly emission rates and exhaust parameters should be used.
- Actual stack heights (NOT artificially truncated stack heights at Good Engineering Practice height) should be used.

The Klafka modeling does not use the appropriate emission rates, the appropriate stack height, and other stack parameters such as flow rates, diameter, and temperature need to be verified with Ameren before being accepted. In fact, Ameren has separately indicated¹² to me that the Klafka stack parameters (both stack physical and exhaust parameters) are incorrect and would tend to lead to overpredictions. In spite of these issues, both the monitor vs. modeling comparison and the misrepresentation of the effective average emission rate by the Klafka

¹² The stack diameter for Units 1 and 2 used by Klafka does not appropriately consider the merged flues for these two units. In addition, the temperature and flow rates for these units used by Klafka are too low.



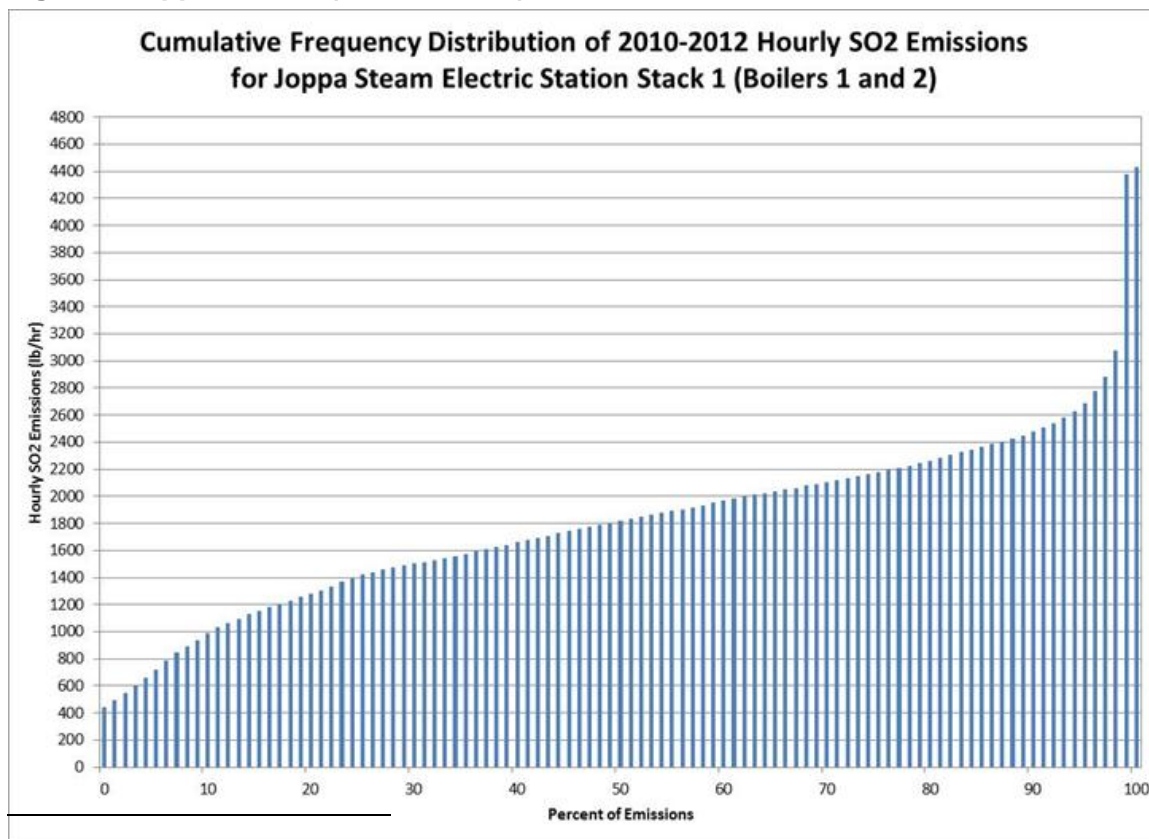
modeling results in about a factor-of-10 overprediction, which, if corrected, would result in modeled NAAQS compliance for the Edwards Power Plant.

Model Overpredictions are Reported by Klafka for the Joppa Steam Station

There are no SO₂ monitors in the vicinity of the Joppa Steam Station, which is located near Joppa, on the Ohio River in extreme southern Illinois. However, the emissions scaling conducted for the Edwards Power Plant can also be used for Joppa to determine an adjustment to the Klafka modeling results.

Klafka modeled each of the three Joppa units' allowable emissions at a rate of about 12,286 lb/hr. The 60th percentile frequency emission rate for the three units, as shown in Figure 8, 9, and 10, is about 2,000 lb/hr for the period of 2010-2012. This results in an adjustment downward by a factor of more than 6 from the Klafka results. In addition, the Klafka modeling utilized an improper stack height, since the May 21, 2013 EPA guidance indicates that actual stack height is to be used (550 feet versus the 407.33 feet used in the modeling). The effect of this adjustment is estimated from SCREEN3¹³ runs to be about 7%. Combining these factors and adding a background of 23.5 µg/m³, results in a total design concentration of about 193 µg/m³, which is below the NAAQS of 196.5 µg/m³.

Figure 8 Joppa Stack 1 (Units 1 and 2) Emissions Distribution



¹³ SCREEN3 is an available screening model tool that is based upon the Industrial Source Complex model, which preceded AERMOD. SCREEN3 was used for assessing the relative difference between predicted impacts due to two different Joppa stack heights.



Figure 9 Joppa Stack 2 (Unit 3 and 4) Emissions Distribution

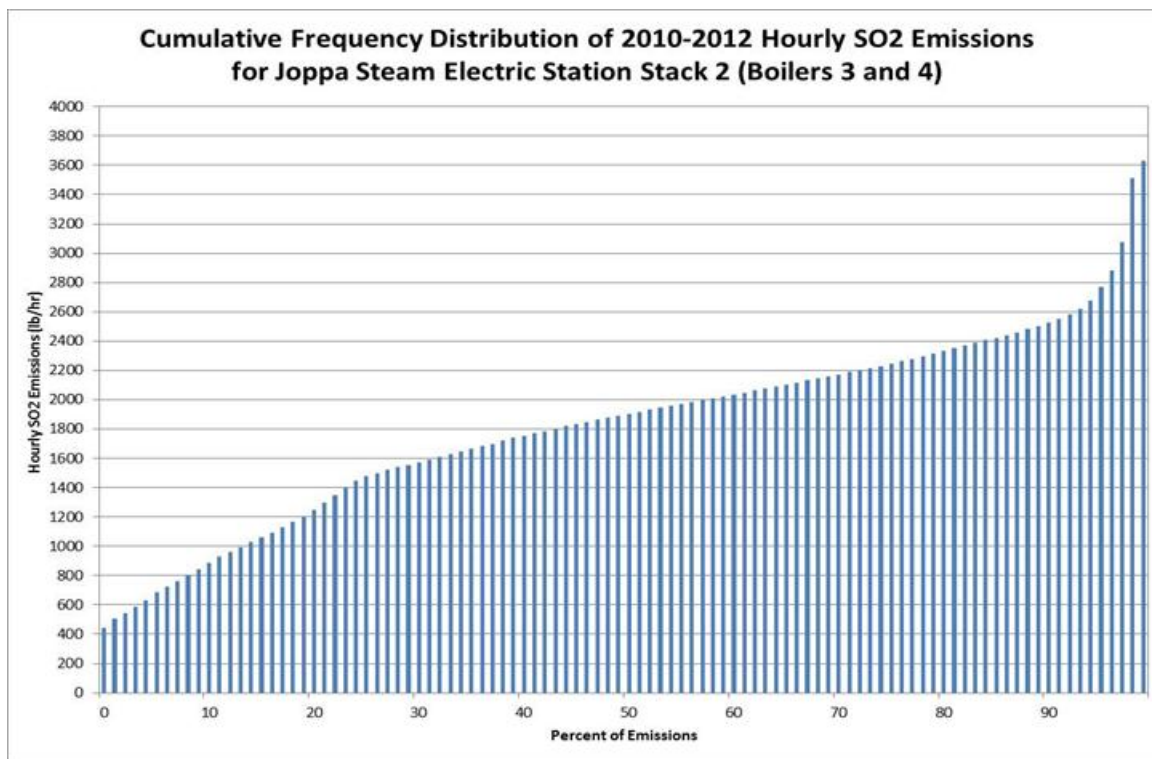
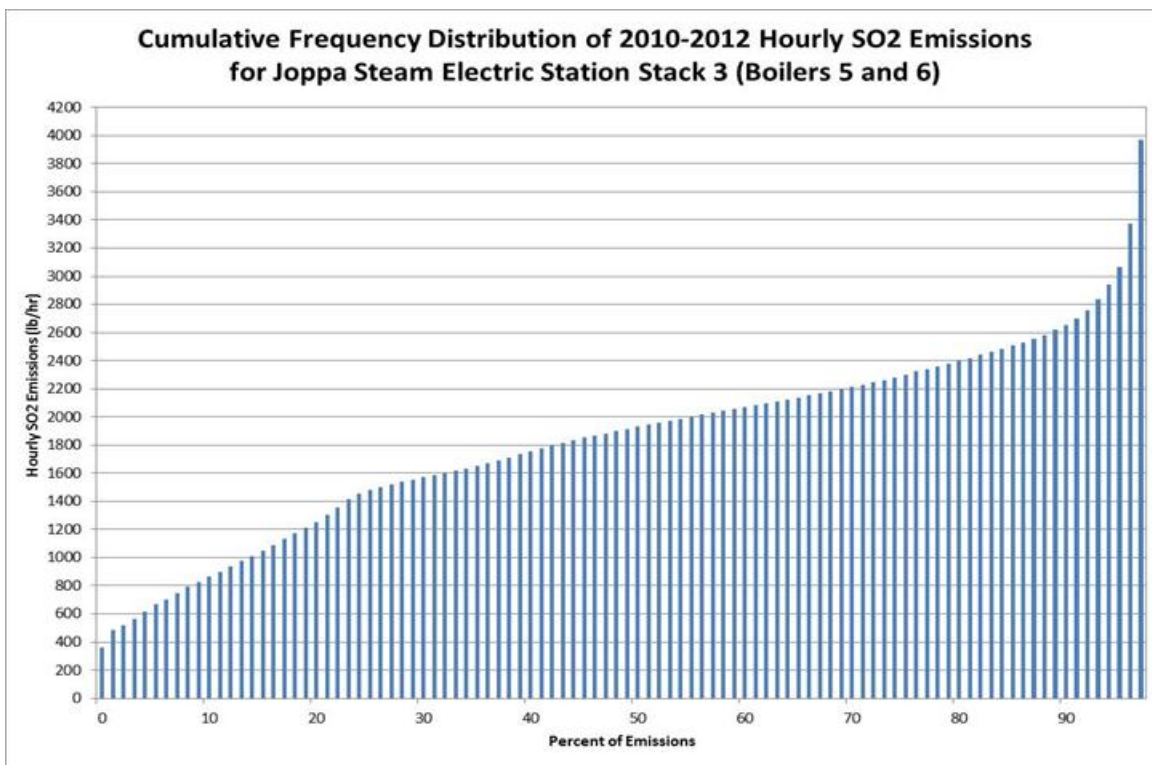


Figure 10 Joppa Stack 3 (Units 5 and 6) Emissions Distribution





Similar Model Overpredictions are Evident for the Newton Power Plant

There are no SO₂ monitors in the vicinity of the Newton Power Plant, which is located near Newton, IL in Jasper County. However, the emissions scaling conducted for the Edwards Power Plant can also be used for Newton to determine an adjustment to the Klafka modeling results.

Klafka modeled each of the two Newton units' allowable emissions at a rate of 831.6 g/s, or 6,600 lb/hr. The 70th percentile frequency emission rate for the two units are about 3,000 and 2,800 lb/hr, respectively, for the period of 2010-2012, as shown in Figures 11 and 12. This results in an adjustment downward by more than a factor of 2 from the Klafka results. If we conservatively adjust the Klafka results by exactly a factor of 2 downward, then the predicted design concentration, with consideration of the background of 23.5 µg/m³, a total of about 171 µg/m³ (below the NAAQS of 196.5 µg/m³).

Figure 11 Newton Unit 1 Emissions Distribution

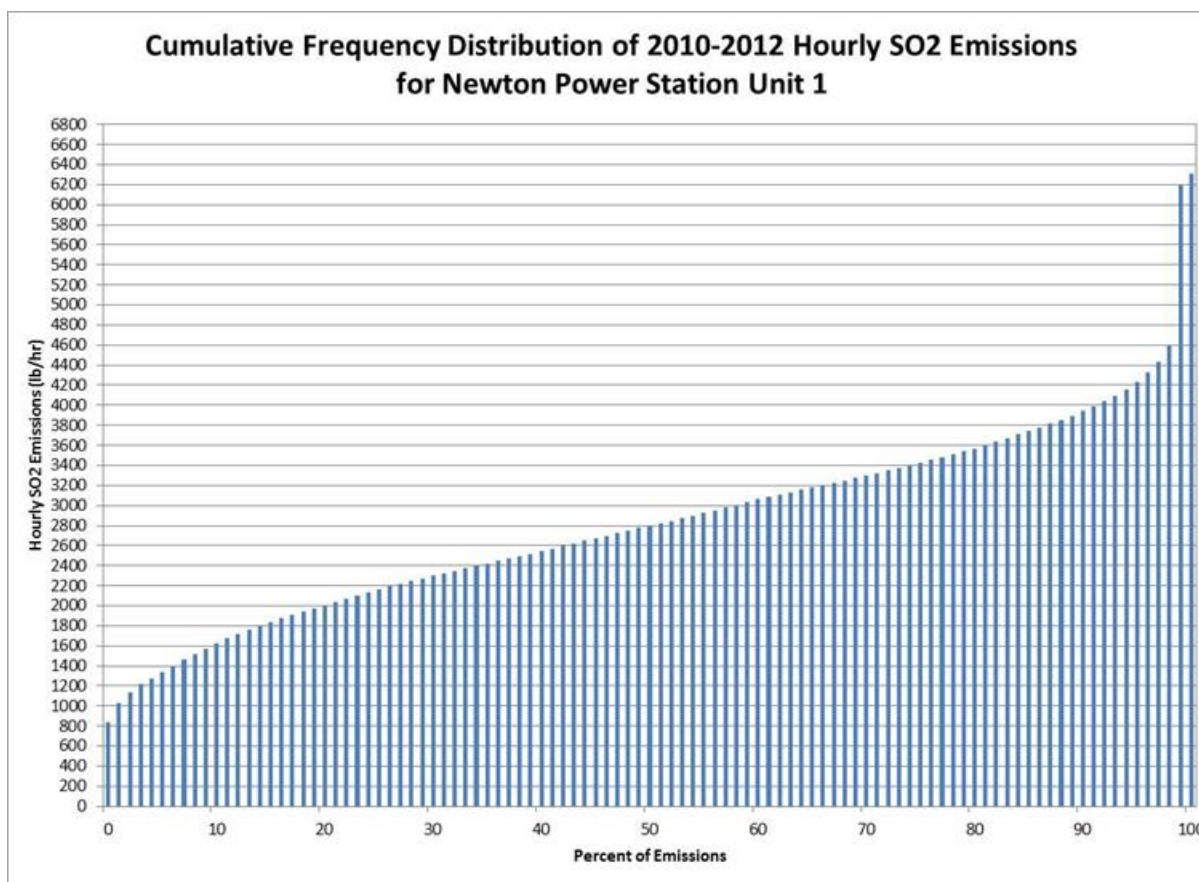
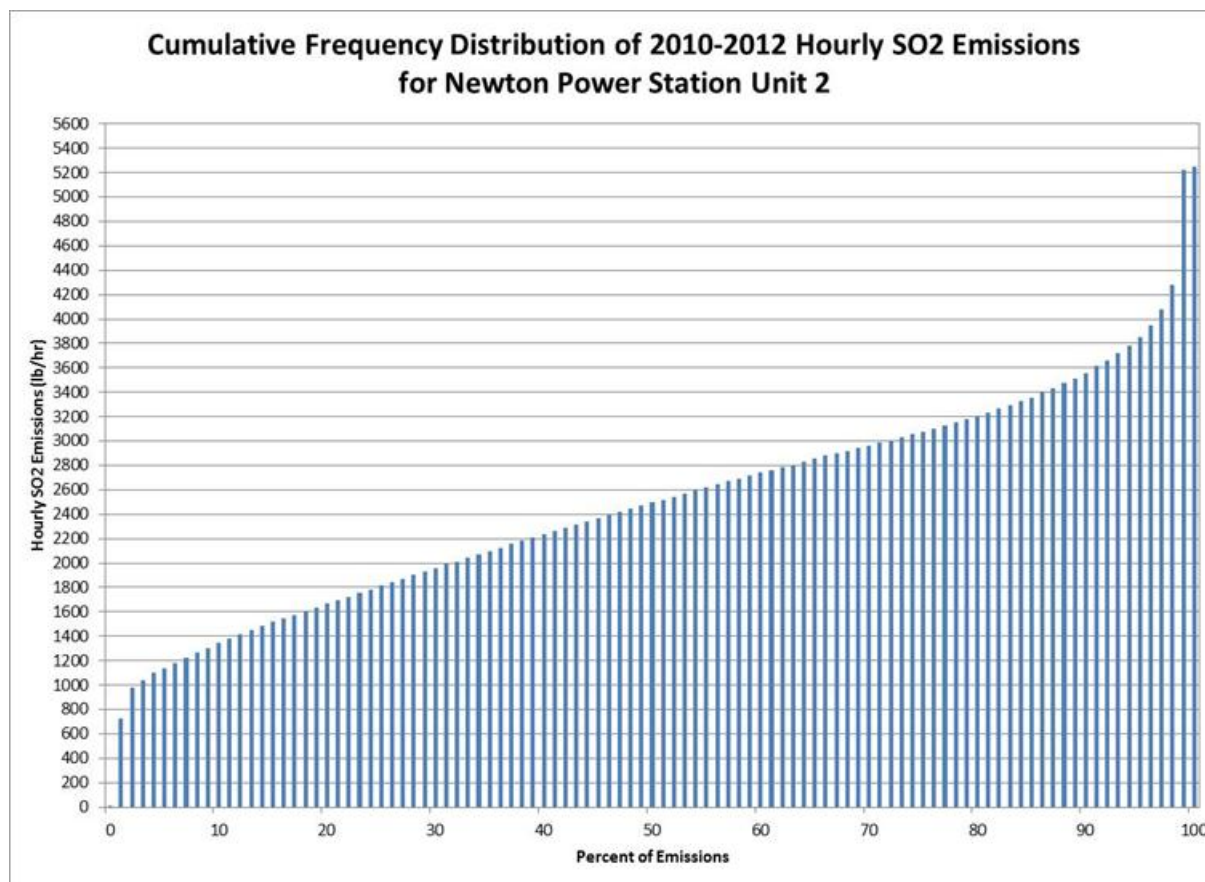




Figure 12 Newton Unit 2 Emissions Distribution



Conclusions

The Sierra Club has conducted modeling to assess the SO₂ NAAQS compliance status of the Edwards, Joppa, and Newton plants operated by Ameren in Illinois. This modeling exercise is an extremely conservative screening analysis that does not provide credible results because the emission rates used for allowable emissions are many times that of average actual emissions.

For the Edwards plant, the comparison of the Sierra Club's predicted concentrations with those actually monitored near Peoria confirms the overprediction tendency of the modeling. An independent adjustment of the modeling results based upon a ratio of typical SO₂ emissions (at about the 60th percentile frequency) is consistent with other evaluations and with the Peoria monitoring results, and indicates that modeling with actual emissions would likely show NAAQS compliance. A similar scaling analysis for the Joppa and Newton plants also leads to the conclusion that with appropriate emissions and stack parameters, modeled NAAQS compliance would likely result.

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Robert J. Paine, C.C.M., Q.E.P. Associate Vice President

Years Experience:
38

Professional History

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Environment

Education

MS, Meteorology,
Massachusetts
Institute of
Technology
BS, Atmospheric
Science, State
University of New
York at Albany

Technical Specialties

Design and
Implementation of
Air Quality Models
Meteorological
Analyses
Permitting Studies
Field Investigations
Impact Analysis of
Airborne Toxic
Releases
Expert Witness
Testimony

Professional Registrations & Affiliations

Certified Consulting
Meteorologist
Qualified
Environmental
Professional

Representative Project Experience

A. Air Dispersion Modeling Applications

ConocoPhillips (AK). Modeling consultant for review of modeling procedures used for offshore drilling activities in the Chukchi Sea. The modeling involved localized impacts near drilling vessels as well as on-shore impacts from this activity. Models reviewed were OCD, AERMOD, and CALPUFF.

Eastman Chemical Company, Kingsport, TN. Principal investigator for site-specific monitoring and modeling study to resolve an SO₂ nonattainment area in Kingsport, TN. The study has involved installation of meteorological and monitoring equipment and negotiation of monitoring and modeling protocols with reviewing agencies.

Columbian Chemicals, Marshall County, WV. Advisor for and reviewer of local modeling applications using RTDM and CALPUFF and review of a 1-year site-specific meteorological database gathered by ENSR Corporation in 1996 for the Industrial Source Group.

Entergy Mississippi, Louisiana, and Arkansas BART (MS, LA, and AR). Principal modeling investigator for BART determinations for Lake Catherine, White Bluff, Michoud, Gerald Andrus, and Baxter Wilson power plants using CALPUFF for visibility improvement modeling.

Entergy NAAQS Compliance Modeling and Permitting (LA): Principal modeling investigator for permitting and compliance modeling for Little Gypsy and Michoud.

Arizona Public Service (NM). Principal modeling investigator for BART visibility modeling support to APS for the Four Corners Power Plant and the Cholla Power Plant using CALPUFF for visibility improvement modeling.

Salt River Project (AZ). Principal modeling investigator for BART visibility modeling and control technology support to SRP for the Navajo and Coronado Generating Stations.

Dominion Energy (VA). Principal modeling investigator in a PSD permit for a 1280-MW natural gas-fired power plant in Warren County, Virginia, just 7 km from the Shenandoah National Park. The project dealt with significant complications involving PSD Class I impacts, 1-hour NO₂ modeling, and

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Robert J. Paine Resume
EnvironmentChelmsford, MA
2013

Americal
Meteorological
Society
Air & Waste
Management
Association
American Institute
of Physics
American
Meteorological
Society: Chair, Air
Pollution
Committee, 1996-
1998
Sigma Xi

PM_{2.5} increment modeling.

Confidential Clients (PA, DC, and IA). Principal modeling investigator in conducting 1-hour SO₂ and NO₂ NAAQS compliance modeling for several actual and hypothetical facilities.

Sithe Global, LLC (NM). Principal investigator in a PSD permit for a 1500-MW coal-fired power plant (Desert Rock) in the Four Corners area of New Mexico. The project was on Navajo Nation land, and included consideration of Indian affair issues. Other unique challenges for this permit were the presence of 15 PSD Class I areas within 300 km.

Unistar (MD). Principal modeling investigator in PSD permitting of a new nuclear-powered 1600-MW unit at the Calvert Cliffs Nuclear Power Plant near Lusby, MD.

Consolidation Coal (VA). Principal modeling investigator in permitting of coal-fired drying equipment associated with a coal preparation plant in Buchanan County, VA. This PSD project submitted in 2000 involved use of advanced complex terrain modeling with site-specific data gathered by ENSR. CALPUFF modeling was conducted for impacts at Linville Gorge and Great Smoky Mountains National Park.

Greene Energy Project (PA). Principal dispersion modeling advisor for a waste coal-fired project proposed for southwestern Pennsylvania. This project involves local modeling with an advanced air quality model, AERMOD as well as refined CALPUFF modeling impacts at Dolly Sods, Otter Creek, and Shenandoah PSD Class I areas.

Tucson Electric (AZ). Principal modeling investigator in the permitting of an approved expansion of the coal-fired Springerville Generating Station in eastern Arizona; modeling involved CALPUFF for three PSD Class I areas and testimony before the Arizona Corporation Commission.

Basin Electric Power Cooperative (ND). Principal investigator in review of CALPUFF modeling of SO₂ increment consumption at several PSD Class I areas in North Dakota and Montana due to emissions from lignite-fueled power plants. ENSR used an advanced modeling approach for CALPUFF that showed more accurate modeled impacts than that indicated by EPA and North Dakota modeling.

Newmont Mining (NV). Principal dispersion modeling investigator for permitting of a coal-fired power plant in north central Nevada. Local modeling involved use of AERMOD with meteorological input from ENSR-operated meteorological tower and sodar. PSD Class I impacts were modeled with a refined CALPUFF analysis for a nearby PSD Class I area.

B. Selected Air Quality Model Development Projects

Minerals Management Service. Assisted in the development and evaluation of the Offshore and Coastal Dispersion (OCD) model. This model was submitted to EPA and it became the preferred dispersion model for outer continental shelf emission sources.

Electric Power Research Institute. Principal investigator in the development of the Emissions Variability Processor (EMVAP), the SubHourly AERMOD Run Procedure (SHARP), and the analysis of distance applicability

AECOM

Robert J. Paine Resume
EnvironmentChelmsford, MA
2013

for short-range models.

AMS/EPA. Acted as an advisor from 1991 through 2005 to the American Meteorological Society and EPA in a working group (AERMIC) to replace the ISC model with a new model (AERMOD).

American Petroleum Institute and Utility Air Regulatory Group. Principal investigator on evaluation study for AERMOD and CALPUFF in low wind speed cases.

C. Expert Witness Testimony

Utility Air Regulatory Group and American Petroleum Institute. Provided expert witness declarations and consulting to support Petitions for Reconsideration of the 1-hour NO₂ and SO₂ National Ambient Air Quality Standards.

Noranda Minerals. Provided extensive testimony regarding the operation for an intermittent control system at a copper smelter in Quebec during a pollution episode.

Nestle Great Waters. Provided testimony regarding the evaporative water transport involving a watershed where a high volume water pumping/withdrawal site is located in Michigan.

Grain Processing Corporation. Provided consulting to legal counsel in anticipation of litigation regarding state agency orders for emissions reduction due to SO₂ compliance issues.

Wellington Development. Provided testimony regarding dispersion modeling procedures in hearings involving a challenge to a PSD permit issued by Pennsylvania DEP for the Greene Energy waste coal project in SW Pennsylvania.

Publications

Kaplan, M., R. Paine, and R. Hamel, 2013. Additional Evaluation of EMVAP Using Hourly Emissions, Meteorological, and Monitoring Data. Control #29, presented at the Air & Waste Management Association's Specialty Conference, Guideline on Air Quality Models: the Path Forward, Raleigh, NC. March 2013.

Connors, J., R. Paine, and S. Hanna, 2013. AERMOD Low Wind Speed Issues: Review of New Model Release. Control #3, presented at the Air & Waste Management Association's Specialty Conference, Guideline on Air Quality Models: the Path Forward, Raleigh, NC. March 2013.

Paine, R., F. Tringale, and S. Gossett, 2013. Resolution of 1-hour SO₂ Nonattainment Area in Kingsport, TN: Advanced Meteorological and Monitoring Study. Control #7, presented at the Air & Waste Management Association's Specialty Conference, Guideline on Air Quality Models: the Path Forward, Raleigh, NC. March 2013.

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Paine, R.J., D.W. Heinold, and R.M. Iwanchuk, 2013. Compliance Challenges Posed by the NAAQS for SO₂, NO₂, and PM_{2.5}, Paper 3.1, presented at the 2013 EUEC conference, Phoenix, AZ.

Paine, R. and D. Heinold, 2012. Advanced Dispersion Modeling Techniques to Assist with NAAQS Compliance. Presented at the NCASI NW Environmental Conference, Vancouver, WA.

Paine, R., D. Heinold, and S. Head, 2012. Predicted BART Visibility Benefits – Real or Illusion? Extended Abstract No. 134. Presented at the A&WMA Specialty Conference on Visibility. Whitefish, MT.

Hamel, R., R. Paine, D. Heinold, and E. Knipping, 2012. EMVAP: an Emissions Variability Processor for Modeling Applications. Paper # 2012-A-341-AWMA, presented at the 105th Annual Conference, Air & Waste Management Association, San Antonio, TX.

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Paine, R., J. Connors, R. Hamel and D. Heinold, 2011. Dealing with Modeling Challenges Posed by the 1-hour NAAQS for SO₂ and NO₂. Paper # 2011-A-331-AWMA, presented at the 104nd Annual Conference, Air & Waste Management Association, Orlando, FL.

Paine, R. and D. Heinold, 2011. Critical Issues in the Completion of Regional Haze Rule State Implementation Plans. Paper # 2011-A-474-AWMA, presented at the 104nd Annual Conference, Air & Waste Management Association, Orlando, FL.

Paine, R. 2010. Air Quality Modeling (Vol IV), edited by P. Zannetti – contributions to Chapters 1 and 2. The Envirocomp Institute and Air & Waste Management Association. ISBN 978-1-9334740-8-3.

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Environment

Chelmsford, MA
2013

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Paine, R.J. and J.A. Connors, 2009. Progress Report: Low Wind Speed Evaluation Study. Paper # 2009-A-406-AWMA, presented at the 102nd Annual Conference, Air & Waste Management Association, Detroit, MI.

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Paine, R.J., 2009. New Permitting Challenges: PM_{2.5} NAAQS and PSD Increment Modeling. Paper A6.4, presented at the 12th Annual Electric Utilities Environmental Conference, Phoenix, AZ.

Paine, R.J., 2008. Permitting Challenges: PM_{2.5} NAAQS and PSD Increment Modeling. Paper E8.1, presented at the 11th Annual Electric Utilities Environmental Conference, Tucson, AZ.

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Paine, R.J. 2007. AERMOD and CALPUFF: Features, Recommended Applications, and Comparisons with AUSPLUME and TAPM: a United States Perspective. Paper presented at the 14th IUAPPA Congress, Brisbane, Australia, September 2007.

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Regional Haze Assessments with CALPUFF and FLAG: Where are we Now? Paper #03-A-7-AWMA, Presented at the AWMA Specialty Conference: Guideline on Air Quality Models: The Path Forward. Mystic, CT.

Paine, R.J. and M.M. Kaplan, 2004. Application of CALPUFF to Assess Compliance with PSD Increment Consumption for SO₂ at Class I Areas in North Dakota and Montana. Paper # 246, Presented at the 97th Annual Conference and Exhibition of the Air & Waste Management Association. Indianapolis, IN.

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Heinold, D., R. Paine, and H. Feldman, 2003. Quantitative Evaluation of the EPA Urban Air Toxics Modeling Strategy: Results of Sensitivity Studies. Paper No. 69639. Presented at the 96th Annual Conference and Exhibition

AECOM

Robert J. Paine Resume
Environment

Chelmsford, MA
2013

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Paine, R., R. Brode, R. Wilson, A. Cimorelli, S. Perry, J. Weil, A. Venkatram, W. Peters, R. Lee, 2003. AERMOD: Latest Features and Evaluation Results. Paper No. 69878. Presented at the 96th Annual Conference and Exhibition of the Air & Waste Management Association. San Diego, CA.

Paine, R.J. and D.W. Heinold, 2002. FLAG Aftermath: Effects of the Federal Land Managers' Modeling Guidance on CALPUFF Applications for New Source Permitting.

Paper No. 43534. Presented at the 95th Annual Conference and Exhibition of the Air & Waste Management Association. Baltimore, MD.

Paine, R.J. and D.W. Heinold, 2001. Regulatory Applications of CALPUFF in Screening and Refined Mode – Lessons Learned. Presented at the Air & Waste Management Association Specialty Conference on Guideline on Air Quality Models: A New Beginning. Newport, Rhode Island. April, 2001.

Paine, R.J., 2001. Meteorological Input Data for AERMOD Applications. Presented at the Air & Waste Management Association Specialty Conference on Guideline on Air Quality Models: A New Beginning. Newport, Rhode Island. April, 2001

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Paine, R.J., D. W. Heinold, and H. J. Feldman. 2001. Quantitative Evaluation of the EPA Urban Air Toxics Modeling Strategy: Overview and Progress Report. Paper #979, Presented at the 2001 Annual Meeting of the Air & Waste Management Association, Orlando, FL.

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Paine, R. and D. Heinold, 2000. Issues Involving Use of CALPUFF for Long-Range Transport Modeling. Paper 00-359, presented at the 93rd Annual Meeting of the Air & Waste Management Association, Salt Lake City, UT.

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Paine, R. and L. Gendron, 2000. Experience in Modeling Applications Using On-site Tower and Sodar Data. Paper 11.4 presented at the 11th Joint Conference on Applications of Air Pollution Meteorology with the A&WMA. 9-14 January 2000, Long Beach, CA. American Meteorological Society, Boston, MA.

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the Air & Waste Management Association, St. Louis, MO.

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Robert J. Paine Resume
EnvironmentChelmsford, MA
2013

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Exhibit 6 – Attachment B

AECOM Analysis of PM_{2.5} NAAQS Compliance Issues



Analysis of PM_{2.5} NAAQS Compliance Issues for Monitors in the Vicinity of the Edwards, Joppa, and Newton Plants

Robert Paine and Jeffrey Connors, AECOM

October 7, 2013

Introduction

Various environmental groups have submitted comments to the Illinois Pollution Control Board in opposition to the Multi-Pollutant Standard (MPS) variance sought by Illinois Power Holdings (IPH) for SO₂ emissions. SO₂ is a precursor to PM_{2.5} formation (ammonium sulfate particles). The Sierra Club and others have asserted that SO₂ emissions from the IPH facilities (specifically the three coal-fired power plants in Illinois: the E.D. Edwards Energy Center, the Joppa Energy Center, and the Newton Energy Center), will result in "significant negative environmental impact" via the transformation of SO₂ into fine particulate matter (PM_{2.5}). Thus, at issue is whether SO₂ emissions from these plants could be contributing to any existing or potential PM_{2.5} nonattainment areas in Illinois or adjacent downwind states.

The analysis described below reviews the attainment status of PM_{2.5} monitors in the area of these power plants. The status of the monitors can generally be categorized as one of the following:

- The monitor shows concentrations below the NAAQS.
- The monitor shows concentrations above the NAAQS, but the trend is downward, and the most recent year or years indicates values below the NAAQS.
- The monitor continues to show concentrations above the NAAQS and the trend is not sufficient to show current NAAQS attainment. However, the component of sulfate particles for the excessive portion of the PM_{2.5} concentrations is very low.

PM_{2.5} Monitor Analysis Approach

AECOM has performed a comprehensive analysis of ambient PM_{2.5} monitoring data in the regional vicinity of these plants with respect to both the 24-hour and annual PM_{2.5} NAAQS. These standards are:

- 24-hour average = 35 ug/m³ (98th percentile day, averaged over 3 years) and
- Annual average = 12 ug/m³ (averaged over 3 years).



AECOM's analysis included a review of the three most recent years of data (2010 through 2012) at several monitoring sites to determine the measured "design" concentrations¹ to be compared to the NAAQS. The regional area in which we reviewed monitoring data included Illinois and relevant areas of several adjoining states, Indiana, Missouri, Kentucky, and Wisconsin, including the major metropolitan areas of Chicago, St. Louis, and Milwaukee. In addition to examining the design concentrations, for selected monitors, we also examined the trend of the monitoring data over the most recent three years (2010 through 2012) and speciation of the measured PM_{2.5} to determine whether sulfates are an important component of the excess PM_{2.5} concentration.

The source of the monitored concentrations used in this analysis is from the United States Environmental Protection Agency's (EPA's) website². The data obtained from this EPA website consists of a summary of PM_{2.5} 24-hour and annual design values from 2010 through 2012. The summary also includes trends of the three-year average design concentrations and each year's design concentrations. We address both of the PM_{2.5} NAAQS averaging times in separate sections below.

PM_{2.5} 24-hour NAAQS Monitoring Data Evaluation

We compiled the 24-hour PM_{2.5} design concentrations as extracted from the EPA spreadsheet provided at (<http://www.epa.gov/airtrends/values.html>). The extracted PM_{2.5} 24-hour design values were plotted for each available monitoring site located in Illinois and relevant areas of Indiana, Missouri, Kentucky, and Wisconsin.

Figure 1 shows the location of all the monitors considered in this analysis, including the locations of the three plants. The figure also indicates whether the PM_{2.5} design value for 2010 through 2012 for each monitor is above or below the NAAQS. A design value below the NAAQS is represented by a blue circle in the figure, while a design value above the NAAQS is represented by a red circle. Note that there are no sites out of compliance with the 24-hour NAAQS. No further analysis was conducted for the 24-hour NAAQS, since ongoing emission reductions in the Midwest (associated with, for example, implementation of controls associated with Best Available Retrofit Technology and the Mercury and Air Toxics Standards), will likely result in further reductions in PM_{2.5} concentrations in future years.

PM_{2.5} Annual NAAQS Monitoring Data Evaluation

Similar to the PM_{2.5} 24-hour data discussed above, we compiled the annual PM_{2.5} design concentrations extracted from the same EPA web source. The annual PM_{2.5} design values were then plotted for each valid monitor for monitors located in Illinois and relevant areas of Indiana, Missouri, Kentucky, and Wisconsin.

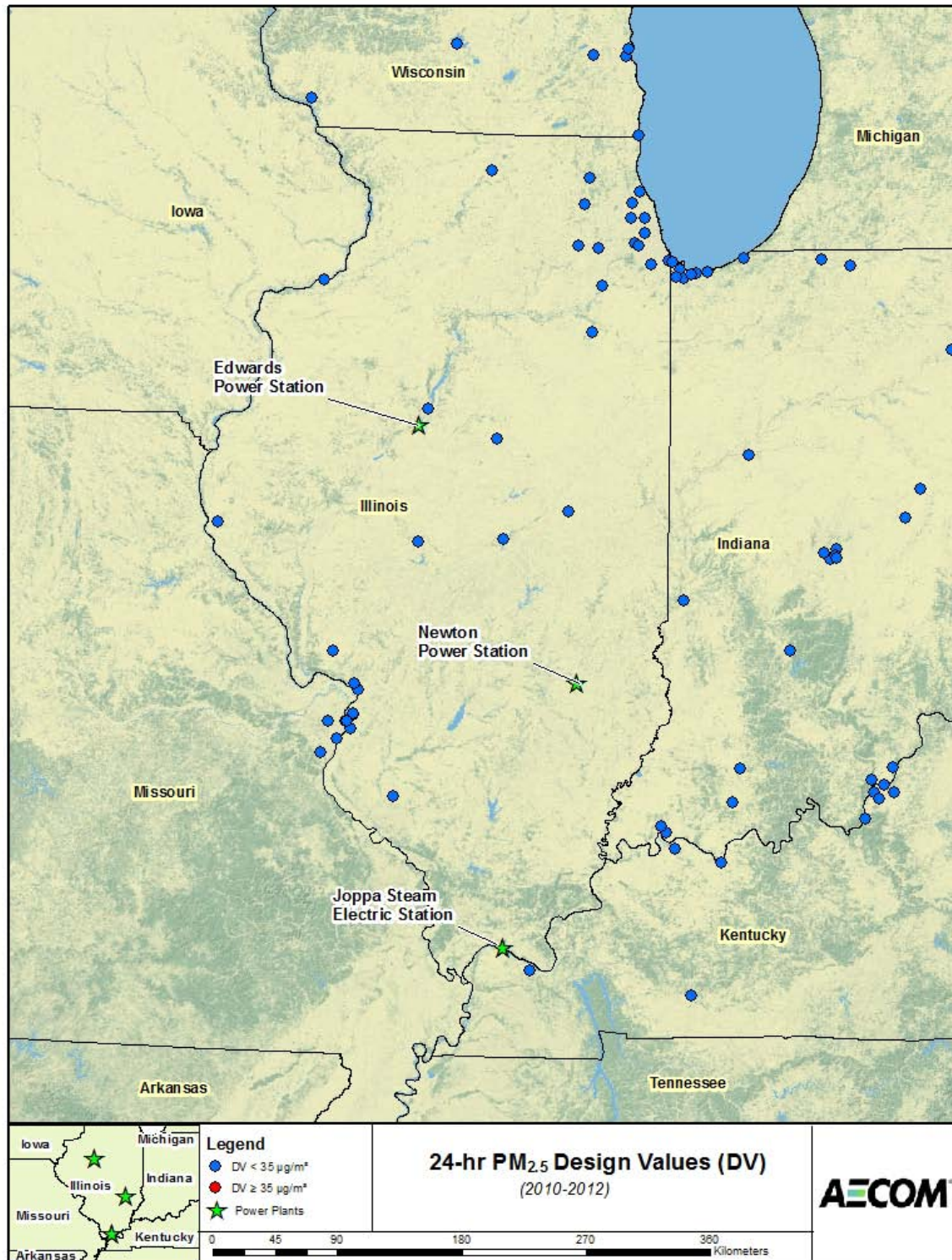
Figure 2 shows the location of all the monitors considered in this analysis. The figure also indicates if the PM_{2.5} design value for 2010 through 2012 for each monitor is above or below the NAAQS. A design value below the NAAQS is represented by a blue circle, while a design value above the NAAQS is represented by a red circle. The figure shows that a majority of the monitors are shown with a blue circle, indicating NAAQS compliance.

¹ "Design" concentrations are monitored (or modeled) values having a form consistent with the NAAQS: the 98th percentile 24-hour value averaged over 3 years, and the highest annual value averaged over 3 years.

² <http://www.epa.gov/airtrends/values.html>



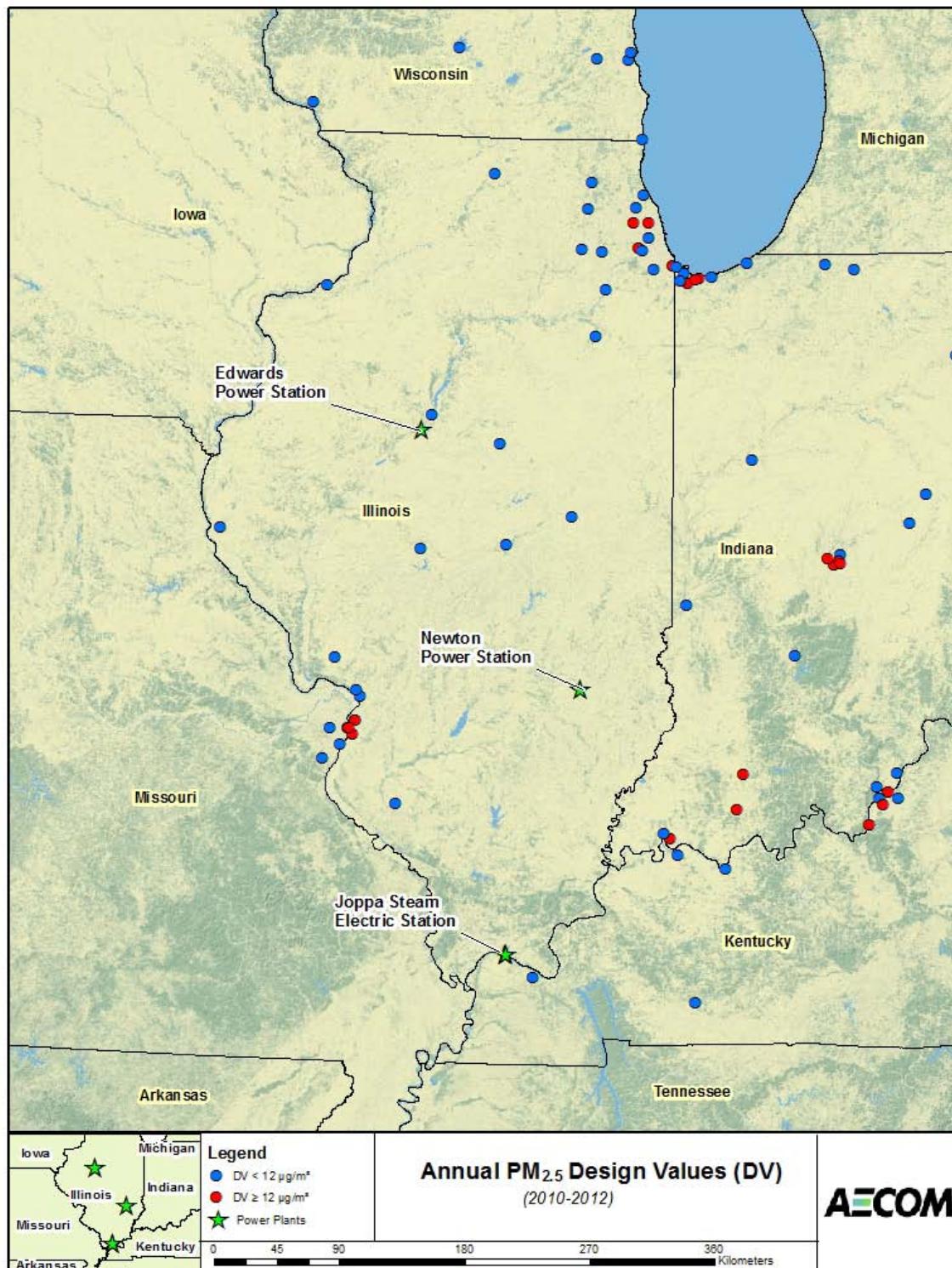
Figure 1: 24-Hour NAAQS Compliance Status of Area-wide PM_{2.5} Monitors^(a)



(a) Monitors were selected from Illinois and relevant areas from Indiana, Kentucky, Missouri, and Wisconsin.



Figure 2: Annual NAAQS Compliance Status of Area-wide PM_{2.5} Monitors ^(a)



(a) Monitors were selected from Illinois and relevant areas from Indiana, Kentucky, Missouri, and Wisconsin.



For the monitors with annual design values above the PM_{2.5} NAAQS (based upon a 3-year average from 2010 – 2012), we examined the trend in the data over the last three years to see if the monitors are likely to soon show attainment based on a continued downward trend in PM_{2.5} concentrations. In many cases, the latest year or two of monitoring data shows concentrations below the NAAQS, with a downward trend expected to continue for the reasons stated above.

Table 1 shows the latest three years of monitoring data for each monitor with annual average PM_{2.5} concentrations above the NAAQS. Of the 19 monitors shown in Table 1, 8 of them (as indicated by an asterisk) still have annual average PM_{2.5} values above the NAAQS for the latest year of monitoring data. However, even for these monitors, it is evident that all but two have a downward trend in the annual average concentrations.

PM_{2.5} speciation data were evaluated, where available, for monitors having a 2012 annual average concentration above the NAAQS (the eight locations identified by an asterisk in Table 1). Such data were available for only one of these locations, Madison County, IL, Site 171191007. For the remaining seven locations, the nearest air monitors included on Table 1 (i.e., those with annual design concentrations above the NAAQS of 12 ug/m³) for which speciation data are available were evaluated and plotted in Figure 3. For these locations, the “urban increment” using the speciation data was calculated. The urban increment is computed by taking the difference of the speciated concentrations in the monitor with a NAAQS exceedance to the monitored speciated concentrations at other monitors (in compliance with the NAAQS) in surrounding rural areas. These calculated concentrations are available at the web site

<http://www.epa.gov/pmdesignations/2012standards/docs/pm25designvalues2010-2012withurbanincrements.xlsx>. Thus on Figure 3, the red dots indicate the locations of the Table 1 air monitors with annual design concentrations above the NAAQS of 12 ug/m³, and the pie charts indicate the locations of the air monitors used for this “urban increment” analysis, as well as the contributions of specific PM_{2.5} urban increment.

Figure 3 shows that most of the PM_{2.5} urban increment at these monitors is due to PM_{2.5} components other than sulfates. This is especially true in the St. Louis area where three of the PM_{2.5} monitors (171190024, 171191007, and 295100093) with annual design values above the NAAQS are located. The major contributor at these locations is PM_{2.5} species of crustal origin. At the remaining monitors, organic and elemental carbon make up the majority of the PM_{2.5} species, these are species not associated with emissions from coal-fired power plants.


Table 1: PM_{2.5} Trend Data (2010-2012) for Monitors with Annual Design Values Greater than the PM_{2.5} Annual NAAQS (12 ug/m³)

State	County	Site	Local Site Name	Annual Average Concentration (ug/m ³)			2010-2012 Annual Design Concentration (ug/m ³) ⁽¹⁾	Monitors with 2012 Annual Average Concentrations Greater than the PM _{2.5} Annual NAAQS	Monitors that do not Show a Decreasing Trend in Annual Average Concentrations
				2010	2011	2012			
Illinois	Madison	171190024	Gateway Regional Medical Center	14.6	14.4	13.0	14.0	*	
Indiana	Marion	180970043	Indpls- West St.	15.1	13.9	12.4	13.8	*	
Illinois	Madison	171191007	FIRESTATION #1	14.3	13.3	12.8	13.5	*	
Indiana	Clark	180190006	Jefferson- Walnut St/ Jefferson PFAU	14.7	12.9	11.9	13.2		
Indiana	Lake	180890026	Gary- Burr St./ pumping station near truck stop	14.1	13.4	12.1	13.2	*	
Missouri	St. Louis	295100093	Branch Street	13.8	13.6	12.2	13.2	*	
Illinois	Cook	170313103	IEPA TRAILER	12.6	13.3	13.1	13.0	*	
Illinois	Cook	170310022	WASHINGTON HS	14.0	12.6	11.5	12.7		
Indiana	Lake	180890022	Gary-IITRI/ 1219.5 meters east of Tennessee St.	13.6	12.1	12.3	12.7	*	*
Indiana	Marion	180970081	Indpls- W. 18th St./ Ernie Pyle School 90	14.0	12.4	11.7	12.7		
Illinois	Cook	170311016	VILLAGE HALL	12.6	12.6	12.6	12.6	*	*
Indiana	Marion	180970083	Indpls- E. Michigan St./ Thomas Gregg Sch. 15	13.9	12.7	11.1	12.6		
Indiana	Marion	180970084	Indpls- School 21/ Florence Fay School 21	13.8	12.7	11.1	12.5		
Indiana	Dubois	180372001	Jasper PO	13.6	12.6	10.8	12.4		
Kentucky	Jefferson	211110051	Watson Lane	14.8	11.8	10.3	12.3		
Illinois	St. Clair	171630010	IEPA-RAPS TRAILER	13.0	12.8	10.9	12.2		
Indiana	Lake	180890031	Gary- Madison St./ Gary Water/ IN American Water Co.	12.9	12.1	11.5	12.2		
Indiana	Vanderburgh	181630016	Evansville- U of E/ University of Evansville-Carson Center	13.4	12.3	11.0	12.2		
Kentucky	Jefferson	211110044	Wyandotte Park	13.7	12.3	10.3	12.1		

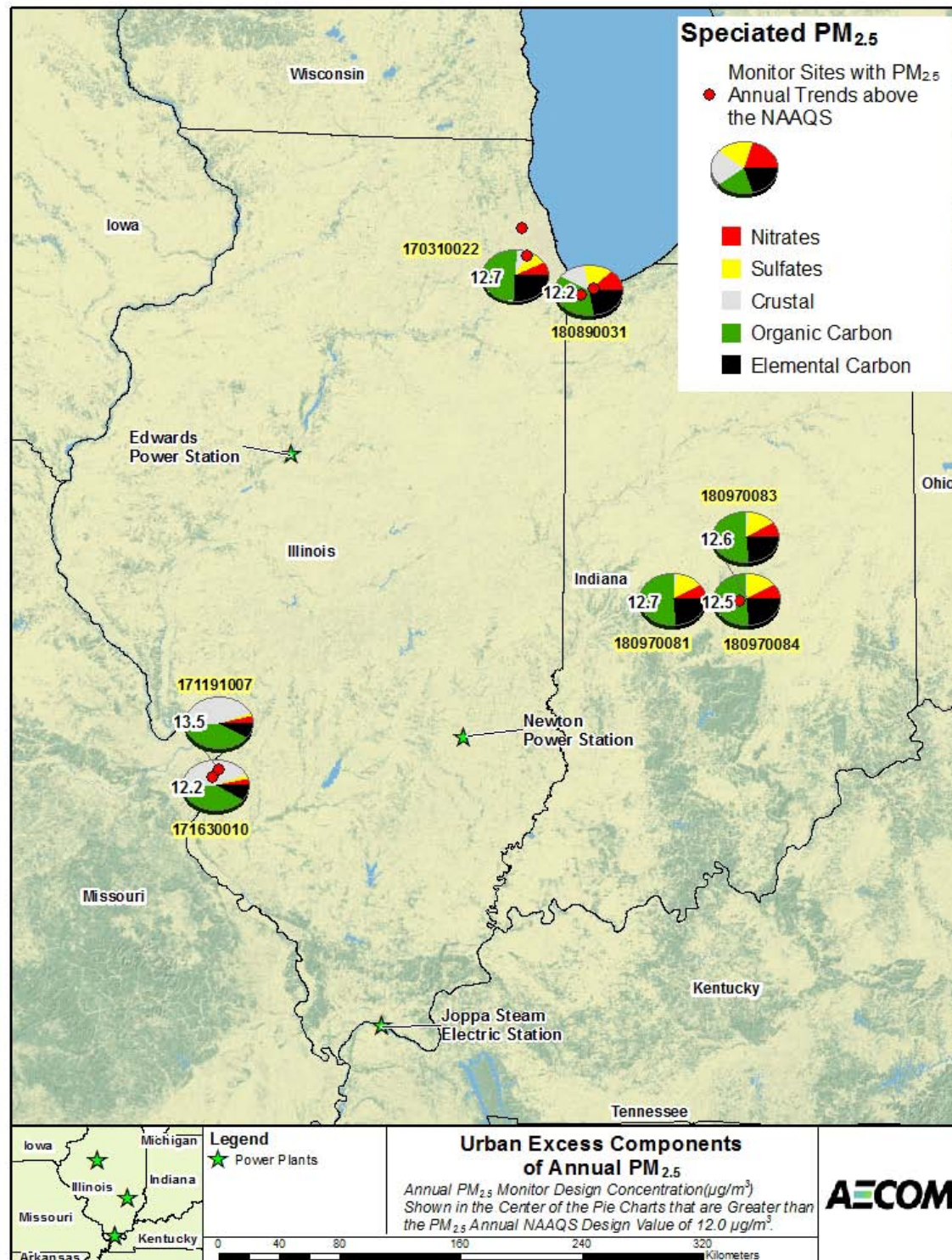
Source of data: <http://www.epa.gov/pmdesignations/2012standards/docs/pm25designvalues2010-2012withurbanincrements.xlsx>

Yellow shaded cell indicates PM_{2.5} annual average concentration has dropped below the PM_{2.5} annual NAAQS of 12 ug/m³.

(1) Monitors were selected from Illinois and relevant areas from Indiana, Kentucky, Missouri, and Wisconsin.



Figure 3: PM_{2.5} Annual Urban Excess Speciation^(a)



(a) Monitors were selected from Illinois and relevant areas from Indiana, Kentucky, Missouri, and Wisconsin.



Conclusions

Ongoing regional emission reduction programs are showing significant progress in downward trends of PM_{2.5} concentrations in Illinois and adjacent states. There are no remaining monitors showing violations of the 24-hour PM_{2.5} NAAQS in this area. Although designations have not yet been made for the revised annual average, there are a few monitors with 2010-2012 3-year averages above the 12 µg/m³ NAAQS. Many of these monitors are showing a downward trend with 2012 annual averages below 12 ug/m³. (As 2013 data becomes available, some of these monitors may come into attainment.) Of the monitors with 2010-2012 annual averages above 12 ug/m³, only two do not show a clear 3-year downward trend; these are Site 180890022 in Lake County, IL, and Site 170311016 in Cook County, IL. These two sites are both quite distant from the IPH power plants. The remaining monitors have localized urban increment components that are not dominated by sulfate species. Therefore, we conclude that SO₂ emissions from the Edwards, Joppa, and Newton plants would not be expected to interfere with maintenance of PM_{2.5} NAAQS attainment, or in preventing bringing those areas that are marginally above the NAAQS into attainment.

EPA Excel Spreadsheet References Cited in this Analysis

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PM25_DesignValues_20102012_FINAL_08_20_13.xlsx – available at <http://www.epa.gov/airtrends/values.html>