

**BEFORE THE
SURFACE TRANSPORTATION BOARD**

214921

STB EX PARTE NO. 658

**THE 25TH ANNIVERSARY OF THE STAGGERS RAIL ACT OF 1980: A
REVIEW AND LOOK AHEAD**

**WRITTEN TESTIMONY OF
MICHAEL A. NELSON**

**ON BEHALF OF
ARKANSAS ELECTRIC COOPERATIVE CORPORATION**

**131 North Street
Dalton, MA 01226
(413) 684-2044**

October 12, 2005

**WRITTEN TESTIMONY OF
MICHAEL A. NELSON**

1. Qualifications

My name is Michael A. Nelson. I am an independent transportation systems analyst with over 25 years of experience advising clients on rail transportation issues. My office is in Dalton, Massachusetts.

I have directed or participated in numerous consulting assignments and research projects in the general field of transportation. My work typically involves developing and applying methodologies based on operations research, microeconomics, statistics and/or econometrics to solve specialized analytical problems.

Of particular relevance to this testimony, I have been intimately involved in many of the changes in the rail industry that have occurred under the Staggers Act. I analyzed competitive and traffic issues for Class I railroads involved in several of the mergers and acquisitions that formed the current rail network. I have also performed extensive analyses related to potential new entry by rail carriers (ranging from buildouts for individual plants to major line construction projects). For the past six years I have assisted coal users in the identification and assessment of options to improve price/service options for coal transportation and in forecasting potential future conditions and developments.

I received my bachelor's degree from the Massachusetts Institute of Technology in 1977. In 1978, I received two master's degrees from MIT, one in Civil Engineering (Transportation Systems) and one from the Alfred P. Sloan School of Management, with concentrations in economics, operations research, transportation systems analysis and public sector management. Prior to February 1984, I was a Senior Research Associate at

Charles River Associates, an economic consulting firm in Boston, Massachusetts. My qualifications and experience are described further in Exhibit A.

2. Scope of Testimony

I have been asked by Arkansas Electric Cooperative Corporation (AECC) to (a) comment on rail regulation under the Staggers Act for the past 25 years; and (b) identify potential changes in rail regulation that are consistent with the public interest and future industry conditions that can reasonably be expected. AECC is a membership-based generation and transmission cooperative providing electric generation and transmission services for the 17 rural electric distribution cooperatives in Arkansas. Those cooperatives, in turn, serve approximately 440,000 customers located in each of the seventy-five counties in Arkansas.

AECC holds a diverse portfolio of generation assets comprising over 2400 MW (powered by coal, natural gas, fuel oil and hydro) to generate electricity for its members. Coal fuels the majority of AECC's generation. The Arkansas coal-fired generation facilities in which AECC holds an ownership interest (jointly with others) include the White Bluff plant at Redfield, the Independence plant at Newark, and the Flint Creek plant at Gentry. These plants utilize in excess of fourteen million tons of Powder River Basin ("PRB") coal annually. AECC's share of this PRB coal is approximately 5,000,000 tons per year.

As a rail-dependent PRB coal user, AECC has had several experiences that have highlighted the importance of issues affecting rail transportation. On three occasions during the past 12 years rail service degradations have interfered materially with coal deliveries, resulting in burn restrictions that have imposed significant costs on AECC's

members and their customers (due to use of alternative fuels and efforts to secure substitute coal). Also, for a period of several years high transportation rates caused AECC's delivered fuel costs to be extraordinarily high in comparison with other PRB users in the region.

As a result of its experiences and concerns, AECC has participated in several efforts to improve price/service options for coal transportation. It has sponsored the submission of filings in several proceedings before this Board, including this testimony, which address public interest considerations that might assist the Board within the discretion it holds on rail matters.

It should be noted that this testimony does not give separate consideration to changes in law subsequent to the Staggers Act that may have affected rail regulation. It also does not address further changes of law that may be considered or enacted. Rather it focuses on actions that are understood to be within the Board's discretion under current law.

3. Staggers Act Background and Overall Impacts

To properly gauge the impacts of the Staggers Act, it is important to take into account industry conditions and trends at the time of its implementation. In 1980 there were dozens of Class I railroads, but the financial health of the industry as a whole was generally weak. For decades the industry had lost traffic as price/service options stagnated under regulatory restrictions, contributing to the existence of significant excess capacity. Major lines, such as the Rock Island, were being liquidated through bankruptcy, and virtually the entire rail network in the northeast required federal financial support to

continue operations. The flow of capital into the industry was scarce, as exemplified by the difficulties faced by CNW in obtaining financing for its PRB access project.¹

Against this backdrop, the Staggers Act constituted a dramatic step to restore the health of the rail industry by increasing the reliance on market forces in lieu of regulation. In the environment created by the Act, competitive forces have led carriers to innovate and improve productivity, contributing to increased volumes, reduced costs and improved financial health. For shippers with competitive alternatives, market forces have frequently generated price competition that has caused rates to decline in real (and sometimes nominal) terms.

For shippers lacking competitive alternatives, the ICC and Board have fostered new construction as a means to improve competitive opportunities. However, they have taken a restrictive view of regulatory steps that would facilitate competitive access absent a viable construction project. As a result, differential pricing has been sustained at rates that in some cases are high relative to variable costs.

Overall, in comparison to 25 years ago, the rail marketplace now exhibits robust volume growth pressing against capacity constraints. Carriers are generally able to make regular, substantial capital investments in their systems without federal subsidies or loan guarantees, and the financial strength of the (remaining) Class I's has been greatly improved. From these broad indicators, the Board can reasonably conclude that the reliance on market forces envisioned in the Staggers Act was well-placed.

¹ Indeed, the Staggers Act contained instructions to the Secretary of Transportation regarding federal loan guarantees that at the time were needed to enable CNW's project to proceed.

4. Mergers and Competitive Issues

The current rail environment results in large part from the handling by the Board and its predecessor of numerous mergers and acquisitions that have been proposed since the Staggers Act. These transactions in many cases have eliminated redundancy, reduced costs, extended single-line services and produced other benefits. However, within the “big picture” of beneficial changes described in Section 3 (above), there are aspects of the ICC/STB’s handling of merger applications under the Staggers Act that may have hindered the full realization of the benefits of market forces.

Each application for a merger or acquisition normally has triggered a detailed consideration of competitive issues. When competitive problems have been identified, remedial conditions have frequently been imposed. Few if any merger approvals have been granted in which substantial unremediated competitive problems were believed (by the ICC/STB) to exist. Moreover, several of the more recent mergers have been followed by formal oversight proceedings (typically 5 years) during which competitive problems that materialized could be brought forward.

Despite these procedural safeguards, there are several avenues through which meaningful competition may have inadvertently been lost in the merger process. This section identifies and discusses four such avenues.

a. “3-to-2”. Competitive issues in early mergers were typically assessed based on increases in market concentration that would ensue. However, some of the later mergers were assessed primarily on the basis of the (more permissive) standard of avoiding the elimination of all rail competition options for individual shippers. As an

example, a merger that combined two carriers which each held 40 percent shares of a given regional commodity flow might raise competitive concerns under the early criteria, but would not under the later criteria as long as individual shippers did not lose all competing rail options. The changed criteria facilitated a “3-to-2” reduction in the number of serving rail carriers (but prevented “2-to-1” reductions), thereby enabling the creation of the current duopolies of the principal railroads in the East and West.

To date, I know of no conclusive evidence as to whether or not this change of criteria, viewed in isolation, produced measurable competitive harm for specific commodity flows. However, there are several reasons for the Board, in hindsight, to give careful consideration to this issue:

- with rail volumes now pushing capacity limits in many lanes, the elimination of redundant facilities in past “3-to-2” mergers may no longer be viewable as a benefit (i.e., those facilities may now be needed for capacity reasons);
- subsequent events have shown that the large duopolies that were created through approval of “3-to-2” mergers lack redundancy, and tend to be susceptible to serious service degradations as result of unplanned events;
- from the outset, the shift in criteria rested in large part on a presumed strength of truck competition that was inconsistent with ICC precedent.² The ineffectiveness of truck competition for long haul rail traffic has subsequently been corroborated by the explosive growth in rail intermodal volume and profitability; and,
- the computation of compensation for trackage rights implemented to protect shippers from complete loss of competitive rail alternatives apparently has not accounted for

differences in contribution between captive and competitive traffic. This omission makes it difficult or impossible for a tenant to replicate the price/service options for competitive traffic that the trackage rights were implemented to serve.

b. “Learning Curve”. As greater experience was gained in processing mergers under the Staggers Act, merger analysis criteria in some instances were changed so that certain types of lost competition could be better identified and remediated. These types of lost competition include the following:

- “Cross-over” effects – Due to merger sequencing and the time lags associated with the availability of the Rail Waybill Sample data used in merger analyses, a proposed transaction sometimes required evaluation before the effects of a predecessor transaction could be observed in the data. While methods for addressing this issue were eventually developed, early transactions may have overlooked some significant cross-over effects.
- Source Competition. As the scope of mergers became larger, the potential for losses of “source competition” increased.³ While the importance of source competition was eventually embraced by the Board in its merger rules, several large transactions had occurred in which no source competition issues were acknowledged or addressed.
- “Bottleneck” Segments. From the outset, mergers carried the potential to eliminate the ability of captive shippers to separately contest the reasonableness of rates on the “bottleneck” portion of specific movements. While the importance of this

² In its landmark decision denying the proposed merger of Southern Pacific and ATSF (Finance Docket No. 30400), the ICC rejected the proposition that truck competition would protect transcontinental rail traffic from competitive harm.

³ “Source competition” refers to a shipper’s ability to sell products through alternative outlets or obtain inputs from alternative sources that are independent of a given railroad, limiting the differential pricing opportunities for that railroad in serving a given movement.

consideration has been accepted by the Board and incorporated in recent merger decisions, many earlier cases did not provide such protection.

c. Shipper "Leverage". It is sometimes thought that large companies have the ability to resist anti-competitive conduct by railroads simply by virtue of their size. To the extent that that is true, it may result from the "leverage" a large shipper may wield as a result of operating multiple plants at multiple locations. In this circumstance, the ability to shift output among plants served by different railroads may constrain differential pricing by the individual railroads. As mergers became larger in scope, they had an increasing tendency to reduce or eliminate this leverage (i.e., by decreasing the number of different rail carriers serving a large shipper's plants). As a result of the loss in leverage, those shippers were exposed to potential degradations in their price/service options for rail transportation.

d. System Breakdowns. There are several avenues through which "breakdowns" of the system in individual cases are believed to have caused competitive problems to avoid scrutiny:

- A responsive carrier fails to pursue relief for a competitive problem in merger X, because it plans to engage in a subsequent merger with the merged "X" system, or fears adverse commercial consequences ("retribution");
- A responsive carrier fails to pursue relief for a competitive problem due to misimpressions regarding the (new) markets it would become able to serve;
- A responsive carrier fails to pursue relief for a specific competitive problem in merger X, because it wishes to negotiate a settlement and cannot obtain concurrence from applicant(s);

- A responsive carrier's counsel directs the filing of competitive analyses at an improper stage of the case, resulting in a successful motion by applicants to strike evidence of demonstrable competitive problems;
- A party advances a meritorious argument in an oversight proceeding, but doesn't develop corresponding traffic analyses to demonstrate the problem, so no action is taken;
- The Board identifies a problem and imposes remedial conditions, but the conditions do not function as planned and go essentially unused.

In general, in the early years after the Staggers Act the self-interest of non-merging railroads led to aggressive pursuit of competitive issues in merger cases. However, the analytical process was somewhat myopic, so the treatment of competitive issues may have been incomplete. As merger analysis processes were refined, industry concentration was increasing, and the ardor of other carriers to pursue competitive conditions diminished. As a result, there have been ways from the outset for competitive problems to avoid detection and remediation in the merger process.

5. Role of Regulation as Paradigm Changes

The change in the financial condition of the rail industry that has occurred under the Staggers Act raises the question of whether corresponding changes in regulatory practices may be needed. While the financial health of the industry was certainly a legitimate concern at the time of the Act, I do not know of any credible theory under which regulatory policies should sustain rate levels that are above the level needed to cover ongoing costs, including a market rate of return on required capital.

As industry financial health is achieved, there are at least two basic changes in regulatory practices that can be considered. First, constraints on differential pricing could be tightened. "Trimming the tail" of the distribution of rates would yield greater consistency in the rates faced by shippers, and would ensure that high differential prices are not used to support supracompetitive earnings.

Second, regulatory practices could be changed to facilitate new entry. In a competitive marketplace, excess earnings normally would be expected to attract entry by new competitors. Above and beyond the regulatory support already provided for new construction proposals, the Board could permit market forces to take a greater role in shaping the future rail marketplace.

6. "Are We There Yet?"

Before implementing any specific regulatory changes, it will be necessary for the Board to determine when such changes are warranted. This section addresses recent developments that may be relevant to this determination, and issues related to the use of revenue adequacy criteria.

a. Recent Developments. Several recent developments suggest that the time has already arrived for the Board to consider and implement significant changes in past regulatory practices:

- Capacity – For the past two years, the Board has taken an active role in the planning process for the fall peak traffic season. This has been necessary, appropriate and commendable as sustained volume growth has begun to strain capacity limitations. If the industry has reached the point where the issue is finding new capacity to meet volume growth – rather than getting rid of old capacity to achieve financial health –

the Board can reasonably conclude that a broader review of its regulatory approach is now warranted.

- Pricing -Coinciding with the tightening of capacity constraints, the few remaining railroads are taking synchronized but largely unsupervised steps that alter or have the potential to alter price/service options for broad groups of shippers. These steps include so-called “public pricing” and the imposition of fuel adjustment clauses (which not only transfer fuel price risks to the customer, but also appear to recover more than the actual cost of fuel price increases). Whether or not such actions are ultimately found to be anticompetitive, the Board can reasonably be concerned when duopolists cooperate to change “ground rules” that previously had supported aggressive competitive conduct on contestable movements. The Board can reasonably conclude that careful scrutiny of the carriers’ actions may be warranted to ensure conformity with the competitive conduct assumed in the national transportation policy and relevant statutes. The Board can also reasonably conclude that in this highly concentrated market, a fresh look at regulatory issues related to market entry may be required to ensure the competitiveness of carrier actions.
- Service collapses – For more than a decade, large rail systems have periodically experienced prolonged service problems that have created substantial adverse impacts on shippers. While these episodes initially materialized primarily as a result of unforeseen merger integration problems, the more recent episodes have been largely self-inflicted, resulting primarily from management decisions made in the course of normal operations. These include a failure to hire sufficient crew to maintain fluidity, and a failure to perform routine roadbed maintenance (resulting in the ongoing,

extended throughput restriction on the PRB Joint Line).⁴ The Board can reasonably be concerned that the economy is experiencing substantial uncompensated losses as a result of such rail management decision-making. Such concern can reasonably be amplified by the fact that the small number of competing rail carriers forces the consequences of such errors largely onto customers, rather than onto the erring company and its shareholders. Put another way, the current large merged systems are “too big to fail” (in that no one else can handle their traffic), but they’ve shown an alarming tendency to create failures through their own actions.

- Rate case results – Recent results from coal rate cases have included findings where a “stand-alone railroad” (SARR) could cover all of its expenses, including a market return on required capital, at a rate less than the prescribed rate.⁵ Put another way, the SARR traffic group as a whole pays supra-competitive rates even after the rate case results are implemented. Because of the 180 percent threshold, the Board is unable to prescribe rates at a level that would sustain revenue adequacy but avoid supra-competitive returns. With growing traffic volumes and unit revenues, the Board can reasonably conclude that such situations are becoming more commonplace.

These developments reinforce the concept that it is appropriate for the Board to now revisit its regulatory practices.

b. Reliance on Revenue Adequacy Criteria. While the Board is required to make determinations of revenue adequacy, the Board should not rely on this measure to

⁴ While the carriers have attempted to portray the Joint Line failure as resulting from extraordinary weather conditions, publicly available data from NOAA refute this characterization.

⁵ This situation arises when the “break-even” rate for the SARR is less than the 180 percent revenue/variable cost jurisdictional threshold.

delay or otherwise determine the timing of regulatory changes it might now consider.⁶ In a competitive marketplace, one would generally not expect all competitors to meet a standard analogous to revenue adequacy in any given time period. Indeed, one of the functions of a competitive marketplace is to provide pressure for improved management to firms that fail to operate efficiently, innovate and/or provide attractive price/service options to their customers. Low earnings by some firms are a normal feature of competitive markets, and should not inhibit the Board from considering or implementing regulatory changes.

Beyond this, the Board has already noted that specific revenue adequacy results may be influenced by management decisions regarding financing methods.⁷ As a result, they may not provide a definitive determination of financial health. The Board's mandate to measure revenue adequacy dates from the time when the entire industry's financial health was in jeopardy, and information was needed regarding prospective further solvency problems. Since that time, the carriers have had 25 years to exercise their freedoms under the Act, and to restructure and tailor their networks to the needs of the marketplace. Revenue adequacy considerations do not provide a basis for withholding regulatory refinements that are appropriate for this improved environment.

⁶ This discussion does not relate to or depend upon the specific methods used to compute measures of revenue adequacy, which are addressed in other Board proceedings.

⁷ In its decision dated August 11, 2004 in Ex Parte 558 (Sub-No. 8), the Board described how the measured return on investment of NS and CSX may change because of differences in the accounting treatment of leasing vs. owning former Conrail assets.

7. Potential Regulatory Refinements

There are many potential actions available to the Board to refine its rail regulatory practices. Based on the issues detailed above, the Board should consider the following refinements:

- a. Maintain and expand the historical support for construction and buildout applications. As volumes and revenues grow against capacity constraints, new entry may occur in some markets.
- b. Accept that some amount of competition and capacity that is now needed may have been lost in the merger process, and facilitate the reopening of merger cases to remediate such problems. In my experience, many shippers do not recognize the significance of the Board's oft-repeated observation that it retains perpetual jurisdiction over such issues.⁸ The Board should further encourage shippers to make use of its established procedures, and should make appropriate modifications to past decisions as warranted by the circumstances.
- c. Revisit trackage rights compensation issues in cases where trackage rights are limited to competitive traffic to ensure that the tenant is able to replicate the premerger competitive conduct lost in the transaction.
- d. Conduct more aggressive in-house monitoring of the effectiveness of conditions imposed in merger cases. The Board has the data and the expertise to identify instances where performance is deviating materially from expectations.

⁸ For example, as stated in the Board's decision of October 20, 2004 concluding formal oversight of the Conrail transaction:

"Under 49 U.S.C. 11327, we have continuing authority to enter supplemental orders and to modify decisions entered in merger and control proceedings under 49 U.S.C. 11323. Thus, the conclusion of the formal oversight process does not preclude any party from invoking our jurisdiction to address any transaction-related concerns."

- e. Tighten constraints on differential pricing. This would be consistent with the intent of the Staggers Act, which permitted differential pricing based on the financial needs of the rail industry. Specific suggestions for refining the Stand-Alone Cost (SAC) methodology used in maximum rate reasonableness determinations were presented in my testimony in Ex Parte No. 657, and are not repeated here.
- f. Take steps to ensure that public pricing does not implement or facilitate the curtailment of price competition.
- g. Take steps to ensure that fuel surcharges replicate fuel costs, and are implemented in a manner that is consistent with the public interest. This would prospectively include consideration of the methods used to compute fuel surcharges, and the degree to which such surcharges may affect carrier incentives to economize on fuel use and cost.
- h. Upon application, grant temporary trackage rights or equivalent relief as needed and feasible to enable shippers to recover from delivery problems caused by rail management decisions. Compensation for such rights should likely be structured to replicate the landlord's financial position had it lost the volume it was originally obliged to deliver (as would be the case in a competitive market).
- i. Remove the presumption that a new entrant will obtain concurrence from the abandoning carrier before returning a railbanked line to rail service. The Board can address any legitimate capacity needs of the abandoning carrier on a case-by-case basis, but should not allow incumbent carriers to obstruct new entry through their influence over unused property.

- j. Facilitate entry in a way that replicates a competitive market response to supra-competitive pricing. Perhaps following the precedent established by the ICC in the creation of the PRB Joint Line, the Board could make it easier for new entrants to buy into partial ownership of existing facilities. New entry would only be attracted where the new entrant could earn a market rate of return on the required capital. This would occur where the new entrant would operate more efficiently than the incumbent, or where the incumbent was charging supracompetitive rates on the traffic handled by the subject facilities.
- k. Minimize reliance on revenue adequacy calculations. Board actions based on carrier-level revenue adequacy protects competitors, but not competition.

With these types of refinements, the Board can assume a position that is consistent with the industry conditions that have evolved. It can embrace the powers of a competitive marketplace while assertively taking steps to establish and enforce ground rules that motivate good decision-making. This would protect the valid interests of the railroads, shippers and public within the scope of the Board's regulatory discretion.

EXHIBIT A

QUALIFICATIONS AND EXPERIENCE

MICHAEL A. NELSON

131 North Street
Dalton, MA 01226

EDUCATION

M.S. Civil Engineering, Massachusetts Institute of Technology

M.S. Management, Alfred P. Sloan School of Management, Massachusetts Institute of Technology

B.S. Management, Massachusetts Institute of Technology

Concentrations in transportation systems analysis, economics, operations research and public sector management.

EXPERIENCE

Mr. Nelson is an independent transportation systems analyst. He provides management and economic consulting and litigation support. His work typically involves developing and applying methodologies based on operations research, microeconomics, statistics and/or econometrics to solve specialized analytical problems, as illustrated by the following examples of his experience:

A. Railroad

On behalf of a group of coal users, including Ameren, Dominion and Arkansas Electric Cooperative Corporation (AECC), Mr. Nelson submitted a verified statement to the Surface Transportation Board (STB) in Finance Docket No. 34421. This testimony addressed technical, operational and public interest considerations associated with a proposal to permit the construction of a competing rail line within the unused portion of an existing rail carrier's right-of-way.

Mr. Nelson has developed information to assist coal users in responding to the coal supply problems created by the

May 2005 derailments and subsequent rail throughput constraints on the Powder River Basin (PRB) Joint Line. He has identified potential actions by coal users to improve PRB coal throughput, transportation issues for substitute coals and fuels, and steps to facilitate rail cooperation.

In response to a public request by the STB for suggested improvements in the "stand alone" cost methodology (SAC) used to assess the reasonableness of contested rail rates, Mr. Nelson provided written and oral testimony in STB Ex Parte No. 657. This testimony identified potential methodological refinements in 10 specific areas, and was cited by Commissioner Mulvey for its uniquely high responsiveness to the Board's request.

Mr. Nelson is the founder of the Coalition to Foster Improved Rail Economy ("CoalFIRE"). This initiative is open on a subscription basis to current and prospective PRB coal users. It identifies and promotes awareness of specific potential group actions to improve the competitiveness of PRB rail transportation options within the current legal and regulatory framework. Over 20 specific potential group actions have been identified to date, including steps to add/restore competitors, increase the effectiveness of existing competitors, increase customer leverage and develop external pressure for reasonable competitive conduct by the current PRB rail duopoly.

For a powerplant developer, Mr. Nelson analyzed issues related to rail transportation service in the supply of coal to two potential sites for a new generation facility in Oklahoma. This work included analysis of likely rate levels in light of movement-specific competitive and operational considerations.

Mr. Nelson prepared a 10-year forecast of expected changes in rail productivity and competitive rail rate levels for the movement of coal from the PRB. This forecast has been provided on a subscription basis to interested parties, and is believed to be the only such forecast that is based on analysis of specific anticipated productivity enhancements (as opposed to extrapolation of past trends). Subscribers have used this information to analyze the merits of converting to PRB coal, to support contract negotiations and for other strategic and planning purposes.

For a powerplant developer, Mr. Nelson analyzed issues related to the anticipated reliance on competitive rail transportation service in the supply of coal to a planned new generation facility in Missouri. This work included analysis of likely rate levels in light of unique limitations faced by one of the competing rail lines.

On behalf of a group of over two dozen major electric utilities, Mr. Nelson provided strategic guidance and analytical support, and participated in negotiations with a Class I railroad regarding prospective multi-billion dollar investments by the utilities to improve their coal transportation options.

For a midwestern utility, Mr. Nelson assisted in the development of improved transportation options for a large coal-fired generating station. As part of this work, he reviewed an analysis performed by a major engineering contractor, and identified a series of cost-effective options that had been overlooked. He then provided strategic guidance and analytical support in the development process.

For a mining company, Mr. Nelson analyzed the transportation options that would be available for a prospective new facility in western Colorado. This included detailed consideration of the "new facilities" condition imposed by the STB in its approval of the merger of the Union Pacific (UP) and Southern Pacific (SP) railroads.

For AECC, Mr. Nelson submitted statements to the STB in Finance Docket Nos. 34177 and 34178. These statements addressed the actual and potential competitive roles of I&M Rail Link (IMRL) in domestic coal transportation, and the prospective impacts associated with control of IMRL by the Dakota, Minnesota and Eastern Railroad (DME).

On behalf of the Town of Easton (MA), representing a coalition of towns, Mr. Nelson identified and corrected a series of substantial errors and inconsistencies in the Final Environmental Impact Report for the proposal by the Massachusetts Bay Transportation Authority (MBTA) to provide new commuter rail service to New Bedford and Fall River. This extended Mr. Nelson's previous analyses, which had identified and documented a series of significant errors in the development of the MBTA's conclusions regarding the alleged infeasibility of a key alternative

route. Mr. Nelson also identified and made preliminary assessments of other alignment and operational possibilities that had been inappropriately omitted from consideration.

As a subcontractor to The Brattle Group, an economic consulting firm, Mr. Nelson provided guidance to the Mexican railroad TFM regarding the identification of different types of competitive and efficiency issues raised by the proposed merger of the other two principal Mexican railroads (Ferromex and Ferrosur). The merger was denied by both the national transportation and antitrust authorities.

For the Cowboy Railroad Development Company (CRDC), a group of major electric utilities, Mr. Nelson directed the identification and evaluation of alternative routes and strategies for creating a new railroad access across Nebraska to coal mines in the PRB.

As part of the work for CRDC, Mr. Nelson analyzed the degree to which the UP/SP merger foreclosed competitive routes that could be offered by a new PRB rail carrier. The results of this analysis were submitted to the STB in Finance Docket 32760 (Sub-No.21), which provided oversight of the UP/SP merger and its impacts.

For a major electric utility, Mr. Nelson performed a detailed analysis of rail transportation options for PRB coal movements to the Sunflower Electric generating station at Holcomb, KS. The results of this analysis were used by the utility in assessing the merits of investing in a planned expansion of that facility.

For an assortment of major electric utilities and power producers, Mr. Nelson has performed detailed analyses of rail transportation options, including build-outs, for a total of over 30 large coal-fired generating stations. The results of these analyses have served as the basis for management decisions that are projected to save many millions of dollars in fuel costs.

On behalf of AECC, Mr. Nelson submitted a statement to the STB in Finance Docket 32760 (Sub-No.21). This statement addressed competitive issues resulting from the UP/SP railroad merger, with a particular focus on the effect of trackage rights compensation levels.

On behalf of the Committee to Improve American Coal Transportation (IMPACT), Mr. Nelson submitted a statement to the STB in Ex Parte 582 (Sub-No. 1). This statement addressed a wide range of issues related to rail merger policy.

For a major Class 1 railroad, Mr. Nelson assisted senior management staff in the design and evaluation of a potential construction project.

For the Mid-States Coalition for Progress (a group of landowners), Mr. Nelson analyzed the proposal by DME to construct an extension of its line into the PRB. Mr. Nelson developed estimates of DME's volumes and unit revenue levels on the basis of a plant-by-plant analysis, taking into account likely future market conditions and the competitive capabilities of the UP and Burlington Northern Santa Fe (BNSF). Mr. Nelson's analysis was filed at the STB (Finance Docket No. 33407).

For the National Railroad Passenger Corporation (AMTRAK), Mr. Nelson investigated issues related to the definition of "express" traffic that AMTRAK is permitted to carry (STB Finance Docket No. 33469). Mr. Nelson analyzed relevant data from the STB Rail Waybill Sample and the Census of Transportation, and investigated the factors affecting use of Amtrak by the U.S. Postal Service. The definition of "express" eventually adopted by the STB was consistent with Mr. Nelson's findings.

For the Moffat Tunnel Commission (Colorado), Mr. Nelson analyzed the factors affecting future railroad use of that tunnel, which traverses the Continental Divide and serves the principal Colorado coal fields on the UP line that formerly was the Denver and Rio Grande Western Railroad (DRGW) main line west of Denver. The tunnel had historically been owned by the Commission (and leased to the railroad), but under sunset legislation was being offered for public sale. Mr. Nelson's analysis included study of the utilization of Colorado/Utah vs. PRB coals in the context of the central corridor conditions imposed by the STB in the UP/SP merger.

For Canadian Pacific Railway (CP), Mr. Nelson performed detailed studies of competitive and traffic issues associated with the acquisition and break-up of Conrail by Norfolk Southern and CSX (Finance Docket No. 33388). These

studies included analyses of competitive issues in the area served by the former Delaware and Hudson (a CP subsidiary) and in the midwest, competitive issues involving coal traffic throughout the Conrail service area, and traffic impacts associated with potential remedial conditions. CP relied upon the results of Mr. Nelson's studies in reaching its settlements with Applicants in that case.

For SP, Mr. Nelson provided expert testimony before the Interstate Commerce Commission (ICC) in Finance Docket No. 32133 (the proposed control of C&NW by UP). This testimony was based primarily on Mr. Nelson's analyses of data from the Rail Waybill Sample, which identified substantial numbers of specific flows for which the proposed transaction created different types of potential competitive problems (including losses of point-to-point competition, source competition, competition in grain originations, and shipper leverage). In addition, Mr. Nelson's testimony utilized Rail Waybill Sample data to demonstrate the occurrence of merger-related foreclosure from previous UP acquisitions, and provided statistical support for SP's traffic study. Mr. Nelson also conducted a detailed investigation of the impact of the merger on source competition for western coal.

For Rio Grande Industries (RGI), Mr. Nelson provided expert testimony before the ICC in Finance Docket No.'s 31505 (the proposed acquisition by RGI of Soo's Kansas City - Chicago line) and 31522 (the proposed acquisition by RGI of the Chicago, Missouri and Western line between St. Louis and Chicago) based on his analysis of Rail Waybill Sample data. This testimony involved analysis of potential cumulative anti-competitive effects from the proposed transactions, development of time-series estimates of rail traffic volumes and carrier shares in different flows, and assessment of the statistical reliability of the portions of the testimony of other RGI witnesses that were based on Rail Waybill Sample data.

Also for RGI, Mr. Nelson provided expert testimony before the ICC in Finance Docket No. 32000, the consolidation of SP and DRGW. This testimony involved analysis of Rail Waybill Sample data to determine rail traffic volumes in different flows, the statistical reliability of studies conducted by other RGI witnesses, and potential competitive problem flows associated with a consolidation of SP and KCS.

For DRGW, Mr. Nelson provided expert testimony before the ICC in Finance Docket No. 30800 (the acquisition of MKT by UP) based on his analysis of Rail Waybill Sample data. This testimony involved examination of intramodal competition in the central corridor, development of traffic flow databases utilized by other witnesses, assessment of the statistical reliability of other witnesses' studies, and analysis of issues related to use of market share data from waybill samples to evaluate the competitive impact of the proposed merger.

Also for DRGW, Mr. Nelson provided extensive expert testimony before the ICC regarding a number of issues raised by the proposed merger of SP with ATSF (Finance Docket No. 30400):

* Mr. Nelson provided a detailed comparison of the economic and operating characteristics of the intercity trucking and railroad industries, with a particular focus on long-haul markets. Mr. Nelson's analysis of the trucking industry utilized the National Motor Transport Data Base (NMTDB). For this study, Mr. Nelson developed and implemented analytical techniques that compensate for the non-random sampling procedures employed in the gathering of the NMTDB, making it possible to use this source to reliably conduct studies at the industry and corridor level. The Commission adopted the results of Mr. Nelson's study verbatim in its analysis of the anti-competitive consequences of the proposed merger.

* Using the NMTDB and the Rail Waybill Sample, Mr. Nelson analyzed the extent to which rail pricing and services on selected traffic are determined by competing intercity trucking alternatives available to shippers. This analysis was conducted at a highly detailed level, and included explicit accounting for the handling characteristics of each rail commodity and the operating economics of the corresponding truck equipment needed.

* Mr. Nelson analyzed the tests applied by various economists in the proceedings, including those of the U.S. Departments of Justice and Transportation, to identify rail traffic that would most likely be subject to anti-competitive effects in the wake of the proposed merger. Mr. Nelson identified circumstances under which these tests

systematically yield invalid results, and provided guidelines for their proper application.

* Mr. Nelson identified improvements needed in the merger applicants' initial methodology for estimating the rail traffic diversions that likely would result from the proposed merger.

* In addition to this expert testimony, Mr. Nelson served as principal investigator for several studies underlying testimony offered by other witnesses, addressing issues related to intramodal (rail) competition, product and source competition, shipper benefits and leverage and trackage rights compensation. Mr. Nelson also conducted a number of special studies on request for other witnesses and counsel.

For a private client, Mr. Nelson participated in a study of the purchase and utilization of jumbo covered hopper cars by shippers and railroads. This study involved extensive analysis of the Rail Waybill Sample and other data sources, and included a detailed examination of historical car shortages in light of economic and traffic conditions, and other related factors. The results of Mr. Nelson's work were incorporated in testimony before the ICC.

As a subcontractor to consulting firms, Mr. Nelson has participated in a number of other rail-related studies. These include (1) analysis of Rail Waybill Sample data to address issues stemming from traffic protective conditions at the Jacksonville (FL) gateway between FEC and CSX, and (2) analysis of CN's Port Huron-Sarnia tunnel project and the alternative of a tunnel at Detroit-Windsor.

B. Postal Service

For Magazine Publishers of America (MPA) acting on behalf of a coalition of periodicals mailers, Mr. Nelson analyzed several issues related to the purchased transportation costs incurred by the Postal Service. This included identification of feasible cost reductions and efficiency improvements, as well as development of needed refinements in the methods used by the Postal Service to analyze transportation costs. The results of this analysis were presented to the Postal Rate Commission (PRC) in the R2000-1 omnibus rate case. A portion of the identified costing refinements has been adopted by the Postal Service.

Mr. Nelson identified and developed opportunities for a major publisher to create more efficient and desirable price/service options by avoiding selected costs in its mailings of periodicals. This work included consideration of transportation, delivery and unfunded retirement liability costs.

For Foster Associates (under contract to the Postal Service), Mr. Nelson worked in the following areas:

- * Delivery costing - Mr. Nelson developed a series of refinements in delivery cost analysis procedures. These refinements included analysis of driving time on motorized letter routes, collection costing and extensive revision of costing for special purpose routes and special delivery messengers. In support of the new methodologies, Mr. Nelson developed data collection plans and assisted in the development of survey instruments and innovative procedures to gather new field data from carrier and messenger operations. He conducted extensive analysis of the new data, including development of data cleaning and weighting procedures, analysis program logic, and specifications for new econometric models. He also identified an overlap in costing systems that produced a "double-count" of delivery activity performed by personnel other than special delivery messengers but charged to LDC 24 (Cost Segment 9). He developed spreadsheet modifications needed to incorporate the costing refinements and new data, and eliminate the "double-count" problem. The results of Mr. Nelson's delivery costing work were presented before the PRC in the R97-1 omnibus rate case. The PRC adopted 9 out of 10 of Mr. Nelson's recommended methodological changes, 2 with commendations.

- * New products - Mr. Nelson identified the cost basis for a number of potential new product offerings involving Express Mail and Priority Mail, and developed the analytical framework and information needed to support their implementation. This included design and analysis of a new field study of relevant Express Mail piece characteristics, which was also presented by Mr. Nelson in the R97-1 rate case.

- * Litigation support - In Docket No. R94-1, Mr. Nelson reviewed intervenor testimony regarding city delivery

carrier and transportation issues, and developed discovery and cross-examination topics for Postal Service counsel.

* IOCS - Mr. Nelson developed refinements in IOCS data gathering procedures to improve the validity and precision of available information regarding Express Mail activities. Mr. Nelson then interpreted the initial results from the new data and provided suggestions for improvements in Express Mail costing procedures.

* Postal AMR - Mr. Nelson developed a plan for analyzing the street time costs associated with a proposal to have postal vehicles perform automated meter reading for utility companies.

* Eagle Network - Mr. Nelson developed a potential methodology for attributing the costs of dedicated air transportation services procured by the Postal Service.

For United Parcel Service (UPS), Mr. Nelson provided extensive expert testimony before the PRC in Docket No. R90-1. This testimony presented Mr. Nelson's studies of cost causality and/or elasticity within the city delivery carrier, special delivery messenger, vehicle service driver, purchased highway transportation and expedited air network operations of the Postal Service. These studies, which involved application of operations research techniques and development of econometric models and other statistical analyses based on postal data, were referenced and relied upon extensively by the PRC in its Opinion and Recommended Decision. To a considerable degree, these studies represented extensions and refinements of Mr. Nelson's previous studies, which were presented before the PRC in Mr. Nelson's testimony in Docket No. R87-1, and in Docket No. RM86-2B, a rulemaking proceeding established in part to explore issues raised in testimony before the PRC in Docket No. R84-1 for which Mr. Nelson served as principal investigator.

C. Other

Mr. Nelson participated in an airport master planning study for Sydney, Australia. For this study, he developed a comprehensive set of site selection criteria and evaluation measures.

Until February 1984, Mr. Nelson was a Senior Research Associate at Charles River Associates (CRA), an economic research and consulting firm, where his work experience included the following:

Freight Transportation

Mr. Nelson served as Manager of Consulting Services for the National Motor Transport Data Base (described above), which at the time was sponsored by CRA. In this position, he was responsible for handling client requests for information from the database, including problem definition, sampling issues, conduct of analyses and reporting of results. He conducted specific analyses for a number of public and private clients.

Mr. Nelson served as principal investigator for a study of motor carrier safety and traffic characteristics. This study involved extensive analysis of a number of databases, including the FHWA "Loadometer" Study, the 1977 Census of Transportation, the ICC "Empty/Loaded" Survey, and the NMTDB. The results of his work were incorporated in testimony before the U.S. District Court on behalf of a private client engaged in litigation with a state over the use of twin trailers.

Mr. Nelson participated in several other projects providing support for motor carriers involved in litigation cases. For these clients he performed detailed financial analyses of motor carrier operations and traffic in different settings, and assisted in the preparation of testimony and briefs. Mr. Nelson also served as an internal consultant on a number of CRA's other motor carrier, railroad, and freight transportation studies.

For the U.S. Department of Transportation (DOT), Mr. Nelson was principal investigator of a study to develop a conceptual framework and data collection strategy for analyzing the impacts of the motor carrier regulatory reforms implemented under the Motor Carrier Act of 1980. For this project, Mr. Nelson was responsible for identifying and selecting specific research issues, data requirements, data sources and analytical techniques.

In a study for the Office of the Secretary of Transportation, Mr. Nelson made extensive use of probabilistic modeling techniques to develop quantitative

estimates of potential fuel conservation resulting from selected aspects of proposed motor carrier regulatory reforms.

For DOT, Mr. Nelson was principal investigator for a study of the merits of alternative approaches that could be utilized by the ICC to implement the inflation-based index for allowable rate adjustments by railroads mandated by the Staggers Rail Act of 1980. For this study he analyzed the ICC's proposed approach and developed specific conclusions and recommendation in a number of issue areas, including selection of the basic index, productivity adjustments, treatment of profit and non-recurring expenses, frequency of index adjustment, rate averaging, regional differences, collective ratemaking and fuel surcharges. The results of this study were used by DOT in formulating its response to the ICC's proposed approach.

For a private client, Mr. Nelson analyzed the logistical considerations involved in siting a plant to process imported high-value mineral ores. This study, which was part of a larger study to assess the overall economic feasibility of plant construction and operation, involved comparisons of costs and other attributes of a variety of modes and modal combinations, including rail, inland waterway, motor carrier and TOFC.

In a study of urban freight consolidation alternatives conducted for the U.S. Department of Energy (DOE), Mr. Nelson utilized principles of network analysis, simulation and queuing theory to evaluate and critique the merits of previous studies, and recommend research approaches for analysis of route and terminal consolidation strategies.

Also for DOE, Mr. Nelson was a major contributor to a study of potential fuel-use changes that could occur in response to dramatic fuel price increases. Mr. Nelson's work focused on the freight and intercity passenger transportation sectors and included analyses of opportunities for improvements in fuel efficiency by each mode under different fuel price increase scenarios, as well as modal shifts and net traffic reductions caused by resulting cost (and rate) increases.

Passenger Transportation

Mr. Nelson served as principal investigator for a series of Service and Management Demonstration Evaluations conducted for DOT. For three parallel assessments of the feasibility of user-side subsidies, and one demonstration of taxicab regulatory reforms and paratransit service innovations, he developed instruments for and implemented several surveys, conducted data analysis and prepared Final Evaluation Reports. For an assessment of alternative transit transfer policies, he developed research issues and data requirements, selected and supervised interviews of over 40 transit properties, and wrote or was responsible for all major deliverables. He assisted DOT in the development of research issues to be addressed in demonstrations of innovative checkpoint paratransit services and in the review of a proposed paratransit policy.

Also for DOT, Mr. Nelson was principal investigator of a study of methods to improve transit productivity and cost-effectiveness. This study involved the identification and documentation of 146 distinct productivity-enhancement measures that have been implemented at U.S. transit properties, assessment of the transferability of each measure to different settings, and development of impact magnitude estimates. Prior to this project, Mr. Nelson developed over two dozen ideas for possible innovations to improve transit productivity and cost effectiveness.

Mr. Nelson participated in a financing study of the New York Metropolitan Transportation Authority's proposed multi-billion dollar capital improvement program. Mr. Nelson's responsibilities in this project involved econometric analysis of operating costs, with a particular emphasis on identifying the variability of different cost components with alternative future levels of rapid rail, bus, and commuter rail activity. The results of his work were incorporated in the MTA's Official Statement for the successful initial offering of \$250 million in transit revenue bonds.

For DOT, Mr. Nelson participated in a study to develop technical guidelines for use by local planners to satisfy alternatives analysis requirements. For this study he developed a matrix-based method for determining data requirements in different scenarios, and played a major

role in the development of a method for generating locally responsive alternatives to high-capital transit investments using multicriteria decision techniques.

For the Massachusetts Port Authority, Mr. Nelson participated in a study to forecast future levels of passenger and air cargo activity at Logan International Airport. For this study, Mr. Nelson supervised data collection efforts, developed methods for synthesizing data from diverse sources (FAA, CAB, Port Authority records, etc.) to yield relevant market segment size estimates, and analyzed seasonality and short-term peaking phenomena.

Mr. Nelson also participated in a quantitative assessment of the market penetration potential and associated impacts of electric vehicles for the Electric Power Research Institute (EPRI).

Thesis

In his graduate thesis at M.I.T., which fulfilled the thesis requirements for two Master's degrees, Mr. Nelson developed a comprehensive review of the theoretical and practical shortcomings encountered in the use of linear programming in a real time multiple vehicle routing and scheduling system (dial-a-ride). Based on network analysis techniques, he then developed a set of heuristic algorithms that avoided the shortcomings inherent in the linear programming (LP) approach. The performance of these algorithms was simulated by computer and found to meet or exceed the LP's performance in a variety of scenarios drawn from actual operating data.

TESTIMONY

Surface Transportation Board, Finance Docket No. 34421

- Verified Statement, 9-29-05

Surface Transportation Board, Ex Parte No. 657

- Written Testimony, 4-20-05
- Oral Testimony, 4-26-05

Surface Transportation Board, Finance Docket No. 34178

- Verified Statement, 11-14-02

Surface Transportation Board, Finance Docket No. 34177

- Verified Statement, 7-18-02

Surface Transportation Board, Finance Docket No. 32760
(Sub-No. 21)

- Verified Statement, 8-17-01

- Verified Statement, 8-18-00

Postal Rate Commission, Docket No. R2000-1

- Direct Testimony, MPA-T-3, 5-22-00

Surface Transportation Board, Ex Parte 582 (Sub-No. 1)

- Statement, 5-16-00

Surface Transportation Board, Finance Docket No. 33407

- Verified Statement, 8-31-98

- Supplemental Verified Statement, 10-28-98

Surface Transportation Board, Finance Docket No. 33469

- Verified Statement, 11-10-97

- Reply Verified Statement, 11-25-97

Postal Rate Commission, Docket No. R97-1

- Direct Testimony, USPS-T-19, 7-10-97

Interstate Commerce Commission, Finance Docket No. 32133

- Verified Statement, SP-20 (Volume 2), 11-29-93

- Rebuttal Verified Statement, SP-41 (Volume 2), 7-28-94

Postal Rate Commission, Docket No. R90-1

- Direct Testimony, UPS-T-1, 7-16-90
- Rebuttal Testimony, UPS-RT-1, 10-1-90

Interstate Commerce Commission, Finance Docket No. 31505

- Verified Statement, RGI-14/SOO-14 (Volume 2), 9-15-89
- Rebuttal Verified Statement, RGI-55/SOO-55, 2-15-90

Interstate Commerce Commission, Finance Docket No. 31522

- Verified Statement, RGI-7/CMW-7 (Volume 2), 8-25-89

Interstate Commerce Commission, Finance Docket No. 32000

- Verified Statement, RGII-10, 2-22-88
- Verified Opposition and Rebuttal Statement, RGII-59, 6-1-88

Postal Rate Commission, Docket No. R87-1

- Direct Testimony Concerning Special Delivery Messenger and City Delivery Carrier Street Time Costs, UPS-T-1, 9-14-87
- Rebuttal Testimony, UPS-RT-5, 11-23-87
- Statement Regarding SDWAFS Analyses, 12-1-87

Interstate Commerce Commission, Finance Docket No. 30800

- Verified Statement, DRGW-13, 4-7-87
- Verified Statement, DRGW-24, 7-13-87

Postal Rate Commission, Docket No. RM86-2B

- Direct Testimony Concerning City Delivery Carrier Street Time Costs, UPS-T-1, 12-1-86

Interstate Commerce Commission, Finance Docket No. 30400

- Verified Opposition Statement, DRGW-20, 11-21-84
- Verified Opposition Statement, DRGW-23, 12-10-84 (with Paul H. Banner)
- Verified Rebuttal Statement, DRGW-33, 5-29-85

SELECTED PUBLICATIONS

Reports Prepared for Charles River Associates

User-Side Subsidy Demonstration Project: Lawrence, Massachusetts. Final Evaluation Report. Prepared for U.S. Department of Transportation. October, 1983.

Analysis of Labor Conditions and Union Status in the Intercity Trucking Industry. Final Report. Prepared for U.S. Department of Transportation. August, 1983.

Actions Being Taken by Transit Operators to Improve Performance. Final Report. Prepared for U.S. Department of Transportation. April, 1983.

User-Side Subsidy Demonstration Project: Montgomery, Alabama. Final Evaluation Report. Prepared for U.S. Department of Transportation. December, 1982.

Plan for Monitoring the Impacts of Regulatory Reforms Implemented Under the Motor Carrier Act of 1980. Final Report. Prepared for U.S. Department of Transportation. October, 1982.

New York City Transit Authority Revenue Feasibility Study: Economic Analyses and Projections. Final Report. Prepared for Metropolitan Transportation Authority, New York, NY. In part. October, 1982.

Taxi Regulatory Revisions in Dade County, Florida. Data Collection Plan. Prepared for U.S. Department of Transportation. April, 1981.

Analysis of Rail Cost-Plus Pricing Systems. Prepared for U.S. Department of Transportation. March, 1981.

Net Demand for Oil Imports: Preliminary Estimates of Short-Run Price Elasticities. Prepared for the U.S. Department of Energy. In part. December, 1980.

User-Side Subsidy Demonstration Project: Kinston, North Carolina. Final Evaluation Report. Prepared for U.S. Department of Transportation. October, 1980. Executive Summary reprinted in Taxicab Management November/December, 1981.

Potential Fuel Conservation from Regulatory Reform of the Trucking Industry. Prepared for Office of the Secretary of Transportation. July, 1980.

Operator Guidelines for Transfer Policy Design. Prepared for U.S. Department of Transportation. June, 1980.

State of the Art of Current Practices for Transit Transfers. Prepared for U.S. Department of Transportation. June, 1980.

"Generation of Transportation Alternatives." Technical Monograph prepared for U.S. Department of Transportation. January, 1979.

"Definition of Transportation Alternatives." Technical Monograph prepared for U.S. Department of Transportation. November, 1978.

Preliminary Analysis of Alternative Proposals to Encourage Efficient Service Concepts in Urban Freight Movement. Prepared for U.S. Department of Energy. In part. October, 1978.

Other Publications

Nelson, Michael and Daniel Brand. 1982. "Methods for Identifying Transportation Alternatives." Transportation Research Record 867.

Nelson, Michael, Daniel Brand and Michael Mandel. 1982. "State of the Art Current Bus Transfer Practices." Transportation Research Record 854.

Nelson, Michael and Jane Piro. March, 1982. "Implementation and Impacts of the Kinston, North Carolina User-Side

Subsidy Demonstration Project." Specialized Transportation Planning and Practice.

Nelson, Michael and Paul H. Banner. 1981. "Analysis of Alternative Railroad Cost Recovery Procedures." Proceedings - Twenty-Second Annual Meeting of the Transportation Research Forum.

Nelson, Michael, Daniel Brand and Michael Mandel. 1981. "Use and Consequences of Timed Transfers on U.S. Transit Properties." Transportation Research Record 798.

Mellman, Robert, Michael Nelson and Jane Firo. 1980. "Forecasts of Passenger and Air Cargo Activity at Logan International Airport." Transportation Research Record 768.

Nelson, Michael. 1978. "Evaluation of Potential Replacements for Failing Conventional Transit Services." M.S. Thesis, Massachusetts Institute of Technology, Department of Civil Engineering and Alfred P. Sloan School of Management.