

**Pre-filed Direct Testimony of
Timothy B. Barton**

**COMMONWEALTH OF MASSACHUSETTS
ENERGY FACILITIES SITING BOARD**

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Western Massachusetts Electric Company)	EFSB 08-2/D.P.U. 08-105/D.P.U. 08-106
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PRE-FILED DIRECT TESTIMONY OF TIMOTHY B. BARTON

1 **Q. Please state your name, position and business address.**

2 A. My name is Timothy B. Barton. I am employed by Burns & McDonnell Engineering
3 Company, Inc. (“Burns & McDonnell”). My current position is senior project manager in the
4 Environmental Studies and Permitting Division. My business address is 9400 Ward
5 Parkway, Kansas City, MO 64114.

6
7 **Q. On whose behalf are you testifying?**

8 A. I am testifying on behalf of Western Massachusetts Electric Company (“WMECO”) in this
9 proceeding.

10
11 **Q. Please summarize your professional and educational background.**

12 A. I graduated from the University of Kansas in 1994 with a Bachelor of General Science in
13 Environmental Studies. I have been employed by Burns & McDonnell since July 1994. I
14 have worked on a variety of projects including power plants, transmission lines, fiber optic
15 communications, reservoirs, railroads and biological & aquatic studies. I have prepared
16 siting studies and environmental assessments for power plants and transmission line projects
17 in a number of states. In the New England area, I have worked on The Connecticut Light &
18 Power Glenbrook Cables Project which is now in operation and WMECO’s proposed
19 Springfield Cables Project which was subsequently cancelled. I am currently Burns &
20 McDonnell’s project manager for the siting efforts associated with the Greater Springfield

1 Reliability Project (“GSRP” or “the Project”). A copy of my resume is provided herewith as
2 Exhibit WMECO-TBB-2.

3

4 **Q. Please identify any regulatory proceedings in which you have testified.**

5 A. I have testified before the Public Service Commission of Wisconsin on behalf of Alliant
6 Energy, in connection with the environmental permitting and licensing associated with a new
7 530 MW simple-cycle gas-fired power plant in Sheboygan County, Wisconsin.

8

9 **Q. What is your involvement and responsibility with respect to WMECO’s proposed**
10 **Greater Springfield Reliability Project (“the Project”)?**

11 A. WMECO commissioned Burns & McDonnell to conduct an impacts comparison of various
12 environmental and social factors affecting the Project and the alternative approaches for the
13 Project and to document the comparison in the Petition for Approval to Construct 345-kV
14 Transmission Lines, Re-Build 115-kV Transmission Lines, and Build and Upgrade Ancillary
15 Facilities (the “Siting Board Petition”), filed by WMECO in this proceeding. I was
16 responsible for assessing underground and overhead alternative approaches for comparison to
17 the proposed Project. With this responsibility, I considered and evaluated the alternatives
18 identified by WMECO for overhead or underground alternatives to the Project based on
19 sound environmental, social and engineering factors. In addition, I used geographic
20 information system technology to identify and map constraints and to analyze the alternatives
21 on the following factors: land use/acquisition; traffic; noise; aesthetics/visual; wetlands/water
22 resources; rare species; oil and/or hazardous materials; tree removal; and historic and
23 archaeological resources.

24

25 **Q. For what portions of WMECO’s Petition are you responsible?**

26 A. Along with David Cameron of AECOM, and Lane Puls and Scott Newland of Burns &
27 McDonnell, I am responsible for portions of the following sections of the Siting Board
28 Petition:

29 • Section 4, Route and Ancillary Facility Site Selection for 345-kV Transmission Lines

- 1 • Section 5, Comparison of Proposed 345-kV Facilities Along Preferred Northern and
- 2 Noticed-Alternative Southern Routes
- 3 • Section 6, Route Selection for 115-kV Improvements
- 4 • Section 7, Comparison of Overhead and Underground 115-kV Facilities

5 While I share responsibility for the foregoing sections, my areas of principal responsibility
6 are as follows:

- 7 • Development and compilation of the criteria analysis of the feasible route options as
- 8 presented in the Siting Board Petition at Section 4.6 and subsections, excluding 4.6.4
- 9 thru 4.6.6.
- 10 • Information provided in Tables 5-5, 5-6, 5-7, 5-8, 5-10, 5-11, 5-25 and 5-26.
- 11 • Development and compilation of the criteria analysis of the feasible route options as
- 12 presented in the Siting Board Petition at Sections 6.5 and subsections.
- 13 • Development and analysis of the criteria scoring and comparisons for the alternative
- 14 115-kV route as presented in the Siting Board Petition at Section 6.6 and subsections.
- 15 • Portions of the comparison of alternative 115-kV underground line-routes with the re-
- 16 building/re-conductoring of the existing overhead lines, Section 7.2, associated with
- 17 landuse/acquisition, noise, aesthetics/visual, wetlands/water resources, protected
- 18 species and habitats, historic and archaeological resources.

19 I am also responsible for various information request responses in this proceeding which
20 cover the same topics, all of which are listed with my name, alone or with another, as the
21 responsible witness.

22

23 **Q. Were the materials referenced above prepared by you or under your supervision and**
24 **control?**

25 A. Yes.

26

1 **Q. Are there any revisions, updates or corrections to those matters for which you are**
2 **responsible?**

3 A. Yes. Due to some additional residential development between Agawam and West
4 Springfield, updates to the number of residences have been made to Tables 4-4, 4-5 and 4-6
5 in Section 4 of the Siting Board Petition and Tables 5-5, 5-6, 5-10 and 5-11 in Section 5 of
6 the petition and are provided in Exhibit WMECO-TBB-3. Updates to Tables 4-4, 4-5, 4-6, 5-
7 7, 5-8, 5-25 and 5-26 are also included in Exhibit WMECO-TBB-3. These updates are due
8 to changes in the length and acreage of right-of-way (ROW) associated with expansion areas.
9 The changes arise from refinements to the lines representing existing easements/ROW. In
10 addition, areas of ROW re-alignment, such as near the landfill in Chicopee, have been
11 excluded from the data as these are not expansions of the ROW but adjustments apart from
12 the proposed Project. Finally, Exhibit WMECO-TBB-3 contains updates to Tables 5-5, 5-6
13 and 5-11, which have been made to clarify that the data includes or excludes portions of the
14 Project in Connecticut.

15

16 **Q. Does this complete your testimony?**

17 A. Yes, it does.

18

Timothy B. Barton



Expertise

- Client Coordination
- Project Management
- Environmental Analysis
- Land-Use Studies
- Aquatic Biology
- Wildlife Biology
- GIS Development
- GPS Surveys

Education

- B.S. in Environmental Science, University of Kansas, 1994

Certifications

-

Organizations

- Geospatial Information and Technology Association (GITA) – Midwest Chapter Executive Board

Registration

-

Total Years of Experience

14

Years With Burns & McDonnell

14

Start Date

July 1, 1994

Mr. Barton is a senior environmental specialist at Burns & McDonnell. He has participated in various projects including land use assessment, aquatic invertebrate identification and environmental assessment. His responsibilities have included department management, project management, fieldwork, laboratory analysis, data collection and report preparation. He also uses ESRI Geographic Information System (GIS) ArcGIS software to review environmental constraints for various projects. He has a broad range of knowledge in working with GIS data and is good at incorporating its use into projects. In addition, he is a Division project administrator for Burns & McDonnell's Oracle based Management Information System (MIS). As an administrator he is responsible for reviewing and approving new projects entered into the system as well as revisions to existing projects. He also provides MIS training and support to the Division.

Greater Springfield Reliability Project – 345-kV Transmission Line and 115-kV Transmission Line Upgrades, Northeast Utilities System Connecticut and Massachusetts, 2007-Ongoing

For Northeast Utilities System (NUS), Mr. Barton is the project manager for the siting efforts associated with the Greater Springfield Reliability Project (GSRP). The GSRP is a set of improvements to the electric transmission systems of The Connecticut Light and Power Company ("CL&P") in Connecticut and Western Massachusetts Electric Company ("WMECO") in Massachusetts. The transmission line improvements include a new 345-kV transmission line, 115-kV transmission line upgrades and ancillary facilities associated with the project.

Burns & McDonnell is acting as the primary consultant providing preliminary engineering and design services and overall monitoring and project management of the Connecticut Siting Council (CSC) and Massachusetts Energy Facilities Siting Board (EFSB) regulatory processes. Burns & McDonnell is assisting CL&P and WMECO in the identification and evaluation of routes, development and participation in the public involvement process, the compilation of municipal recommendations, and the preparation of the CSC Certification of Environmental Compatibility and Public Need (CECPN) and EFSB application documents.

Both underground and overhead route alternatives have been identified by Burns & McDonnell for consideration and evaluation. Routes along existing transmission, gas and rail corridors and public streets and highways were considered and evaluated for overhead or underground construction based on sound environmental, social and engineering factors typical for similar voltage lines in the region. For underground routes, Burns & McDonnell also identified appropriate locations for river crossings and determined necessary methods for the crossings to minimize impacts. Burns & McDonnell used geographic information system (GIS) technology to identify and map constraints and analyze routes.

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Springfield Cables Project – Two 115-kV Underground Transmission Lines and Substation Upgrades, Northeast Utilities System

Massachusetts, 2007

Also for NUS, Mr. Barton was the project manager for the siting efforts associated with the Springfield Cables Project which included two new 115-kV underground transmission lines, a new switching station and upgrades at three substations. The Project primarily involved installation of two, solid dielectric underground cables between three substations in the City of Springfield as part of improvements to the electric transmission system for WMECO in Massachusetts. These improvements were needed to provide safe, reliable, and economic transmission service throughout the Springfield geographic area and to assure that that portion of the transmission system will comply with mandatory federal and regional reliability standards. Burns & McDonnell assisted WMECO in the identification and evaluation of routes, development and participation in the public involvement process, the compilation of municipal recommendations, and the preparation of the EFSB application documents.

Multiple underground route alternatives have been identified by Burns & McDonnell for consideration and evaluation. Routes along existing transmission, gas and rail corridors and public streets and highways were considered and evaluated for underground construction based on sound environmental, social and engineering factors typical for similar voltage lines in the region. Burns & McDonnell also identified appropriate locations for river crossings and determined necessary methods for the crossings to minimize impacts. Burns & McDonnell used GIS technology to identify and map constraints and analyze routes. The Project was cancelled after the EFSB application was submitted.

Glenbrook Cables Project – 115-kV Underground Transmission Line and Substation Upgrades, Northeast Utilities System

Connecticut, 2005

Also for NUS, Mr. Barton was the project manager for the siting efforts associated with the Glenbrook Cables Project which included a new 115-kV underground transmission lines and upgrades at two substations. The Project primarily involved installation of solid dielectric underground cables between two substations in Fairfield County, Connecticut. Burns & McDonnell assisted CL&P in the identification and evaluation of routes, development and participation in the public involvement process, the compilation of municipal recommendations, and the preparation of the CSC application documents.

Multiple underground route alternatives were identified by Burns & McDonnell for consideration and evaluation. Routes along existing transmission, gas and rail corridors and public streets and highways were considered and evaluated for underground construction based on sound environmental, social and engineering factors typical for similar voltage lines in the region. Burns & McDonnell also identified appropriate locations for river crossings and determined necessary methods for the crossings to minimize impacts. Burns & McDonnell used GIS technology to identify and map constraints and analyze routes. The Project was approved by the CSC and is currently in operation.

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Ely Energy Center – 2,500 MW Generating Station, Nevada Power Company and Sierra Pacific Power Company

Ely, Nev., 2005-2007

For Nevada Power Company (NPC) and Sierra Pacific Power Company (SPPC), Mr. Barton assisted with the development of the proposed 2,500-megawatt (MW) Ely Energy Center Project. He was assisting with preparation of environmental documentation to support filings with the U.S. Bureau of Land Management (BLM) and general site development including electric transmission lines, water supply pipelines and railroad access routes. He functioned as a contract employee at NPC's main office and was responsible for maintaining and updating the GIS developed for the project and coordination with subcontractors.

Weston Unit 4 – 500 MW Coal-Fired Power Plant, Wisconsin Public Service Corporation

Central Wisconsin, 2002-2003

For Wisconsin Public Service Corporation (WPS), Mr. Barton was the assistant project manager and CPCN Coordinator for environmental permitting and licensing associated with a new 500 MW coal-fired power plant at the Weston Generating Station. The primary service was the preparation of a CPCN application that was submitted to the PSC of Wisconsin for approval of the project. The CPCN application addressed both a preferred and alternate site and included assessment of a 2.5-mile natural gas pipeline corridor. The CPCN application required a number of field surveys including; bathymetric mapping, discharge plume modeling, noise study, habitat survey and wetland survey. Other services associated with the CPCN application included; data collection from local municipalities, preparation of figures using GIS, socioeconomic assessment, natural resources analysis and preparation of the application. Additionally, Burns & McDonnell has prepared all necessary permits and permit modifications for the new plant including; air permit, construction storm water permit, hydrostatic discharge permit, industrial discharge permit, Chapter 30 permits and FAA/WDOT notifications. The CPCN application was approved by the PSC and Weston Unit 4 is currently under construction.

Clean Water Act 316(b) Compliance, Wisconsin Public Service Corporation

Wisconsin, Pennsylvania and New York, 2005-Ongoing

For Wisconsin Public Service Corporation (WPS), Mr. Barton is the project manager for environmental services associated with Clean Water Act 316(b) compliance. The project involves coordination with state agencies in Wisconsin and New York for five power plants that a subject to Phase II of the 316(b) requirements. The project will also involve fisheries studies, entrainment studies and impingement studies at one or more of the plant sites. The studies required will vary by plant site, but will become part of a Comprehensive Demonstration Study (CDS) that contains a Proposal for Information Collection, source water flow information, technology and compliance assessment information or information to support a site-specific determination of Best Technology Available (BTA), and a Verification Monitoring Plan. Plant sites are located on Lake Michigan, Wisconsin River, Mississippi River, Fox River and Beaver River.

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Joint Baseload Siting Study, Wisconsin Public Service Corporation and Wisconsin Power & Light

Wisconsin, 2004-2005

In a joint project with WPS and Wisconsin Power & Light (WPL), he was the project manager for environmental services associated with a joint baseload feasibility study for a potential power plant in Wisconsin. The project consisted of two main components, a siting study and a technology assessment. The siting study involved screening of various infrastructures such as proximity to electric transmission lines, railroads, gas pipelines and water. The project team developed a matrix of 44 screening criteria to analyze and rate each potential site. He developed a GIS to analyze the infrastructure and other environmental constraints to assist in the screening of the potential sites. The sites were then narrowed down to nine sites for field visits to review and verify environmental and other constraints associated with the sites. The technology assessment was conducted by Burns & McDonnell's Energy Group.

Siting Study, Alliant Energy – Interstate Power & Light

Iowa and Minnesota, 2005-2006

For Alliant Energy - Interstate Power & Light (IPL), Mr. Barton was the project manager for environmental services associated with a siting study which evaluated six brownfield sites in Iowa and Minnesota for baseload generation. The sites were evaluated for environmental and infrastructure constraints and a short-list of sites were visited to verify information reviewed during the desktop evaluation. A report documenting evaluation methodology and siting constraints was prepared and will be used to assist IPL in determining which sites to pursue for future generation needs

Pulliam 83 MW CT, Wisconsin Public Service Corporation

Green Bay, Wisconsin, 2001-2002

Additionally for WPS, he was the project manager for the addition of an 83 MW simple-cycle gas-fired combustion turbine at WPS's Pulliam Generating Station. Burns & McDonnell provided environmental field services for the power plant and associated three-mile gas pipeline. Our environmental services also included an air permit application and Environmental Report submitted to the Wisconsin Department of Natural Resources for the new air emissions source. We also prepared a Certificate of Authority application that was submitted to the PSC for authority to build the project. The power plant is currently in operation.

Sheboygan Falls Energy Facility, Sheboygan Power LLC

Sheboygan Falls, Wisconsin, 2002-2004

For Sheboygan Power LLC, Mr. Barton was the project manager for environmental services for a 530 MW simple-cycle gas-fired power plant in Sheboygan County, Wisconsin. Burns & McDonnell prepared the CPCN application and the associated permits consisting of an air permit, high capacity well permit, WPDES construction storm water and operational storm water permit, industrial discharge permit, FAA/WDOT notifications and various state and local permits. To support the CPCN application, Burns & McDonnell staff conducted wetland and habitat surveys, a noise study, a cultural resources survey and multiple contacts with federal, state, county and local entities for information. Mr. Barton also provided expert testimony during the

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PSC's technical hearings. The project was approved by the PSC and is currently under construction by Burns & McDonnell's Construction Group. The project has since been sold to Alliant Energy and is currently in operation.

Power Plant Site Selection Study, Wisconsin Public Power Inc. and Madison Gas & Electric

Wisconsin, Illinois and Michigan, 2005-2006

In a joint project for Wisconsin Public Power Inc. (WPPI) and Madison Gas & Electric (MG&E), Mr. Barton is the project manager for environmental services associated with a feasibility study for a potential baseload power plant in Wisconsin. The project consists of two main components, a siting study and a technology assessment. The siting study involves screening of various infrastructures such as proximity to electric transmission lines, railroads, gas pipelines and water. The project team will then develop screening criteria to analyze and rate each potential site. AGIS will be used to analyze the infrastructure and other environmental constraints to assist in the screening of the potential sites.

Port Washington 1,080 MW CCCT, Wisconsin Energy Corporation/We Energies

Port Washington, Wis., 2002-2003

For Wisconsin Energy Corporation/We Energies, Mr. Barton was the project manager for a power plant project that consisted of shutting down five existing 80 MW coal-fired plants and replacing them with two 500 MW combined-cycle gas-fired units with a heat recovery steam generator. Burns & McDonnell provided environmental services for the power plant, including a new 16-mile natural-gas pipeline to serve the proposed generation facility. The primary environmental service was assistance in producing the CPCN application. The permitting, licenses, approvals and field studies for the power plant and the natural-gas pipeline were included in the CPCN application. The project has been approved by the PSC and is currently under construction.

Power Plant Site Selection Study, Old Dominion Electric Cooperative

Virginia, Maryland and Delaware, 2001

For Old Dominion Electric Cooperative, Mr. Barton assisted with a site selection study by determining state and local permitting requirements and identifying information used in the constraint mapping for up to 1,000 megawatts of proposed simple- and combined-cycle combustion turbine generating units in Virginia, Maryland and Delaware. This involved contacting various agencies to determine permitting requirements and collecting information on physical resources. Once the three preferred sites were selected, Mr. Barton assisted with the environmental permitting process for construction.

Power Plant Site Selection Study, Union Electric Company

Missouri, 1996

For Union Electric Company, Mr. Barton assisted with a site selection study by determining state and local permitting requirements and identifying information used in the constraint mapping for up to 1,200 megawatts of simple- and combined-cycle combustion turbine generating units in Missouri and Illinois. This involved contacting

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various agencies to determine permitting requirements and collecting information on physical resources. Mr. Barton also assisted with the constraint mapping using a Geographic Information System (GIS) to identify favorable areas for the proposed units.

Power Plant Site Selection Study, Sierra Pacific Power Company

Missouri, 1996

Additionally for Sierra Pacific Power Company, Mr. Barton assisted with a site selection study by determining state and local permitting requirements and identifying information used in the constraint mapping for up to 600 megawatts of proposed simple- and combined-cycle combustion turbine generating units in Nevada. This involved contacting various agencies to determine permitting requirements and collecting information on physical resources. He also assisted with the constraint mapping using a GIS to identify favorable areas for the proposed units.

Fiber Optic Telecommunications Permitting, T-Cubed

Florida and Georgia, 2000-2001

For T-Cubed, Mr. Barton managed the environmental permitting for a fiber-optic telecommunications system project between Atlanta and Jacksonville, Florida. The project involves coordination with all federal, state and local permitting agencies in Georgia and Florida. The project crosses two U.S. Army Corps of Engineers Districts, both of which require a Nationwide Permit. Following informal consultation with the U.S. Fish and Wildlife Service and Georgia Department of Natural Resources, Burns & McDonnell biologists conducted a survey for gopher tortoises. A number of gopher tortoise burrows were found within the right-of-way for the telecommunications project and will be scoped using an infrared camera prior to construction. Mr. Barton's team also successfully permitted under the new Georgia NPDES regulations put into effect August 1, 2000, requiring an Erosion, Sedimentation and Pollution Control Plan (ESPCP) and a Comprehensive Water Monitoring Plan, detailing water sampling locations and methodology. Additionally, Mr. Barton managed permitting for crossing streams in Florida, under the Department of Environmental Protection (DEP) Submerged Lands and Environmental Resources Program, and obtained a use agreement under the sovereign submerged lands requirements.

Fiber Optic Telecommunications Permitting, Williams Communications Inc.

Georgia, Tennessee, Kentucky, Indiana, Ohio and Illinois, 1999-2001

For Williams Communications Inc., Mr. Barton managed the environmental permitting for a communications system project between Atlanta and Chicago. The project involved coordination with all federal, state and local permitting agencies in Georgia, Tennessee, Kentucky, Indiana, Ohio and Illinois. The project crossed five U.S. Army Corps of Engineers Districts, all of which required Nationwide Permits. In addition, multiple state stream- and wetland-crossing permits and authorizations were acquired.

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Fiber Optic Telecommunications Permitting, Williams Communications Inc.

Louisiana, Mississippi, Alabama, North Carolina, and Virginia, 1999-2001

Mr. Barton has managed environmental permitting for regeneration sites on a project in Louisiana, Mississippi, Alabama, North Carolina, and Virginia for Williams Communications Inc.,. In the Great Lakes region, he has permitted sites in Michigan and Ohio.

Land Use Assessment, Entergy Inc.

Arkansas, 1998-1999

As part of a land use assessment for Entergy Inc., Mr. Barton was the principal investigator for its Carpenter-Remmel Hydroelectrical Facility. The project consists of two lakes formed by the Carpenter and Remmel dams, which create Lake Hamilton and Lake Catherine. At the two lakes and hydroelectric facilities, lands within 200 feet of the shorelines were studied. Mr. Barton coordinated all aspects of mapping for land use, performed using ArcInfo, GIS and digital aerial photography of the area. The mapping consisted of layers for land use, land ownership, environmentally sensitive features, and existing infrastructure. The study's purpose was to document existing patterns and to analyze the potential impact of relicensing the hydroelectric facilities. Mr. Barton was the principal author of the report, which will ultimately become part of an Applicant Prepared Environmental Assessment for relicensing of this facility.

Recreation Use Study, Entergy Inc.

Arkansas, 1997-1998

As part of a recreation use study for Entergy, Mr. Barton conducted on-site interviews at various locations at both Lake Hamilton and Lake Catherine. A standardized questionnaire form was developed to solicit responses to a variety of aspects of recreation uses. Various persons were interviewed at boat ramps, public facilities and commercial areas to obtain a thorough cross-section of people utilizing the Lakes. As part of his responsibilities on this project, Mr. Barton entered the data collected during the on-site interview process into a database that was then used to analyze the data. He also participated in entering returned questionnaire data solicited from lake front property owners at Lake Hamilton and Lake Catherine.

Baseline Water Quality Assessment, U.S. Army Corps of Engineers

Missouri, 1994-1995

He assisted in the preparation of a baseline water quality assessment for the Kansas City District U.S. Army Corps of Engineers. His duties included identification of aquatic macro-invertebrates from field samples, data analysis and preparation of charts and tables used in the final document.

Seasonal Fisheries Survey, City of Wichita

Kansas, 1995-1996

Mr. Barton assisted with a seasonal fisheries survey of the Little Arkansas River in Sedgewick County, Kansas. The objective of the study is to establish baseline fisheries data for the river prior to implementation of surface water diversions associated with a groundwater recharge project. To accomplish this objective, seven sampling sites have

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been established over 30 miles of the river. Sampling is conducted with a bag seine in riffle and run habitats and with a backpack electrofisher in pool habitats and around structure. In addition, physical stream habitat parameters at each site are measured and qualitative macroinvertebrate samples are collected. Data obtained from this study will provide baseline information for the Little Arkansas River and will provide a basis of comparison for long-term monitoring after project implementation.

Reservoir Project – Fisheries Survey, Wyoming Water Development Commission

Wyoming, 1994-1995

For the Wyoming Water Development Commission, Mr. Barton assisted in an Environmental Impact Statement (EIS) for a reservoir project. His duties included a water quality study of aquatic invertebrates, habitat quality assessment of various streams and use of an electrofisher for salmonid sampling. He also assisted in identification of plant species and wildlife species in the study area.

Reservoir Project – Wetland Delineation, Wyoming Water Development Commission

Wyoming, 1995-1996

Also for the Wyoming Development Commission, Mr. Barton participated in an extensive wetland delineation using a Sokkia Global Positioning System (GPS). The GPS was used to accurately access the extent and acreage of wetlands in the study area. He is one of the primary personnel familiar with using GPS and helped manage the data collection from pre-field-work mission planning to post-field-work processing. The GPS information was then submitted to the Corps of Engineers for final evaluation.

Baseline Contaminant Study, U.S. Army Corps of Engineers

Missouri, 1995

Mr. Barton assisted in a 30-day Baseline Contaminant Study of air quality at a military installation in Missouri. This involved sampling of air using flow controlled canisters over 24-hour time periods. These samples were then analyzed and used to prepare a document on air quality in these areas.

Land Ownership Study, U.S. Army Corps of Engineers

Missouri, 1994

For the Kansas City District Army Corps of Engineers he participated in an ownership study of properties along the Missouri River. This study was conducted for the Fish and Wildlife Mitigation Project. It involved obtaining ownership information for various sites from county court houses, obtaining property tax maps and visitation of sites to identify access points. As principal author, the culmination of his effort was a report, which detailed ownership information along with tables and figures for seven locations along the Missouri River.

Air Contaminant Study, Kansas City Power & Light

La Cygne, Kansas, 1995

Mr. Barton also participated in air contaminant studies for Kansas City Power & Light's (KCPL) La Cygne Generating Station, a coal-fired power plant in Eastern Kansas. This

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involved sampling of various concentrations of gases over extended periods of time in order to meet federal one-year compliance regulations. He helped analyze this data which was then integrated into a report.

Land Use Census, Department of Energy

Amarillo, Texas, 1994-1995

For the Department of Energy, Mr. Barton conducted a land use census for a nuclear munitions plant near Amarillo, Texas. The census required personal interviews with over 200 residents, agency contacts, data collection and report preparation for a 10- and 50-mile radius from the plant. He also used an Arc/ Info, Geographic Information System (GIS) to digitize various point locations such as houses, gardens, water wells, schools, industries, public facilities and feed lots. The final report incorporated tables, figures, and text derived from the field work and data collection.

Reservoir Project – Habitat and Extent Survey, City of Fort Smith Arkansas

Arkansas, 1996

For the City of Fort Smith, Arkansas, Mr. Barton participated in habitat and extent surveys for two species of concern (Category II) plants. These plants are the southern lady's slipper orchid (*Cypripedium kentuckiense*) and the Ozark chinquapin (*Castanea pumila*). Both of these species were observed within the project boundaries during his fieldwork. Reports on his findings were submitted to various state and federal agencies for review.

Reservoir Project – Fisheries Survey, City of Fort Smith Arkansas

Arkansas, 1996

Mr. Barton participated in a fisheries survey for the city of Fort Smith, Arkansas. This survey included backpack electrofishing in stream habitats and gill netting on lake habitats. He also snorkeled in various parts of the stream habitat for occurrence of the long-nosed darter, which is a species of concern.

Environmental Resource Inventory, U.S. Army Corps of Engineers

Minnesota, Wisconsin, Iowa, Illinois, Missouri, South Dakota and Kansas, 1995-1996

Mr. Barton assisted in the preparation of an Environmental Resource Inventory for the Upper Mississippi River/Lower Missouri River and major tributaries. He coordinated state soil associations with STATSGO major soil associations using Arc/Info GIS software. This information was then incorporated as an appendix into the report. He also authored the chapter on impacts of flooding.

Cultural Resource Survey for a Water Pipeline, City of Olathe, Kan.

Olathe, Kansas, 1996

For the City of Olathe, Mr. Barton participated in a Phase I archaeological investigation of a proposed water pipeline. He assisted our staff archaeologist by conducting fieldwork to document the location and extent of five known sites. He also aided in the report writing of this survey, which was submitted to the State Historic Preservation Office.

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Cultural Resource Survey for an Electric Transmission Line, American Electric Power

Oklahoma, 1996

Mr. Barton assisted our staff archaeologist in a Phase I survey of a 345-kV transmission line in Oklahoma. The objective of this survey was to establish a viable corridor through an area with a high density of archaeological sites.

Wetland Delineation and Environmental Inventory, Trans Continental Gas Pipe Line Company

South Carolina, North Carolina, Virginia, Maryland and Pennsylvania, 1997-1998

For Trans Continental Gas Pipe Line Company (Transco), Mr. Barton managed all aspects of Global Positioning System (GPS) field work in Pennsylvania, Maryland, Virginia, North Carolina, and South Carolina. The project included use of multiple Sokkia GPS units to accurately log all wetlands, streams, waterbodies and threatened or endangered species habitat, within 580 miles of pipeline right-of-way. As the GPS supervisor, he was responsible for all pre-field-work planning for operation of GPS including locating monuments for base stations and developing the methodology for collecting data. While in the field, he was responsible for all aspects of data collection including supervising field crews. The project culminated in mapping more than 1,000 wetlands and 1,600 streams and waterbodies. This data will be used by the client to maintain a Geographic Information System (GIS) database of environmental features on their pipeline right-of-way.

Electric Distribution System Inventory, Holland Board of Public Works

Holland, Mich., 1997-1998

For the Holland Board of Public Works, Mr. Barton assisted in a field inventory using GPS for more than 50,000 locations for its transmission and distribution network. This involved determining a coordinate location and multiple features for poles, transformers, switches, risers, fuses, conductors, streetlights and meters. As the GPS supervisor, he was responsible for all pre-field-work planning for operation of GPS and developing the methodology for collecting data. While in the field, he was responsible for all aspects of data collection including supervising field crews and data collection. This field assignment encompassed the city of Holland, Michigan, and covered over 20-square-miles.

Wetland Delineation and Endangered Species Survey, City of Omaha, Metropolitan Utilities

Nebraska, 1995

For the City of Omaha, Metropolitan Utilities District (MUD), Mr. Barton participated in a wetland delineation and an endangered species survey for the western prairie fringed orchid (*Platanthera praeclara*). The project site is a 2,000-acre area located along the Platte River and involves the potential use of groundwater pumping for municipal water use. Wetland locations were located and mapped using false-color infrared aerial photography, National Wetland Inventory maps provided by the U.S. Fish and Wildlife Service and then surveyed on foot. Potential western prairie fringed orchid locations were identified using the same methodology and surveyed during the

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flowering period. No orchids were observed during the field survey.

Environmental Inventory, Norfolk Southern Railroad

Illinois and Ohio, 1996

For Norfolk Southern railroad, Mr. Barton conducted site visits on seven new rail line construction projects in Illinois and Ohio. The purpose of the site visit was to document existing conditions and determine any potential impacts to water resources, biological resources, threatened and endangered species, cultural resources, noise and safety. He was responsible for writing a report on these issues for each of these connecting track constructions along with addressing agency comments. The project was on a very tight time schedule because Norfolk Southern was attempting a hostile takeover of Conrail and needed to submit their application to the Surface Transportation Board (STB) before their competitor CSX. Mr. Barton's reports aided in the filing of an application before CSX and ultimately allowed Norfolk Southern and CSX to agree to a merger with Conrail instead of an outright takeover. He was an integral part of the team that responded to the pressures of a client requesting a compressed time schedule for our services because millions of dollars were potentially at stake for them if we could not meet certain deadlines.

EIS Support, Norfolk Southern Railroad

Eastern U.S., 1996-1997

In a related task for Norfolk Southern, Mr. Barton was responsible for developing a database on communities related to the Norfolk Southern/CSX merger with Conrail. He used insight from previous projects and applied his knowledge to plan a database designed for handling an immense amount of data in an easy search, query and print format. The database contained information on over 700 communities, which had rail line segments that met or exceeded STB thresholds for analysis passing through their community. Information collected from numerous sources included; socioeconomic, demographics, sensitive noise receptors, Norfolk Southern and Conrail customers, grade crossings, proximity to biological and water resources, air quality attainment status, point source air emissions and rail segments in the community. This data was used in an analysis of environmental justice issues and for community outreach programs related to the Draft Environmental Impact Statement (EIS) issued by the STB on the Conrail merger.

Environmental Inventory, Kansas City Southern Railroad

Texas, 1998

For Kansas City Southern Railroad, Mr. Barton was the principal investigator on a proposed reinstatement of 85 miles of abandoned rail line in Texas. His responsibilities included a site survey of the proposed line, documentation of potential environmental impacts, and coordination with state and federal agencies. The project currently is on hold awaiting decision on the abandonment status of the line.

Timothy B. Barton



Environmental Report, Wisconsin Public Service Company

Rhineland, Wis., 1995

For Wisconsin Public Service Company, Mr. Barton assisted with an Environmental Impact Report (EIR) by gathering information for a proposed 106 megawatt circulating fluidized unit at the Rhineland Energy Center. This involved contacting various agencies to determine environmental constraints that were included in the report.

Feasibility Study, Utilicorp

Colorado, 1995

For West Plains Energy Division of Utilicorp, Mr. Barton assisted with a feasibility study and permitting to repower an existing gas-fired 19-megawatt steam-turbine and a relocated 18-megawatt steam turbine generator in Colorado. This involved contacting various agencies to determine permitting requirements and collecting information on physical resources.

Power Plant Site Selection Study, Chugach Electric Association

Alaska, 1995

For Chugach Electric Association, Mr. Barton assisted with a site selection study by determining state and local permitting requirements and identifying information used in the constraint mapping for up to 230 megawatts of proposed combined-cycle combustion turbine generating units in Alaska. This involved contacting various agencies to determine permitting requirements and collecting information on physical resources.

Cultural Resources Survey for a Highway Project, Arkansas Highway and Transportation Department

Arkansas, 1996

In association with a cultural resources survey for an EIS on south Highway 71, Mr. Barton conducted a preliminary centerline survey for the proposed highway project. The survey involved use of traditional survey methods utilizing USGS topographic maps and a compass to flag the centerline.

His background includes fieldwork in aquatic ecology, terrestrial ecology and small mammal sampling. Also, his education includes course work in statistical analysis, research methods and preparation of reports related to his fieldwork.

Mr. Barton's specific accomplishments include:

- Attended Southern Gas Association's three-day Environmental Inspectors Workshop in February 1996.
- Obtained environmental experience while serving as an assistant environmental professional on a 36-inch pipeline replacement project in Pennsylvania. This involved working with the environmental professional on staff and assessing the duties and responsibilities involved with this type of field assignment.

Table 4-4: Project Evaluation Criteria Metrics {REVISED}

Evaluation Criteria Metrics	Northern Route	Southern Route
Total Length (Miles)	35 miles	57 miles
Railroad Crossings (Number)	2	4
Stream Crossings (Number)	41	61
Length NOT paralleling existing linear facilities	0 feet	0 feet
Length through private easement	0 feet	0 feet
Length of ROW expansion	4.1 <u>4.3</u> miles	5.7 <u>4.5</u> miles
Area of ROW expansion	11.1 <u>12.0</u> acres	15.6 <u>12.2</u> acres
Residences within ROW (Number) ¹ 11		12 <u>15</u>
Residences within 100 feet of edge of ROW (Number)	316 <u>328</u>	428 <u>440</u>
Residences within 101 to 300 feet of edge of ROW (Number)	754 <u>769</u>	1,116 <u>1,131</u>
Businesses within ROW (Number)	0	2
Businesses within 100 feet of edge of ROW or centerline (Number)	46 54	
Businesses within 101 to 300 feet of edge of ROW (Number)	42 58	
Public Facilities within 300 feet of edge of ROW (Number)	2 3	
Public Facilities within 301 to 1,200 feet of edge of ROW (Number)	9 18	
Length by land use (Commercial/Industrial)	6.8 miles	10.4 miles
Length by land use (Residential)	13.1 miles	18.7 miles
Length by land use (Undeveloped Land)	11.3 miles	23.8 miles
Length by land use (Park/School/Open Space)	3.3 miles	3.9 miles
Visibility (Rating) ² 50.7		67.5
Length through stream or wetland	6.2 miles	12.8 miles
Length through environmentally sensitive area ³	7.8 miles	20.5 miles
Potential impact on cultural resources (Rating) ⁴ 39.2		68.3

Notes:

- 1. Residences or businesses considered to be located within the ROW does not necessarily mean they would need to be relocated.*
- 2. The visibility rating is a subjective rating and was assigned to portions of the segment based on the length of the line that was considered to have a high (5), medium-high (4), medium (3), medium-low (2), or low (1) impact. These ratings were determined by the presence of residences, businesses, and roads within a 1/4-mile of the line and described further below. Portions of the segment where the 345-kV structures would be significantly taller than the existing structures in the corridor were multiplied 1.5 times the visibility rating.*
- 3. Environmentally sensitive areas are locations identified in Massachusetts by the Natural Heritage and Endangered Species Program as Priority Habitats of Protected Species and in Connecticut as the Natural Diversity Database Endangered Species locations.*
- 4. The cultural resources rating is a rating that was assigned to portions of the segment based on the length of the line that was considered to have a High (3), Medium (2), No /Low (1) predicted sensitivity for archaeological resources and described further below.*

**Table 4-5: Unweighted Common Data Range Ratio-Scoring for 345/115-kV Line
 Routes REVISED**

Evaluation Criteria Metrics	Northern Route Ratio-Score	Southern Route Ratio-Score
Total Length (Miles)	0.61	1.00
Railroad Crossings (Number)	0.50	1.00
Stream Crossings (Number)	0.67	1.00
Length NOT paralleling existing linear facilities	n/a	n/a
Length through private easement	n/a	n/a
Length of ROW expansion	0.71 <u>0.95</u>	1.00
Area of ROW expansion	0.71 <u>0.99</u>	1.00
Residences within ROW (Number)	0.92 <u>0.73</u>	1.00
Residences within 100 feet of edge of ROW (Number)	0.74 <u>0.75</u>	1.00
Residences within 101 to 300 feet of edge of ROW (Number)	0.68 1.00	
Businesses within ROW (Number)	0.00	1.00
Businesses within 100 feet of edge of ROW or centerline (Number)	0.85 1.00	
Businesses within 101 to 300 feet of edge of ROW (Number)	0.72 1.00	
Public Facilities within 300 feet of edge of ROW (Number)	0.67 1.00	
Public Facilities within 301 to 1,200 feet of edge of ROW (Number)	0.50 1.00	
Length by land use (Commercial/Industrial) 0.66		1.00
Length by land use (Residential)	0.70	1.00
Length by land use (Undeveloped Land)	0.47	1.00
Length by land use (Park/School/Open Space)	0.83	1.00
Visibility (Rating)	0.75	1.00
Length through stream or wetland	0.48	1.00
Length through environmentally sensitive area	0.38	1.00
Cultural resources predictive modeling analysis (Rating)	0.57	1.00
TOTAL	13.12 <u>13.46</u>	21.00

Table 4-6: Weighted Common Data Range Ratio-Scoring for 345/115-kV Line Routes [REVISED]

Evaluation Criteria Metrics	Weight	Northern Route Ratio-Score	Southern Route Ratio-Score
Total Length (Miles)	5	3.03	5.00
Railroad Crossings (Number)	2	1.00	2.00
Stream Crossings (Number)	1	0.67	1.00
Length NOT paralleling existing linear facilities	4 n/a		n/a
Length through private easement	4	n/a	n/a
Length of ROW expansion	4	2.83 <u>3.81</u>	4.00
Area of ROW expansion	4	2.85 <u>3.95</u>	4.00
Residences within ROW (Number)	4	3.67 <u>2.93</u>	4.00
Residences within 100 feet of edge of ROW (Number)	3	2.24 <u>2.24</u>	3.00
Residences within 101 to 300 feet of edge of ROW (Number)	2	1.35 <u>1.36</u>	2.00
Businesses within ROW (Number)	3	0.00	3.00
Businesses within 100 feet of edge of ROW or centerline (Number)	2 1.70		2.00
Businesses within 101 to 300 feet of edge of ROW (Number)	1 0.72		1.00
Public Facilities within 300 feet of edge of ROW (Number)	4 2.67		4.00
Public Facilities within 301 to 1,200 feet of edge of ROW (Number)	3 1.50		3.00
Length by land use (Commercial/Industrial) 1		0.66	1.00
Length by land use (Residential)	4	2.79	4.00
Length by land use (Undeveloped Land)	3	1.42	3.00
Length by land use (Park/School/Open Space)	5 4.17		5.00
Visibility (Rating)	2	1.50	2.00
Length through stream or wetland	3	1.45	3.00
Length through environmentally sensitive area	3 1.14		3.00
Cultural resources predictive modeling analysis (Rating)	2 1.15		2.00
TOTAL		38.48 <u>39.86</u>	61.00

Table 5-5: Preferred Northern Route Land Use Evaluation Criteria {REVISED}

Evaluation Criteria Metrics	Preferred Northern Route
Total Length (Miles)	22.9 <u>35</u> miles
Stream Crossings (Number)	47 <u>41</u>
Residences within 100 feet of edge of ROW (Number)	316 <u>328</u>
Residences within 101 to 300 feet of edge of ROW (Number)	754 <u>769</u>
Businesses within 100 feet of edge of ROW or centerline (Number)	46
Businesses within 101 to 300 feet of edge of ROW (Number)	42
Public Facilities within 300 feet of edge of ROW (Number)	2
Public Facilities within 301 to 1,200 feet of edge of ROW (Number)	9
Length by land use (Commercial/Industrial) 6.8	miles
Length by land use (Residential)	13.1 miles
Length by land use (Undeveloped Land)	11.3 miles
Length by land use (Park/School/Open Space)	3.3 miles
Length through vegetated wetland	3.6 miles ¹
Length through environmentally sensitive area	7.8 miles ¹
Cultural resources predictive modeling analysis (Rating)	39.2

Note:

1. Excludes the CT portion of the project.

Table 5-6: Noticed-Alternative Southern Route Land Use Evaluation Criteria

{REVISED}

Evaluation Criteria Metrics	Southern Route
Total Length (Miles)	21.4 <u>1</u> miles
Stream Crossings (Number)	44 <u>44</u>
Residences within 100 feet of edge of ROW (Number)	112 <u>179</u>
Residences within 101 to 300 feet of edge of ROW (Number)	362 <u>525</u>
Businesses within 100 feet of edge of ROW or centerline (Number)	8 <u>22</u>
Businesses within 101 to 300 feet of edge of ROW (Number)	16 <u>28</u>
Public Facilities within 300 feet of edge of ROW (Number)	1
Public Facilities within 301 to 1,200 feet of edge of ROW (Number)	9 <u>11</u>
Length by land use (Commercial/Industrial)	3.6 <u>6.1</u> miles
Length by land use (Residential)	5.6 <u>11.8</u> miles
Length by land use (Undeveloped Land)	12.5 <u>19.9</u> miles
Length by land use (Park/School/Open Space)	0.6 <u>2.5</u> miles
Length through stream or wetland	12.8 miles ¹
Length through environmentally sensitive area	20.5 miles ¹
Cultural resources predictive modeling analysis (Rating)	29.1

Note:

1. Excludes the CT portion of the project.

**Tables 5-7 and 5-25: Summary of ROW Expansion along the Preferred Northern
 Route {REVISED}**

Town(s)	From	To	Mileage	Existing ROW (ft)	Proposed ROW (ft)	Additional Width (ft)	Acres of Additional ROW¹
Agawam	CT/MA Border	S. Agawam Switching Station	2.3 <u>2.1</u>	100 110		10	2.79 <u>2.7</u>
Agawam S	ilver Substation	Agawam Substation	0.5 <u>0.4</u>	100 135		35	2.12 <u>1.4</u>
Chicopee E.	Springfield Junction	Exit 6 Junction	1.5	100	125	25	4.55 <u>4.5</u>
Totals ---		---	4.3	---	---	---	9.46 <u>8.6</u>

Note:

1. Excludes ROW expansion on property owned by WMECO.

**Tables 5-8 and 5-26: Summary of ROW Expansion along the Noticed-Alternative
 Southern Route {REVISED}**

Town(s)	From	To	Mileage	Existing ROW (ft)	Proposed ROW (ft)	Additional Width (ft)	Acres of Additional ROW¹
Agawam	CT/MA Border	S. Agawam Switching Station	2.3 <u>2.1</u>	100 110		10	2.79 <u>2.7</u>
Agawam S	ilver Substation	Agawam Substation	0.5 100		165	65	3.94 <u>3.2</u>
Agawam S	ilver Substation	Agawam Substation	1.9 <u>1.7</u>	150 165		15	3.45 <u>2.9</u>
Totals ---		---	4.7	---	---	---	10.18 <u>8.8</u>

Note:

1. Excludes ROW expansion on property owned by WMECO.

Table 5-10: Preferred Northern Route Noise Sensitive Receptors {REVISED}

Evaluation Criteria Metrics	Preferred Northern Route
Residences within 100 feet of edge of ROW (Number)	316 <u>328</u>
Residences within 101 to 300 feet of edge of ROW (Number)	754 <u>769</u>
Businesses within 100 feet of edge of ROW or centerline (Number)	46
Businesses within 101 to 300 feet of edge of ROW (Number)	42
Public Facilities within 300 feet of edge of ROW (Number)	2
Public Facilities within 301 to 1,200 feet of edge of ROW (Number)	9
Length by land use (Park/School/Open Space)	3.3 miles

Table 5-11: Noticed-Alternative Southern Route Noise Sensitive Receptors

{REVISED}

Evaluation Criteria Metrics	Southern Route
Residences within 100 feet of edge of ROW (Number)	112 <u>179</u>
Residences within 101 to 300 feet of edge of ROW (Number)	362 <u>525</u>
Businesses within 100 feet of edge of ROW or centerline (Number)	8 <u>22</u>
Businesses within 101 to 300 feet of edge of ROW (Number)	16 <u>28</u>
Public Facilities within 300 feet of edge of ROW (Number)	1
Public Facilities within 301 to 1,200 feet of edge of ROW (Number)	9 <u>11</u>
Length by land use (Park/School/Open Space)	0.6 <u>2.5</u> miles