COMMONWEALTH OF KENTUCKY
BEFORE THE KENTUCKY STATE BOARD ON
ELECTRIC GENERATION AND TRANSMISSION SITING

In the Matter of:

THE APPLICATION OF THOROUGHBRED GENERATING COMPANY, LLC FOR A MERCHANT POWER PLANT CONSTRUCTION CERTIFICATE IN MUHLENBERG, COUNTY, KY	))))	CASE NO. 2002-00150

REBUTTAL TESTIMONY
OF
MICHAEL T. DEBUSSCHERE, P.E., CIH, QEP

October 13, 2003

Q1. Please state your name, your employer, your position and your business address.

A. My name is Michael DeBusschere. I am President of Kentuckiana Engineering Co., Inc. My business address is 4350 Brownsboro Road, Louisville, Kentucky 40207.

Q2. What are your responsibilities as President of Kentuckiana Engineering and how long have you served in that position?

A. My service as President of Kentuckiana Engineering began in 1996. In that position, I provide environmental consulting services to companies who want construction permits for facilities, including electrical generating units. My fields of expertise and areas of responsibility include (1) air permitting issues, including permitting under the Clean Air Act's Prevention of Significant Deterioration (PSD) and Title V programs, (2) air dispersion modeling, and (3) compliance with federal and Kentucky standards applicable to air toxics and hazardous air pollutants. A more detailed discussion of my work experience, responsibilities, and accomplishments appears in my curriculum vitae attached to this testimony as Exhibit A.

Q3. Please give an overview of your work experience and educational background.

A. My professional focus has been environmental air permitting and compliance issues since 1970, when I graduated from the Georgia Institute of Technology with a Bachelor of Science Degree in Chemical Engineering. I also (1) received an MBA from Butler University in Indianapolis, Indiana in 1977; (2) am registered as a Professional Engineer in the states of Kentucky, Indiana, Ohio, and Florida; (3) am certified by the American Board of Industrial Hygienists; (3) am certified as a Qualified Environmental

Professional by the Institute of Professional Environmental Practice; and (4) am a Board registered and accredited Environmental Auditor ISO14001. From June 2000 to June 2001, I served as President of the Air and Waste Management Association, an international association of environmental professionals.

My professional experience spans both the government and private sector. From 1970 to 1977, I worked as a chemical engineer for EPA Region IV, the EPA Region that includes Kentucky. During that time, I served as the Acting Chief of the Planning and Standards Branch, on assignment as the Director of the Indianapolis Air Pollution Control District, and as the Project Manager for the development of four State Implementation Plans (SIPs), including the SIP for Kentucky. SIPs are EPA-approved state plans for carrying out Clean Air Act requirements and standards.

From 1977 to 1986, I served as the Air Pollution Control Officer for the Air Pollution Control District (APCD) in Jefferson County, Kentucky. The APCD is the air permitting authority for sources in Jefferson County just as the Natural Resources and Environmental Protection Cabinet (NREPC) is the air permitting authority for sources in the remaining counties of Kentucky. In that position, I oversaw all engineering, enforcement, and regulatory development within that Agency.

My service as an environmental consultant on air quality issues, including permitting and compliance, began when I left APCD.

Q4. What is the purpose of your testimony?

A. The purpose of my testimony is to rebut the testimony of Big Rivers Electric Corporation (BREC) witness Mick Durham regarding fine particulate ($PM_{2.5}$), PSD and regional haze issues. My testimony is intended to demonstrate to the Board that Mr.

Durham's testimony is inaccurate and misleading. My testimony also responds to the testimony of Intervenor Gary Watrous.

Q5. On page 12 of his Testimony, Mr. Durham states that "economic impacts on neighboring facilities are not typically items that an air permitting agency like NREPC will consider in issuing such permits". Do you agree?

A. No. Under the Clean Air Act, the issuance of a construction permit for an individual facility – by its nature – involves decisions as to whether an individual permit applicant can use the available resource and how much of that resource the applicant can use. This is true whether the permitting agency is addressing attainment of the ambient air quality standards or consumption of the increments in PSD Class I or II areas.

When Kentucky issues a permit that authorizes a new source or an expansion at an existing source, the permit represents a declaration by the Commonwealth of how much of the available air resource the permittee can use and how much cannot be used by anyone else. This decision has obvious implications for existing and proposed facilities that have an interest in the attainment of those air quality standards and/or consumption of those increments. Any facility that wants Kentucky to consider competing interests in the air resource for which an applicant applied should present its case to the state permitting agency, in this case the Kentucky Division for Air Quality (KDAQ).

As a practical matter, however, few such facilities raise this claim in Kentucky for three reasons. First, Kentucky's practice is to consider applications on a *first come, first served* basis. That practice does not preclude a facility from raising the claim, however; and, if raised, Kentucky would have to respond to it. Resolution of the claim would

require Kentucky to make a policy decision as to how much, if any, of the air resource to assign to the applicant. And such decisions would be appealable.

Second, major point sources have not suffered under this approach in that subsequent applicants were able to secure permits. This is the case because increment consumption is predicted by dispersion modeling at discrete receptor sites, of which there are thousands across the map, and for multiple years of meteorological data. The fact that one source will consume some increment at one receptor at one point in time does not preclude another new source from consuming increment at a different receptor during the same time or at the same receptor during a different time. Because of meteorology, terrain features, and different source and receptor orientations, the probability of two point sources having significant impacts at the same receptor at the same time is very small.

Third, as existing sources reduce their emissions, the available increment expands, providing more air resource for new sources. Given all of the controls recently added to existing sources and expected in the near term as a result of other regulatory programs under the Clean Air Act, I doubt that increment availability will control future PSD permitting.

Q6. On page 2, Mr. Durham refers to Thoroughbred's "failure" to "address negative economic consequences resulting from possible environmental impacts" in its application to the Siting Board. Did Thoroughbred address BREC's concerns about "economic consequences" in the permit proceeding before the KDAQ?

A. No.

Q7. Do you know why not?

A. BREC did not raise the issue in that proceeding.

Q8. On page 4 of his testimony, Mr. Durham testifies that Thoroughbred did not provide information in its Siting Board application indicating that it evaluated the impact of its $PM_{2.5}$ emissions on the $PM_{2.5}$ ambient air standard. What are $PM_{2.5}$ emissions, and how does the PSD permit for Thoroughbred facility mitigate its effect on ambient air quality for $PM_{2.5}$?

A. PM refers to "particulate matter," which is the general term used to refer to a broad class of substances that exist as discrete particles over a wide range of sizes. Particulate matter can originate from industrial and mobile sources, as well as from natural sources. In addition, particulate matter may be emitted directly from a source or may be formed in the atmosphere by transformations of gaseous emissions such as sulfur oxides into sulfates and nitrogen oxides into nitrates. $PM_{2.5}$ refers to particulate matter that is less than or equal to 2.5 micrometers in diameter.

Under the Clean Air Act and Kentucky statutes and regulations, PSD permits must require new sources to install equipment that can achieve the emission limitations associated with "best available control technology" (BACT). With respect to ambient $PM_{2.5}$, Thoroughbred's PSD permit establishes BACT emission limitations for particulate matter (of which $PM_{2.5}$ is a subset) and precursors to $PM_{2.5}$ such as sulfur dioxide (SO_2) and nitrogen oxides (NO_x). In response to its stringent emission limitations, Thoroughbred plans (1) selective catalytic reduction (SCR) to reduce NO_x emissions and the potential for the formation of particulate nitrates, (2) dry electrostatic precipitators and wet electrostatic precipitators (ESP/WESP) to reduce emissions of all PM including $PM_{2.5}$ and hazardous air pollutant (HAP) particulates, and (3) wet flue gas desulfurization

(FGD) to reduce SO_2 emissions (and the potential for formation of particulate sulfates), ammonia and oxidized mercury. The WESP technology is a state of the art application for this project and is particularly effective at removing fine particulate. KDAQ found that this advanced technology satisfied all applicable requirements.

Q9. Was Mr. Durham correct when he testified that Thoroughbred did not provide information in its Siting Board application indicating that it evaluated the impact of its emissions of $PM_{2.5}$ on the $PM_{2.5}$ ambient standard?

A. Yes.

Q10. Why did Thoroughbred not provide such information?

A. KDAQ fully addressed the legal requirements for the plant's air emissions and detailed information about Thoroughbred's impacts on ambient $PM_{2.5}$ is not germane to the Siting Board's consideration of Thoroughbred's application. Additionally, Thoroughbred did not provide information in its Siting Board application evaluating the impact of its emissions on the $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) because there are currently no federal or Kentucky requirements addressing emission levels or permit requirements for attaining the $PM_{2.5}$ NAAQS.

NAAQS set limits on the allowable concentration of certain air pollutants in the ambient air, the open air to which the public has access. The NAAQS for $PM_{2.5}$ were set by EPA in a rule in 1997 found at 40 C.F.R. §50.5. Following the establishment of a NAAQS, states and EPA must develop the emission levels and permit requirements that are necessary to attain that standard. First, states, using monitoring data, designate areas within their borders as either being in "attainment" or "nonattainment" with respect to the NAAQS; and those designations are subject to EPA review and approval. Thereafter,

states submit to EPA proposed amendments to their Clean Air Act SIPs outlining the regulatory measures (including emission levels and permit requirements) that the state intends to implement in order to attain (in areas that are nonattainment) and maintain (in areas that are attainment) the NAAQS in their state. Upon approval by EPA, those regulatory measures take effect.

Before SIPs for $PM_{2.5}$ can be developed, however, EPA must issue a rule guiding states regarding the permissible ways to amend their SIPs to regulate existing sources to assure attainment of the $PM_{2.5}$ NAAQS, and to regulate new sources through PSD permitting to assure maintenance of the $PM_{2.5}$ NAAQS. EPA's implementation rule for the $PM_{2.5}$ NAAQS is expected by the end of the year.

Currently, states, including Kentucky, are only in the process of gathering data so that they can determine which areas attain the new NAAQS for $PM_{2.5}$. As Mr. Durham points out, the states have until February 15, 2004, to complete that work and have until December 2007 to develop a SIP. Therefore, even if the process proceeds as scheduled, it will be several years before designations are made, SIPs are adopted, the SIPs are approved by U.S. EPA, and the regulatory impacts of nonattainment are known. Mr. Durham's testimony invites the Board to speculate about both the extent of $PM_{2.5}$ NAAQS nonattainment in Kentucky and what Kentucky would do about it.

Q11. At page 5 of his testimony, Mr. Durham testifies that the estimated impact of Thoroughbred's $PM_{2.5}$ emissions on ambient concentrations will be 0.8 ug/m3. Do you agree with that estimate?

A. No. Mr. Durham's calculation is incorrect. First, while Mr. Durham notes that Thoroughbred will have a dry electrostatic precipitator (ESP) as a control device for PM,

he misstates the $PM_{2.5}$ that it might emit. He claims that EPA's AP-42 indicates that 43% of the PM from such a device is $PM_{2.5}$. Actually, as shown in Exhibit B, that reference states that 29% of the PM would be $PM_{2.5}$ with an ESP-only control system.

Second, Mr. Durham has ignored Thoroughbred's plan to use a wet ESP, which is specifically designed to remove fine particulate matter from the flue gas of coal fired power plants. Mr. Durham's failure to take this into account is a flaw in his testimony.

Q12. Even if Muhlenberg County were classified as nonattainment for the annual $PM_{2.5}$ NAAQS, is Thoroughbred the type of facility that KY would regulate to bring the County into attainment?

A. I doubt – for several reasons – that Kentucky would regulate Thoroughbred to resolve the hypothetical nonattainment issue that has been raised by Mr. Durham.

First, several Clean Air Act programs are expected to make significant strides toward attainment of the $PM_{2.5}$ NAAQS. For example, states are now controlling their sources' emissions of NO_x under EPA's NO_x SIP Call. While these reductions are aimed at reducing ozone concentrations, they will – as a by-product – lower fine particulate nitrate concentrations and $PM_{2.5}$. In addition, the second phase of the SO_2 reductions under Title IV of the Clean Air Act will be occurring over the next few years. Wilson 1 and TVA's Paradise Plant are likely to be two of the many coal-fired power plants regulated by one or more of these programs, which will improve air quality in the vicinity of Wilson 2, and increase the air resource for Wilson 2 or other new sources.

Second, in the event that local controls of $PM_{2.5}$ emissions were pursued, Thoroughbred would not likely be a prime regulatory target, because it will install and operate best available control technology for emissions that contribute to ambient

particulate matter, including $PM_{2.5}$. A search for local $PM_{2.5}$ emissions to control would focus on larger sources of emissions without such controls already in place.

To conclude, a passage in Mr. Durham's testimony is disingenuous. On page 3, he cites a TVA modeling analysis to suggest that Muhlenberg County will be nonattainment for $PM_{2.5}$; and, at lines 1-3 of page 4, testifies that "TVA predicted that although concentrations of SO_2 from Paradise Unit No. 3 will be reduced as the result of installation of a scrubber, particulate matter emissions would not be expected to change." Mr. Durham fails to acknowledge that SO_2 is a precursor of $PM_{2.5}$ and that TVA's reductions in SO_2 concentrations are more important to trends in ambient $PM_{2.5}$ concentrations than Paradise's $PM_{2.5}$ emissions would be.

Q13. How could the Board address Mr. Durham's concerns?

A. Absent a set of regulatory guidance from EPA and nonattainment designations, I do not know how the Board would address those concerns. I see Mr. Durham's testimony as inviting the Board to speculate about the effect on air quality of all ongoing Clean Air Act programs (not just $PM_{2.5}$ regulatory developments), the extent of nonattainment after those programs are implemented, and what Kentucky would do about residual nonattainment, if any existed. These considerations are not appropriate for this proceeding.

Q14. On page 4 of his testimony, Mr. Durham faults Kentucky's cumulative analysis of power plants for not tabulating their ammonia emissions. Is this omission significant?

A. No. While ammonia emissions do contribute to the mass of $PM_{2.5}$ in the atmosphere, coal fired power plants are small emitters of ammonia. I doubt that

Kentucky's not accounting for ammonia emissions from coal fired power plants had a significant effect on the result of its analysis. For example, the Thoroughbred plant is designed to emit no more than 2 parts per million of ammonia from the SCR outlet. Moreover, given the high solubility of ammonia in water, the scrubber and wet ESP should remove even traces of ammonia.

Q15. Does Thoroughbred's application adequately present an analysis of the environmental impacts from its proposed facility to enable the Siting Board to assess the probable economic impacts?

A. Yes. Thoroughbred's application details the socio-economic benefits that the Thoroughbred facility will provide to the community and Kentucky as a whole in the form of jobs, increased area economic activity, jobs from the use of coal. The testimony of Mr. Durham, who is not an economist, is unable to point to any concrete economic harm that BREC or other industry will suffer as a result from the construction and operation of Thoroughbred's facility. I understand that these issues are being addressed in more detail in the Prefiled Rebuttal Testimony of Dr. Glenn D. Meyers. However, note that I am not aware of any steps having been taken by BREC to place its possible expansion in the queue for obtaining increment on the first come, first served basis followed by KDAQ. Mr. Durham's claims of economic harm due to possible increased regulatory requirements as a result of $PM_{2.5}$ emissions and increment consumption are entirely speculative and are based on numerous assumptions that may never materialize.

Q16. With respect to PSD Class I increment consumption issues, Mr. Durham testifies on page 7 that Thoroughbred will consume "virtually all of . . . the sulfur dioxide 24 hour averaging time Class I increment of 5 ug/m3" and that this

"increment has now been reserved for Thoroughbred, and is not available for use by any other source". Do you agree?

A. No. In pertinent part, KY's Table 6.4 at pages 31 to 32 of its Statement of Basis provides as follows:

Pollutant	Averaging Period	Class I Increment (ug/m3)	Source Class I Increment Consumption (ug/m3)
SO2	Annual	2	0.142
	24-hour	25	1.16
	3-hour	5	4.37

Three observations are in order. First, rather than the 24-hour averaging period, Mr. Durham was actually testifying about the 3-hour averaging period. Second, rather than 4.97 ug/m3 of increment consumption, TGS will actually use only 4.37 ug/m3. Third, Mr. Durham failed to note that KDAQ transposed the increments for the 24-hour and 3-hour averaging period. (See section 23 of 401 KAR 51:017 for the proper designations.) Thus, instead of consuming 99+% of a 5 ug/m3 increment, TGS will consume only 17.5% of a 25 ug/m3 increment.

Moreover, the available 82.5% is subject to increment expansion from emission reductions at existing sources. Because many existing sources in western Kentucky were and will be controlled under the various Clean Air Act programs, I expect 82.5% to be an underestimate of how much air resource is available at the time and place where Thoroughbred has its maximum effect.

Even putting increment expansion aside, Mr. Durham's testimony is also misleading due to the suggestion that this "increment has now been reserved for Thoroughbred". While it is true that for one receptor for one 3-hour period, 4.37 of the 25 ug/m3 was reserved for Thoroughbred, a lesser amount of this increment was reserved for Thoroughbred for all other receptor sites and all other 3-hour periods. For Mr. Durham to demonstrate that Kentucky's award of increment to Thoroughbred affects his client, he must perform atmospheric modeling that demonstrates that Wilson 2 would contribute to ambient air quality at the same place and time that Thoroughbred was modeled to contribute and would contribute to an extent that an increment exceedance would result.

Q17. What is your evaluation of Mr. Durham's modeling on that issue?

A. I am not aware that he performed the necessary modeling to demonstrate whether Thoroughbred's increment consumption actually affects BREC.

Q18. Is that the extent of your testimony on this issue?

A. No. Mr. Durham's claim is based on his concern that Kentucky's issuance of a PSD permit granting Thoroughbred use of some of the increment harmed BREC's interest in developing Wilson 2. These concerns reinforce my initial point. If BREC was disappointed with Kentucky's issuance of a permit to Thoroughbred, BREC should have been before KDAQ asking that it issue to Thoroughbred a different set of permit conditions.

Moreover, Mr. Durham's statements are based on modeling Thoroughbred emissions at the permitted short-term limit of 0.41 lb/MBtu SO_2 over a 24-hour averaging period. By basing his conclusion on this modeling, Mr. Durham ignores certain realities. First, as the record before the NREPC clearly shows, Thoroughbred cannot operate at this

0.41 level for many days without violating its 30-day rolling average permit limit. Thus, Thoroughbred's peak increment consumption will as a practical matter be much less than the 4.37 ug/m3 listed in the Statement of Basis' Table 6.5.

Second, Thoroughbred's permit requires a revision of Thoroughbred's 24-hour emission limitation after two years of operations to reflect actual conditions. The target for the revised emission rate is 0.23 lb/MBtu. The August 7, 1980 PSD rule on increment consumption allows future applicants to model actual emissions from existing facilities once they establish normal operating conditions (in this case, two years). In making its decision to use actual emissions in determining increment consumption, EPA specifically addressed economic development concerns when it stated, "EPA believes it is unwise to restrict source growth based only on emissions of sources permitted to emit but which, in many instances, have not been and are not likely to be emitted. Increment calculation based on best prediction of actual emissions links PSD permitting more closely to actual air quality deterioration than calculations based on allowable 'paper' emissions. . . . Increment calculations will generally be based on actual emissions as reflected by normal operation for a period of two years." 45 Federal Register 52,676 at 52,718. Therefore, at most, Thoroughbred will consume 4.37 ug/m3 of the 3-hour increment for no more than two years, and will consume an even lesser amount thereafter.

Q19. On page 9, Mr. Durham expresses concern about future applicants' having to carry the burden of proof regarding their impacts on the air quality related values (AQRVs) of Mammoth Cave National Park (MCNP), if their modeled impacts are in excess of 0.03 ug/m3. Do you agree?

A. No. The maximum modeled effect of Thoroughbred at one modeling receptor site and one 3-hour period is 4.37 ug/m3 (and not the 4.97 ug/m3 alleged by Mr. Durham) and this impact is compared to 25 ug/m^3 not 5. Moreover, as I testified, Thoroughbred's modeled impact for all other receptor sites and 3-hour periods is less than 4.37 ug/m^3. The likelihood of a modeled exceedance of the increment would depend on whether the modeled impacts of Thoroughbred and a future proposal matched up in both space and time. Only in the unlikely event that the future proposal had an emissions impact that was about 4.5 times greater than Thoroughbred's impact, at the same time and at the same place that Thoroughbred had its highest impacts would the increment assigned to Thoroughbred affect the future proposal.

Q20. Also on page 9, Mr. Durham refers to Thoroughbred's claims of not consuming the increment in the county containing MCNP. Do you agree with Mr. Durham?

A. No. The information that Thoroughbred provided to BREC and that KDAQ provided in its updated Statement of Basis speak for themselves about the extent of Thoroughbred's increment consumption and the amount of increment left for future facilities. And my testimony addresses the technical and regulatory flaws in Mr. Durham's testimony regarding the status of increment consumption in Kentucky.

Q21. On page 10, Mr. Durham testifies that he is concerned about Wilson 2 because Thoroughbred "is already expected to cause half of the modeling visibility impacts at the Park". Is Mr. Durham correct in this statement?

A. No. I am not able to determine the basis for Mr. Durham's concern. However, any concern Mr. Durham may have would be unrelated to Thoroughbred emissions. The

initial inquiry on visibility in Mammoth Cave National Park (MCNP) would focus on a proposed Wilson 2's individual impact (i.e., independent of any impact from Thoroughbred's emissions), which would be reviewed under federal guidance by the federal land manager for MCNP. In any event, as stated in my answer to Question 16, unless modeled impacts are at the same location at the same time they are not added together.

Q22. On page 11, Mr. Durham makes analogous claims with respect to the Class II increments as he does for the Class I increments. Do you support his Class II claims?

A. No. Until he produces modeling results showing that a future proposed facility will have significant ambient impacts at the same time and place as Thoroughbred's modeled ambient impacts and that they are not affected by increment expansions due to controls on existing sources, we cannot know whether a future source would be affected by the Class 2 increment awarded to Thoroughbred or not.

Q23. On page 11, Mr. Durham refers to the regional haze rule and testifies that Thoroughbred is "directly upwind from the" MCNP and that BREC's Wilson Station "will likely be required to impose additional controls that might not be required but for the additional impact caused by Thoroughbred". Do you agree?

A. No. The wind rose in the vicinity of MCNP indicates that the most frequent wind is Southerly, while Thoroughbred is to the West of MCNP.

Moreover, Mr. Durham's claim ignores the individualized source assessments that are conducted under the visibility protection program. D.B. Wilson will be addressed based on its impact on MCNP and the costs required to mitigate that impact.

Q24. Have you reviewed the testimony filed by Mr. Watrous?

A. Yes, I have.

Q25. Do you agree with the concerns raised by Mr. Watrous?

A. No. For the reasons noted in my earlier testimony, I believe the concerns raised by Mr. Watrous are based on speculation, both as to air impacts and as to economic impacts. At present, the Jefferson County area has not be redesignated as nonattainment with the new ozone NAAQS and Kentucky is still collecting data about the fine particulate standard as I testified earlier. Mr. Watrous has produced no modeling or other concrete information to support his position. I also note that the Thoroughbred facility will use best available control technology to control its emissions and the air emissions from the facility have been the subject of detailed review by KDAQ. Potential impacts on MCNP were addressed in the air permitting process as well. Mr. Watrous has not asserted any objections in the air permit proceedings. Finally, as I have stated before, a number of Clean Air Act programs are expected to reduce emissions in the region, including the NO_x SIP Call. In fact, EPA has emphasized the need to address regional issues, such as ozone, on a regional basis.

With respect to the analysis of economic impacts from the project, it is my understanding that this issue is addressed by the Thoroughbred Application and is also discussed in the Prefiled Rebuttal Testimony of Dianna Tickner and Dr. Glenn D. Meyers. I would only note that the statements by Mr. Watrous are very general and lack concrete support. Under his analysis, presumably he would not want any new development in Jefferson County, even though new development would appear to

increase the demand for architectural design, since new development might contribute some incremental increase in air emissions.

Q26. Does this conclude your testimony?

A. Yes.

Lex.632612.2

VERIFICATION

STATE OF KENTUCKY)
) SS: 2e3785455
COUNTY OF JEFFERSON)

The undersigned, Michael T. DeBusschere, being duly sworn, deposes and says that he is President of Kentuckiana Engineering Company, Inc., that he has personal knowledge of the matters set forth in the foregoing testimony and the answers contained therein are true and correct to the best of his information, knowledge and belief.

Michael T. DeBusschere

Michael T. DeBusschere

Subscribed and sworn to before me, a Notary Public in and before said County and State this 10th day of October, 2003.

My commission expires: 10-13-2003.

Notary Public

Lex. 632300.2

EXHIBIT A

Exhibit A

MICHAEL T. DeBUSSCHERE, P.E., CIH, QEP

Kentuckiana Engineering Company, Inc.
4350 Brownsboro Road
Louisville, Kentucky 40207

Telephone: (502) 893-4599; Fax (502) 893-4598

Fields of Competence:

Corporate Air Quality Planning and Implementation; Air Permitting (Title V, PSD, Off-sets, Retroactive PSDs, Emissions Banking, Synthetic Minors, FEDOOPs/FESOPs); Air Diffusion Modeling; Air Toxics and HAPs Compliance; MACT Standards Compliance; Emission Inventories; Air Control Technology Assessment; RACT/BACT Cost-Effectiveness Reviews; Air Compliance Negotiations; Property Transfer Assessments; Industrial Hygiene Employee Monitoring; Indoor Air Quality; Ventilation Studies; ISO14000 Auditing; Environmental Compliance Auditing; Environmental Management Systems Development/Gap Fill Analyses; Source Testing.

Technical Work Experience:

1996-Present President, Kentuckiana Engineering Co., Inc.

- Manages complete Title V Operating Permit application development for major clients in chemicals and utilities industries.
- Provides oversight technical assistance for Title V Operating Permit application development clients.
- Provides ISO14000 and EMS audit services for major facilities.
- Conducts compliance negotiations on behalf of clients.
- Conducts or oversees industrial hygiene projects for chemical, printing and law office clients.
- Provides compliance assessments for MACT standards.
- Conducts diffusion modeling analyses for compliance with toxic air pollutant threshold ambient limits for major and minor facilities.
- Prepares current, retroactive and revised PSD permit applications.
- Conducts Phase I environmental assessments for major local banks.
- Oversees conduct of business and services provided to clients.

1995-96 Vice President, TRC Environmental Corporation

- Air Quality Director for Midwest Region
- Corporate Air Quality Consultation & Planning
- Quality Audits of TRC Work Products
- Oversee Title V Permit Application Projects
- MACT, RACT and BACT Compliance Programs

1990-95 Sr. Vice President, ERM Midwest Inc.

- Branch Manager with P&L Responsibility
- Midwest Air Quality Program Director
- Midwest Industrial Hygiene Program Director
- Project Director on Major RCRA, Environmental Audits and Groundwater Investigation Projects

1986-90 Principal Engineer, Camp Dresser & McKee

- Industrial Services Branch Manager
- Industrial Business Development Coordinator for South Region
- Project Manager, Air Quality Programs in South Region

1977-86 Air Pollution Control Officer, Jefferson County, Kentucky

- Managed Engineering, Enforcement and Regulatory Development
- Initiated First US Emissions Banking Program
- Oversaw Ozone SIP Development 1980-82

1970-77 Chemical Engineer, US EPA Region IV

- Acting Chief, Planning & Standards Branch
- Director, Indianapolis APCD (on assignment)
- Project Manager on 4 Original SIPs, including KY

Education & Certifications:

1970 B.S. Chemical Engineering, Georgia Institute of Technology, Atlanta
1977 MBA, Butler University, Indianapolis

Professional Engineer Registrations: Kentucky, Indiana, Ohio & Florida
Certified Industrial Hygienist, American Board of Industrial Hygienists, 1990
Qualified Environmental Professional (QEP), Institute of Professional Environmental Practice
Environmental Auditor ISO14001, Registration & Accreditation Board

International Experience

President of the international Air & Waste Management Association, 2000-01
International Executive Service Corps Consultant 1999-2001
Panama Canal Authority EMS Consulting
EMS Audits of five Bulgarian Companies
Air & Waste Management Association Section Council Chair 1991-1994
Formation of Sections in Hong Kong, Taiwan, Saudi Arabia, Brazil and Korea
Environmental Standards Conference Chair – Mexico City 1994

EXHIBIT B

Table 1.1-6. CUMULATIVE PARTICLE SIZE DISTRIBUTION AND SIZE-SPECIFIC EMISSION FACTORS FOR DRY BOTTOM BOILERS BURNING PULVERIZED BITUMINOUS AND SUBBITUMINOUS COAL[a]

Particle Size[b] (□m)	Cumulative Mass % □ Stated Size					Cumulative Emission Factor[c] (lb/ton)				
		Controlled					Controlled[e]			
	Uncontrolled	Multiple Cyclones	Scrubber	ESP	Baghouse	Uncontrolled[d]	Multiple Cyclones[f]	Scrubber[g]	ESP[g]	Baghouse[f]
15	32	54	81	79	97	3.2A	1.08A	0.48A	0.064A	0.02A
10	23	29	71	67	92	2.3A	0.58A	0.42A	0.054A	0.02A
6	17	14	62	50	77	1.7A	0.28A	0.38A	0.024A	0.02A
2.5	6	3	51	29	53	0.6A	0.06A	0.3A	0.024A	0.01A
1.25	2	1	35	17	31	0.2A	0.02A	0.22A	0.01A	0.006A
1.00	2	1	31	14	25	0.2A	0.02A	0.18A	0.01A	0.006A
0.625	1	1	20	12	14	0.10A	0.02A	0.12A	0.01A	0.002A
TOTAL	100	100	100	100	100	10A	2A	0.6A	0.08A	0.02A

[a] Reference 33. Applicable Source Classification Codes are 1-01-002-02, 1-02-002-02, 1-03-002-06, 1-01-002-12, 1-02-002-12, and 1-03-002-16. To convert from lb/ton to kg/Mg, multiply by 0.5. Emission Factors are lb of pollutant per ton of coal combusted, as fired. ESP = Electrostatic precipitator.

[b] Expressed as aerodynamic equivalent diameter.

[c] A = coal ash weight percent, as fired. For example, if coal ash weight is 8.2%, then A = 8.2.

[d] EMISSION FACTOR RATING = C.

[e] Estimated control efficiency for multiple cyclones is 80%; for scrubber, 94%; for ESP, 99.2%; and for baghouse, 99.8%.

[f] EMISSION FACTOR RATING = E.

[g] EMISSION FACTOR RATING = D.

CERTIFICATE OF SERVICE

It is hereby certified that a copy of the forgoing was sent by United States First Class Mail, sufficient postage prepaid, to the following this the 13th day of October, 2003.

Hank List
Secretary
Natural Resources and Environmental Protection Cabinet
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