

TESTIMONY OF MICK DURHAM

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3 **Q1. Please state your name, business address, and your relation to Big Rivers Electric**
4 **Corporation?**

5 Response: Mick Durham, Stanley Consultants, Inc., 2658 Crosspark Road, Suite
6 110, Coralville, Iowa. I am a consultant for Big Rivers.

7 **Q2. Please provide a brief description of your background and experience.**

8 Response: I have worked in the environmental field since 1975, after graduating
9 with a Bachelors of Science degree in Meteorology from Iowa State University, in 1974. I
10 am responsible for all aspects of environmental analyses and project management, including
11 monitoring, modeling, pollution control, and permitting; and meteorological analyses
12 including monitoring, data collection, and interpretation both as technical lead and project
13 manager, for Stanley Consultants, Inc. Stanley Consultants is an international consulting firm
14 with a primary focus on power engineering.

15 My professional experience encompasses air quality planning and analysis for the
16 Iowa Department of Natural Resources, extensive experience in air quality modeling and
17 pollutant dispersion analysis, air quality construction permit and Title V operating permit
18 application development, evaluation of pollution control equipment, development of air
19 quality monitoring networks and operation of air quality and meteorological equipment, noise
20 monitoring and modeling, and presentation of study data.

21 Major environmental-related projects that I have worked on have included
22 participation on a team that developed the statewide implementation plan in Iowa for
23 controlling suspended particulate and sulfur dioxide; preparation and review Prevention of
24 Significant Deterioration (PSD) permits and Title V air emission operating permits; air
25 quality monitoring for PSD permitting purposes; environmental assessment; emission
26 reduction analyses through the use of offsets, banking, and plant-wide bubbles; permit

1 preparation and renewal documentation; evaluation of toxic and hazardous air pollutant
2 releases; and dispersion modeling analyses utilizing various dispersion models for stack
3 height determination, rule development, permitting, and environmental impact.

4 **Q3. What is the purpose of your direct testimony being filed today?**

5 Response: I intend to address the failure of Thoroughbred Generating Company's
6 application to address negative economic consequences resulting from possible
7 environmental impacts associated with the Plant.

8 **Q4. Did Thoroughbred's application address all of the negative economic consequences that
9 could be caused by environmental impacts from the proposed plant?**

10 Response: No, the application did not address negative economic consequences at
11 all. The Thoroughbred application should have addressed the potential negative economic
12 impacts of PM2.5 emissions, PSD Class I increment consumption for sulfur dioxide, Regional
13 Haze and visibility, and the effects of plant discharges on ambient water quantity and quality.

14 **PM2.5**

15 **Q5. Describe briefly what you mean by PM2.5 emissions.**

16 Response: PM2.5 refers to particulate matter of less than 2.5 microns in size.

17 **Q6. Are PM 2.5 emissions regulated by USEPA and the Commonwealth of Kentucky?**

18 Response: Yes. In 1997, The United States Environmental Protection Agency
19 (USEPA) promulgated new National Ambient Air Quality Standards for PM2.5. National
20 Ambient Air Quality Standards establish concentrations for certain "criteria pollutants" which
21 cannot be exceeded in ambient air. Under the schedule required by USEPA, states are
22 required to identify nonattainment areas for PM2.5 by February 15, 2004, and to adjust their
23 State Implementation Plans to account for PM2.5 by December, 2007, providing for
24 attainment with the standard by December, 2009. This information can be found at
25 Memorandum dated April 1, 2003, from Jeffrey R. Holmstead, Assistant Administrator, to
26 Regional Administrators, USEPA Regions I-X, regarding Designations for Fine Particle

1 National Ambient Air Quality Standards, available at
2 http://www.epa.gov/ttn/oarpg/tl/memoranda/naqsf_gda.pdf

3 **Q7. What would happen if an area is considered nonattainment for PM 2.5?**

4 Response: The effect of a nonattainment designation can be very significant. A
5 nonattainment designation in any area will subject new sources in that area to more stringent
6 permitting and emission limits. In some circumstances, a new source could be completely
7 prohibited, unless the new source obtains offsetting emission reductions by reducing or
8 eliminating another source of similar emissions in the area.

9 **Q8. What are the ambient air quality standards for PM2.5?**

10 Response: The annual standard for PM 2.5 is 15 micrograms per cubic meter
11 (ug/m^3) and the 24-hour standard is $65 \text{ ug}/\text{m}^3$.

12 **Q9. Is any information available showing whether the area of the Thoroughbred plant will
13 meet this standard?**

14 Response: Yes. As part of implementation of the PM2.5 rule, the Commonwealth
15 of Kentucky has been required to monitor PM2.5 levels at various locations throughout the
16 state to determine attainment. Currently, PM2.5 monitoring is being conducted in 22
17 locations within the State, but not Muhlenberg or Ohio Counties. The monitoring stations
18 nearest to the proposed TGS location are located in Christian (Hopkinsville), Daviess
19 (Owensboro), and Henderson (Henderson) counties. Annual monitored levels for these
20 locations are 13.1, 14.6, and 14.2 micrograms per cubic meter, respectively. (**Kentucky
21 Ambient Air Quality Annual Report 2002**). The statewide annual average is 14.4
22 micrograms per cubic meter.

23 TVA published a Draft Environmental Analysis (EA) in January, 2003 for the
24 installation of a scrubber at Unit 3 of its Paradise Plant. In that Draft, TVA indicated that
25 ambient air concentrations in Muhlenberg County would not be in attainment with the PM 2.5
26 standard based upon representative data from 2001 for Hardin County, which is downwind

1 from the site. TVA predicted that although concentrations of SO² from Paradise Unit 3
2 would be reduced as a result of installation of the scrubber, particulate matter emissions
3 would not be expected to change.

4 **Q10. Has Thoroughbred provided any information in its application indicating that it has**
5 **evaluated the impact of PM2.5 emissions from the plant?**

6 Response: No. In response to data requests for information on the impact of the
7 TGC generation facility on PM2.5 attainment in the area, TGC referenced a study prepared by
8 the Natural Resources and Environmental Protection Cabinet titled "A Cumulative
9 Assessment of the Environmental Impacts Caused by Kentucky Electric Generating Units" as
10 the only source which analyzed PM2.5 impact from the TGC facility. While this evaluation
11 did include a Thoroughbred facility, details on specific emissions and specific impacts were
12 not presented.

13 Actual evaluation of PM2.5 from any new sources may have been limited. In the
14 modeling discussions in Appendix A of this document, PM2.5 emissions were not even listed
15 in either the table for "Projected New Power Plant Emissions" (p. A-8) or the table "Total
16 New and Projected Power Plant Emissions" (p. A-10). Ammonia emissions were also void
17 from these tables. Ammonia has been shown by EPA to contribute to the formation of PM
18 2.5. This information can be found at *PM2.5 Composition and Sources*, USEPA Office of
19 Air Quality Planning and Standards, Emissions, Monitoring and Analysis Division, June 16,
20 1997, available at http://www.epa.gov/ttn/oarpg/naaqsfm/pie_txt.pdf.

21 In addition, throughout the report numerous disclaimers are reiterated on the accuracy
22 of the modeling. Again in Appendix A, p. A-19, "This modeling study to determine the
23 impacts of electric generating unit emissions on air quality in Kentucky cannot provide an
24 exact and accurate description for the future. Rather it provides information that can assist in
25 gauging the impacts of proposed power plants." In addition, it appears that only a limited
26 number of 'summer' days were evaluated for PM2.5, which corresponded with an ozone

1 episode. The impact of PM2.5 on annual concentrations was not addressed, which appears to
2 be of greatest concern in Kentucky, based on monitored levels of PM2.5. TGC had based the
3 entire evaluation of PM2.5 impacts from the proposed facility on this document, which, at
4 best, gives a very limited regional overview of fine particulate impacts.

5 **Q11. What does current monitoring data show in the area of the Thoroughbred plant?**

6 Response: It shows that both Daviess and Henderson counties are close to
7 exceeding the annual PM2.5 standard. Muhlenberg and Ohio counties do not have
8 monitoring data available for PM2.5. Since the Christian county site is one of the lowest
9 monitored and Daviess and Henderson are average, it can be assumed that Ohio and
10 Muhlenberg are probably within the three county annual monitored levels of 13.5-14.5
11 microgram per cubic meter range. Such a level would allow these counties to absorb only
12 0.5 to 1.5 micrograms per cubic meter annual impact from new sources before being
13 considered nonattainment.

14 **Q12. Have you estimated the potential impacts of PM 2.5 emissions from the plant?**

15 Response: Yes. Using USEPA AP-42 Compilation of Emission Factors for coal
16 firing (AP-42, 1.1-26), approximately 43% of particulate matter less than ten microns (PM-
17 10) is considered PM2.5 for units controlled by an ESP. Since dispersion modeling
18 concentrations are proportional to emission rates, a calculation of the impact of emissions
19 from the TGC facility can be estimated to be 0.8 micrograms per cubic meter. This does not
20 include possible additions from ammonia, sulfates, or nitrogen oxides.

21 **Q13. What are the potential economic impacts associated with the estimated emissions?**

22 Response: PM2.5 nonattainment can have substantial economic impacts. With
23 respect to Big Rivers' Wilson Plant, the addition of the TGC facility will reduce or possibly
24 eliminate available PM2.5 air resources in the immediate vicinity and will complicate the
25 permitting of any additional sources, due to the uncertainty of the impact of TGC.

26 If Ohio or Muhlenberg Counties are found to be in nonattainment for PM2.5, federal

1 law would require that Kentucky revise its State Implementation Plan to provide for
2 reasonable further progress toward reaching attainment status. New sources locating in one
3 of these counties would be subject to strict permitting requirements, including a requirement
4 to obtain offsetting emissions from other sources in the area so that the effect of the new
5 emissions is positive.

6 If Ohio County is in nonattainment status for PM2.5 when a second Unit is proposed
7 to be installed at the Wilson Station, Big Rivers will likely be forced to reduce emissions
8 from Wilson Unit 1 and may also be required to attempt to secure reductions in PM2.5
9 emissions from other sources in the area, including Thoroughbred. Big Rivers would be
10 expected to pay the cost of reducing such emissions. If forced to install additional control
11 technology on Unit 1 to control PM2.5 emissions, or obtain offsetting emissions from other
12 sources in the area, the cost to Big Rivers would be in the millions of dollars.

13 PSD Class I Increment Consumption

14 **Q14. What is a Class I area under the Clean Air Act?**

15 Response: Class I areas are specifically designated in the Clean Air Act as areas
16 allowed minimal air quality degradation, and include National Parks like Mammoth Cave
17 National Park.

18 **Q15. How are Class I areas protected under the Clean Air Act?**

19 Response: Class I Areas, are afforded special protection under the Clean Air Act.
20 According to the New Source Review Workshop Manual (Draft 1990), which is the principal
21 federal guidance document for NSR analyses, one way in which air quality degradation is
22 limited in all Class I areas is by stringent limits defined by Class I increments for sulfur
23 dioxides, particulate matter, and nitrogen dioxides. PSD increments are the maximum
24 increases in ambient pollutant concentrations allowed over baseline concentrations.

25 Congress intended the Class I increments to serve a special function in protecting the
26 air quality and other unique attributes in Class I areas (This information can be found at NSR

1 Workshop Manual, at E.7). In Class I areas, increments are a means of determining which
2 party, i.e., the permit applicant or the Federal Land Manager (FLM), has the burden of proof
3 for demonstrating whether the proposed source would cause an adverse impact on Air Quality
4 Related Values (AQRVs), such as visibility for a particular Class I area. If the proposed
5 source would cause or contribute to a Class I increment violation, the burden of proof is on
6 the applicant to demonstrate *to the FLM* that the emissions source would have no adverse
7 impact on the AQRVs. If the proposed source would not cause or contribute to a Class I
8 increment violation, the FLM may demonstrate to the permitting agency that the emissions
9 would have an adverse impact on AQRVs.

10 **Q16. What is the intent of imposing increments on new or modified sources under the PSD**
11 **Program?**

12 Response: The increments are intended to limit the increases in ambient pollutant
13 concentrations caused by new major sources or major modifications near Class I areas. This
14 information can be found at NSR Workshop Manual, at E.8.

15 **Q17. In response to data requests, Thoroughbred stated that the plant does not consume**
16 **increment at Mammoth Cave. Do you believe this is an accurate statement?**

17 Response: No. Thoroughbred's statements that it does not consume Class I
18 increment in the vicinity of Mammoth Cave National Park is misleading. According to
19 modeling conducted in July, 2002 by Thoroughbred, using emissions based on the permit
20 limit of .41 lb/MMBtu sulfur dioxide for a 24 hour averaging period, Thoroughbred predicted
21 that the plant would consume as much as 4.97 ug/m³, or virtually all of, the sulfur dioxide 24
22 hour averaging time Class I increment of 5 ug/m³. Thoroughbred's permit application
23 documents and correspondence with the NPS and USEPA state that Thoroughbred will
24 consume Class I increment, and the agreed 24 hour limit of .41 lb/MMBtu sulfur dioxide is
25 specifically intended to protect Class I and Class II increment. This increment has now been
26 reserved for Thoroughbred, and is not available for use by any other source.

1 **Q18. Would it be possible for Thoroughbred to emit .41 lb/MMBtu sulfur dioxide in 24 hour**
2 **periods several times a month without violating other limitations in the permit?**

3 Response: Probably not. In the permit application file, Thoroughbred indicated
4 that the NPS modeling did not reflect actual conditions because the facility will also have a
5 30-day average limit for sulfur dioxide of .167 lb/MMBtu, which would prohibit emissions at
6 a level of .41 lb/MMBtu sulfur dioxide for any extended period due to the possibility of
7 enforcement and penalties, and would lessen the probability that emissions would cause
8 actual Class I or Class II increment violations. However, regardless of whether the modeling
9 reflects actual conditions that might occur at Mammoth Cave, if new sources in the area are
10 forced to apply the same analysis as that required of Thoroughbred, there will be little
11 increment left for purposes of consumption, especially if the new source bases its analysis on
12 Thoroughbred's potential to emit rather than its actual emissions.

13 **Q19. What sources are required to prepare an increment analysis with respect to Mammoth**
14 **Cave?**

15 Response: Any new major source or modification planning to locate within a
16 fixed radius of 100 kilometers of Mammoth Cave National Park will be required to perform a
17 air quality impact analysis, and if emissions exceed significance levels, a Class I increment
18 analysis. This would include major sources locating near the cities of Bowling Green and
19 Elizabethtown, and several smaller cities in the area within 100 kilometers of the Park.
20 Furthermore, large sources locating more than 100 kilometers from the Park may be required
21 to perform the analysis.

22 **Q20. By saying it does not consume increment in the Class I area, Thoroughbred implies that**
23 **new or modified sources in the area will not be affected by the plant. How will new or**
24 **modified sources proposed to be constructed within 100 kilometers of Mammoth Cave**
25 **after Thoroughbred be affected by the plant?**

26 Response: Clearly, any new major source will be required to take into account the

1 contribution of Thoroughbred. Therefore, Class I increment has now been set aside for
2 Thoroughbred, and under the numbers used in Thoroughbred's modeling, a new source will
3 only have the benefit of approximately .03 ug/m³ for the 24 hour averaging time for sulfur
4 dioxide increment before the burden shifting mechanism is imposed. At that point, any new
5 plant in the area will be required to obtain a permit from NREPC *and* prove to the FLM that
6 the plant does not affect Mammoth Cave National Park. Certainly, any facility that causes a
7 modeled increment violation will be subject to significantly more scrutiny including the
8 possibility of no permit at all.

9 It is also inaccurate to say that Class I increment has not been consumed in the County
10 in which Mammoth Cave is located because the Minor Source Baseline Date has not been
11 triggered for that county. While that may be true with respect to Class II increment, Class I
12 increment is applied on a different basis. Otherwise, no source would ever consume Class I
13 increment so long as no new major sources located in Edmonson County. So, according to
14 Thoroughbred, one hundred plants the size of Thoroughbred could be built in Muhlenberg
15 County, and no Class I increment would be consumed by any of the plants, so long as a major
16 source was not constructed in one of the counties where the Park is located. Obviously, such
17 a result is not what Congress intended when it created the PSD program and gave National
18 Parks special protection.

19 **Q21. What are the potential negative economic effects that could be caused by**
20 **Thoroughbred's Class I increment consumption?**

21 Response: The types of economic impacts caused by Thoroughbred Class I
22 increment consumption could be very significant. Any significant new or modified major
23 source of sulfur dioxide within 100 kilometers of Mammoth Cave will be required to perform
24 a Class I increment analysis. If the Thoroughbred plant is allowed to consume virtually all of
25 the available Class I increment, new plants, or significant expansions at existing plants,
26 within 100 kilometers of the Park will be significantly limited in the amount of sulfur dioxide

1 that may be emitted. Although there remains a possibility that new or modified major sources
2 in the area could prove to the FLM that the source does not adversely impact an AQRV, the
3 process will become much more difficult and costly.

4 Furthermore, the cumulative impacts from Thoroughbred emissions make it more
5 likely that a subsequent major source like a second unit at Wilson Station will have difficulty
6 demonstrating that it does not cause adverse visibility impacts or other impacts on AQRVs.
7 For example, according to the Statement of Basis, modeling results show that Thoroughbred
8 is already expected to cause half of the modeled visibility impacts at the Park.

9 It is impossible to quantify the precise economic consequences to Big Rivers and to
10 the state arising from Thoroughbred's Class I increment consumption. However,
11 Thoroughbred's application should have addressed the negative consequences regarding
12 limitations on future development caused by the Plant. Increment consumption of any
13 amount by Thoroughbred will take away increment that could be used for future development
14 in the area.

15 Similarly, consumption of Class II increment will impose limitations on future
16 economic development in the affected areas. While Thoroughbred's analysis makes it
17 appear that ample Class II increment would be available for Big Rivers' needs at Wilson Unit
18 2, the consumption of Ohio County Class II increment by Thoroughbred removes increment
19 that might have been available for use by other sources locating in Ohio County. And while
20 it may not be possible to quantify the precise effects, this negative economic impact should
21 have been addressed in some fashion by Thoroughbred so the board could properly address
22 the full impact of the proposed facility.

23 **Q22. Has Thoroughbred addressed the potential negative economic consequences to the state**
24 **and other facilities in the region from implementation of the visibility protection**
25 **requirements of EPA's Regional Haze rule?**

26 Response: No. Although the potential impacts of the Regional Haze rule are

1 somewhat speculative, it is likely that the accumulation of plants in the immediate area,
2 directly upwind from the park, will receive significant attention under the rule when it is
3 implemented, and the visibility impacts at the Park will be greater with Thoroughbred than
4 without it. Consequently, the three existing Plants in the area, including Big Rivers' Wilson
5 Station, will likely be required to impose additional controls that might not be required but
6 for the additional impact caused by Thoroughbred.

7 **Water Withdrawal and Water Quality**

8 **Q23. Has Thoroughbred addressed the potential negative economic consequences of its**
9 **anticipated water withdrawal and discharges?**

10 Response: No, potential negative economic consequences associated with
11 Thoroughbred's water withdrawal have not been addressed, nor have the consequences of the
12 Plant's water discharges.

13 **Q24. How will the Thoroughbred Plant affect the Green River?**

14 Response: Substantially. Under its permit, Thoroughbred is constrained from
15 withdrawing water if flow in the Green River falls below 515 cubic feet per second or 333.9
16 million gallons per day (MGD). The maximum daily withdrawal permitted is 24 MGD.
17 During low flow conditions, Thoroughbred still has the ability to withdraw up to 7.2 percent
18 of the total flow. Since the facility will use recirculating cooling towers for cooling, it is
19 assumed that eighty percent of the influent will be consumed as evaporative loss. Using this
20 assumption, the facility operating under maximum withdrawal would consume 19.2 MGD in
21 evaporative loss, returning 4.8 MGD to the Green River pursuant to a KPDES permit. This
22 would result in a net consumption of 5.8 percent of low flow in the Green River.

23 **Q25. How will this withdrawal affect downstream users like Big Rivers?**

24 Response: Under applicable regulations of the Division of Water of the Kentucky
25 Natural Resources and Environmental Protection Cabinet, when evaluating water withdrawal
26 permits, the stated policy of the Division is to preserve the seven day, ten year low flow to

1 ensure proper water quality and provide for aquatic life needs. (See 401 KAR 4:200 Section
2 2(1).) The Division does not assess withdrawal permit applications in light of preservation of
3 future downstream industrial uses. Without sophisticated hydrologic models capable of being
4 calibrated with empirical field data, it is impossible to state with certainty to what degree the
5 Thoroughbred withdrawal would affect downstream flow. However, qualitatively, the
6 withdrawal would certainly lower the flow, and have an incremental impact on water levels
7 downstream, thereby possibly reducing available water resources, increasing water
8 temperatures, and degrading existing water quality.

9 Because of the incremental decrease in flow, Big Rivers will likely be forced to
10 construct a substantial storage basin to provide for adequate availability of water during
11 periods of low flow on the Green River when Wilson Unit 2 is constructed. Without the
12 withdrawal by Thoroughbred, greater flow may be available, and would make the need for
13 additional storage less likely. Thoroughbred's application should have addressed the
14 impacts to downstream users caused by the decreased flow.

15 **Q26. In its Response to Big Rivers' Motion to Deny the Application, Thoroughbred took the**
16 **position that Big Rivers should have raised issues regarding negative economic**
17 **consequences before the Natural Resources and Environmental Protection Cabinet. In**
18 **your experience, are negative economic impacts to other facilities considered in**
19 **determining whether to grant or deny an air emission or water discharge permits?**

20 Response: No, economic impacts on neighboring facilities are not typically items
21 that an air permitting agency like the NREPC will consider in issuing such permits.

22 **Q27. Does this conclude your testimony?**

23 Response: Yes.

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VERIFICATION

I verify, state, and affirm that the foregoing testimony is true and correct to the best of my knowledge and belief.

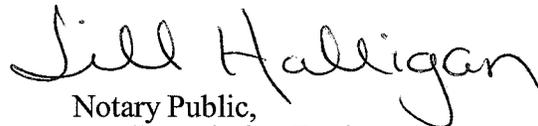


Mick Durham

STATE OF IOWA

COUNTY OF MUSCATINE

Subscribed and sworn to before me by Mick Durham on this the 3 day of October, 2003.



Notary Public,
My Commission Expires

May 7, 2006

