



Control Number: 51023



Item Number: 504

Addendum StartPage: 0

SOAH DOCKET NO. 473-21-0247  
PUC DOCKET NO. 51023



APPLICATION OF THE CITY OF  
SAN ANTONIO ACTING BY AND  
THROUGH THE CITY PUBLIC  
SERVICE BOARD (CPS ENERGY)  
TO AMEND ITS CERTIFICATE OF  
CONVENIENCE AND NECESSITY  
FOR THE PROPOSED SCENIC  
LOOP 138-KV TRANSMISSION  
LINE IN BEXAR COUNTY

§  
§  
§  
§  
§  
§  
§  
§  
§

BEFORE THE STATE OFFICE  
  
OF  
  
ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY OF MARK TURNBOUGH, PHD  
ON BEHALF OF BEXAR RANCH, L.P.

Mark Turnbough, PhD, files this, his Direct Testimony, on behalf of Intervenor BEXAR RANCH, L.P., and stipulates that all parties may treat this Direct Testimony as though filed under oath.

Respectfully submitted,

SPIVEY VALENCIANO, PLLC  
McAllister Plaza – Suite 130  
9601 McAllister Freeway  
San Antonio, Texas 78216  
Telephone: (210) 787-4654  
Facsimile: (210) 201-8178

By: 

James K. Spivey  
[jkspivey@svtxlaw.com](mailto:jkspivey@svtxlaw.com)  
State Bar No. 00794680  
Soledad M. Valenciano  
State Bar No. 24056463  
[svalenciano@svtxlaw.com](mailto:svalenciano@svtxlaw.com)

ATTORNEYS BEXAR RANCH, L.P.

**CERTIFICATE OF SERVICE**

I hereby certify that the foregoing document has been filed in the records of Docket 51023 on this 17th day of February, 2021.

  
\_\_\_\_\_  
Soledad M. Valenciano

1 **PLEASE STATE YOUR NAME FOR THE RECORD.**

2 My name is Vince Terracina.

3 **ON WHOSE BEHALF ARE YOU PROVIDING DIRECT TESTIMONY?**

4 Intervenor, Bexar Ranch, L.P.

5 **WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

6 The purpose of my testimony is to state Bexar Ranch's opposition to Segments  
7 43, 44 and 45, all of which are proposed to run across Bexar Ranch.

8 **DO YOU OPPOSE ANY OTHER SEGMENTS?**

9 Yes, those that tie in to Segments 43, 44 and 45.

10 **DO YOU ALSO INCORPORATE THE DIRECT TESTIMONY OF MICHAEL W.  
11 BITTER, SARAH A. BITTER AND STEPHEN BITTER IN FULL INTO YOUR  
12 DIRECT TESTIMONY AS THOUGH YOUR OWN?**

13 Yes, I do.

14 **DOE THIS CONCLUDE YOUR TESTIMONY?**

15 Yes. Thank you for the opportunity to provide this testimony.

**PUC DOCKET NO. 51023  
SOAH DOCKET NO. 473-21-0247**

<b>APPLICATION OF THE CITY OF SAN</b>	<b>§</b>	<b>BEFORE THE STATE OFFICE</b>
<b>ANTONIO TO AMEND ITS</b>	<b>§</b>	
<b>CERTIFICATE OF CONVENIENCE</b>	<b>§</b>	
<b>AND NECESSITY FOR THE SCENIC</b>	<b>§</b>	<b>OF</b>
<b>LOOP 138-kV TRANSMISSION LINE</b>	<b>§</b>	
<b>IN BEXAR COUNTY, TEXAS</b>	<b>§</b>	<b>ADMINISTRATIVE HEARINGS</b>

**DIRECT TESTIMONY**  
**OF**  
**MARK TURNBOUGH, PhD**

**ON BEHALF OF**  
**BEXAR RANCH, LP**

**FEBRUARY 17, 2021**

**DIRECT TESTIMONY  
OF  
MARK TURNBOUGH, PhD**

**TABLE OF CONTENTS**

**I. INTRODUCTION .....3**

**II. PURPOSE OF TESTIMONY .....8**

**III. FINDINGS REGARDING CPS / POWER .....12**

**IV. FINDINGS REGARDING ALTERNATIVE ROUTES .....16**

**V. CONCLUSIONS .....24**

**VI. RECOMMENDATION.....25**

**ATTACHMENT**

Attachment MT-1     Resume

**DIRECT TESTIMONY OF  
MARK TURNBOUGH**

**I. INTRODUCTION**

**Q. PLEASE STATE YOUR NAME.**

A. My name is Mark Turnbough.

**Q. WHAT IS YOUR OCCUPATION?**

A. I am an environmental / land use and regulatory consultant.

**Q. ON WHOSE BEHALF ARE YOU PRESENTING TESTIMONY IN THIS PROCEEDING?**

A. I am testifying on behalf of Bexar Ranch, LP.

**Q. PLEASE DESCRIBE THE DISCIPLINARY AREAS IN WHICH YOU PROVIDE CONSULTING SERVICES.**

A. A significant amount of my work deals with site suitability analysis and regulatory permitting. Most of that work is related to land use analysis, facility permitting and compliance, environmental assessment, statistical analysis, regulatory impact assessment, policy analysis, water resource protection, and multi-disciplinary project management. Attachment MT-1 contains my resume.

**Q. HOW LONG HAVE YOU WORKED AS AN ENVIRONMENTAL CONSULTANT?**

A. Thirty-seven years.

**Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL QUALIFICATIONS AS WELL AS YOUR CONSULTING EXPERIENCE.**

A. I received a PhD from Texas Tech University in 1985 in Systems Theory and Environmental Policy. My dissertation focused on environmental resources management. I have undergraduate and master's degrees from Texas Tech in Anthropology/Sociology with a specialization in the statistical analysis of quantitative indicators.

I have had significant participation in well over 170 projects. During the past 37 years, I have participated in the preparation of over 125 technical papers and reports for clients in the public and private sectors. I am a regulatory and systems consultant to Nuclear Waste Partnership, LLC (NWP) which manages the U.S. Department of Energy's (DOE's) Waste Isolation Pilot Plant (WIPP) located in southeastern New Mexico. From 2007 until October 2014, I was also a regulatory consultant to the operator of Los Alamos National Laboratory, Los Alamos National Security, LLC. Beginning in August 2020, I was retained as a regulatory consultant to the U.S. Department of Energy, Environmental Management Division at Los Alamos National Laboratory.



In the mid-1980's I participated in several transmission line projects as an employee of Espey, Huston & Associates in Austin, Texas. I worked with a multi-disciplinary team, including Rob Reed, Charles Jasper, Tom VanZandt, Sandy Hicks, George Vaught, and Wayne Glander, which developed a set of criteria that could be applied to the evaluation of potential impacts that would result from placement of an electric transmission line in any given location. These criteria included land use impact variables, environmental impact variables, archaeological/historical impact variables, competing electrical infrastructure variables, and aesthetics considerations. These criteria were adapted from environmental impact assessments conducted by Espey Huston teams for various projects. They pre-date the establishment of statutory requirements in PURA and the current P.U.C. Substantive Rule for siting electric transmission lines. However, variations of these original criteria are widely used today as a means for evaluating compliance with PURA and the P.U.C. Substantive Rule. Some of the individuals on that original team have continued to do work in this area.

From 2004 to the present, I have been retained to evaluate proposed transmission line projects in 24 PUC cases including the one pending in this matter. (PUC Docket Numbers 29684, 37448, 38140, 38230, 38324, 38597, 38877, 40319, 40728, 41756, 41718, 42087, 42729, 43599, 43878, 44837, 46234, 48358, 48785, 48625, 50410, 50812, 50830, and 51023) In a relatively recent case, PUC Docket No. 44837, which involved an AEP application to route a 345-kV electric transmission line in south central Texas across remnants of the Coastal Prairie, the ALJs and the PUC cited my testimony as a

basis for selecting an alternative route other than the one proposed by AEP and Power Engineers.

I continue to be very active in site selection, site suitability analysis and related land use analyses for complex non-linear siting efforts. For example, in 2006 I was selected by the French nuclear power company AREVA and the Washington Group International (now known as AECOM URS) to manage the characterization of and selection of a site for the U.S. Department of Energy's Global Nuclear Energy Partnership (GNEP) that would be suitable for a Consolidated Interim Storage Facility for High Level Radioactive Waste, a Spent Fuel Reprocessing Facility and a Next Generation Nuclear Reactor. A suitable "greenfield" site was selected and fully characterized for the GNEP in southeastern New Mexico. It received the highest level of DOE funding for any of the alternatives under consideration.

Beginning in March of 2011, I was heavily involved as the senior regulatory adviser in the re-permitting of the DOE Waste Isolation Pilot Plant (WIPP), located roughly halfway between Carlsbad and Hobbs, New Mexico. It is the only deep geologic repository for Defense Related Transuranic Waste in the world.

In January of 2012, I was retained by the New Mexico State Land Commission as an expert witness for the Commission in a contamination remediation and ranch land restoration case (Ray Powell, Commissioner of Public Lands of the State of New Mexico

vs. Equity Investments Corp, et al (No. D-101-CV-2011-01285, First Judicial District Court, State of New Mexico)).

In April of 2014, I was selected by AECOM URS, Babcock & Wilcox and AREVA to be on a six-person team to review and provide guidance on the Recovery Plan of the DOE WIPP. The facility was shut down in February of 2014 by a radiation leak caused by a drum sent by Los Alamos National Laboratory for disposal. The WIPP was officially re-opened for disposal operations in January of 2017.

From 1991 to the present, I have managed or had a major role in the permitting of over 70 percent of the total disposal capacity of Sub-Title D facilities for solid waste in the state of New Mexico. In that context, my work consists of assisting applicants in locating suitable sites, securing regulatory approval of those projects, and then maintaining compliance with applicable regulatory frameworks.

I managed the application process for the first “Rule 36” facility permitted by the New Mexico Oil Conservation Division (OCD) for the processing and disposal of waste generated by the exploration for and production (E&P) of oil and gas. The permit was issued in December of 2014, and it is the first full-service facility permitted under the Division’s “new” rule which was promulgated in 2008. Presently, I am managing the application processes for several other OCD Rule 36 E&P disposal facilities and several water rights acquisition projects in southeastern New Mexico.

In April 2019, I was retained by the Edwards Aquifer Authority (EAA) to provide technical and regulatory expertise in the development of an extensive land use and socioeconomic data base for Bexar, Medina and Uvalde Counties.

Currently I am managing the site suitability analysis and permitting of a large multipurpose recycling and industrial solid waste disposal facility for Enviro Lands, LLC near Albuquerque, New Mexico.

## **II. PURPOSE OF TESTIMONY**

### **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

**A.** The purpose of my testimony is to provide an evaluation of the methodology, findings, and recommendations of the City of San Antonio CPS Energy (CPS) based on the Environmental Assessment and Routing Study (EA) conducted by POWER Engineers (POWER), as amended, for a proposed 138-kV Transmission Line Project (Scenic Loop Transmission Line) in Bexar County, Texas. The purpose of the project is to construct one new substation (Scenic Loop Substation) and a new double circuit 138-kV transmission line that would connect the new substation to the electric grid from CPS's existing Ranchtown to Menger Creek 138-kV transmission line. The new Scenic Loop Substation is proposed to be located near the intersection of Scenic Loop Road and Toutant Beauregard Road. The new transmission line will be approximately 4.6 to 6.9 miles in length given the alternative route selected for construction.

In general, my scope of work in this case focuses on an evaluation of alternative routes identified by POWER for consideration under PURA and the PUC Substantive Rule.

My analysis is based on data provided in the CPS Application, as amended, and POWER's EA, as amended, evaluating the impacts associated with the development of the proposed transmission line and the qualities of each alternative route as they relate to criteria established by statute and Public Utility Commission (PUC) rules. My references to the Application and the EA are intended to include and should be understood to include the amendments made to date, unless otherwise stated, including amendments to the alternative routes and related data tables. As a result, I evaluate proposed alternative routes in terms of the relevant statutory and regulatory parameters and in terms of how well each route would serve the established need supporting development of the transmission line. My background in systems engineering, regulatory consulting, and other multi-disciplinary fields supporting the analysis of specific land uses is applicable to much of the work that goes into these kinds of projects.

**Q. WAS YOUR TESTIMONY AND SUPPORTING DOCUMENTATION PREPARED BY YOU OR UNDER YOUR SUPERVISION?**

**A. Yes.**

**Q. IS THE INFORMATION CONTAINED IN YOUR TESTIMONY AND THE SUPPORTING DOCUMENTATION TRUE AND CORRECT TO THE BEST OF YOUR KNOWLEDGE AND BELIEF?**

A. Yes.

**Q. WHY DID YOU PREPARE AN EVALUATION OF THE POWER EA AND CPS SELECTION OF ROUTE Z1, FORMERLY KNOWN AS ROUTE Z, AS THE ROUTE THAT THEY BELIEVE BEST ADDRESSES THE REQUIREMENTS OF PURA AND THE PUC SUBSTANTIVE RULE FOR THIS PROJECT?**

A. Actually, as stated in the question, CPS selected Route Z. However, in its Amended Filing, CPS replaced Route Z with Route Z1. To my knowledge, CPS has not actually stated that it has selected Route Z1 as the route that best meets the requirements of PURA and the PUC Substantive Rule, however, it is apparent that CPS fully replaced Route Z with Route Z1, and that Z1 is an improvement over Route Z. To that end, my testimony addresses and refers to only Route Z1, where appropriate. Jim Spivey and Soledad Valenciano with the firm Spivey Valenciano PLLC retained me on behalf of Bexar Ranch, LP to evaluate the methods and the results of the EA used by CPS to select Route Z1 as the route that is thought to best meet the requirements of PURA and the PUC Substantive Rule. In addition, I was asked to evaluate the potential land use and environmental impacts of the remaining primary alternative routes in order to determine if potentially more suitable alternative routes could be identified from within the larger set of alternative routes. I was also asked to evaluate the application of POWER's criteria in the generation of those alternative routes within the study area.

**Q. PLEASE DESCRIBE THE STEPS TAKEN TO PREPARE YOUR EVALUATION.**

A. I took the following steps:

- The first task was to review applicable statutory and regulatory requirements for development of suitable routes.
- The second task was to review CPS's initial and amended CCN Application in this proceeding, including the initial and amended EA prepared by POWER.
- The third task was to review CPS / POWER initial and supplemented testimony in support of the CCN that would help me understand CPS's decision to select Route Z1.
- The fourth task involved the evaluation of the validity of selected aspects including scoping issues for the EA, the analysis that was reported in the EA, and the Applicant's responses to requests for information from other parties, including the Applicant's recent responses to Intervenor Lisa Chandler's Request for Information regarding proposed Route AA2
- The fifth task involved review of testimony and comments provided by interested parties regarding the decision by CPS to select Route Z1, including the Texas Parks & Wildlife Department (TP&WD) comments dated September 10, 2020 regarding Route Z.
- Given the information I gathered from the preceding steps, I evaluated the potential impact (in terms of requirements contained in PURA and the PUC Substantive Rule) on the areas affected by the proposed placement of Route Z1.

- On October 14, 2020, I conducted a general reconnaissance of the Scenic Loop study area. Subsequently, on October 15, 2020, I conducted a site specific reconnaissance of the Bexar Ranch.

### **III. FINDINGS REGARDING CPS / POWER EA**

**Q. PLEASE DESCRIBE THE BASIS OF AND METHODOLOGY DEVELOPED FOR CONDUCTING THE EVALUATION OF THE EA.**

**A.** The primary basis for evaluating the EA was a review of the aerial photography, mapping, and examination of data collected for the 48 siting criteria used in POWER's Environmental and Land Use Data for Route Evaluation and Environmental and Land Use Data for Segment Evaluation, Tables 4-1 and 4-2 in Attachment 2 and Table 1 Transmission and Substation Facilities Total Estimated Costs in Attachment 3. I also reviewed documentation (Mapping and Tabular Descriptions) of Habitable Structures within 300 feet of the centerline of proposed alternative routes (Tables 4-6 through 4-34 as amended). Further, I reviewed the narrative in the POWER EA that sets forth the basis for identifying Routes they believe meet the requirements of PURA and the PUC Substantive Rule. As stated previously, this included review of any amendments.

Using those data, I compared the land use, aesthetic, ecology, and cultural resources attributes for the proposed alternative routes.



**Q. WHAT SPECIFIC CRITERIA DID THE POWER EA USE TO DETERMINE THE ROUTES THAT BEST MEET THE REQUIREMENTS OF PURA AND THE PUC SUBSTANTIVE RULE?**

A. As indicated above, POWER used 48 criteria in order to provide comparisons of the alternative routes. In many respects, these criteria systematically quantify the broader requirements of the PUC Substantive Rule and PURA. For example, they estimate total length of the proposed alternative routes which roughly correlates to cost, if topographic characteristics along the proposed alignments are not significant and other geotechnical issues are unremarkable. Depending on the fact pattern in a given study area, it is not unreasonable to assume that arguments for the protection of vulnerable ecological and cultural resources and local land uses can be compatible with objectives expressed by utilities for selecting routes that may be shorter and less expensive than some of the alternatives.

In this case, it can be argued that protecting predominantly rural land uses, environmental resources, aesthetics, and cultural resources that characterize the overall study area correspond with a reasoned argument for selecting one of the shortest and least expensive routes.

Based on my analysis of the routes delineated in the study area, the selection of Route Z1 by the applicant as the route that best addresses the requirements of PURA and the PUC Substantive Rule can be supported by the data and my working knowledge of the area. I also think that Route AA1 recommended in the TP&WD comment dated

September 10, 2020 is highly suitable if Z1 was not approved by the Commission. It should be noted here that Route AA was replaced by AA1 in the Amended CPS Filing. TP&WD has not indicated that it supports Route AA1. However, given the similarity of the two routes in terms of ecological and resource protection issues and the addition of donated land, I am assuming that the agency will likely support AA1. To that end, the remainder of my testimony will address and refer to Route AA1, when appropriate.

**Q. PLEASE DESCRIBE THE GENERAL CHARACTERISTICS OF THE SCENIC LOOP STUDY AREA.**

A. The study area for the proposed CPS Project is a roughly rectangular shaped polygon located in the northwest quadrant of Bexar County, Texas. The study area runs approximately 5.2 miles (along the north / south axis) and approximately 6.1 miles (along the east / west axis). The study area is large enough to accommodate the identification of geographically diverse routes proposed to connect the existing project end points. The study area appears to have been defined in order to utilize existing transmission lines, highways, county roads, and apparent property lines as well as existing land uses and cultural features in order to provide for an adequate number and distribution of primary alternative routes. The analysis conducted by POWER provides for the final delineation of 31 alternative routes composed of 49 segments. The analysis provides more than adequate geographic distribution of segments / routes along meaningful land use boundaries and features in the area. There is, however, evidence of potentially significant fragmentation of a large amount of open space in the southwestern corner of the study area.

The study area is located mainly outside the city limits of San Antonio. Land use patterns within the study area are primarily suburban developments that are encroaching on remaining rural woodlands, pastureland, and rangeland. A notable exception is the unfragmented upland woodlands concentrated in the southwest corner of the study area. There, for example, are large forested areas with diverse stands of Ash Juniper and deciduous trees.

According to studies reported in the POWER EA, the study area is located in a transitional zone that separates the Balcones-Blackland Prairies from the Edwards Plateau physiographic regions of the state. The regional topography consists of relatively flat surfaces at higher elevations that have been incised by drainage features that have evolved into large arroyos and even some significant canyon structures.

Typically, elevations for the Edwards Plateau range from approximately 3,000 feet in the western and northern reaches to approximately 450 feet above sea level in the southeastern reaches. With regard to the study area, itself, elevations range between approximately 1,400 feet in the northwestern portion to slightly more than approximately 1,250 feet in the southeastern portion.

According to data reported in the EA, surficial units in the area essentially are comprised of gravelly clay loam, silty to cobbly clays, and a variety of rock outcrop associations.

According to the EA, land use in the study area is characterized by primarily suburban land use patterns except for interspersed rural areas that tend toward lower density tracts in the southwest corner of the study area. According to data reported in the EA, the amount of prime farm land in the study area is negligible.

#### **IV. FINDINGS REGARDING ALTERNATIVE ROUTES**

**Q. IN YOUR ANALYSIS DID YOU COMPARE OTHER ALTERNATIVE ROUTES TO ROUTE Z1 IDENTIFIED BY CPS / POWER?**

**A.** Yes.

**Q. WOULD YOU PLEASE DESCRIBE THAT COMPARISON?**

**A.** With regard to CPS selection of Route Z1 as the route that best addresses the requirements of PURA and the PUC Substantive Rule, I compared all 31 alternative routes and the recently reported Route AA2 using the 48 criteria applied by POWER, and using considerations unique to the CPS cost analysis. Generally, the results of my analysis concur with the applicant's and their contractor's assessment that all 31 alternative routes meet the requirements of PURA and the PUC Substantive.

#### **LAND USE, AESTHETICS, ECOLOGICAL AND CULTURAL RESOURCES CONSIDERATIONS**

More specifically, based on my analysis, Route Z1 is in my opinion the route that best meets the requirements of PURA and the PUC Substantive Rule. Consistent with POWER's EA, my comparative analysis focuses on the following criteria:

- Route Z1 is the shortest route of the 31 alternative routes at 4.53 miles.
- Route Z1 runs parallel to existing compatible rights of way (ROW) including existing public roads and highways, railroads, and apparent property lines for approximately 68 percent of its length. For the remaining alternative routes, the maximum value for running parallel to existing compatible ROW is 83 percent.
- There are 30 habitable structures within 300 feet of the centerline of Route Z1. For the 31 alternative routes, the mean number of habitable structures within 300 feet of the centerline is 34.5, with a median of 34. The standard deviation is 17.1.
- Route Z1 has the third shortest length across upland woodland / brushland at 3.59 acres compared to 3.12 acres for the lowest.
- Route Z1 accounts for a cumulative total of 11.12 acres of ROW across Golden Cheeked Warbler (GCW) (modeled) habitat designated as a 3-Moderate High to 4-High Quality. For all 31 routes the mean is 13.04 acres, and the median is 11.81 acres.
- Route Z1 utilizes proposed Substation Site 7 which has the potential to be shielded from public view.
- Route Z1 is comparable to the alternative routes with regard to impacts on cultural resources in the study area.
- Route Z1 utilizes Segment 42a which has approximately 2,059 feet of ROW that the land owner agreed to donate to CPS if a route utilizing Segment 42a is approved by the Commission. The donated distance represents approximately 8.61 percent of the total length of Route Z1.

- In that context, Route Z1 has the second lowest total estimated cost of the 31 alternative routes at \$38,474,771.

**Q. DID YOU EVALUATE ANY OTHER OF THE 31 ALTERNATIVE ROUTES THAT YOU THOUGHT MIGHT BEST ADDRESS THE REQUIREMENTS OF PURA AND THE P.U.C. SUBSTANTIVE RULE?**

A. Yes. Route AA1.

**Q. WOULD YOU PLEASE EXPLAIN THE BASIS OF YOUR OPINION?**

A. Yes. The basis of my opinion follows:

- Route AA1 is the fifth shortest route of the 31 alternative routes at 4.82 miles.
- Route AA1 runs parallel to existing compatible ROW, including public roads and highways, railroads, and apparent property lines for approximately 56 percent of its length.
- As is the case with Route Z1, there are 30 habitable structures within 300 feet of the centerline of Route AA1.
- Route AA1 has the sixth shortest length across upland woodland / brushland at 3.81 miles.
- Route AA1 accounts for a cumulative total of ROW across GCW habitat designated as 3-Moderate High and 4-High Quality of 9.6 acres. As indicated in the analysis of Route Z1, the mean value for the 31 alternative routes for GCW acreage in this category is 13.04 acres, with a median of 11.81 acres.

- According to TP&WD, Route AA1 is located almost completely within Karst Zone 5, which is defined as cavernous and non-cavernous areas that do not contain endangered Karst invertebrate species.
- Route AA1 is comparable to the alternative routes with regard to potential impacts on cultural resources in the study area.
- Route AA1 utilizes available / donated ROW on Alternative Segments 36, 42a, 46, and 49a which accounts for 32.21 percent of the total length of the route.
- Not surprisingly, Route AA1 has the lowest total estimated cost of the 31 alternative routes at \$38,291,572.

**Q. IN YOUR EVALUATION DID YOU REVIEW THE LETTER DATED SEPTEMBER 10, 2020, FROM THE TEXAS PARKS' AND WILDLIFE DEPARTMENT (TP&WD) TO RACHEL ROBLES, PUC STAFF, RE: FINDINGS AND RECOMMENDATIONS FOR THIS PUC DOCKET NO.?**

**A.** Yes.

**Q. PLEASE SUMMARIZE YOUR REACTION TO THE TP&WD POSITION RE: ROUTE SELECTION IN THIS CASE.**

**A.** TP&WD recommends alternative Route AA1 based on the assertion that it would cause the least adverse impacts to natural resources. Given the relatively significant range of ecological issues identified in the study area, that may be an empirically correct assessment with regard to natural resource protection. Moreover, it is relatively rare to

identify an alternative route that scores well on environmental integrity and is also the least expensive alternative.

**Q. DID YOU ADDRESS THE ISSUE OF FRAGMENTATION IN YOUR ANALYSIS?**

A. Yes.

**Q. HOW DO YOU DEFINE FRAGMENTATION FOR THE PURPOSE OF YOUR ANALYSIS?**

A. In the context of routing electric transmission lines, from a land use perspective, fragmentation can be defined as the placement of large transmission line infrastructure across open space. The Substantive Rule provides a hierarchy of existing features e.g., existing transmission lines, highways, roads, railroads, and even apparent property lines (so called “compatible rights-of-way”) to which new power lines should run parallel. Nowhere in the rule is “Open Space” identified as a suitable criterion for placement of a proposed transmission line. Fragmentation is the consequence of not properly considering criteria in the Substantive Rule for utilizing existing compatible ROW.

**Q. DID YOU FIND EXAMPLES OF FRAGMENTATION IN YOUR REVIEW OF THE PROPOSED ALTERNATIVE ROUTES?**

A. Yes. There are several examples throughout the study area, but the most significant example is in the southwest portion of the study area. The example involves



the proposed placement of Alternative Segments 43, 44, and 45 (refer to POWER EA Figure 2.3 Primary Alternative Segments and Attachment 6, Sheets 10, 11, 14, and 15). The three segments run roughly sub-parallel to each other east / west across tract F-006 (the Bexar Ranch) for approximately 2.05, 1.98, and 1.68 miles, respectively.

Segments 43 and 44 fragment parcel F-006 for their entire length. Segment 45 fragments F-006 for approximately 66 percent of its total length. Approximately 30 percent of Segment 43 runs parallel to an apparent property line. The remaining 70 percent diverges without any apparent rationale from the property line which marks the northern boundary of F-006 in a straight east / west line. Inspection of mapping and aerial photography in the POWER EA indicates that with the exception of the 30 percent of Segment 43 noted above, none of the remaining 5.1 miles of Segments 43, 44, and 45 that fragment F-006 follow any defensible compatible ROW.

POWER Table 4-2, Amended, for Criterion Number 7, "Sum of evaluation criteria 4, 5 and 6" (Length of ROW parallel and adjacent to (4) existing transmission line ROW; (5) Length of ROW parallel and adjacent to other existing ROW; and (6) Length of ROW parallel and adjacent to apparent property lines) reports that Segment 43 has a length of 1.50 miles, Segment 44 has a length of 1.39 miles, and Segment 45 has a length of 1.20 miles.

Based on a reconnaissance of the Ranch, proposed changes to those values for Criterion Number 7 are suggested in the following: Segment 43 should have a length of

approximately 0.65 miles as opposed to 1.50 miles. The only compatible ROW for Segment 43 is 0.65 miles where it parallels the north property line. Segment 44 should have a length of 0 miles as opposed to 1.39 miles. There is no compatible ROW parallel or adjacent to the entire length of Segment 44. Segment 45 has a length of 1.20 miles. It is unlikely that Segment 45 has a Criterion Number 7 combined length of 1.20 miles. None of it is evident on the portion that crosses the Bexar Ranch. Because only 0.90 miles of Segment 45 is located outside of the Ranch property, it is unlikely that it could have a combined length of 1.20 miles.

Segments 44 and 45 run roughly parallel, but not necessarily adjacent to very rugged “two-track” roads on the Ranch. These two-track roads are not public roads. In fact, they are not available to the public. They cannot be confused with apparent property lines. Moreover, they are not anything else. Consequently, they are not compatible ROW. It follows that there is no basis for the alignment of Segment 44 or for the western portion of Segment 45 on the Ranch. Along with 70 percent of Segment 43, Segments 44 and 45 are, however, obvious examples of fragmentation. Segment 44 literally bisects the portion of the Ranch that is located inside the Study Area. In fragmenting the property so severely, Segment 44 offers a panoramic view of the transmission line from all angles, including from the family headquarters.

Segment 43 departs from the northern property line and runs east / west in a “V” shaped pattern diagonally across / sub-parallel to a scenic valley and then climbs to some of the highest wooded outcrops on the Ranch. The negative land use and aesthetic

impacts of this segment and Segment 45 are significant. Segment 45 runs across and sub-parallel to scenic bottom lands, draws, and creeks. Seventy percent of Segment 43, all of Segment 44, and 66 percent of Segment 45 do not have any comparable or compatible ROW to justify their respective alignments across the Bexar Ranch.

One of the more significant ecological consequences of the fragmentation caused by the three proposed segments is the damage to Moderate / High Quality Habitat for Golden Cheeked Warblers (GCW) on the ranch. According to data reported in POWER EA Tables 4-1 and 4-2, Amended, the combined acreage of modeled habitat for GCW designated as 3-Moderate High and 4-High Quality that would be crossed by proposed Segments 43, 44, and 45 on the Bexar Ranch total nearly 20 acres (19.85 acres). If those three segments constituted an entire route in this case, they would cross the sixth largest quantity of acreage of all 31 alternative routes. It should be noted that the GCW data in Tables 4-1 and 4-2 come from Model C reported in the Diamond Report (Footnote 8, Tables 4-1 and 4-2). It should also be noted that the four preferred models (B, C, D, and L) featured in the study show a relatively high level of agreement on the extensive presence of Moderate to High Quality GCW Habitat on the Bexar Ranch, both north and south of the southern Study Area boundary.

In terms of general agreement reported among experts who participated, or were cited, in the Diamond Study, there were two strongly supported hypotheses: one is that larger patch size of Moderate to High Quality GCW Habitat is better than smaller patch size; and the other related hypothesis is that the less fragmentation of those patches the

better the sustained quality of the habitat. There is modeled evidence that the Bexar Ranch has significant coverage and density of Moderate to High Quality GCW Habitat. The task at hand is to minimize the potential to fragment that habitat by not selecting any of the Alternative Segments 43, 44, or 45 that would essentially bisect the north, central, or southern reaches of the Ranch.

**Q. IN YOUR OPINION, WHICH OF THE ALTERNATIVE ROUTES BEST MEET THE REQUIREMENTS OF PURA AND THE PUC SUBSTANTIVE RULE?**

A. Based on my review of the CPS CCN Application, the POWER EA, and supporting testimony regarding characteristics of the 31 alternative routes and the recently tabulated Route AA2, I concur with their selection of Route Z1 as the alternative that best meets the requirements of PURA and the PUC Substantive Rule. Also, based on my analysis, I think that Route AA1 is first among equals in the remaining set of 30 alternative routes. If Z1 was not approved by the Commission, Route AA1 would be an appropriate replacement.

**V. CONCLUSIONS**

**Q. WHAT CONCLUSIONS HAVE YOU DRAWN FROM YOUR ANALYSIS?**

A. Based on my review of the CPS Application for an Amended CCN and the supporting documents provided by POWER in the EA, as amended, there is adequate information to reach an informed conclusion regarding the suitability of the alternative segments and the alternative routes. The study area is sufficiently large to accommodate

the delineation of a geographically reasonable distribution of alternative routes for connecting the Project end points. There are systematic comparisons of the primary alternative routes across 48 land use, aesthetics, ecology, and cultural resource variables. These comparisons indicate that all of the alternative routes meet the requirements of PURA and the PUC Substantive Rule. Consideration of those variables make it possible to identify Route Z1 as relatively more likely to best meet the requirements of PURA and the PUC Substantive Rule.

## **VI. RECOMMENDATION**

**Q. WHAT IS YOUR RECOMMENDATION TO THE ALJS AND THE COMMISSION WITH REGARD TO THE SELECTION OF ROUTE Z1?**

**A.** It is my recommendation that the ALJs and the PUC adopt Route Z1 as the route that best meets the requirements of PURA and the PUC Substantive Rule.

## RESUMÉ

**MARK W. TURNBOUGH, PhD**

February 2021

**General Background:** Includes advanced multi-disciplinary education, training and experience in the analysis and synthesis of complex systems, environmental policy, technology assessment, statistical research, land-use analysis/socio-economics/demography, legislative analysis/bill drafting, drafting of regulatory language and preparation of complex permit applications for critical facilities.

**Consulting Experience:** Primary areas of activity include regulatory permitting/compliance monitoring, systems analysis, management of technical negotiations for legal/regulatory settlements, environmental impact assessment, site suitability analysis, site selection, site characterization, analysis of land uses, site remediation/restoration analysis, statistical research and computer applications, including Geographic Information Systems and Inductive Statistical Models.

### **Synopsis of Selected Consulting Activity (1984-2020):**

(For complete project/work history, see Page 12, **Experience** section)

Note: All of the activities described in this section that include reference to a Texas Public Utilities Commission (PUC) Docket Number typically require my expert testimony (regarding the results of my research and analysis) in a contested case hearing presided over by a panel of Administrative Law Judges

In October of 2020 was retained by the law firm of Luce Evans on behalf of Crooked Creek, Inc. to evaluate the environmental and land use impacts of the proposed Rayburn Country Electric Cooperative, Inc. 138-kV transmission line (New Hope Project) in Collin County, Texas PUC Docket Number 50812.

In August of 2020 was retained by the U.S. Department of Energy, Environmental Management Division at Los Alamos National Laboratory to provide regulatory consulting re: Legacy Waste Cleanup on the inactive Technical Areas located on the LANL compound.

In August of 2020 was retained by the law firm of Brady & Hamilton, LLP on behalf of undisclosed clients to evaluate the environmental and land use impacts of the proposed Wind Energy Transmission Texas, LLC and ONCOR Electric Delivery Company, LLC 345-kV transmission line for the Bearkat Switching Station to Longhorn Switching Station in Glasscock and Howard Counties, Texas PUC Docket Number 50410

In August of 2020 was retained by the law firm of Spivey Valenciano, PLLC on behalf of Bexar Ranch, LP to evaluate the environmental and land use impacts of the proposed CPS Energy 138-kV Scenic Loop Transmission Line in Bexar County, Texas PUC Docket Number 51023.

In July of 2020 was retained by the law firm of Spivey Valenciano, PLLC on behalf of James F. Benedict, Janice Benedict, Marion C. Henegar, PML Holdings LLC, Perry Little, Marika Little, Jared Brumme, Colleen Brumme, Mark Pearson, Amy Pearson, The Flor Maria Loya Trust, and Flor Maria Loya, Trustee to evaluate the environmental and land use impacts of a proposed Guadalupe Valley Electric Cooperative, Inc 138-Kv Transmission Line in Caldwell and Gonzales Counties, Texas (Delhi to Bluestem 138 -kV Transmission Line) PUC Docket Number 50830.

In March of 2019 was retained by the law firm of Brady & Hamilton on behalf of undisclosed clients to evaluate the environmental and land use impacts of the proposed Sharyland Utilities and City of Lubbock acting by and through Lubbock Power and Light Wadsworth to New Oliver to Farmland 345-Kv transmission line in Lubbock and Lynn Counties, Texas and the proposed Southeast to New Oliver to Oliver 115-kV transmission line in Lubbock County, Texas PUC Docket Number 48909.

In December of 2018 was retained by the law firm of Brady & Hamilton, LLP on behalf of David Pinkerton et.al and Route 19 Proponents to evaluate the environmental and land use impacts of a proposed Sharyland Utilities L.P. and City of Lubbock Acting by and Through Lubbock Power and Light 345 -kV transmission line in Castro, Hale and Swisher Counties, Texas (Ogallala to Abernathy) PUC Docket No. 48625.

In December of 2018 was retained by the law firm of Spivey Valenciano, PLLC on behalf of MM Smithfield Family Limited Partnership, LTD., and Pettus Czar, LTD. to evaluate the environmental and land use impacts of a proposed ONCOR Electric Delivery Company, LLC, AEP Texas Inc, and LCRA Transmission Services Corporation 345-kV electric transmission line in Pecos, Reeves, and Ward Counties, Texas (Sand Lake to Solstice and Bakersfield to Solstice Project). PUC Consolidated Docket No. 48785.

In August of 2018 was retained by the law firm of Burdett Morgan Williamson & Boykin on behalf of The Eastern Coalition to evaluate the environmental and land use impacts of a proposed LCRA Transmission Services Corporation 138-kV electric transmission line in Burleson County, Texas (Cooks Point Project). PUC Docket No. 48358.

In March of 2018 was retained by Kemp Smith Law Firm to provide technical expertise in support of Edwards Aquifer Authority litigation (Uvalde County Underground Water Conservation District, Uvalde County, City of Uvalde, et al. v. Edwards Aquifer Authority) re: complex water rights re-distribution policy.

In January of 2018 was retained by Lea Land Industrial Landfill (located at Halfway, New Mexico) to recruit and manage a multi-disciplinary team to develop an application for a major modification

to the New Mexico Oil Conservation Division in order to triple the solid waste disposal capacity for Oil and Gas Exploration and Production wastes and to develop a state of the art large volume liquids recycling facility.

In May of 2017 was retained by Enviro Lands, LLC to identify and characterize a suitable site west of the City of Albuquerque, NM that could be permitted as a full service solid waste recycling and disposal facility under the Solid Waste Management Regulations of the New Mexico Environment Department.

In November of 2017 was retained by Straten Realty, L.L.C. (Joe Will Ross Attorney at Law) to evaluate the environmental and land use impacts of a Joint Application of AEP Texas North Company and Electric Transmission Texas, L.L.C. for the proposed AEP TNC Heartland to ETT Yellow-Jacket 138-kV Transmission Line in McColloch and Menard Counties, Texas (PUC Docket No. 46234).

In November of 2016 was retained by Synergy Medwaste, L.L.C. to provide systems and regulatory support for EPA Region 6 authorization to test and operate a high temperature pyrolysis system to treat medical waste at a location on the Nambe Pueblo near Santa Fe, New Mexico.

In September of 2016 was retained by VJ Technologies, L.L.C. to provide systems and regulatory support for the development of an integrated real time radiography inspection, remediation and re-packaging unit for managing containers of mixed Transuranic Waste that have the potential for hazardous waste incompatibility problems. **This project was initiated in order to address the Los Alamos National Laboratory (LANL) Trans-Uranic Waste shipped to WCS which was subsequently isolated in concrete modular canisters and re-located to the federal disposal cell for safe keeping until it could be further characterized and treated on-site.**

In January 2016 was retained by Pitchfork Landfarm, L.L.C. to coordinate an assessment of potential contamination, and the development of a final closure plan for the facility located in south east Lea County, New Mexico under New Mexico Oil Conservation Rule 36.

In August of 2015 was retained by Braun and Gresham Attorneys at Law to evaluate the environmental and land use impacts of an AEP Texas Central Company Proposed Tuleta to Euler to Coleta Creek 138-kV Double Circuit Electric Transmission Line in Bee and Goliad Counties, Texas (PUC Docket No. 44837). Both the SOAH Administrative Law Judges and the PUC cited my testimony as a basis for requiring the Utility to adopt an alternative route recommended in my testimony.

In May of 2015 was retained by TVG Texas 1, LLC (Windsong Ranch Development) to evaluate the environmental and land use impacts of a proposed Brazos Electric Power Cooperative Parvin Substation and 138-kV Double Circuit Transmission Line in Collin and Denton Counties, Texas (PUC Docket No. 43878).

In May of 2015 was retained by Ewell, Brown and Blanke on behalf of Chuck Norris to evaluate



the environmental and land use impacts of a proposed Centerpoint Energy 345-kV Transmission Line in Grimes, Harris and Waller Counties, Texas (PUC Docket 44547).

In February of 2015 was retained by CK Oilfield Services to conduct site suitability- site selection studies to identify land in south east New Mexico that is suitable for permitting under NMOCD Rule 36 a surface disposal facility for the treatment and disposal of oil and gas exploration waste.

In November of 2014 was retained by Brady & Hamilton to evaluate the environmental and land use impacts of a proposed Southwestern Public Service Company 240-kV Transmission Line from Wolfforth to Carlisle in Lubbock County, Texas (PUC Docket No. 42727).

In July 2014 was retained by the FFPTHC Alliance to evaluate the environmental and land use impacts of a set of routes for a 138-kV electric transmission line proposed by the Lower Colorado River Authority (LCRA TSC) in, Blanco, Gillespie, and Kendall Counties, Texas (PUC Docket No. 43599) Case was not heard on the SOAH Docket until May 2015.

In April 2014 was selected by URS, Inc., B & W, Inc., and AREVA to be on a six person executive team to review and provide technical and regulatory guidance for the development of the Recovery Plan for the U.S. Department of Energy Waste Isolation Pilot Plant. The facility was shut down in February of 2014 by a radiation leak in the underground repository.

In March of 2014 was retained by the City of Haslet, Texas and the Blue Mound Alliance to evaluate the environmental and land use impacts of a set of routes for a 138-kv electric transmission line proposed by ONCOR Electric Delivery Company in Denton, Tarrant and Wise Counties, Texas, PUC Docket No. 42087.

In February of 2014, was retained by Braun & Gresham, PLLC on behalf of Ray Audas, et al., Four S Investments, Henry Bethea and Jeff and Peggy Fye to evaluate an electric transmission line proposed by Entergy Texas, Inc. in Grimes and Montgomery Counties, Texas, PUC Docket No. 41718.

In January of 2014 was retained by the firm of Braun & Gresham, PLLC on behalf of Wayne "Skip" Hill, et al., Michael Bradley Nevil, and Brunhild Investments, Inc. to evaluate the TNMP CCN and route study that was used to select a route for the proposed Westminster 138-kV transmission line in Collin County, Texas, PUC Docket No.41756.

In May of 2013 was retained by Bechtel National, Inc. to provide consulting expertise on the development of a water infrastructure business unit that would serve national and international water development needs.

In November of 2012 was retained by the law firm of Ewell, Bickham and Brown, LLP on behalf of The East Wildlife Foundation in re: The San Antonio Viejo Ranch to evaluate the Recommended Route advanced by Electric Transmission Texas, LLC in its application for a 345-kV double circuit Transmission Line from Rio Lobo to Rio Bravo to North Edinburg in Webb, Zapata, Jim Hogg,

Brooks, Starr, and Hidalgo Counties, Texas. Was also tasked to file Cross Rebuttal Testimony in the case, PUC Docket No. 40728. Case settled on February 19, 2013 with adoption of alternate route advanced by East Wildlife Foundation and the Alliance of South Texas Ranches.

In October of 2012 was retained by Herrera & Boyle, PLCC on behalf of Bryan Herr, Tom Trial, Anthony Jennings, and John Morvant to evaluate the Application of Brazos Electric Power Cooperative, Inc. to Amend a CCN for construction of a 138-kV single circuit transmission line in Grimes, Walker, and Montgomery Counties, Texas-SOAH Docket No.473-12-7019, PUC Docket No. 40319, Public Utility Commission of Texas.

From June of 2012 to October of 2016 was retained by Boston Government Services, to provide consulting services directly to the Environmental Management Division of the U.S. Department of Energy on regulatory and cross-cutting issues in the management of legacy waste at sites throughout the DOE Complex. The DOE program was designed to provide nationally recognized expertise to the EM Division.

In January of 2012, was retained by the New Mexico State Land Office to provide technical and regulatory expertise on two unrelated tasks: (1) To evaluate the nature, extent, remediation and reclamation of surface resources affected by large scale tire dumping on State lease land, and to testify as an expert in re: New Mexico Commissioner of Public Lands v. Daniels, et al (2) To assist the Commissioner of Public Lands in evaluating the potential impact on state owned lands of proposed changes to New Mexico Oil Conservation Commission (“OCC”) Rules regarding the disposition of Oil and Gas Exploration and Production wastes, and preparing a formal comment to the OCC.

In November of 2011, was retained by Gordon Environmental, Inc., Albuquerque, New Mexico, to provide site selection-site suitability expertise re: the selection of land in Sandoval County suitable for the development of a new Regional Subtitle D Landfill.

In July of 2011, was retained by the Law Firms of Lafont, Tunnel, Formby, Lafont & Hamilton, Plainview, Texas and Zach Brady & Co. on behalf of the Cogdell Ranches Trust to evaluate and prepare direct testimony as an expert before the Texas PUC re: the Application of Southwestern Public Service Company to Amend a Certificate of Convenience and Necessity for a Proposed 345-kV Electric Transmission Line within Hale, Floyd, Motley, Cottle, Briscoe, Hall, Childress, Donley, Collingsworth, and Wheeler Counties, Texas (SOAH Docket No. 473-11-5978, PUC Docket No. 38877 Public Utility Commission of Texas) that would cross nine of the Cogdell ranches in the Panhandle of Texas.

In June of 2011, was retained by Robert Hall, Oklahoma City, Oklahoma to oversee resolution of compliance issues between Lea Land Industrial Landfill and the New Mexico Environment Department.

In March of 2011, was retained by the Lea County, New Mexico Economic Development Corporation to prepare an application to the New Mexico Environment Department for a

“Voluntary Remediation Program/Covenant Not To Sue” on behalf of International Isotopes, Inc.

In January of 2011, was retained by the Law Firm of Stubbeman, McRae, Sealy, Laughlin & Browder on behalf of John B. Phillips, Skipper Driver, and Dane Driver to evaluate selected links in the Wind Energy Transmission Texas, LLC proposed Long Draw to Sand Bluff to Divide and Sand Bluff to Bearkat 345-kV CREZ Transmission Lines in Borden, Coke, Glasscock, Howard, Mitchell, & Sterling Counties (SOAH Docket No. 473-11-1266, PUC Docket No. 38825).

In November of 2010, was retained by Big Bear (Brian Urlacher & Associates) Disposal, Lovington, New Mexico to evaluate the suitability of sites in southeastern New Mexico for the development of proposed Oil and Gas Waste Disposal Facilities.

In October of 2010, was retained by the Lea County, New Mexico Economic Development Corporation to validate site suitability for two tracts of land west of Hobbs, New Mexico for the location of two facilities: one (640 acres) that would De-convert Depleted Uranium Hexafluoride, and the other (1000 acres) for a facility that would utilize a patented recombinant organism, brine-water and carbon dioxide in a large array of photosensitive panels to produce diesel products and related molecular chains.

In August of 2010, was retained by Law Firm of Herrera & Boyle on behalf of Group of Allied Landowners to evaluate selected links in the amended ONCOR Willow Creek-Hicks 345-kV CCN for a CREZ Transmission Line in Denton, Parker, Tarrant and Wise Counties (SOAH Docket No. 473-10-4789, PUC Docket No. 38324).

In July of 2010, was retained by Law Firm of Herrera & Boyle on behalf of the Ioni Creek Conservation Group to evaluate selected links in the Lone Star Central A to Central B to Sam Switch to Navarro 345-kV CCN Route Analysis (SOAH Docket No.473-10-4398, PUC Docket No. 38230).

In May of 2010, was retained by Law Firm of Herrera & Boyle on behalf of Clear Creek Preservation Coalition to evaluate selected links in the ONCOR Riley-Krum 345-kV CCN Route Study and Environmental Assessment (SOAH Docket No.473-10-4109, PUC Docket No. 38140).

In December of 2009, was retained by Law Firm of Locke, Lord, Bissell and Lydell on behalf of CJ Ranch, Garrett Ranch, Point Peak Resort and Jean Mueller to evaluate alternatives to LCRA’s proposed 345-kV transmission line from Gillespie –Newton (PUC Docket No. 37448)

In July of 2009, was retained by Hicks & Co. to evaluate the environmental impacts of alternative routes for a Lower Colorado River Authority (LCRA) electric transmission line that would run from Dallas to Kendall County, Texas.

In August of 2008, was retained by Waste Connections, Inc. to characterize and acquire land from the New Mexico Commissioner of Public Lands that would be suitable for permitting under 20.9.1 NMAC for a Subtitle D solid waste disposal facility in Otero County, New Mexico.

In August of 2008, was retained by The Urlacher Group (Big Bear Disposal, Inc.) to site, characterize, permit and oversee construction of an Oilfield disposal system under Rule 36 of the Oil Conservation Commission Regulations.

From February of 2008 to October 2011, was retained by Project Enhancement Corporation (PEC) to provide regulatory expertise to the Environmental Management Division of DOE re: Cross-cutting issues with the potential to affect multiple sites in the complex.

From January 2008 to October 2014, was retained by Los Alamos National Security (LANS) to provide regulatory guidance to LANS and NNSA re: implementation of the Los Alamos RCRA Order on Consent signed by the state of New Mexico, DOE and LANS.

In December 2007, coordinated the legal/technical case and testified for the applicant in the New Mexico Environment Department's adjudicatory permit hearing for Camino Real Landfill in Sunland Park, New Mexico.

In August 2007, was retained by the Lea County Energy Committee / Lea County Economic Development Corporation to characterize the suitability of several selected sites for construction and operation of a Uranium Enrichment Facility. A separate entity, International Isotopes has selected one of those sites for a de-conversion plant.

In January 2007, was retained by the Eddy-Lea Energy Alliance, LLC (ELEA), The Washington Group and AREVA as Principal Site Investigator for the proposed ELEA Global Nuclear Energy Partnership (GNEP) Site Characterization effort for a Consolidated Fuel Reprocessing Facility and an Advanced Burner Reactor.

In December 2007, was retained by Sundance Oilfield Services, LLC to develop an application under new Oil Conservation Division regulations (Rule 36) for solid waste disposal facilities near Eunice, New Mexico.

In October 2006, was retained by Ben Barnes & Associates to evaluate RCRA compliance issues for the Lea Land Industrial Waste Disposal Facility in Lea County, New Mexico.

In May 2006, was retained by the City of Clayton, New Mexico to locate, characterize, acquire and permit a suitable site for a regional landfill for northeast New Mexico and northwest Texas.

In April 2006, was retained by Gordon Environmental, Inc. for Southwest Landfill to evaluate the relationship between the existing facility and land uses in the surrounding area.

In April 2006, was retained by a private consortium representing Lea and Eddy Counties (ELEA), New Mexico to manage the preparation of a site proposal to the DOE (Global Nuclear Energy Partnership-GNEP) request for proposals to identify a suitable site for a proposed spent nuclear fuel recycling facility. After GNEP the ELEA has purchased the proposed site for other economic development purposes.

From January 2006 to the present, has been retained as a consultant by Las Uvas Dairies, Hatch, New Mexico (one of the largest family owned dairy operations in the United States) to provide regulatory assistance to its facility engineers regarding the renewal and compliance maintenance of its consolidated discharge permits issued by the state of New Mexico.

From March 2005 to March 2006, drafted sections for the Camino Real Solid Waste permit application and provided quality assurance review of the entire submission. The application package was submitted to the New Mexico Environment Department Solid Waste Bureau on March 6, 2006.

From October 2005 to March 2006, coordinated independent third party preparation of Community Impact Assessments (CIA) for Camino Real Landfill (Sunland Park, N.M.) and the proposed Rhino Landfill (Chaparral, N.M.). The studies were prepared as part of the permitting process for both facilities.

As consultant to Camino Real Landfill in Sunland Park, New Mexico, participated in the preparation and submission of the Title V Operating Permit renewal application. The application was submitted to the New Mexico Environment Department (NMED) on April 29, 2005 and was subsequently approved and the permit was re-issued.

As consultant to Sandoval County (New Mexico), participated in the preparation of a RCRA Subtitle D Application for a major expansion of regional landfill and recycling facility. (April 2004-June 2005). Facility permitted on July 17, 2005.

As consultant to Controlled Recovery, Inc. (CRI), provided regulatory expertise to large scale oil recycling operation in Lea County New Mexico (April, 2005-January 2007).

As consultant to WCI, Inc., negotiated settlement of NMED Administrative Order against El Paso Disposal, Inc. (a subsidiary of WCI, Inc.) (October-December, 2004).

As consultant to Carroll, Gross, Reeder & Drews, LLP provided expertise on behalf of Lawrence and Carolyn Biedenharn in re: a 138-kV electric transmission line proposed by the Lower Colorado River Authority ("LCRA") Transmission Services in Kendall and Bexar Counties (SOAH Docket No. 473-04-7609, PUC Docket No. 29684, Public Utility Commission of Texas) July, 2004-July, 2005.

As consultant to CH2M HILL, provided specialized regulatory and project development expertise (January 2004-December 2009).

As consultant to Advanced Technologies and Laboratories International, Inc. (ATL) provided regulatory expertise to U. S. Department of Energy Headquarters Environmental Management Division (EM3) for the definition and resolution of major regulatory problems for DOE facilities, e.g. LANL Consent Order, Hanford TRU Tank Waste and Fernald Silos Waste (April 2004-2009).

As consultant to Nuclear Waste Partnership LLC (Formerly the Washington Group International) provides specialized regulatory consulting for the site management contractor at the U.S. Department of Energy WIPP facility in the state of New Mexico (January 2004-present).

As consultant to the LES/URENCO National Enrichment Facility (NEF), provided specialized regulatory consulting for the acquisition of environmental permits from the state of New Mexico (January 2002-July 2009).

As consultant to Aquila / Canberra, Inc. provided specialized regulatory and policy analyses for ongoing North American projects (July 2003-2006).

As consultant to the New Mexico State Land Office drafted policy guidance for enhancing the protection of surface resources on land owned by the State of New Mexico (June 2003-July 2004).

As consultant to Cogema (AREVA), Inc. conducted regulatory and technical feasibility studies for a range of potential North American projects (September 2002-2003).

As consultant to American 3CI, provided regulatory expertise on the preparation of permits for infectious waste management facilities (February 2002-March 2006).

As consultant to CTAC, provided regulatory expertise on the modification of the U.S. Department of Energy (DOE) /WIPP hazardous waste permit issued by the State of New Mexico (January 2002-January, 2004).

As consultant to Moncrief Oil Company, provided specialized regulatory guidance on the disposition of sulfur and related by-products of natural gas processing facilities in the Wind River Basin of central Wyoming (August 2001-August 2002).

As consultant to Westinghouse/TRU Solutions and Westinghouse Safety Management Solutions, provided regulatory expertise on the modification of the U.S. DOE/WIPP hazardous waste permit issued by the state of New Mexico (September 2000-December 2001).

As consultant to the Edwards Aquifer Authority (contracted through Kemp Smith, P.C. and Hicks and Co.) provided regulatory analysis for the development of and impact assessment for new aquifer management rules (June 2000-December 2009).

As environmental consultant to CRI, Inc. provided regulatory expertise; client was in opposition to a proposal by the state of New Mexico to co-mingle oilfield wastes with solid waste (sub-title D) in disposal cells permitted for sub-title D wastes (Jan.-Nov., 2000). NMED hearing officer adopted my interpretation of the regulatory framework. It was the first time an NMED hearing officer had ever ruled against an established NMED policy.

As consultant to the Washington Group assisted in the development of a community interface plan to improve the company's relationship with Lea County, New Mexico (July-September, 2000).

As consultant to the Washington Group, provided permit and license data regarding WCS capabilities to store and characterize TRU waste in support of the WIPP project (February- April, 2000).

As environmental consultant to Lea County, New Mexico provided interface with U.S. Department of Energy (DOE) in preliminary discussions regarding economic development associated with the operation of the DOE Waste Isolation Pilot Plant (WIPP) (1999-2000).

As environmental consultant to Raymond G. Sanchez and Robert Desiderio, attorneys at law, provided project management and coordination for site assessments on Maloof properties in New Mexico (January 2000-December 2001).

As environmental consultant to the El Paso, Texas based law firm of Kemp Smith, provided expertise for the selection and development of water resources for use by the City of El Paso (2000-2005).

As environmental consultant to Spivey & Ainsworth and Chandler and Associates, provided expertise on the assessment of a large and complex oilfield contamination case (Cantrell v. Ashland Oil Co.) in Johnson and Lawrence Counties, Kentucky (1999-2009).

As lead consultant on the Lea County Landfill project managed site selection studies and permit document preparation for submission to the New Mexico Environment Department (Permit granted 1999).

As environmental consultant to WCS, LLC provided regulatory guidance for the development of permits and licenses for additional radioactive and hazardous waste streams for the facility. Provided systems support and compliance monitoring at facility permitted and licensed in Texas. Also, managed compliance issues with regulatory agencies in New Mexico re: potential discharges from WCS to “a downstream receiving state.” (WCS is located adjacent to the Texas/New Mexico state line). (June 1995-2016).

As environmental consultant to Harlan Richey (President of Richey Oil Co.), provided expertise and expert testimony; client was in opposition to a proposed 27,000 acre sludge application project adjacent to the historic Eagle Mountain Ranch in Hudspeth County, Texas. The Texas Natural Resources Conservation Commission (TNRCC) subsequently withdrew its prior approval of the project (1997-1998).

As environmental consultant to Phillips Petroleum, Inc., provided expertise and expert witness testimony (deposition only—case was settled in favor of Phillips) on a complex land use/groundwater contamination case (1997-1998).

As environmental consultant/project manager to Camino Real Environmental Center (CREC), managed the development of three solid waste permit applications for boundary modification, recycling center and landfill permit renewal for the solid waste facility at Sunland Park, (Doña Ana

County) New Mexico. (Permits granted 1997). Coordinated Title V and NSPS permitting and related compliance issues at the all of the subsidiary facilities in New Mexico (1990-2006). Provided regulatory guidance for early phases of solid waste permit application preparation for 2007 hearing. Compliance monitoring (2004-2012).

As environmental consultant/project manager for USA/UNITED WASTE, coordinated the rehabilitation of a permit (solid waste) application for Tri-Sect Landfill in Valencia County, New Mexico. (1998)

As environmental consultant/project manager for CREC, managed the acquisition of a discharge permit for a sludge land application site at the CREC Sunland Park, New Mexico site. (1994)

As environmental consultant/project manager for CREC, managed the site selection and development of a permit application for the Eddy County, New Mexico regional landfill (Sand Point Regional Landfill). (Permit granted 1994)

As environmental consultant/project manager for Med-Compliance Services (MCS), managed the development of a permit application for a bio-medical waste transfer and processing facility in Albuquerque (Bernalillo County) New Mexico. (Permit granted 1994). Project required the development of a new processing technology that could meet new state standards.

As environmental consultant to Lower Valley Water District (El Paso County), prepared environmental assessments for Las Azaleas constructed wetlands project. (1993).

As permit consultant to R.R.I., acquired landfill and recycling permits for R.R.I. (NUMEX Landfill) facilities at Sunland Park, New Mexico. (1991).

As project manager for El Paso County, (El Paso County v. State of Texas), coordinated 4 year review of Ft. Hancock site suitability for radioactive waste disposal. Developed technical case for plaintiffs. Plaintiffs prevailed on all 25 factual issues. District court decision upheld plaintiffs. State did not appeal. (1988-1991).

As Director of Special Projects (consulting position) at the Rio Grande Council of Governments, El Paso, Texas responsibilities included development and management of multi-disciplinary projects that focused primarily on land use and site planning issues in the region, e.g., site selection for landfills, industrial parks, experimental energy storage systems, etc., (1989).

As Principal Planner at Sub-Land, Inc. El Paso, Texas responsibilities included management of environmental and economic feasibility studies for large-scale land use projects. (1986-1987).

As a Senior Staff Policy Analyst/Planner at EH & A Environmental Consultants, Austin, Texas was responsible for the design and implementation of land use, environmental/economic baseline and impact studies and other assessments. Also was responsible for various types of specialized studies



(regulatory, budgeting and forecasting). Developed and managed computer-based models for environmental planning, e.g. riverine flow impacts on bays and estuaries, predictive models for archeological resources in large scale surveys. (1984-1987).

**Expert Witness Experience:** Federal and State Court; Regulatory Hearings. (Primary areas – permitting, environmental assessment, environmental remediation/restoration, land use analysis, solid waste facility regulations, municipal services assessment and redistricting). Expert testimony in Administrative/Regulatory Hearings on environmental/land use issues, e.g. RCRA permits, air quality permits, routing of electric transmission lines and water plans.

**Academic Experience:** Taught courses in systems analysis, site planning, land use management, environmental policy, alternative energy resource investigations, organization theory, industrial expansion analysis, policy typology assessment, public budgeting fiscal planning, anthropology and quantitative sociology.

**Experience/Work History:**

(Note: Several activities have overlapping/ concurring time frames)

<b>Environmental Consultant</b>	Crooked Creek, Inc. Mckinney, Texas October, 2020 through present
<b>Regulatory Consultant</b>	U. S. Department of Energy, Los Alamos National Laboratory August 2020 through present
<b>Environmental Consultant</b>	Spivey Valenciano, PLCC San Antonio, Texas December, 2018 through present
<b>Environmental Consultant</b>	Brady & Hamilton, LLP Lubbock, Texas December, 2018 through present
<b>Environmental Consultant</b>	Burdett Morgan Williamson & Boykin Amarillo, Texas October 2018-January 2019
<b>Systems/Regulatory Consultant</b>	Kemp Smith Law Firm Austin, El Paso, San Antonio, Texas March 2018 – February 2020

<b>Regulatory Consultant</b>	Lea Land, L.L.C. Oklahoma City January 2018-Present
<b>Environmental/Regulatory Consultant</b>	Enviro Lands, L.L.C. Albuquerque, NM May 2017 – Present
<b>Environmental/Regulatory Consultant</b>	Staten Realty, L.L.C. Brady, Texas November 2016 – April 2017
<b>Systems/Regulatory Consultant</b>	Synergy Medwaste, L.L.C. Dallas, Texas November 2016 – November 2017
<b>Systems/Regulatory Consultant</b>	VJ Technologies Bohemia, New York September 2016 – January 2017
<b>Environmental/Regulatory Consultant</b>	Pitchfork Landfarm, L.L.C. Jal, New Mexico January 2016 – January 2017
<b>Environmental/Land Use Consultant</b>	Braun & Gresham, Attorneys at Law on Behalf of the Coastal Prairie Alliance Austin, Texas August 2015- March 2016
<b>Environmental/Land Use Consultant</b>	TVG Texas 1, LLC (Windsong Ranch Development) Prosper, Texas May – September, 2015
<b>Environmental/Land Use Consultant</b>	Ewell, Brown & Blanke, Chuck Norris Austin, Houston, Texas May 2015-July 2015
<b>Site Selection, Oil and Gas Waste Disposal Permitting Consultant</b>	CK Environmental Services Portland Oregon February 2015 to the present
<b>Environmental/Land Use Consultant</b>	Brady & Hamilton Lubbock, Texas November 2014-May 2015

**Environmental/Land Use  
Consultant**

FFPTHC Alliance  
Fredricksburg, Texas  
July 2014 through May 2015

**Environmental/Land Use  
Consultant**

City of Haslet, Texas  
March 2014 through July 2014

**Environmental/Land Use  
Consultant**

Braun & Gresham, PLLC  
Austin, Texas  
January 2014 through July 2014

**Water Resource Consultant**

Bechtel National, Inc.  
Michael Graham Sr. VP Reston, VA  
May 2013 to May 2014

**Environmental/Land Use  
Consultant**

Ewell, Brown, and Blanke, LLP  
Austin, Texas  
November 2012 to February 2013

**Environmental/Land Use  
Consultant**

Herrera & Boyle, PLLC  
Austin, Texas  
October to December 2012

**Regulatory Consultant**

Boston Government Services, LLC  
Lenoir City, TN  
June 2011 to May 2015

**Environmental Consultant:**

New Mexico State Land Office  
SLO v. Daniels, et al/ Pit Rule Amendments  
Santa Fe, New Mexico  
January 2012 to October 2014

**Environmental Consultant:**

Gordon Environmental, Inc.  
Sandoval County Landfill  
Albuquerque, New Mexico  
November 2011 to the present

**Environmental Consultant:**

Lafont, Tunnel, Formby, et al  
On behalf of Cogdell Trust  
Plainview, Texas  
August 2011 to September 2011

**Environmental Consultant/  
Regulatory Compliance:**

Robert Hall  
Oklahoma City, Oklahoma  
June 2011 to the present

**Environmental Consultant/  
Regulatory Compliance:**

Lea County Economic Development Corp  
Lea County, New Mexico  
March 2011 to September 2011

**Environmental Consultant/  
Utility CCN Review:**

Stubbeman, McRae, Sealy, Laughlin &  
Browder, LLC  
Midland, Texas  
January 2011 to March 2011

**Environmental Consultant/  
Site Suitability Assessment:**

Big Bear Disposal Disposal  
Lovington, New Mexico  
November 2010 to November 2012

**Environmental Consultant/  
Site Suitability Assessment:**

Lea County Economic Development Corp,  
New Mexico  
October 2010 to March 2011

**Environmental Consultant/  
Utility CCN Review:**

Herrera & Boyle, PLLC  
Austin, Texas  
May 2010 to December 2010

**Environmental Consultant/  
Utility CCN Review:**

Locke, Lord, Bissell and Lydell, PLLC  
Austin, Texas  
December 2009 to March 2010

**Environmental Consultant:**

Hicks & Co.  
Austin, Texas  
July 2009

**Land Acquisition/  
Permitting Consultant:**

Waste Connections, Inc  
Houston, Texas  
August 2008 to October 2012

**Permitting Consultant:**

The Urlacher Group  
Doing Business as DNCS  
Phoenix, AZ  
August 2008 to 2015

**Regulatory Consultant:**

Project Enhancement Consultants  
Germantown, Maryland  
February 2008 to October 2011

**Regulatory Consultant:**

Los Alamos National Security, LLC  
Los Alamos National Laboratory  
January 2008 to October 2014

**Project Manager:**

Waste Connections, Inc. (Houston, Tx)  
Adjudicatory Permit Hearing for Camino  
Real Landfill (Sunland Park, NM)  
December 2007 (30 day hearing)

**Site Suitability Consultant:**

Lea County, New Mexico  
Nuclear Facility Sites  
Hobbs, New Mexico  
August 2007 to January 2015

**Principal Site Investigator:**

Eddy-Lea Energy Alliance, WGI, AREVA  
Global Nuclear Energy Partnership  
Site Characterization for Spent Fuel  
Reprocessing Facility and ABR  
Carlsbad, NM  
January 2007 to July 2009

<b>Permitting Consultant:</b>	Sundance Oilfield Services, Eunice, New Mexico December 2006-November 2012
<b>Regulatory Consultant:</b>	Ben Barnes & Associates, Austin, Texas October 2006-October 2008
<b>Land Use/ Regulatory Consultant:</b>	City of Clayton, New Mexico May 2006-January 2007
<b>Land Use Consultant:</b>	Lea/Eddy County GNEP Proposal Hobbs/Carlsbad, New Mexico, April 2006-2009
<b>Land Use Consultant:</b>	Southwest Landfill Albuquerque, New Mexico February, 2006-July 2006
<b>Regulatory Consultant:</b>	Las Uvas Dairies Hatch, New Mexico January 2006-October 2018
<b>Environmental Consultant/ Utility CCN Review:</b>	Carroll, Gross, Reeder & Drews, L.L.P. Austin, Texas, July 2004-July 2005
<b>Systems and Environmental Consultant:</b>	CH2M Hill, Inc., Albuquerque, New Mexico August 2004-December 2009
<b>Regulatory Consultant:</b>	Advanced Technologies and Laboratories, International, Inc. Germantown, Maryland, April 2004-April 2007
<b>Regulatory Consultant:</b>	Nuclear Waste Partnership, LLC Carlsbad, New Mexico U. S. Dept of Energy WIPP Facility January 2004-present
<b>Regulatory Consultant:</b>	National Enrichment Facility Albuquerque, New Mexico January, 2000 –January 2009

<b>Policy Consultant:</b>	Aquila/Canberra, Inc. Albuquerque, New Mexico July, 2003 - 2006
<b>Land Use Consultant:</b>	New Mexico State Land Office Santa Fe, New Mexico June 2003- July 2005
<b>Regulatory Consultant:</b>	Cogema, Inc. Bethesda, Maryland August, 2002 - 2003
<b>Regulatory Impact Consultant:</b>	Hicks & Co. Austin, Texas January, 2002-2009
<b>Regulatory Consultant:</b>	American 3CI Dallas, Texas February 2002-March 2004
<b>Regulatory Consultant:</b>	CTAC Technical Assistance Carlsbad, New Mexico U.S. DOE/WIPP Site January 2002-2003
<b>Regulatory Consultant:</b>	Moncrief Oil Company Fort Worth, Texas Wind River Basin Wyoming August 2001-2003
<b>Regulatory Impact Consultant:</b>	Edwards Aquifer Authority San Antonio, Texas June 2000-2009
<b>RCRA Permit Consultant: (Sub-title C)</b>	Westinghouse / U.S. Dept. of Energy WIPP Facility Carlsbad, New Mexico September 2000-December 2001
<b>Expert Witness (remediation):</b>	Bramblett & Bramblett El Paso Texas 2000-2001
<b>Environmental Consultant:</b>	CRI, Inc.

**(Regulatory Compliance)**

Hobbs, New Mexico  
January 2000-2006

**Environmental Consultant:  
(Site Assessment)**

Raymond G. Sanchez and Bob Desiderio  
Attorneys at Law  
Albuquerque, New Mexico  
February, 2000-February 2001

**Environmental Consultant:  
(Water Development Strategy)**

Kemp- Smith Law Firm  
El Paso, Texas  
February, 2000-2006

**Environmental Consultant:  
(DOE Policy)**

Lea County, New Mexico  
1999- April 2000

**Environmental Consultant:  
(Oilfield Contamination  
Assessment-Expert Witness)**

Chandler and Associates, Lufkin, Tx  
Spivey & Ainsworth, Austin, Tx  
In Re: Martha Oilfield (Paintsville, Kentucky)  
July, 1999-2009

**Environmental Consultant:  
(Oilfield Contamination  
Assessment-  
Expert Witness)**

Phillips Petroleum  
Borger Refinery (Tx)  
Bartlesville, Oklahoma  
1997-1998

**Environmental Consultant:  
(Surface Water Protection-  
Expert Witness)**

Richey Oil Company  
Tyler, Texas  
(Hudspeth Co Texas) 1997-1998

**Environmental Consultant:  
(Remediation Estimates-  
Expert Witness)**

“Triangl” (sic) Equities  
El Paso, Texas  
1997-1998

**Environmental Consultant:  
(RCRA/RAD Regulation)  
DOE Interface**

Waste Control Specialists, LLC.  
Dallas, Texas/  
Pasadena, Texas July 1995-**November** 2016

**Environmental Consultant:  
(Land Use Analysis)**

Santa Teresa Development, Inc.  
February, 1986 to August 1994

**Environmental Consultant:  
(Landfill Evaluation)**

El Paso County Commissioner's Court  
El Paso, Texas  
1989 to 1991



<b>Environmental Permit Consultant:</b>  <b>(Landfill Site Selection, Permitting)</b>	R.R.I. (Waste Disposal) El Paso, Texas June 1990-2012 (Purchased in 1999 by Waste Connections)
<b>Biomedical Waste Technology Development:</b> <b>(Regulatory Consultant)</b>	Med-Compliance Services El Paso, Texas February, 1991-1999
<b>Environmental Consultant:</b> <b>(Land Use)</b>	Horizon Environmental Services Austin, Texas January 1995-December 1996
<b>Director, Environmental Projects:</b>	Rio Grande Council of Governments El Paso, Texas March 1987-July, 1989
<b>Professor:</b> <b>(Adjunct)</b>	New Mexico State University Land Use Analysis Las Cruces, New Mexico 1988
<b>Principal Planner</b>	Sub-Land, Inc. El Paso, Texas 1986-1987
<b>Senior Policy Analyst / Land Use Analyst:</b>	Espey, Huston & Associates, Inc Austin, Texas 1984-1986
<b>Division Chairman:</b> <b>(Interim)</b>	Social Sciences Wayland University Plainview, Texas 1983
<b>Lecturer - Budgeting and Forecasting:</b>	MPA Program, Texas Tech University Lubbock, Texas 1983
<b>Research Associate:</b>	Center for Energy Research Texas Tech University Lubbock, Texas 1979

<b>Lecturer - Technology Assessment:</b>	Department of Industrial and Systems Engineering (Doctoral Program) Texas Tech University Lubbock, Texas 1979
<b>Assistant Division Chairman:</b>	Public Administration/Systems Wayland University Plainview, Texas 1978-1983
<b>Administrative Head/Interim Director:</b>	Computer Services Wayland College Plainview, Texas 1976-1978
<b>Instructor - Public Policy:</b>	Department of Political Science Texas Tech University Lubbock, Texas 1976
<b>Assistant to City Manager:</b>	City of Plainview, Texas 1976
<b>Research Assistant, Stochastic Models:</b>	Frederick Hartmann, Alfred Thayer Mahan Professor of Maritime Strategy Naval War College 1971-1975
<b>Instructor- Department of Anthropology:</b>	Department of Anthropology Wayland College Plainview, Texas 1971-1974
<b>Research Assistant:</b>	Department of Anthropology Texas Tech University Lubbock, Texas 1970-1971
<b>Technical Writer:</b>	Litton Industries Lubbock, Texas 1969

**Education: (Major Fields)**

**PhD:** Systems Theory (Industrial Eng) and Environmental Policy (Public Admin)  
Dissertation Topic – Typological Constructs  
(Environmental Policy Issue—Environmental Resources Management)  
Texas Tech University  
Lubbock, Texas  
August, 1985

**MA:** Anthropology/ Sociology/ Public Policy Analysis  
Thesis Topic – Configurations of Authoritarianism  
Texas Tech University  
Lubbock, Texas  
1971

**BA:** Anthropology / Biology / Journalism  
Texas Tech University  
Lubbock, Texas 1969

**Advisory Committees:**

New Mexico Environment Department, Draft Dairy Regulation Advisory Committee, June 2009 to January 2011/2014-2016.

New Mexico Environment Department, Environmental Justice Planning Committee, December, 2003 to 2006.

New Mexico Governor-Elect Bill Richardson Transition Team Chairman (Tri-Chair) for the New Mexico Environment Department, November 14, 2002 to January 31, 2003.

New Mexico Environment Department Radioactive Materials Fees Advisory Committee (Waste Management and Disposal Industry Representative), May 1, 2000 to December 31, 2003.

USEPA Environmental Justice Advisory Council/ SWANA-- Waste Transfer Station Working Group, 1999 to May, 2001

New Mexico Environment Department, Tire Recycling Advisory Committee, 1995-1996

New Mexico Environment Department, Solid Waste Regulations Revision Advisory Committee, August - December, 1993

Rio Grande Council of Governments, Regional Solid Waste Management Plan (Far West Texas Planning Region), 1993

El Paso City/County Consolidated Data Processing Advisory Board - Oversight of computer operations for consolidated system, 1989 - 1991

## **Awards:**

Solid Waste Association of North America—(Camino Real) Landfill Excellence Award for Best Landfill Operation in North America, 1997 (Coordinated effort for facility operation and evaluation).

Outstanding Contribution Award - Environmental Design Contest, Waste Education Research Consortium, (Los Alamos National Laboratory, Sandia National Laboratory, University of New Mexico, New Mexico Tech, New Mexico State University and U.S. Department of Energy) May, 1993.

Outstanding Graduate Student Teacher of the Year, Texas Tech University, 1976.

George Mahon Congressional Scholarship Award for Graduate Study of Public Policy, 1974-1975.

Joint Graduate Student/Graduate Faculty Research Grant, "Development of Dis-aggregative Analysis for Decomposition of Large Data Sets", Texas Tech University, 1974.

## **Technical Reports/Papers/ Pre-Filed Direct Testimony and Related Documents:**

**Note: All of the Espey-Huston (EH&A) reports and all of the regulatory assessments prepared for the Edwards Aquifer Authority were prepared in collaboration with multi-disciplinary teams of experts. Many of the documents listed here are proprietary and confidential and cannot be released for review. All of the PUC pre-filed testimony listed here is, however, publicly available and can be located on the Texas PUC Interchange.**

Pre-filed Direct Testimony in re: Application of Guadalupe Valley Electric Cooperative, Inc. for a 138-Kv Transmission Line in Caldwell and Gonzales Counties, Texas in the Delhi to Bluestem 138 -kV Transmission Line Project (PUC Docket Number 50830, November 2020)

Pre-filed Direct Testimony in re: Application of Rayburn Country Electric Cooperative, Inc for a Certificate of Convenience and Necessity for the Proposed New Hope Project 138-kV Transmission Line in Collin County, Texas (PUC Docket No. 50812, October 27, 2020)

Pre-filed Direct Testimony in re: Application of Wind Energy Transmission Texas, LLC and ONCOR Electric Delivery Company, LLC 345-kV Transmission Line for the Bearkat Switching Station to Longshore Switching Station in Glasscock and Howard Counties, Texas (PUC Docket No. 50410, October 22, 2020)

Pre-filed Direct Testimony in re: Application of Sharyland Utilities and City of Lubbock Acting By and Through Lubbock Power and Light For a Certificate of Convenience and Necessity for the Proposed Wadsworth to New Oliver to Farmland 345-Kv Transmission Line in Lubbock and Lynn Counties, Texas (PUC Docket No. 48909, May 7, 2019)

Pre-filed Direct Testimony in re: Joint Application of Sharyland Utilities, L.P. and City of Lubbock, Acting By and Through Lubbock Power and Light , For a Certificate of Convenience and Necessity for the Proposed Ogallala to Abernathy 345-kV Transmission Line in Castro, Hale, and Swisher Counties, Texas (PUC Docket No. 48625, February 14, 2019)

Pre-filed Direct Testimony in re: Application of ONCOR Electric Delivery Company LLC, AEP Texas Inc and LCRA Transmission Services Corporation to Amend Their Certificates of Convenience and Necessity for 345-Kv Transmission Lines in Pecos, Reeves, and Ward Counties, Texas (Sand Lake to Solstice and Bakersfield to Solstice) (PUC Docket No. 48785, January 10, 2019)

Pre-filed Direct Testimony in re: Application of LCRA Transmission Services Corporation to Amend a Certificate of Convenience and Necessity for the Cooks Point 138-kV Transmission Line in Burleson County, Texas (PUC Docket No. 48358, October 23, 2018)

Pre-filed direct Testimony in re: Application of AEP Texas North Company and Electric Transmission Texas, L.L.C. for the proposed AEP TNC Heartland to ETT Yellow Jacket 138kV Transmission Line McColloch and Menard Counties, Texas (PUC Docket No. 46234, February, 2017)

Pre-filed Direct Testimony in re: Application of AEP Texas Central Company for a Certificate of Convenience and Necessity for the Tuleta to Euler to Coletto Creek Double Circuit 138-KV Transmission Line in Bee and Goliad Counties, Texas prepared for the Coastal Prairie Alliance (PUC Docket No.44837), December 7, 2015. SOAH Administrative Law Judges cited my testimony in their ruling to require the Utility to adopt an alternative route described in my testimony as the route that best met the requirements of PURA and the Substantive Rule. The PUC adopted the ALJ's findings in their final decision.

Pre-filed Direct Testimony in re: Application of Centerpoint Energy Houston Electric, L.L.C. to Amend a Certificate of Convenience and Necessity for a Proposed 345-KV Transmission Line Within Grimes, Harris, and Waller Counties, Texas prepared for Concerned Property Owners Alliance (PUC Docket No. 44547) July 13, 2015.

Pre-filed Direct and Rebuttal Testimony in re: Application of Brazos Electric Power Cooperative Certificate of Convenience and Necessity for the Proposed Parvin Substation and a Double Circuit Transmission Line in Collin and Denton Counties, Texas prepared for TVG Texas 1, L.L.C. (Windsong Ranch Development) (PUC Docket No. 43878). June 22, 2015 and August 7, 2015

Pre-filed Direct and Rebuttal Testimony in re: Application of Lower Colorado River Authority (LCRA TSC) for a Double Circuit Transmission Line in Blanco, Gillespie, and Kendall Counties, Texas (Luckenbach Case) prepared for the FFPTHG Alliance (PUC Docket No.43599, April 6, 2015 and May 5, 2015)

Pre-filed Direct Testimony in re: Application of Southwestern Public Service Company to Amend its Certificate of Convenience and Necessity for a Proposed 240-KV Transmission Line Within Lubbock County (Wolfforth to Carlisle) PUC Docket No. 42729, January 9, 2015)

Pre-filed Direct Testimony in re: Proposed Amendment to 20.6.6 NMAC (Dairy Rule) before the State of New Mexico Water Quality Control Commission on behalf of DIGCE, No.WQCC 13-08(R), November 2014.

Pre-filed Direct Testimony in re: Application of ONCOR Electric Delivery Company for Application for a Certificate of Convenience and Necessity for a Proposed Electric Transmission Line in Denton, Tarrant and Wise Counties, Texas: prepared for the City of Haslet and the Blue Mound Alliance (PUC Docket No. 42087, June 9, 2014)

Pre-filed Direct Testimony in re: Application of Entergy Texas, Inc. for Application for a Certificate of Convenience and Necessity for a Proposed Transmission Line in Grimes and Montgomery Counties prepared for the Law Firm of Gresham & Braun, PLLC on behalf of Ray L. Audas, et al., Four S Investments, Henry Bethea and Jeff and Peggy Fye (SOAH Docket No. 473-14-0551, PUC Docket No. 41718, March 25, 2014).

Pre-filed Direct Testimony in re: Application of Texas-New Mexico Power Company to Amend its Certificate of Convenience and Necessity for the Proposed Westminster 138kV Transmission Line in Collin County, Texas prepared for the Law Firm of Braun & Gresham on behalf of Wayne "Skip" Hill, et al., Michael Bradley Nevil and Brunhild Investment, Inc. (SOAH Docket No.473-14-0807, PUC Docket No. 41756, February 13, 2014)

Pre-Filed Cross Rebuttal Testimony in re: Application of Electric Transmission Texas, LLC to Amend its Certificate of Convenience and Necessity for the Proposed Rio Lobo to Rio Bravo to North Edinburg 345 kV Double Circuit Transmission Line in Webb, Zapata, Jim Hogg, Brooks, Starr, and Hidalgo Counties, Texas prepared for the Law Firm of Ewell, Bickham, and Brown on behalf of The East Wildlife Foundation (SOAH Docket No. 473-13-0846, PUC Docket No. 40728, February 12, 2013)

Pre-Filed Direct Testimony in re: Application of Southwestern Public Service Company to Amend a Certificate of Convenience and Necessity for a Proposed Transmission Line within Hale, Floyd, Motley, Cottle, Briscoe, Hall, Childress, Donley, Collingsworth, and Wheeler Counties, Texas prepared for the Law Firm of Zach Brady & Co. on behalf of the Cogdell Trust (SOAH Docket No. 473-11-5978, PUC Docket No. 38877, Public Utility Commission of Texas, September 23, 2011)

Lea County, New Mexico Voluntary Remediation Program Application and Supporting Ground Water Documentation, submitted to the New Mexico Environment Department ("NMED") May, 2011. Covenant Not to Sue issued by NMED September, 2011.

Pre-Filed Direct Testimony in re: Wind Energy Transmission Texas, LLC Proposed Long Draw to Sand Bluff, Sand Bluff to Divide, and Sand Bluff to Bearkat 345 kV CREZ Transmission Lines in Borden, Coke, Glasscock, Howard, Mitchell, & Sterling Counties, Texas prepared for the Law Firm of Stubbeman, McRae, Sealy, Laughlin & Browder on behalf of John B. Phillips, Skipper Driver, and Dane Driver (SOAH Docket No. 473-43-1266, PUC Docket No. 38825, January, 2011)

Pre-Filed Direct Testimony in re: ONCOR Willow Creek-Hicks 345-kV CCN for a CREZ Transmission Line in Denton, Parker, Tarrant and Wise Counties, prepared for the Law Firm of Herrera & Boyle on behalf of Group of Allied Land Owners (SOAH Docket No.473-10-4789, PUC Docket No. 38324, August 2010)

Pre-Filed Direct and Cross Rebuttal Testimony in re: Lone Star Central A to Central B to Sam Switch to Navarro CCN and Route Analysis, prepared for the Law Firm of Herrera & Boyle on behalf of the Ioni Creek Conservation Group (SOAH Docket No. 473-10-4398, PUC Docket No. 38230, August 2010)

Pre-Filed Direct Testimony in re: ONCOR Riley-Krum 345-kV CCN Route Study and Environmental Assessment, prepared for the Law Firm of Herrera & Boyle on behalf of the Clear Creek Preservation Coalition (SOAH Docket No. 473-10-4109, PUC Docket No. 38140, June 2010).

Pre-Filed Direct and Cross Rebuttal Testimony in re: LCRA CCN for a proposed 345-kV Transmission Line from Gillespie to Newton prepared for the Law Firm of Locke, Lord, Bissel and Lydell on behalf of CJ Ranch, Garrett Ranch, Point Peak resort and Jean Mueller (PUC Docket No. 37448, March 2010). ALJ's adopted findings in my testimony to require the Utility to abandon their preferred route and use the alternative described in my testimony.

"Site Suitability Analysis for proposed Big Bear Oil and Gas Waste Disposal Facility (Section 32, T17S, R31E, NMPM, Eddy County New Mexico," prepared for Big Bear, Inc., Lovington, New Mexico, December 2009.

"High Desert Site Suitability Analysis for a Sub-Title D Disposal Facility-Otero County, New Mexico," prepared for WCI, Inc., Folsom, California, December 2008.

"Site Selection/Suitability Analysis for Proposed DOE Global Nuclear Energy Partnership (GNEP) Consolidated Fuel Reprocessing Facility and an Advanced Burner Reactor," prepared for AREVA, Washington Group International and the Eddy-Lea Energy Alliance, December 2007.

"Volume IV: Siting and Land Use" IN THE MATTER OF THE APPLICATION OF CAMINO REAL ENVIRONMENTAL, INC. FOR A SOLID WASTE FACILITY PERMIT FOR THE CAMINO REAL LANDFILL, prepared for WCI, Inc. Folsom, California, March 2006.

"Rhino Landfill Status: Comprehensive Report to Otero County Commissioners," presented on behalf of WCI, Inc., Folsom, California, November 2, 2005.

"Summary and Evaluation of New Mexico Oil Conservation Division Process and Procedure Under OCD Rule 711(B) In Re: Proposed Permits for Solid Waste Disposal for Artesia Aeration and Gandy Marley, Inc., prepared for CRI, Inc. Hobbs, New Mexico, June, 2005.

"Proposed Findings of Fact" In Re: THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING THE APPLICATION OF GANDY MARLEY, INC. TO MODIFY NMOCD PERMIT NO.NM- 01-019... Case No. 13,480, prepared for CRI, Inc. Hobbs, New Mexico, submitted to OCD June 24, 2005.

In Re: APPLICATION OF LCRA TRANSMISSION SERVICES CORPORATION TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR A 138KV TRANSMISSION LINE IN KENDALL AND BEXAR COUNTIES: SOAH DOCKET NO. 473-04-7609; P.U.C. DOCKET NO. 29684, Expert Testimony presented in HEARING ON THE PROPOSED ALTERNATIVE FOR THE HILL COUNTRY PROJECT, June 27- July 2, 2005.

In Re: APPLICATIONS OF SANDOVAL COUNTY TO EXTEND AND MODIFY SOLID WASTE PERMITS FOR THE SANDOVAL COUNTY REGIONAL LANDFILL BEFORE THE NEW MEXICO ENVIRONMENT DEPARTMENT, Expert Testimony presented on Land Use and Site Suitability Criteria presented on May 11, 2005. (Permits Granted by NMED on June 17, 2005).

In Re: APPLICATION OF LCRA TRANSMISSION SERVICES CORPORATION TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR A 138KV TRANSMISSION LINE IN KENDALL AND BEXAR COUNTIES: SOAH DOCKET NO. 473-04-7609; PUC DOCKET NO. 29684, Expert Testimony pre-filed on December 8, 2004, Austin, Texas.

In Re: APPLICATION OF LCRA TRANSMISSION SERVICES CORPORATION TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR A 138KV TRANSMISSION LINE IN KENDALL AND BEXAR COUNTIES: SOAH DOCKET NO.473-04-7609; PUC DOCKET NO. 29684, Expert Testimony presented in HEARING ON ADEQUACY OF ROUTES, November 10, 2004, Austin, Texas.

“Siting and Land Use; Volume IV, Sandoval County Landfill Application,” prepared for Sandoval County, New Mexico under contract to Gordon Environmental, Albuquerque, New Mexico, July, 2004.

“Regulatory Impact Assessment for Proposed Amendments to Rule 711 (Groundwater Withdrawals), Subchapters E (Groundwater Withdrawal Permits), F (Standard Groundwater Withdrawal Conditions), G (Groundwater Available for Permitting; Proportional Adjustment; Equal Percentage Reduction), L (Transfers), and M (Meters; Alternative Measuring Methods; and Reporting): Rule 715 (Comprehensive Water Management Plan Implementation), Subchapters A (Definitions) and D (Demand Management and Critical Period Management Rules): Rule 702 (General Definitions): Rule 709 (Fees), Subchapter D (Aquifer Management Fees)” prepared for the Edwards Aquifer Authority under contract to Hicks and Co./ Kemp Smith, P.C., San Antonio, Texas, July 2004.

“New Mexico Environment Department: Transition Task Force—Follow-Up Analysis of NMED Issues Raised in December 2002 Transition Team Report” prepared for the New Mexico Governor’s Office, Santa Fe, New Mexico, December 9, 2003.

“Regulatory Impact Assessment for Proposed Rules Chapter 711 (Groundwater Withdrawal Permits) Subchapters E (Groundwater Withdrawal Permits), G (Groundwater Available for Permitting; Proportional Adjustment; Equal Percentage Reduction) and K (Additional Groundwater Supplies)” prepared for the Edwards Aquifer Authority under contract to Hicks & Co./ Kemp Smith, P.C., San Antonio, Texas, November 2003.

“Draft Surface Resource Protection Guidelines for Oil and Gas Operations on New Mexico State Trust Lands” prepared for the New Mexico State Land Office, Santa Fe, New Mexico, October, 2003.

“Regulatory Impact Assessment for Proposed Rules Chapter 715 (Comprehensive Water Management Plan Implementation Rules) Subchapters A (Definitions), B (Variance Procedures) and C (Groundwater Conservation and Reuse Rules) prepared for the Edwards Aquifer Authority under contract to Hicks & Co./ Kemp Smith, P.C., Austin, San Antonio, and El Paso, Texas, July, 2003.



“New Mexico Environment Department: Transition Task Force Report” prepared for the Hon. Bill Richardson, Governor-Elect, State of New Mexico, Santa Fe, New Mexico, December, 2002.

“Regulatory Impact Assessment for Proposed Rule Chapter 711 (Groundwater Withdrawal Permits) Subchapter J (Aquifer Recharge, Storage and Recovery Projects) prepared for the Edwards Aquifer Authority under contract to Hicks & Co./Kemp Smith, P.C., San Antonio, Texas, September, 2002.

“Regulatory Impact Assessment of Alternative Proposed Rule 715 (Comprehensive Water Management Plan Implementation Rules) Subchapter A (Definitions) and D (Demand Management and Critical Period Management Rules) [15 Percent Reduction in Stage IV Critical Period Management Groundwater Withdrawals] prepared for the Edwards Aquifer Authority under contract to Hicks & Co./Kemp Smith, P.C., San Antonio, Texas, September, 2002.

“Regulatory Impact Assessment for Proposed Rule Chapter 713 (Water Quality) Subchapters A (Definitions), B (General Provisions), C (Well Construction, Operation and Maintenance) and D (Abandoned Wells; Well Closures) prepared for the Edwards Aquifer Authority under contract to Hicks & Co./Kemp Smith, P.C., San Antonio, Texas, August, 2002.

“Regulatory Impact Assessment for Proposed Rule Chapter 715 (Comprehensive Water Management Plan Implementation Rules) Subchapters A (Definitions) and D (Demand Management and Critical Period Management Rules) prepared for the Edwards Aquifer Authority under contract to Hicks & Co./Kemp Smith, P.C., San Antonio, Texas, July, 2002.

“Regulatory Impact Assessment for Proposed Rule Chapter 713 Water Quality; Subchapter A (Definitions) and Subchapter G (Recharge Zone Protection—Phase I Regulated Substance Tank Rules)” prepared for The Edwards Aquifer Authority under contract to Hicks & Co./Kemp Smith, P.C., San Antonio, Texas, June 2002.

“Disposal of Non-Weapons Materials: GTCC Privatization Efforts.” Prepared for Aquila, Inc., July 2001.

“Revised Cost Estimates for Remediation of Contaminated Sites on Cantrell et al. Properties in Johnson and Lawrence Counties, Kentucky (Martha Oilfield)” prepared for the Chandler Law Offices and Spivey-Ainsworth Law Firm, July 5, 2000.

“Final Site Assessment and [14 Day Report] for Maloof Holdings at 100 Industrial Avenue, Albuquerque, N.M.”, prepared for Raymond G. Sanchez and Robert Desiderio. Submitted to the New Mexico Environment Department, UST Bureau, May 19, 2000.

“Disposition of Pre-Subtitle D Landfills”, presented at the SWANA Arid Landfill Symposium, Albuquerque, New Mexico, April 12, 2000.

Preliminary Cost Estimates for Remediation of Contaminated Sites on Cantrell et al. Properties in Johnson and Lawrence Counties, Kentucky (Martha Oilfield)”, prepared for the Chandler Law Offices and Spivey-Ainsworth Law Firm, May 25, 1999.

In Re: APPLICATION FOR SOLID WASTE PERMIT FOR LEA COUNTY REGIONAL LANDFILL BEFORE THE NEW MEXICO ENVIRONMENT DEPARTMENT, Presented Expert Testimony on Land Use and Site Suitability Criteria, Eunice, New Mexico October 15, 2005.

"Permit Application for Lea County Solid Waste Authority Regional Landfill", prepared for Lea County Solid Waste Authority, Lea County , New Mexico, submitted to Solid Waste Bureau, New Mexico Environment Department (NMED), January, 1998 (Permit granted December, 1998).

"Evaluation of Proposed Longo Construction, Inc. Sludge Application Project (27,000 acres) in southern Hudspeth County, Texas", prepared for Harlan Richey, March 1, 1998.

In Re: APPLICATION FOR SOLID WASTE RECYCLING AND DISPOSAL PERMIT FOR CAMINO REAL ENVIRONMENTAL CENTER BEFORE THE NEW MEXICO ENVIRONMENT DEPARTMENT, Presented Expert Testimony on Land Use, Socioeconomics, Demographics, Epidemiological Statistics and Site Suitability Criteria, Sunland Park, New Mexico, June 15, 1997.

"Permit Application for Camino Real Environmental Center Regional Landfill and Recycling Center, (Sunland Park, New Mexico), prepared for RRI, Inc., El Paso, Texas, submitted to Solid Waste Bureau, New Mexico Environment Department (NMED), Nov. 1996. (Permit granted August 1997).

"Changing Patterns in Regulatory Frameworks for Incinerator Technology", presented to National Solid Waste Management Association - Colorado/New Mexico Annual Meeting, Telluride, Colorado, October 11 - 12, 1996.

"Regulation of Incinerator Technology in New Mexico" (joint presentation with New Mexico Environment Department) presented to Interim Committee on Radioactive and Hazardous Waste - New Mexico Legislature, Santa Fe, New Mexico, September 12, 1996.

"Environmental Justice and Landfill Siting in New Mexico", with Hicks & Co. co-author -contract research for C.R.E.C., August, 1996.

"Las Azaleas Constructed Wetlands - Environmental Assessment", prepared for El Paso County, Texas Lower Valley Water District Authority. Submitted to Texas Water Development Board, August, 1994.

"U. S. Bureau of Reclamation as Regional Water Manager - Rio Grande Project", written testimony presented to Senate Sub Committee on Natural Resources (Senator Bill Bradley, Chair) U.S. Senate, Washington, D.C., May, 1994.

"Plainview Independent School District (Hale County, Texas) Redistricting Submission", Prepared for Plainview ISD, Board of Trustees, Submitted to U.S. Department of Justice, Voting Rights Section, August 1993. Pre-clearance Granted.

"Permit Application for Carlsbad/Eddy County, New Mexico Regional Landfill", prepared for Carlsbad/Eddy County, submitted to Solid Waste Bureau, New Mexico Environment Department (NMED), July 9, 1993. (Permit granted 1994).

Nu-Mex Landfill Supplementary Data Report/Documentation of Compliance, Submitted to U.S. Environmental Protection Agency Region 6, Prepared for JOAB, Inc., Sunland Park, New Mexico, May 28, 1993.

"Final Permit Application for Regulated Medical Waste Processing Facility - Albuquerque, New Mexico", prepared for Med Compliance Services, Inc., Submitted to the Solid Waste Bureau, NMED, May 1, 1993. Permit granted January 1994.

"Brownfield Independent School District (Terry County, Texas) Redistricting Submission", Prepared for Brownfield ISD Board of Trustees, Submitted to U.S. Department of Justice, Voting Rights Section, January 1993. Pre-clearance Granted.

"Floydada Independent School District (Floyd County, Texas) Redistricting Submission", Prepared for Floydada ISD Board of Trustees, Submitted to U.S. Department of Justice, Voting Rights Section, December 1992. Pre-clearance Granted.

"Preliminary Site Selection/Site Characterization of Proposed Carlsbad/Eddy County, New Mexico Regional Landfill", Prepared for City of Carlsbad/Eddy County, New Mexico, Submitted to Solid Waste Bureau, NMED, August 10, 1992.

"Draft Permit Application for Bio-Medical Waste Processing Facility - Albuquerque, New Mexico", prepared for Med. Compliance Services, Inc., Submitted to the Solid Waste Bureau, NMED, July 15, 1992.

"Documentation in Support of a Bio-Medical Waste Transfer Facility, Las Cruces, New Mexico", Prepared for Med. Compliance Services, Inc., Submitted to NMED and City of Las Cruces, July 1, 1992.

"Transportation Contingency Plan for Bio-Medical Waste Services", Prepared for Med. Compliance Services, Inc., Submitted to the Solid Waste Bureau, NMED, June 15, 1992.

"Documentation in Support of a Proposal to Provide Bio-Medical Waste Services to the New Mexico Hospital Association", Prepared for Med. Compliance Services, Inc., Submitted to Hospital Services Corporation, May 15, 1992.

"Alternative Redistricting Plans for the City of Brownfield, Texas - City Council Precincts", Prepared for the City of Brownfield, Texas, May 15, 1992. Pre-clearance Granted.

"Alternative Redistricting Plans for the Post Independent School District - School Board Trustee Districts", Prepared for the Post Independent School District (Garza County, Texas), June 30, 1992. Pre-clearance Granted.

"Land Use Analysis of Proposed Sunland Park Annexation of Santa Teresa Commercial District" - Expert Testimony Before the New Mexico Boundary Commission, January 25, 26, 1992 for Santa Teresa Community Development, Inc.

"Border Environmental Issues", Prepared Testimony Delivered to the New Mexico Secretaries of Environment and Economic Development on Potential Border Crossings at Santa Teresa and Sunland Park, New Mexico, Las Cruces, New Mexico, January 14, 1992.

"Terry County Commissioner's Precinct Redistricting Submission", Prepared for Terry County, Texas, Submitted to U.S. Department of Justice, Voting Rights Section, January, 1992. Pre-clearance Granted.

"Environmental Assessment of Proposed Leviton Site", (Airport Business Park at Santa Teresa, New Mexico), prepared for C. L. Crowder Investment Company, Santa Teresa, New Mexico, September 19, 1991.

"Proposal to Replace MCS Incinerator" (to NMED), Prepared for Med. Compliance, Inc., El Paso, Texas, December, 1991.

"Prepared Testimony on Impacts of Buffer Zones in NMED Proposed Solid Waste Rules", Delivered to New Mexico Environmental Improvement Board - Roswell Hearings, November, 1991.

"Special Use Permit Application for Bio-Medical Waste Processing Facility", submitted to Doña Ana County for Med. Compliance, Inc., El Paso, Texas, September 16, 1991.

Summary of Findings for Nu-Mex Landfill Application Hearing, ("New Mexico Environment Department"), Prepared for JOAB, Inc./Med. Compliance, Inc., El Paso, Texas, August, 1991.

"Compliance Schedule for Bio-Medical Incinerator Pursuant to New Mexico Environment Department Air Quality Control Regulation 2020", Prepared for Med. Compliance, Inc., El Paso, Texas, August 1, 1991.

"Air Quality Permit Application for Proposed Microwave Bio-Medical Waste Processing Facility", Submitted to NMED (Air Quality Control Bureau) for Med. Compliance, Inc. El Paso, Texas, August 1991.

"Who Needs an Assessment?" Presented at National Association of Engineering Geologists Annual Meeting, Chicago, Illinois, October 4, 1991.

"Environmental Assessment of Proposed Belen-Rio Grande Railroad Bridge", prepared for Southern Pacific Transportation Company, San Francisco, California, August, 1991.

"Environmental Assessment of Proposed Sparks Water Delivery System", prepared for El Paso County Lower Valley Water District, El Paso, Texas, June, 1991.

"Environmental Assessment (Socioeconomics and Land Use Issues) for Proposed Brownsville Channel Dam", Prepared for Brownsville Water Authority under contract to Horizon Environmental, Brownsville, Texas, February, 1991.

"Environmental Information Documents for Santa Teresa International Project", Prepared for Charles Crowder, Santa Teresa, New Mexico, August, 1990.

"Status Report and Proposed Action -- Fabens Landfill", Prepared for El Paso County Commissioner's Court, El Paso, Texas, March 14, 1990.

"Environmental Assessment of Proposed El Paso County River Park", Prepared for El Paso County, Submitted to Texas Parks and Wildlife Department, January 31, 1990.

"Muleshoe Independent School District Redistricting Submission", Prepared for MISD, Submitted to U.S. Department of Justice Voting Rights Section, January, 1990. Pre-clearance Granted.

"An Evaluation of Alternatives for Providing Water Infrastructure to Unplanned Sub Divisions", Prepared for Presentation at the Conference on Sanitation Problems in the Colonias Sponsored by the Institute of Regional Studies, San Diego State University, October 25, 1989, El Paso, Texas.

"Groundwater Discharge Plan/Extension: Mesquite Site, Doña Ana County, New Mexico", Prepared for Doña Ana County Commissioners, Las Cruces, New Mexico, Submitted to NMED, Santa Fe, New Mexico, August, 1989.

"Testimony Before Special Committee of New Mexico Legislature on Solid Waste Management Problems - Site Selection Criteria on Federal Land", Las Cruces, New Mexico, June, 1989.

"Documentation in Support of Detachment/Annexation of Section 40 from CISD to AISD - Land Use and Socioeconomic Considerations", Prepared for Robert Garrett, Coldwell Banker/Terra Finis, Amarillo, Texas, February, 1989.

"Report of the Special Committee on El Paso City/County Consolidation", Prepared for the El Paso County Commissioner's Court and El Paso City Council, January, 1989.

Written Statement Submitted at Technical Hearings Before the New Mexico Environmental Improvement Division Regarding Proposed New Mexico Solid Waste Management Regulations, Santa Fe, New Mexico, November 17, 1988.

"Mapping Alternatives for Intergovernmental Cooperation in an Environment Characterized by Intergovernmental Conflict", Prepared for Presentation at the American Society for Public Administration, Region VII Conference, El Paso, Texas, November 4, 1988.

"Environmental Information Document (EID) for Water Delivery Plans for the El Paso Lower Valley

(Colonias)", Prepared for the El Paso County Lower Valley Water District Authority (1988) for Submission to U.S. Bureau of Reclamation. (EID Approved by Bureau of Reclamation November 4, 1988).

"Fiscal and Land Use Impact Assessment of Lubbock-Cooper Independent School District Boundary Modification", Prepared for Lubbock-Cooper ISD (Texas), June, 1988.

"Preliminary Market Analysis for General Dynamics/El Paso Sand Facility", Prepared for El Paso Sand, Inc., El Paso, Texas, 1988.

"Comparative Land Use Analysis: Santa Teresa, New Mexico, (2400 Acres)", Prepared for Wilson & McIlvaine, Chicago, Illinois, 1988.

"Site Suitability Study for Superconducting Magnetic Energy Storage System - ETM", Prepared for El Paso Electric Company, El Paso, Texas, 1988.

"Waste Management Plan for Doña Ana County, New Mexico", prepared for Doña Ana County Commissioners, Las Cruces, New Mexico, 1988.

"Groundwater Discharge Plan: Mesquite Landfill Site, Doña Ana County, New Mexico", Prepared for Doña Any County Commissioners, Las Cruces, New Mexico, Submitted to New Mexico Environmental Improvement Division, Santa Fe, New Mexico, 1988.

"Evaluation of Mesa Verde Apartment Project Proposal", Prepared for Paul Lyle & Associates, Plainview, Texas, 1988.

"Southern New Mexico Superconducting Super Collider Site Proposal", DOE Submission, September 1987.

"Far West Texas (Hudspeth County), Superconducting Super Collider Site Proposal", DOE Submission, September, 1987.

"Redistricting Submission (Single Member Election Precincts), Floydada Independent School District", U.S. Department of Justice, Voting Rights Section, 1987. Pre-clearance Granted.

"Preliminary Feasibility Report on Land Use Alternatives - ASARCO El Paso Property", Prepared for Nebyn Peterson & Associates, Houston, Texas, 1986.

"Comprehensive Evaluation of Infrastructure: Sunland Park/Santa Teresa, New Mexico", Prepared for Santa Teresa Associates, Santa Teresa, New Mexico, 1986.

"Preliminary Feasibility Analysis of Land Use Alternatives - Hueco Ranch (50,000 Acre Parcel)", Prepared for R.O. Anderson, Diamond A Cattle Company, Roswell, New Mexico, 1986.

"Feasibility Analysis of Knapp Properties Development - Franklin Mountain Parcels", Prepared for Texas State Attorney General; provided expert land use testimony- In Re: Knapp vs State of Texas (Parks and Wildlife Department), 1986.

"Highway Diversion Channel Modification Study", Prepared for Duke, Inc., Submitted to Army Corps of Engineers, Ft. Worth, Texas, March, 1986.

"Population Projection Update, South Texas Nuclear Power Plant (STP, ER-OL)", Prepared for Houston Light & Power, EH & A Document 1985.

"Montecello-Winfield Mine Area Cultural Resources Model", Prepared for TUMCO, EH & A document, 1985.

"Possum Kingdom Inn and Country Club Feasibility Study", Prepared for Leo Appleby, Mineral Wells, Texas, EH & A Document, 1985.

"Environmental Assessment of Osuna Road Extension", Prepared for City of Albuquerque, EH & A document, 1985.

"Environmental Assessment of Infrastructure Extension on Sandia Pueblo", Prepared for Bureau of Indian Affairs, EH & A Document, 1985.

"Existing Environment of the Region of Interest for LCRA's Proposed Deenville Project (Land Use and Socioeconomics)", Prepared for Lower Colorado River Authority, EH & A Document, 1985.

"Final Report on Pre-Construction Monitoring of Brown Pelican and Migratory Waterfowl Movements Near CP & L's Proposed Laguna Madre Transmission Line", Prepared for Central Power & Light, EH & A Document, 1985.

"City of Brownfield City Council Redistricting Submission", Prepared for Mayor and City Council of Brownfield, Texas, Submitted to U.S. Department of Justice, Voting Rights Section, May, 1985. Pre-clearance Granted.

"Existing Environment of the Region of Interest for LCRA's Proposed Round Top Project, Phase II, Volume I & II (Land Use and Socioeconomics)", Prepared for Lower Colorado River Authority, EH & A Document, 1985.

"Brownfield Independent School District Redistricting Submission", Prepared for BISD, Submitted to U.S. Department of Justice, Voting Rights Section, May, 1985. Pre-clearance Granted.

"Land Use Assessment for Proposed Comanche Peak Nuclear Power Plant Transmission Lines", Prepared for Texas Power & Light, EH & A Document, 1985.

"City of Littlefield City Council Redistricting Submission", Prepared for Mayor and City Council of Littlefield, Texas, Submitted to U.S. Department of Justice, Voting Rights Section, May, 1985. Pre-clearance Granted.

"Littlefield Independent School District Redistricting Submission", Prepared for LISD, Submitted to U.S. Department of Justice Voting Rights Section, February, 1985. Pre-clearance Granted.

"Plainview Independent School District Redistricting Submission", Prepared for PISD, Submitted to U.S. Department of Justice, Voting Rights Section, January, 1985. Pre-clearance Granted.

"Response to the Northwest Area Growth Plan", Prepared for the Austin Chamber of Commerce, EH & A Document, 1984.

"Capital Recovery Fees and the Problem of Equity", Proceedings, Western Governmental Research Association, Palm Springs, California, November 16 - 19, 1984.

"Exhibit E, Land Management, Economic and Recreation Resources", prepared for Brazos River Authority, Morris Sheppard Hydroelectric Dam F.E.R.C. Permit, EH & A Document, August, 1984.

"Environmental Update, South Texas Project (Nuclear Power Plant) (31,400 square miles)", Prepared for Houston Light & Power, EH & A Document, 1984.

"Typology Construction and Case Survey Methodology", Proceedings, Western Social Science Association, San Diego, California, April 27, 1984.

"An Economic and Social Assessment of Industrial Development Potential - Plainview, Texas", Southwest Polimetrics Report, No. 165, April, 1984.

"Market Analysis Inventory - Pioneer Hi-Bred, Intl., Inc.", Southwest Polimetrics Report No. 164, May, 1984.

"Plainview city Council Redistricting Proposal", Southwest Polimetrics Report No. 161, February 1984. Pre-clearance Granted.

"Lamb County Redistricting Submission", Southwest Polimetrics Report No. 160, October, 1983. Pre-clearance Granted.

"Floyd County Redistricting Submission", Southwest Polimetrics Report No. 155, August, 1983. Pre-clearance Granted.

"Swisher County Redistricting Submission", Southwest Polimetrics Report No. 140, June, 1983. Pre-clearance Granted.

"Deaf Smith County Redistricting Submission", Southwest Polimetrics Report. No. 133, April, 1983. Pre-clearance Granted.



"Hale County Redistricting Submission", Southwest Polimetrics Report No. 120, February, 1983. Pre-clearance Granted.

"Terry County Redistricting Submission", Southwest Polimetrics Report No. 101, November, 1982. Pre-clearance Granted.

"Housing Needs in Plainview", HUD Application for Community Development, September, 1982.

"Hale County Redistricting Submission", Prepared for Hale County Commissioner's Court, Submitted to U.S. Department of Justice, Voting Rights Section, November, 1979. Pre-clearance Granted.

"Biomass Transfer Systems", Report to Office of Technology Assessment, August, 1979.

"Rehabilitation Technologies - A Technology Assessment", (Research Associate), Texas Tech Press, Prepared for U.S. Department of Health, Education and Welfare, November, 1978.

"Solid Waste Collection Optimization - A Critical Path Approach", Prepared for City of Plainview, Texas, 1978.