BEFORE THE

ALBERTA UTILITIES COMMISSION

Re: ATCO Electric Ltd.: New 144kV transmission line, to be called 7LA24, to connect existing transmission line, 7L24, to a new substation to be called Beartrap 940S	**Application 1609059 Proceeding ID 2196**

Direct Testimony of James R. Dauphinais

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A James R. Dauphinais. My business address is 16690 Swingley Ridge Road, Suite 140, Chesterfield, MO 63017.

Q WHAT IS YOUR OCCUPATION?

A I am a consultant in the field of public utility regulation and a Managing Principal of Brubaker & Associates, Inc., energy, economic and regulatory consultants.

Q PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A I have earned a Bachelor of Science in Electrical Engineering from the University of Hartford and have completed a number of graduate level courses in electric power systems through the Engineering Outreach Program of the University of Idaho. In the twelve and one-half years prior to the beginning of my current employment with BAI, I was employed in the Transmission Resource Planning Department of the Northeast Utilities Service Company. Since my employment with BAI in 1997, I have testified before the Federal Energy Regulatory Commission and many state commissions on a

wide variety of issues including, but not limited to, avoided cost calculations, certification of public convenience and necessity, fuel adjustment clauses, interruptible rates, market power, market structure, prudency, resource planning, standby rates, transmission rates, transmission line routing, transmission losses, and transmission planning. I have also testified in the past before the Alberta Utilities Commission ("AUC" or "Commission"). Finally, I have assisted end-use customers with power procurement and a variety of clients in regard to transmission access issues. My background is further detailed in Appendix A to my evidence.

Q PLEASE IDENTIFY THE MATTERS WHERE IN THE PAST YOU FILED EVIDENCE OR TESTIMONY REGARDING TRANSMISSION LINE ROUTING.

A I have in the past filed transmission line routing evidence or testimony in the following matters:

Jurisdiction	Applicant	Docket/Proceeding No.
PUCT[1]	Oncor Electric Delivery Company	37464
PUCT	LCRA Transmission Service Corporation	37778
PUCT	Oncor Electric Delivery Company	38140
PUCT	Lone Star Transmission, LLC	38230
PUCT	Sharyland Utilities, L.P.	38290
PUCT	Oncor Electric Delivery Company	38324
PUCT	LCRA Transmission Services Corporation	38354
PUCT	Oncor Electric Delivery Company	38517
PUCT	Oncor Electric Delivery Company	38597
MPSC[2]	International Transmission Company	U-16200
AUC[3]	AltaLink Management Ltd.	979
AUC	ATCO Electric	1363
AUC	ATCO Electric	1069
MPSC	Michigan Electric Transmission Company, LLC	U-17041
PUCT	Electric Transmission Texas, LLC	40728
ICC[4]	Ameren Transmission Company of Illinois	12-0598

[1]Public Utility Commission of Texas
[2]Michigan Public Service Commission
[3]Alberta Utilities Commission
[4]Illinois Commerce Commission

Q ON WHOSE BEHALF ARE YOU PROVIDING EVIDENCE IN THIS PROCEEDING?

A I am providing evidence on behalf of Red Route Group ("RRG"). RRG is a group of landowners with lands and/or residences along or near ATCO's Preferred West Route for its proposed Beartrap Transmission Project.

Q WHAT IS THE SUBJECT MATTER OF YOUR EVIDENCE?

A My evidence addresses the Application of ATCO for a permit and license to construct and operate the single-circuit 144 kV transmission line portion of its proposed Beartrap Transmission Project ("Beartrap Project").

At the request of the RRG's counsel, I developed routing factors for a modified version of ATCO's filed Preferred West Route west and north of Node E4 based on a survey commissioned by the RRG member, Ms. Eileen Leeds. The modification would shorten ATCO's Preferred West Route by 1.6 km. I also provided an evaluation of RRG's modified Preferred West Route (or the "RRG Route") versus ATCO's filed version of the Preferred West Route. The RRG modified the Preferred West Route to create the RRG Route which is shown in purple on the route mosaic presented in Attachment JRD-1 to my evidence.

My silence in regard to any issue should not be taken as an endorsement of any position taken by ATCO with respect to that issue.

Q CAN YOU PLEASE SUMMARIZE YOUR CONCLUSIONS?

A The RRG's modification to ATCO's Preferred West Route "short cuts" a detour to the west that ATCO's Preferred West Route takes from Node E4 to Node A1. This "short cut" is accomplished by navigating through a well site field located north of Node E4 while respecting the setback requirements from the well sites themselves. The

resulting route, the RRG Route, has equal or better routing factor performance than ATCO's Preferred West Route with regard to minimizing: length, major turns, estimated cost, residences within 150 meters, distance not parallel to quarter/section lines, cultivated hectares crossed, pasture hectares crossed, wetland and water body hectares crossed and km of non-crown land crossed. The RRG Route has inferior performance to the ATCO Preferred Route with regard to: (i) the number of residences more than 150 meters but less than 800 meters from the edge of right-of-way (23 versus 20) and (ii) the hectares of tree clearing (2.8 versus 1.9). However, to put this inferiority into perspective, a 144 kV transmission line constructed on wooden davit-arm structures has far less adverse visual impact beyond 150 meters than, for example, a 240 kV transmission line constructed on steel lattice tower structures. Furthermore, there are only 0.9 hectares of additional tree clearing, while the total right-of-way area for the proposed transmission line is approximately 30 hectares. Therefore, without considering pipeline crossings and the number of objections, in my professional opinion the RRG Route on an overall basis has routing factor performance comparable to that of ATCO's Preferred West Route.

II. Route Selection Factors

Q WHAT FACTORS SHOULD BE CONSIDERED IN THE SELECTION OF A TRANSMISSION LINE ROUTE BY THE COMMISSION?

A Safety and health, cost, the impact on property owners, the impact on the environment, the impact on archeological and historic sites and the impact on aesthetics are all factors that should be considered. The transmission line route selection objectives and considerations presented in Alberta Environment's Environmental Protection Guidelines for Transmission Lines ("Alberta Environment

R&R/11-03") should also be considered by the Commission. Finally, while they technically apply to ISO Needs Identification Applications rather than Transmission Line Applications, it is also appropriate to apply the agriculture impact, residential impact, environmental impact, cost, electrical consideration, visual impact and special constraints aspects of ND12 of Section 6.1 of AUC Rule 007.

Q SHOULD GREATER WEIGHT BE PLACED ON CERTAIN FACTORS VERSUS OTHERS?

A Yes. While all factors should be considered, some factors should be given more weight than others. For example, when practicable, it is desirable to route new transmission lines using existing linear developments such as road allowances, fence lines, quarter section and section lines, and existing transmission or utility corridors as outlined in Section 1.2 of Alberta Environment R&R/11-03. However, if two hypothetical alternative routes only differed in that one entirely ran along quarter lines and the other entirely ran along an existing transmission line corridor, it could not be said that the two routes have similar impacts as the existing transmission line corridor route is already impacted by existing transmission line infrastructure while the quarter line route is not likely to have been as significantly impacted by existing infrastructure. Thus, all else being equal, the route using the existing transmission line corridor would likely be a much better route for the proposed line than the one that utilized quarter lines.

As another example, if two hypothetical routes differed only in that one introduced significant health and safety concerns, but the other introduced significant aesthetic concerns, if a choice had to be made between the two lines, it is likely the route with greater aesthetic impact would be the better choice of the two routes.

Q WHEN WEIGHING THE FACTORS TO BE CONSIDERED, IS IT POSSIBLE THAT SUBSTANTIALLY BETTER PERFORMANCE WITH RESPECT TO ONE FACTOR CAN ULTIMATELY OUTWEIGH INFERIOR PERFORMANCE WITH RESPECT TO ANOTHER FACTOR?

A Yes. A hypothetical example of this would be when one route impacts a relatively small number of residences, but very little of its length runs along existing transmission line corridors. In such a circumstance, it may be appropriate to select a different route that impacts more residences if that route also significantly outperforms the other route in terms of minimizing the portion of its length that does not run along existing transmission line corridors.

III. ATCO's Route Selection Analysis

Q PLEASE DESCRIBE THE METHOD ATCO UTILIZED TO DEVELOP ITS FILED PREFERRED WEST ROUTE AND ALTERNATIVE EAST ROUTE FOR THE 144 KV TRANSMISSION LINE THAT ATCO IS PROPOSING IN THIS PROCEEDING.

A ATCO reports that it developed general criteria that were taken into consideration through the route selection process. These criteria include:

- Utilizing existing linear developments to minimize new disturbance, tree clearing and agricultural impact (i.e., right-of-ways, property boundaries, road allowances, etc.);
- Minimizing impacts to other land uses such as residences, built-up areas and oil and gas facilities;
- Keeping routes as straight as practical to reduce line length and costly corner structures;
- Minimizing impacts to environmentally sensitive areas such as watercourses, sensitive habitats, parks and recreation areas;
- Avoiding wet areas and steep slopes to improve access and reduce environmental impacts and construction costs; and

- Ensuring all electrical system constraints and considerations are respected.

ATCO then developed route options based on the technical economic, environmental, and land-use criteria described above. The process of developing preliminary routes was based on an evaluation of routing opportunities (i.e., features favorable to the development of a transmission line route in the area) and routing constraints (i.e., features that constrain or prevent the development of a transmission line route in a particular location) (ATCO Application, Attachment 1 at page 16).

Q HOW DID ATCO PROCEED ONCE IT HAD DEVELOPED PRELIMINARY ROUTE OPTIONS?

A Once ATCO developed the three preliminary route options, ATCO indicates the routes were presented to landowners, land occupants, the general public and agencies during the first round of consultation. Based on multiple rounds of stakeholder consultation, modification of the preliminary east and west routes, rejection of the preliminary central route and further analysis of the route metrics, ATCO selected the Preferred West Route and Alternative East Route as the proposed routes that it believes best meets its selection criteria.

Q HOW DID ATCO ARRIVE AT ITS FINAL CHOICE OF ITS PREFERRED WEST ROUTE FOR THE 144 KV TRANSMISSION LINE?

A ATCO indicates that it compared the route metrics of the proposed Preferred West Route and Alternative East Route. ATCO indicates it selected the Preferred West Route as its preferred route based on the following five strengths:

- The shortest line length and least cost area of disturbance;
- The lowest line cost;

- The least amount of tree clearing required;
- The least impact to wetland habitat; and
- Least number of residences within 150 m.

(ATCO Application, Attachment 1 at page 19)

IV. Proposed RRG Modification to ATCO's Preferred West Route

Q PLEASE DESCRIBE TO ORIGIN OF THE RRG ROUTE.

A The RRG Route was conceived by Ms. Eileen Leeds of the RRG to address certain concerns she has with ATCO's Preferred West Route from Node E4 to Node A1. She outlines these concerns in her submission to the Commission. Conceptually, the RRG Route replaces the segment of ATCO's Preferred West Route from Node E4 to Node A1 with a route segment that runs from Node E4 generally due north for approximately two sections (3.2 km) to intersect with ATCO's existing 7L24 144 kV transmission line in the southeast corner of SW-4-62-4-4. Ms. Leeds also commissioned survey maps for the RRG modification that produces the RRG Route. She has included the survey maps in her submissions as Exhibits 0098.01.LEEDS-2196 and 0099.01.LEEDS-2196.

Q DID BAI HAVE ANY ROLE WITH REGARD TO THE DEVELOPMENT OF THE SURVEY MAP THAT HAS BEEN SUBMITTED BY MS. LEEDS?

A We provided feedback with regard to maintaining required setbacks from the well sites in SW-28-61-4-4 and SE-28-61-4-4. We also provided feedback with regard to how ATCO's Preferred West Route from Node E4 to Node A1 is portrayed on the survey map. This was the limit of our participation in the development of the survey map. However, the final survey map serves the basis of our development of routing

factors for the RRG Route versus ATCO's Preferred West Route. As I noted earlier, the modification is also shown in purple in the route mosaic presented in Attachment JRD-1 to my evidence.

Q PLEASE DESCRIBE HOW BAI DEVELOPED ROUTING FACTORS FOR THE RRG ROUTE.

A In order to develop the routing factors for the RRG Route, BAI first calculated the routing factors for the ATCO segment that runs from Node E4 to Node A1 and then for the RRG modified segment that runs due north from Node E4 to the existing 7L24 144 kV transmission line. After all routing factors were calculated for the ATCO Node E4 to Node A1 segment and the RRG segment, they were used to develop the routing factors for the entire RRG Route. Starting with the ATCO Preferred West Route factors, BAI subtracted out the routing factor values for the ATCO Node E4 to Node A1 segment and then added in the RRG segment routing factors. The result of that calculation yielded the RRG Route routing factors.

Q HAVE YOU CREATED ANY DOCUMENTS THAT WERE USED IN THIS DEVELOPMENT OF ROUTING FACTORS FOR THE ATCO NODE E4 TO NODE A1 SEGMENT AND RRG SEGMENT THAT RUNS FROM NODE E4 NORTH TO THE 7L24 TRANSMISSION LINE?

A Yes. Working cooperatively with Mr. Cliff Wallis of Cottonwood Consultants Ltd., we created Attachment JRD-2 to my evidence. Attachment JRD-2 is a map portraying the land use of the area containing the ATCO Node E4 to Node A1 segment and the RRG Route segment. The land use polygons surrounding the ATCO route were provided as ArcGIS shape files that were provided by ATCO in response to

Information Requests RRG.ATCO-003 and RRG.ATCO-004. The land use polygons located outside the ATCO study area that are crossed by the RRG Route were developed based on aerial photography of the area.

Q **PLEASE DESCRIBE HOW YOU CALCULATED THE ROUTE LENGTH (KM) AND AREA OF RIGHT-OF-WAY (HA) ROUTING FACTORS FOR THE ATCO NODE E4 TO NODE A1 SEGMENT AND THE RRG SEGMENT THAT RUNS FROM NODE E4 NORTH TO THE 7L24 144 KV TRANSMISSION LINE.**

A Utilizing an electronic version of Attachment JRD-2, Mr. Wallis provided the length in meters of both route segments. The ATCO Preferred Route segment measured 4,888 meters and the RRG Route segment measured 3,268 meters. Those lengths in meters were converted into areas in hectares based on an 18 m right-of-way. The ATCO Preferred West segment was calculated as 8.8 ha and RRG segment right-of-way has an area of 5.9 ha.[1]

Q **PLEASE DESCRIBE HOW YOU CALCULATED THE NUMBER OF MAJOR TURNS (<15°) ROUTING FACTOR FOR THE ATCO NODE E4 TO NODE A1 SEGMENT AND THE RRG SEGMENT THAT RUNS FROM NODE E4 NORTH TO THE 7L24 144 KV TRANSMISSION LINE.**

A The number of major turns greater than 15° was determined by visual inspection of survey plot that has been sponsored by Ms. Eileen Leeds.

[1] 5.9 ha = (3,268 m x 18 m) ÷ 10,000 m^2 / ha.

Q **PLEASE DESCRIBE HOW YOU CALCULATED THE QUARTER/SECTION LINE (KM) AND CROSS COUNTRY (KM) ROUTING FACTORS FOR THE ATCO NODE E4 TO NODE A1 SEGMENT AND THE RRG SEGMENT THAT RUNS FROM NODE E4 NORTH TO THE 7L24 144 KV TRANSMISSION LINE.**

A In response to Information Request RRG.ATCO-016 d), we learned that the centerline must be within 50 m of the quarter/section line otherwise it is considered cross country. By measurement of the route segments as shown on the survey plot sponsored by Ms. Leeds, BAI determined the entire length of both segments was considered to be paralleling quarter/section lines and none of the segment length went cross county.

Q **PLEASE DESCRIBE HOW YOU CALCULATED THE ADJACENT ACCESS (INCLUDING ROAD CROSSING) (KM) ROUTING FACTOR FOR THE ATCO NODE E4 TO NODE A1 SEGMENT AND THE RRG SEGMENT THAT RUNS FROM NODE E4 NORTH TO THE 7L24 144 KV TRANSMISSION LINE.**

A The length in km of the adjacent access including road crossings was calculated for the ATCO segment as the entire length that traverses west to east along township road 614 plus the length measured on Attachment JRD-2 that crosses the disturbed land use polygon that represents Highway 28. The RRG Route adjacent access is only the length that crosses Highway 28 as measured on Attachment JRD-2.

Q PLEASE DESCRIBE HOW YOU CALCULATED THE RESIDENCE IMPACT ROUTING FACTORS FOR THE ATCO NODE E4 TO NODE A1 SEGMENT AND THE RRG SEGMENT THAT RUNS FROM NODE E4 NORTH TO THE 7L24 144 KV TRANSMISSION LINE.

A The three residence impact routing factors are based on the survey map sponsored by Ms. Leeds and my Attachment JRD-1. Using the scale and measuring the distance from each residence to the nearest edge of right-of-way for the proposed transmission line, the total number of residences within 150 m and within 800 m was calculated. In addition, for both the ATCO and RRG Route segments, the nearest residence was measured to be approximately 90 m from edge of right-of-way.

Q PLEASE DESCRIBE HOW YOU CALCULATED THE CULTIVATED (HA), PASTURE (HA), TREE CLEARING (HA) AND WETLANDS AND WATER BODIES (HA) ROUTING FACTORS FOR THE ATCO NODE E4 TO NODE A1 SEGMENT AND THE RRG SEGMENT THAT RUNS FROM NODE E4 NORTH TO THE 7L24 144 KV TRANSMISSION LINE.

A Utilizing the land use map in Attachment JRD-2, the total area traversing each of the land use categories was estimated based on an 18 m right-of-way.

Q PLEASE DESCRIBE HOW YOU CALCULATED THE LENGTH OF LINE (KM) WITHIN CROWN LAND ROUTING FACTOR FOR THE ATCO NODE E4 TO NODE A1 SEGMENT AND THE RRG SEGMENT THAT RUNS FROM NODE E4 NORTH TO THE 7L24 144 KV TRANSMISSION LINE.

A Attachment JRD-1 shows that neither route segment traverses any Crown land.

Q PLEASE DESCRIBE HOW YOU CALCULATED THE LINE COST ESTIMATE (MILLION $) ROUTING FACTOR FOR THE ATCO NODE E4 TO NODE A1 SEGMENT AND THE RRG SEGMENT THAT RUNS FROM NODE E4 NORTH TO THE 7L24 144 KV TRANSMISSION LINE.

A The line cost estimates are based on the number and type of structures utilized as well as the length of the route segment. For the ATCO Preferred West Route, an average cost per km excluding structures was calculated. The structure count and cost data was provided in a supplemental response to Information Request RRG.ATCO-018, Exhibit 0095.00.AE-2196. Based on that Information Request, the total estimated cost of structures on the West Preferred Route was determined and subtracted from the total labor and material cost of that route. The remaining dollars were then divided by the 17.94 km length of the West Preferred Route Yielding an average estimated per km cost (excluding structures) of $317,741. The length of the ATCO route segment was then multiplied by the $317,741 per km cost estimate to yield the estimated cost for the segment excluding structures.

The structure cost was then determined for the ATCO Node E4 to Node A1 segment by identifying and counting the structure types as shown on Map 1.1 of the ATCO Application Appendix 1 Attachment A, Exhibit 0074.00.AE-2196. The northern most structure has been excluded from the count as it will be the same type for both the ATCO route and the RRG Route. The structures were counted and placed into four categories: tangent, 2°-15°, 15°-60° and Deadend. Then those structure counts were multiplied by the average cost of the structure type and totaled resulting in a total estimated structure cost for the ATCO Node E4 to Node A1 route segment.

The estimated structure cost and the cost less structures were then summed resulting a cost of $2.5 million. That number was then multiplied by the PPS estimate

differential factor of 1.0761 which resulted in a final cost of $2.7 million for the ATCO route segment from Node E4 to Node A1.

The RRG Route segment cost estimate was calculated with a similar method to the ATCO route segment cost estimate. The only difference is that the number of turning structures was determined by inspection of the survey plot sponsored by Eileen Leeds. The number of tangent structures was calculated based on the number of tangent structures per mile of the ATCO Node E4 to Node A1 segment times the length of the RRG Route segment. The resulting estimated structure cost of the RRG segment is $1.7 million and the line cost excluding structures was estimated as $1.0 million. The total estimated cost of the RRG Route segment from Node E4 to the 7L24 144 kV transmission line including the PPS estimate differential factor is $1.9 million.

Q HAVE YOU TABULATED ALL OF YOUR RESULTING ROUTING FACTORS?

A Yes. My routing factors for the RRG Route in its entirety are tabulated in Attachment JRD-3 to my evidence in comparison to ATCO's filed route alternatives.

Q HAVE YOU DETERMINED THE NUMBER OF PIPELINES CROSSED AND THE NUMBER OF OBJECTIONS TO THE RRG ROUTE?

A No. We did not have the necessary information for either of these routing factors.

Q HAVE YOU EVALUATED ROUTING FACTORS YOU DEVELOPED FOR THE RRG ROUTE VERSUS THOSE FOR ATCO'S PREFERRED WEST ROUTE?

A Yes. Versus ATCO's Preferred West Route, the RRG Route:

- Is 1.6 km shorter in length;

- Has one fewer major turn (<15°);
- Has a resulting estimated cost that is approximately $0.8 million lower;
- Has the same number of residences within 150 meters of the edge of right-of-way;
- Has three more residences within 800 meters of the edge of right-of-way;
- Has the same amount of length that is not parallel to quarter/section lines;[2]
- Has the same amount of estimated distance that does not have adjacent access;
- Has 1.5 fewer hectares of cultivated lands within its right-of-way;
- Has the same amount of cross-cultivated hectares in its right-of-way;
- Has 1.7 fewer hectares of pasture lands in its right-of-way;
- Requires 0.9 more hectares of tree clearing;
- Has 0.5 fewer hectares of wetland and water bodies; and
- Crosses the same amount of Crown land.

With regard to the above routing factors, the RRG Route has equal or better performance than ATCO's Preferred West except with regard to: (i) the number of residences greater than 150 meters, but less than 800 meters from the edge of right-of-way (23 versus 20) and (ii) the hectares of tree clearing (2.8 hectares versus 1.9 hectares).

[2]Both the entire length of the RRG modification and the entire length of ATCO's Preferred West Route is parallel to and within 50 meters of quarter/section lines.

V. Conclusions and Recommendations

Q WHAT ARE YOUR CONCLUSIONS?

A The RRG's modification to ATCO's Preferred West Route "short cuts" a detour to the west that ATCO's Preferred West Route takes from Node E4 to Node A1. This "short cut" is accomplished by navigating through a well site field located north of Node E4 while respecting the setback requirements from the well sites themselves. The resulting route, the RRG Route, has equal or better routing factor performance than ATCO's Preferred West Route with regard to minimizing: length, major turns, estimated cost, residences within 150 meters, distance not parallel to quarter/section lines, cultivated hectares crossed, pasture hectares crossed, wetland and water body hectares crossed and km of non-crown land crossed. The RRG Route has inferior performance to the ATCO Preferred Route with regard to: (i) the number of residences more than 150 meters but less than 800 meters from the edge of right-of-way (23 versus 20) and (ii) the hectares of tree clearing (2.8 versus 1.9). However, to put this inferiority into perspective, a 144 kV transmission line constructed on wooden davit-arm structures has far less adverse visual impact beyond 150 meters than, for example, a 240 kV transmission line constructed on steel lattice tower structures. Furthermore, there are only 0.9 hectares of additional tree clearing, while the total right-of-way area for the proposed transmission line is approximately 30 hectares. Therefore, without considering pipeline crossings and the number of objections, in my professional opinion the RRG Route on an overall basis has routing factor performance comparable to that of ATCO's Preferred West Route.

Q DOES THIS CONCLUDE YOUR EVIDENCE?

A Yes, it does.

Qualifications of James R. Dauphinais

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A James R. Dauphinais. My business address is 16690 Swingley Ridge Road, Suite 140, Chesterfield, MO 63017, USA.

Q PLEASE STATE YOUR OCCUPATION.

A I am a consultant in the field of public utility regulation and a Managing Principal with the firm of Brubaker & Associates, Inc. ("BAI"), energy, economic and regulatory consultants.

Q PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A I graduated from Hartford State Technical College in 1983 with an Associate's Degree in Electrical Engineering Technology. Subsequent to graduation I was employed by the Transmission Planning Department of the Northeast Utilities Service Company as an Engineering Technician.

While employed as an Engineering Technician, I completed undergraduate studies at the University of Hartford. I graduated in 1990 with a Bachelor's Degree in Electrical Engineering. Subsequent to graduation, I was promoted to the position of Associate Engineer. Between 1993 and 1994, I completed graduate level courses in the study of power system transients and power system protection through the Engineering Outreach Program of the University of Idaho. By 1996 I had been promoted to the position of Senior Engineer.

In the employment of the Northeast Utilities Service Company, I was responsible for conducting thermal, voltage and stability analyses of the Northeast

Utilities' transmission system to support planning and operating decisions. This involved the use of load flow, power system stability and production cost computer simulations. It also involved examination of potential solutions to operational and planning problems including, but not limited to, transmission line solutions and the routes that might be utilized by such transmission line solutions. Among the most notable achievements I had in this area include the solution of a transient stability problem near Millstone Nuclear Power Station, and the solution of a small signal (or dynamic) stability problem near Seabrook Nuclear Power Station. In 1993 I was awarded the Chairman's Award, Northeast Utilities' highest employee award, for my work involving stability analysis in the vicinity of Millstone Nuclear Power Station.

From 1990 to 1996, I represented Northeast Utilities on the New England Power Pool Stability Task Force. I also represented Northeast Utilities on several other technical working groups within the New England Power Pool ("NEPOOL") and the Northeast Power Coordinating Council ("NPCC"), including the 1992-1996 New York-New England Transmission Working Group, the Southeastern Massachusetts/Rhode Island Transmission Working Group, the NPCC CPSS-2 Working Group on Extreme Disturbances and the NPCC SS-38 Working Group on Interarea Dynamic Analysis. This latter working group also included participation from a number of ECAR, PJM and VACAR utilities.

From 1990 to 1995, I also acted as an internal consultant to the Nuclear Electrical Engineering Department of Northeast Utilities. This included interactions with the electrical engineering personnel of the Connecticut Yankee, Millstone and Seabrook nuclear generation stations and inspectors from the Nuclear Regulatory Commission ("NRC").

In addition to my technical responsibilities, from 1995 to 1997, I was also responsible for oversight of the day-to-day administration of Northeast Utilities' Open Access Transmission Tariff. This included the creation of Northeast Utilities' pre-FERC Order No. 889 transmission electronic bulletin board and the coordination of Northeast Utilities' transmission tariff filings prior to and after the issuance of Federal Energy Regulatory Commission ("FERC" or "Commission") FERC Order No. 888. I was also responsible for spearheading the implementation of Northeast Utilities' Open Access Same-Time Information System and Northeast Utilities' Standard of Conduct under FERC Order No. 889. During this time I represented Northeast Utilities on the Federal Energy Regulatory Commission's "What" Working Group on Real-Time Information Networks. Later I served as Vice Chairman of the NEPOOL OASIS Working Group and Co-Chair of the Joint Transmission Services Information Network Functional Process Committee. I also served for a brief time on the Electric Power Research Institute facilitated "How" Working Group on OASIS and the North American Electric Reliability Council facilitated Commercial Practices Working Group.

In 1997 I joined the firm of Brubaker & Associates, Inc. The firm includes consultants with backgrounds in accounting, engineering, economics, mathematics, computer science and business. Since my employment with the firm, I have filed or presented testimony before the Federal Energy Regulatory Commission in Consumers Energy Company, Docket No. OA96-77-000, Midwest Independent Transmission System Operator, Inc., Docket No. ER98-1438-000, Montana Power Company, Docket No. ER98-2382-000, Inquiry Concerning the Commission's Policy on Independent System Operators, Docket No. PL98-5-003, SkyGen Energy LLC v. Southern Company Services, Inc., Docket No. EL00-77-000, Alliance Companies, et al., Docket No. EL02-65-000, et al., Entergy Services, Inc., Docket No.

ER01-2201-000, and Remedying Undue Discrimination through Open Access Transmission Service, Standard Electricity Market Design, Docket No. RM01-12-000, Midwest Independent Transmission System Operator, Inc., Docket No. ER10-1791-000 and NorthWestern Corporation, Docket No. ER10-1138-001, et al. I have also filed or presented testimony before the Alberta Utilities Commission, Colorado Public Utilities Commission, Connecticut Department of Public Utility Control, Illinois Commerce Commission, the Indiana Utility Regulatory Commission, the Iowa Utilities Board, the Kentucky Public Service Commission, the Louisiana Public Service Commission, the Michigan Public Service Commission, the Missouri Public Service Commission, the Montana Public Service Commission, the Council of the City of New Orleans, the Public Utility Commission of Texas, the Wisconsin Public Service Commission and various committees of the Missouri State Legislature. This testimony has been given regarding a wide variety of issues including, but not limited to, ancillary service rates, avoided cost calculations, certification of public convenience and necessity, cost allocation, fuel adjustment clauses, fuel costs, generation interconnection, interruptible rates, market power, market structure, off-system sales, prudency, purchased power costs, resource planning, rate design, retail open access, standby rates, transmission losses, transmission planning and transmission line routing.

I have also participated on behalf of clients in the Southwest Power Pool Congestion Management System Working Group, the Alliance Market Development Advisory Group and several working groups of the Midwest Independent Transmission System Operator, Inc. ("MISO"), including the Congestion Management Working Group and Supply Adequacy Working Group. I am currently an alternate member of the MISO Advisory Committee in the end-use customer sector on behalf

of a group of industrial end-use customers in Illinois. I am also the past Chairman of the Issues/Solutions Subgroup of the MISO Revenue Sufficiency Guarantee ("RSG") Task Force.

In 2009, I completed the University of Wisconsin-Madison High Voltage Direct Current ("HVDC") Transmission course for Planners that was sponsored by MISO. I am a member of the Power and Energy Society ("PES") of the Institute of Electrical and Electronics Engineers ("IEEE").

In addition to our main office in St. Louis, the firm also has branch offices in Phoenix, Arizona and Corpus Christi, Texas.

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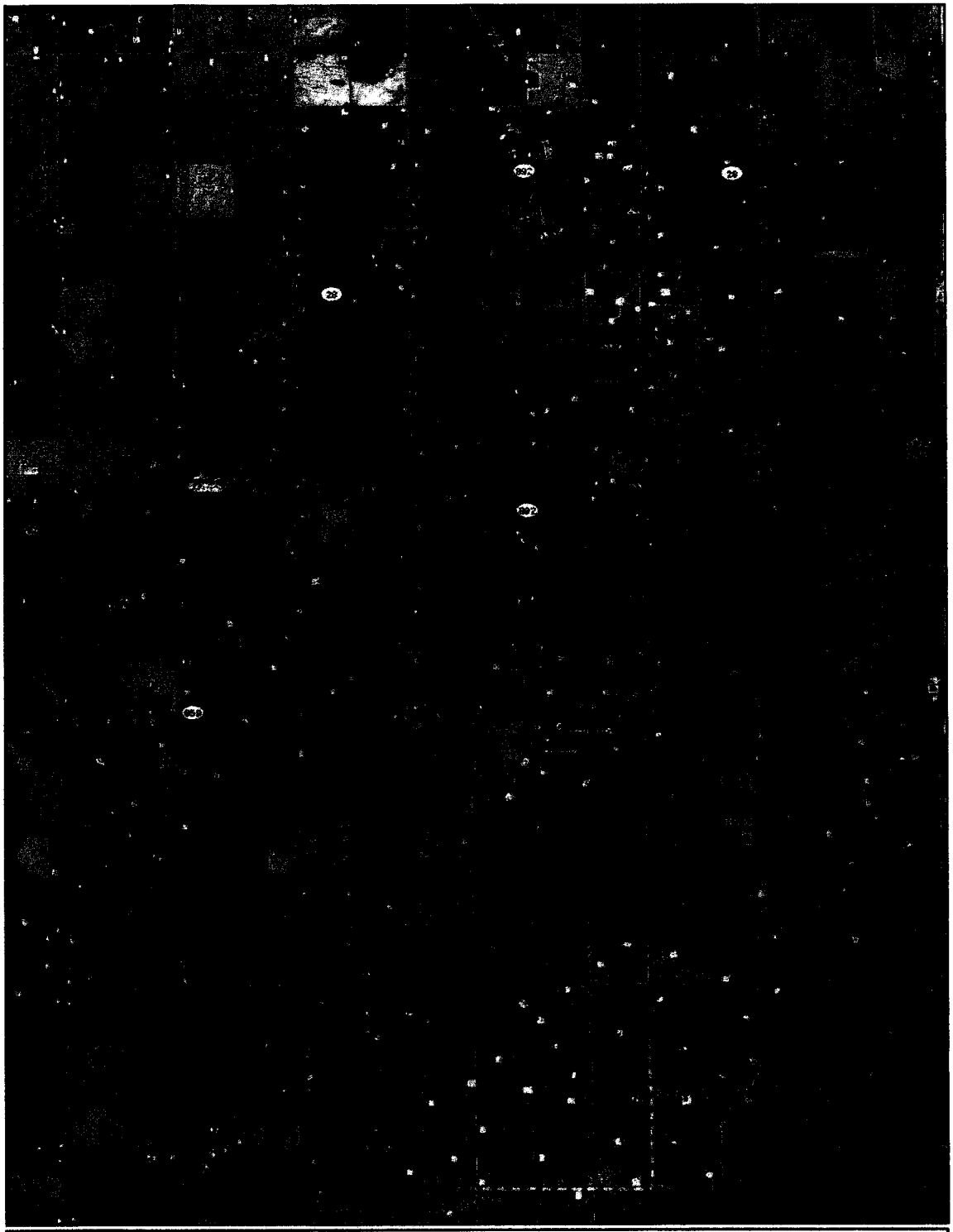
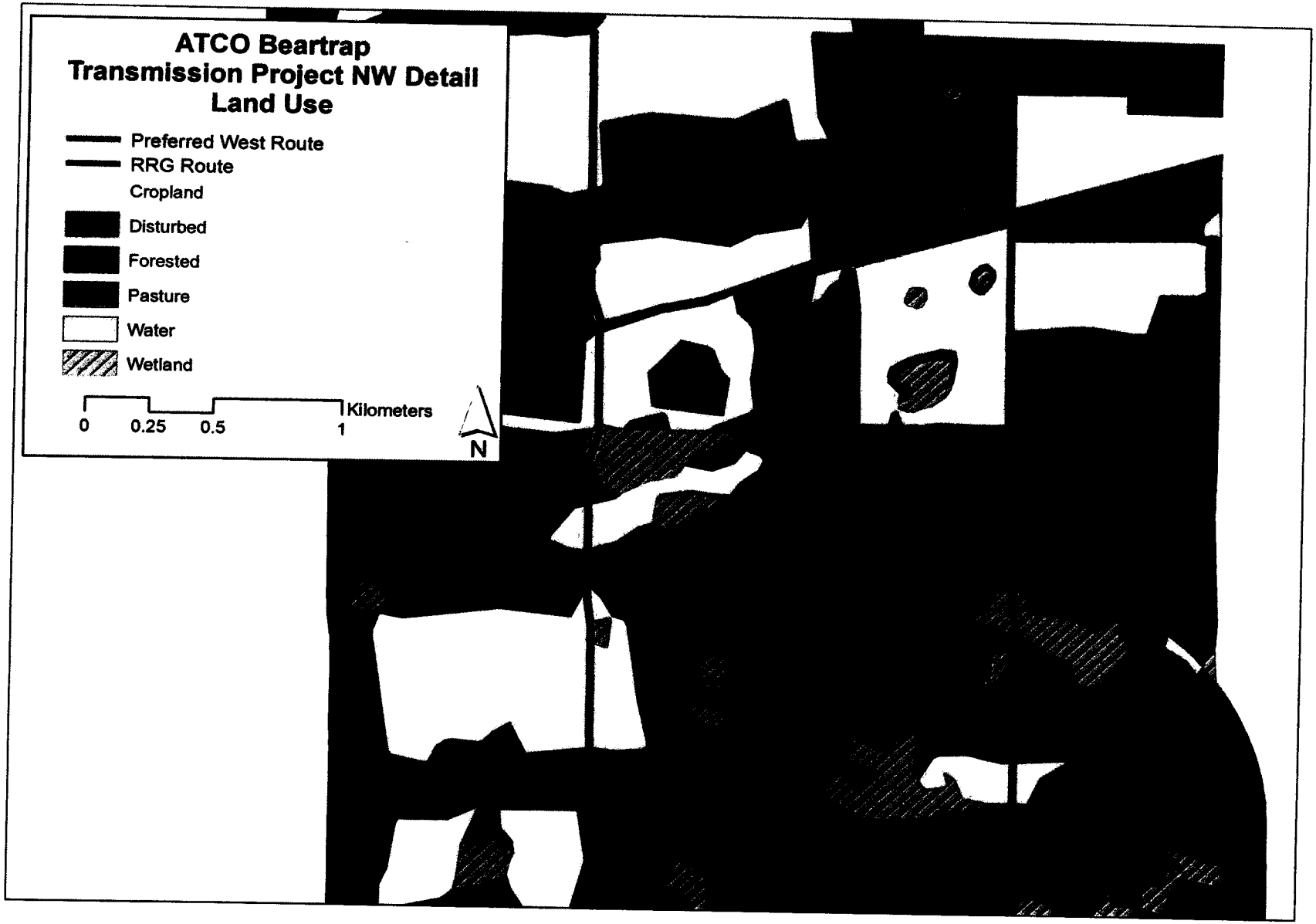
Attachment JRD-1
RRG Route Modification Overlaid on ATCO Attachment 7 Revision 1
Brubaker and Associates, Inc.

ATCO Electric
Application 1609059
Proceeding ID 2196



Attachment JRD-2
Land Use Detail of RRG Route Modification
Brubaker and Associates, Inc.

ATCO Electric
Application 1609059
Proceeding ID 2196



RRG Modified Table 10 : Summary of 7LA24 Route Options

Route Option	Proposed RRG Route	ATCO Proposed		
		Preferred West Route	Alternative East Route	Rejected Central Route
Route Length (km)	16.3	17.9	23.6	19.6
Area of ROW (ha)	29.4	32.3	42.5	35.4
Number of Major Turns (>15°)	12	13	16	9
Quarter/Section Line (km)	8.5	10.1	10.9	14
Cross Country (km)	0.03	0.03	2.1	2.5
Adjacent Access (including road crossings) - (km)	6.2	7.8	10.6	3.1
Distance to nearest occupied Residence (km)	0.09	0.09	0.08	0.06
Residences within ≤ 150 m of Right-of-Way	1	1	2	2
Residences within ≤ 800 m of Right-of-Way	24	21	10	24
Landowners & Occupants on ROW with Objections	N/A	10	3	4 (preliminary results)
Landowners & Occupants within 800m with Objections	N/A	18	7	9 (preliminary results)
Number of Pipeline Crossings on Centerline	N/A	39	24	17
Cultivated (ha)	2.7	4.2	8.9	1.5
Cross-Cultivated (ha)	1	1	0	0.4
Pasture (ha)	17.2	18.9	17.1	16.3
Tree Clearing (ha)	2.8	1.9	11.4	12.7
Wetlands & Waterbodies (ha)	2.1	2.6	3.9	3.7
Length of Line (km) within Crown land	4.2	4.2	9	7.4
Line Cost Estimates (million $)	$9.7	$10.5	$13.0	$11.5