APPENDIX C

REQUEST FOR PROPOSALS

OCTOBER 4, 2013

Consultant Services

for Assistance in the Study of Likely Changes to Oil Industry Practices, Production, Impacts, and Tax Policy in the Foreseeable Future in North Dakota

SUBMITTED TO:
North Dakota Legislative Management

THE Louis Berger Group, INC.

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This proposal includes information that shall not be disclosed outside of North Dakota Legislative Management and shall not be duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of, or in connection with, the submission of this information, North Dakota Legislative Management shall have the right to duplicate, use, or disclose the information to the extent provided in the resulting contract. This restriction does not limit North Dakota Legislative Management's right to use information contained in this proposal if it is obtained from another source without restriction The information subject to this restriction is contained on all pages that follow.

THE Louis Berger Group, INC.

October 4, 2013

Mr. Timothy J. Dawson
Legal Counsel
State Capitol
600 East Boulevard Avenue
Bismarck, North Dakota 58505-0360

RE: Consultant Services for Assistance in the Study of Likely Changes to Oil Industry Practices, Production, Impacts, and Tax Policy in the Foreseeable Future in North Dakota

Dear Mr. Dawson:

As oil production from the Bakken formation continues to unfold, bringing with it increasing infrastructure needs and public service demands, North Dakota's fiscal policy in terms of how well the state collects and distributes tax revenues derived from this production and how the state is capturing wealth to ensure long-term economic benefit is key to sustainable development in the State. We, The Louis Berger Group, Inc. (Louis Berger) are prepared to help the North Dakota Legislature understand what this important economic activity means to the State and how to plan for its continued success. We believe we have the ideal team for this work. We bring the following to the North Dakota Legislative Management for this effort:

- **Full breadth and depth of specialized experience and technical competence:** The team includes Drs. Lisa McDonald, PhD and Holly Bender, PhD, who have the necessary expertise and experience to conduct robust fiscal and economic evaluations of oil and gas operations.
- **In-depth understanding of the oil and gas industry:** Our team brings more than a decade of experience evaluating policies and impacts of the oil and gas industry. This includes evaluation of the socioeconomic implications of oil and gas development activities managed under various Bureau of Land Management resource management plans; extensive evaluation of the economic contribution of the oil and gas industry in Colorado and Wyoming; expertise in understanding some of the fiscal tradeoffs of enhanced oil recovery in Wyoming; and evaluation of oil and gas rules and regulations for the state of Colorado and the National Park Service (NPS).
- **Client and industry-recognized quality:** Our team members have performed studies for both private and government clients that are often times subject to public scrutiny. Our subject matter experts have collectively completed hundreds of technical economic analyses of various issues related to natural resource management, energy development, agricultural operations, water policy analysis, ecosystem restoration, and endangered species protection. Most of these analyses are subject to legal scrutiny and, thus, must be prepared in an objective, technically sound, and defensible manner. In some of these cases, our staff has been asked to prepare oral and written testimony in support of analysis in formal legal proceedings as expert witnesses.

Our philosophy is to provide clients and the public with the best possible value. As part of this approach, we emphasize the federal government's best value principles throughout its operations, giving highly qualified people the tools and initiative to most effectively and efficiently complete their projects.

We look forward to the opportunity to work with you. Please contact proposed project manager Dr. McDonald at 303.985.6613 or lmcdonald@louisberger.com.

Sincerely,

The **Louis Berger Group**, Inc.

Lawrence Pesesky, AICP
Senior Vice President

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Tel 303.985.6600 | Fax 303.984.4942 | www.louisberger.com

Firm Introduction and Key Personnel

FIRM INTRODUCTION AND KEY PERSONNEL

ABOUT THE LOUIS BERGER GROUP, INC.

Founded by Dr. Louis Berger in 1953 in Morristown, New Jersey, The Louis Berger Group, Inc. (Louis Berger), is an internationally recognized consulting firm that provides architectural, engineering, and planning services to clients worldwide. The firm is a devoted and a trusted partner to federal, state, and local government agencies, as well as to private industries. To this diverse client base, Louis Berger brings a strategic vision and an entrepreneurial spirit, developing innovative solutions to some of the world's most challenging problems. The firm partners with its clients to tackle largescale, complex, and controversial projects that require significant stakeholder coordination and facilitation. Louis Berger understands the requirements associated with complex technical endeavors, and maintains the professional resources to provide a solid foundation of analysis and execution to support client's programs and decisions.

WHY THE LOUIS BERGER TEAM?

Louis Berger's capabilities include:

- Fiscal analysis of oil and gas development
- Regional economic analysis
- Infrastructure and public service impacts of oil and gas development programs
- Formulation of economic scenarios
- Sensitivity analysis

The Louis Berger team is keenly aware of the benefits and costs that come with robust oil and gas development. The team has been evaluating the effects of oil and gas development for more than a decade. This includes evaluation of the socioeconomic implications of oil and gas development activities managed under various Bureau of Land Management (BLM) resource management plans; extensive evaluation of the economic and fiscal contribution of the oil and gas industry in Colorado and Wyoming; and evaluation of oil and gas rules and regulations for the state of Colorado and the National Park Service (NPS).

In addition, Louis Berger has evaluated the fiscal implications of providing tax credits to CO2 capture, compression and transport facilities and equipment which will be used for enhanced oil recovery. The Louis Berger team brings unsurpassed expertise to this assignment, including nationally-recognized experts in evaluating the socioeconomic impacts of oil and gas development.

THE LOUIS BERGER TEAM - SERVICE AND VALUE

The Louis Berger Team offers the following to the North Dakota Legislative Management:

KEY PERSONNEL EXPERIENCE SUMMARIES

Louis Berger's key personnel for this project have extensive knowledge and expertise of the oil industry and state government issues. Brief descriptions of the team's key personnel are detailed below, followed by full resumes.

Lawrence Pesesky, AICP | Principal-in-Charge

Mr. Pesesky is senior vice president with Louis Berger and specializes in analyzing the effects of transportation projects. He has more than 26 years of experience in preparing and managing environmental impact statements (EISs), permit applications and related studies. In addition to understanding the technical methodological requirements of such studies, he is also thoroughly familiar with the requirements of environmental laws, including the National Environmental Policy Act (NEPA), the Clean Air Act, and the Clean Water Act. **Mr. Pesesky will serve as principal-in-charge and will provide valuable oversight throughout the contract.**

Lisa McDonald, PhD | Project Manager

Dr. McDonald will serve as project manager for this contract. As a trained natural resource economist, Dr. McDonald has spent the majority of her career conducting or leading social and economic assessments for private industry, state and federal government clients. Her projects have focused on various natural resources related issues, such as recreation and tourism, energy and mineral development, agriculture, water policy analysis, protection of endangered species and ecosystem restoration. She has conducted numerous studies using economic impact analysis, benefit-cost analysis, regulatory impact analysis, fiscal analysis, and market and nonmarket valuation studies. One area of expertise is using IMPLAN, a regional input/output model, to evaluate changes in employment, earnings, and taxes with changes in land use policies.

Holly Bender, PhD | Lead Economist

Dr. Holly Bender will serve as lead economist for this contract. She has more than 16 years of experience in consulting with government agencies and environmental, natural resource, and energy industries and organizations. She has led numerous socioeconomic analyses in support of NEPA compliance for many federal clients, including BLM, NPS, U.S. Forest Service (USFS), U.S. Army Corps of Engineers (USACE), and the Department of Defense-Department of the Navy. Dr. Bender has analyzed social and economic impacts of issues related to oil and gas, grazing, ecosystem and estuary restoration, ecosystem services, recreation, and other land management plans and decisions. She was recently the task lead on the development of Regional Economic System for Federal Spending (RECONS), a USACE nationwide economic impact analysis tool, which analyzes Civil Works spending at regional, state, and national geographies. Supplied by IMPLAN data and multipliers, RECONS was voted as model of the year by the USACE Institute of Water Resources.

Christopher Dixon, AICP | Economic Analyst

Mr. Dixon will serve as economic analyst for this contract. He specializes in social and economic analysis, database management, geographic information system (GIS) analysis, and environmental planning. While at Louis Berger, Mr. Dixon has supported several socioeconomic analysis studies for the NPS, USACE, U.S. Navy, Bonneville Power Administration (BPA), and Federal Energy Regulatory Commission. On these assignments, he has prepared social and economic baseline assessments, including identifying potential EJ populations using U.S. Census Bureau data and GIS software. He has also used his database and GIS skills to evaluate land use changes and impacts to property values.

Leo Tidd, AICP | Environmental Support

Mr. Tidd will provide environmental support on this contract. His work at Louis Berger has been focused on conducting environmental analyses for proposed projects and preparing documents to demonstrate compliance with state and federal environmental laws and regulations. He has been lead author and editor of complex transportation project EISs required as a result of prior environmental litigation. On these projects Mr. Tidd has served as the primary author, synthesizing the work of various technical specialists into a logical and concise narrative that addresses regulatory compliance and documents that the transportation agencies took the requisite "hard look" at environmental issues. In addition, he is responsible for technical environmental analyses on topics that include air quality, noise, and indirect and cumulative impacts. Mr. Tidd has extensive experience and training with transportation-related emissions modeling and dispersion modeling with MOVES2010, CAL3QHC/R and AERMOD, including research at the national level to develop guidance and templates to increase the efficiency of quantitative particulate matter hot spot analysis.

Matthew Jacobs | Model Development

Mr. Jacobs will provide model development for this contract. He is a senior economist with Louis Berger, specializing in market research, regional economics, economic development, and socioeconomics. His experience also includes facilitating economic development planning and business attraction initiatives, smart growth and commercial real estate development. His model development experience includes the Toll Revenue Forecast Model for the Port Authority of New York and New Jersey, and the Transportation Model Update for the New Hampshire Department of Transportation.

LAWRENCE PESESKY, AICP Principal-in-Charge

Mr. Pesesky is senior vice president with Louis Berger, specializing in analyzing the effects of transportation projects. He has more than 26 years of experience in preparing and managing EISs, permit applications and related studies. In addition to understanding the technical methodological requirements of such studies, he is also thoroughly familiar with the requirements of environmental laws, including NEPA, the Clean Air Act, and the Clean Water Act.

FIRM Louis Berger Group

EDUCATION
- MS, Geography
- BS, Agricultural Economics

YEARS OF EXPERIENCE 34
YEARS WITH FIRM 26

RELEVANT PROJECT / WORK EXPERIENCE

National Cooperative Highway Research Program (NCHRP) Project 25-25 Environmental Indefinite Delivery Indefinite Quantity Contract, Washington, DC. Principal-in-charge for the nationwide environmental support contract.

NCHRP Project 20-59 (32), A Transportation Guide for All-Hazards Evacuation. Principal-in-charge for this research effort to develop tools and guidance for transportation and emergency managers.

NCHRP, Estimating the Indirect Effects of Proposed Transportation Projects (NCHRP 25-10). Co-principal investigator of American Association of State Highway and Transportation Officials (AASHTO)-sponsored research designed to develop and test an analytical framework for assessing indirect effects. Developed research plan and supervised research in areas of case law, published literature, regulations and procedures, and EISs. Interviewed transportation and environmental agency officials on the topic throughout the United States. Synthesized research findings into framework.

AASHTO, Center for Environmental Excellence. The Center is funded by state departments of transportation (DOTs) and the Federal Highway Administration (FHWA) to advance environmental analysis best practices. Mr. Pesesky is a Center-designated expert in the topic areas of Indirect Effects and Cumulative Impacts, and Land Use. He has provided support to the Center through the development of a practitioners' handbook and project-specific advisory services.

New Hampshire DOT, I-93 (Salem to Manchester) Transportation Improvements Supplemental EIS. Principal-in-charge and project manager responsible for preparing the supplemental environmental document in response to a court order. Major issues addressed in this update to the 2004 FEIS include the effects of the project on growth and related effects on traffic and air quality on secondary roads. The record of decision (ROD) was issued in September 2010.

Vermont Agency of Transportation, Circ-Williston Transportation Project EIS/ Preliminary Engineering, Chittenden County, Vermont. Principal-in-charge and project manager for the studies that constitute a "fresh look" at this controversial highway project of regional and statewide importance. The project has involved extensive public involvement and interagency coordination which has built consensus around the identified needs and the alternatives meriting detailed analysis in the EIS and Preliminary Engineering. The ROD was issued in May 2011.

LISA MCDONALD, PHD Project Manager

As a trained natural resource economist, Dr. McDonald has spent the majority of her career conducting or leading social and economic assessments for private, state, and federal government clients. Her projects have focused on various natural resources related issues, such as recreation and tourism, energy and mineral development, agriculture, water policy analysis, protection of endangered species and ecosystem restoration. She has conducted numerous studies using economic impact analysis, benefit-cost analysis, regulator impact analysis, fiscal analysis, and market and nonmarket valuation studies. One area of expertise is using IMPLAN, a regional input/output model, to evaluate changes in employment, earnings, and taxes with changes in land use policies.

FIRM Louis Berger Group

EDUCATION

- PhD, Mineral Economics
- MS, Mineral Economics
- BS, Earth Science

YEARS OF EXPERIENCE 20
YEARS WITH FIRM 5

RELEVANT PROJECT / WORK EXPERIENCE

Wyoming Heritage Foundation. Principal investigator. Conducted a fiscal analysis of oil and gas activities in Wyoming during 2007. The analysis was part of a larger study that evaluated the economic contribution of the industry to the State of Wyoming.

Denbury Resources, Analysis of Tax Policies Affecting CO2 Capture and Utilization in Wyoming. Principal investigator. Leading the analysis of various tax policies that apply to the capture of CO2 from anthropocentric sources for utilization in enhanced oil recovery. The evaluation will compare the property tax obligations on capture, treatment, compression and transportation equipment.

Bureau of Land Management (BLM), Pinedale and Rawlins Resource Management Plan and EIS, Wyoming. Principal investigator. Dr. McDonald worked with the BLM to develop both a Resource Management Plan and EIS for the Pinedale and Rawlins Field Offices in Wyoming. As part of the NEPA process, she developed the Socioeconomic Baseline Report for both areas which describes the current management practices, laws and regulations concerning these public lands. In addition, for each of these projects she directed the socioeconomic impact analysis associated with changes in grazing, oil and gas development and recreation as required for the EIS which included economic impact modeling using an I/O model.

BLM, Jack Morrow Hills, Coordinated Activity Plan and EIS, Wyoming. Principal investigator. As part of the NEPA process, Dr. McDonald completed the socioeconomic analysis for supplemental coordinated activity plan/EIS for the Jack Morrow Hills planning area, Wyoming for the BLM. Her tasks include describing the economic impacts of various alternatives associated with changes in grazing, oil and gas development and recreation estimated with an Input/Output Model, developed by the University of Wyoming. She also researched other implications of changed management in the Jack Morrow Hills including environmental justice and social issues.

Colorado Energy Research Institute, Colorado School of Mines. Project manager. Ms. Mcdonald served as project manager of a study to evaluate the full economic contribution of the oil and gas industry in Colorado. She was responsible for leading a team of economists in validating model parameters in a readily available I/O model with local industry data to specify a model for Colorado. The customized model was then utilized to estimate current economic contributions for different regions of the state. Finally, a site-specific fiscal model for high production areas in the state was developed to determine the economic contribution of the industry to various government entities.

Evaluation of Volatile Organic Compounds from Oil and Gas Operations. Dr. McDonald completed a regulatory impact analysis of regulations focused on the emissions of volatile organic compounds (VOCs) which are subject to Regulation No. 7, Section XVI.C.4, promulgated by Colorado Air Quality Control Commission. The analysis considered the cost estimates associated with pollution control equipment on lean burn RICE operating in the 8-hour Ozone Control Area, as required by Colorado Air Quality Control Commission, Regulation No. 7, Emission of Volatile Organic Compounds (VOC). Upon completion of her analysis, Dr. McDonald completed written and oral testimony presented to the Commission.

BLM, White River Field Office, Colorado. Project manager. Dr. McDonald managed both field crews and geospatial technicians in the collection and organization of route information and data that will be the basis for a Comprehensive Travel Management Plan. The adequate inventorying of routes in the study area was integral to the success of the travel management planning. In her role, she was responsible for ensuring high quality and consistency in the delivery of a high-caliber geospatial product and a strict adherence to project objectives by implementing a clear plan to implement field activities.

Boulevard Associates, LLC (Boulevard), Sonoran Solar Energy Project. Project manager. Led the socioeconomic assessment of the Sonoran Solar Energy Project in Maricopa County, Arizona. The SSEP would be located almost entirely on BLM administered land in the Little Rainbow Valley. The evaluation provided a description of existing socioeconomic conditions of the study area and an evaluation of all socioeconomic impacts (positive and negative) of developing and operating the solar facilities. In addition an EJ analysis was completed to determine if any EJ populations are present within the study area that could be potentially impacted by the proposed development and operation of the solar project.

Rocky Mountain Power. Principal investigator. Completing a socioeconomic impact analysis of the Sigurd to Red Butte No. 2 Transmission Line Project in Utah. The analysis evaluated current socioeconomic baseline conditions in seven counties in central and southwest Utah covering 23,000 square mile study area and will estimate impacts of a proposed overhead transmission line. The socioeconomic analysis will be integrated within a larger EIS as required by NEPA.

Rocky Mountain Power. Principal investigator. Completed a socioeconomic impact analysis of the Mona-Quirrh Transmission Line in north central Utah. The analysis evaluated current socioeconomic baseline conditions in the 1,700 square mile study area and estimated impacts of a proposed 500/345kV overhead transmission line and two new 500/345kV substations. The socioeconomic analysis was integrated within a larger EIS as required by NEPA.

Energy Fuels Resources. Principal investigator. Completed a socioeconomic impact analysis of the proposed Piñon Ridge Uranium Mill in western Colorado. The proposed mill will be located in a rural region of Montrose County near the town of Naturita. The analysis described the socioeconomic baseline conditions of the 80 km study area and estimated social and economic impacts of the proposed mill as required by the State of Colorado.

BLM, Pinedale and Rawlins Resource Management Plan and EIS, Wyoming. Principal investigator. Dr. McDonald worked with the BLM to develop both a RMP and EIS for the Pinedale and Rawlins Field Offices in Wyoming. As part of the NEPA process, she developed the Socioeconomic Baseline Report for both areas which describes the current management practices, laws and regulations concerning these public lands. In addition, for each of these projects she directed the socioeconomic impact analysis associated with changes in grazing, oil and gas development and recreation as required for the EIS which included economic impact modeling using an I/O model.

USFWS, Socioeconomic Impact Analysis, Chenier Plain National Wildlife Refuge, Texas. Project manager. Dr. McDonald directed an analysis of the socioeconomic impacts associated with two proposed actions of the USFWS associated with the Chenier Plain National Wildlife Refuge Complex in southeast Texas which is the subject of an upcoming EIS. The goal of this EIS is to evaluate the overall human and natural environment impacts of implementing alternative management strategies and acquiring up to 108,000 acres of additional coastal habitat. The comprehensive socioeconomic analysis will focus on potential economic, fiscal and social impacts in local areas from FWS actions and provide important sections for the EIS.

HOLLY BENDER, PHD Lead Economist

Dr. Bender has 16 years experience in consulting with government agencies and natural resource related industries. Her primary knowledge areas include socioeconomic analysis, economic impact analysis and input-output modeling, EJ analysis, stakeholder analysis, benefit cost analysis, econometric analysis, and survey research. She has recently led a project for Boulevard Associates and the BLM to analyze the socioeconomic baseline, impact analysis and EJ assessment of the development and operation of a solar thermal power plant southwest of Phoenix. Dr. Bender has conducted a number of socioeconomic and EJ analyses for BLM, EPA, NPS, USACE, and for USFS in NEPA compliance and was lead socioeconomic analyst for the considerable natural gas development for the Pinedale, Wyoming, Field Office EIS/RMP. She is part of a team leading and guiding the social, cultural, and economic analysis associated with the Missouri River Ecosystem Restoration Plan. Dr. Bender has also been a lead analyst for numerous projects funded through the USFS Rocky Mountain Research Station assessing public's views, values, attitudes and perceptions related to the use and management of the national forests.

FIRM Louis Berger Group

EDUCATION
- PhD, Mineral Economics
- MS, Mineral Economics
- BA, Economics and Political Science

REGISTRATIONS / CERTIFICATIONS
- Advanced IMPLAN Economic
- Impact Analysis, 2006

YEARS OF EXPERIENCE 16
YEARS WITH FIRM 4

RELEVANT PROJECT / WORK EXPERIENCE

Basin Electric and Rural Utility Services, Socioeconomic Sections of the EIS for the Antelope Valley Transmission Line. Technical lead. Basin Electric is currently developing an Environmental Impact Statement for two 345-kV transmission line segments. The first is line segment is approximately 130 miles long and goes from the Antelope Valley Power Station near Beulah, North Dakota to the Williston, North Dakota substation. The second line segment is approximately 60 miles long and goes from the Williston, North Dakota substation to the Tioga, North Dakota substation. Dr. Bender has developed the socioeconomic sections for the EIS, which includes impacts of the Project on workforce, population, housing, property values, property taxes, public services (police, medical facilities, schools, etc.). The current oil boom in the area could incrementally stress the housing situation and public services associated with the project; mitigating measures have also been described to lessen the impact to the region.

Denbury Resources, Analysis of Tax Policies Affecting CO2 Capture and Utilization in Wyoming. Lead economist. The project the evaluation of the fiscal tradeoff associated with capture, compression, and distribution of carbon dioxide for its use in enhanced oil recovery. Dr. Bender evaluated the fiscal tax receipts associated with property taxes on carbon capture, compression, and distribution equipment and those associated with tertiary production with enhanced oil recovery for the State of Wyoming to better understand the tradeoffs associated with a pollution control property tax exemption for this carbon capture equipment.

Boulevard, Socioeconomic Baseline and Impact Assessment, Sonoran Solar Energy Project. As a subconsultant to EPG, Dr. Bender recently submitted the socioeconomic baseline and impact assessment of the SSEP located on BLM lands in Maricopa County, Arizona southwest of Phoenix. The analysis included baseline assessment and impacts related to population, housing, wages and income, employment and workforce assessment, public services, schools, fiscal resources, and EJ populations. The IMPLAN model was utilized to assess both construction and operational employment, income, and gross regional product impacts. The EJ analysis to showed that lower income populations existed to the northeast of the project; potential disproportionate and adverse impacts were also analyzed.

The Louis Berger Group, USACE, Institute of Water Resources, RECONS for The Louis Berger Group, Estimating Jobs and other Economic Impacts of USACE Economic Stimulus and Civil Works Spending on National and Regional Economies. Dr. Bender was a technical lead on a project that developed an economic impact tool, Regional ECONomic System (RECONS), to evaluate national and regional economic impacts of expenditures associated with USACE Civil Works and American Recovery and Reinvestment Act (ARRA) projects. Deployed in both an online and desktop interface, the model provides an accurate and defensible assessment of the regional economic impacts (jobs, income, sales) of $4.6 billion in ARRA expenditures allocated

to the USACE for recreation, navigation, water supply, and restoration projects, among others. RECONS data includes over 1,300 pre-built study areas (based on OMB-defined metropolitan, micropolitan, and rural regions) from IMPLAN's county-level databases. RECONS won the Institute of Water Resources Model of the Year in 2011.

Rocky Mountain Power, Socioeconomic Baseline Assessment of the Gateway South Transmission Line. As a subconsultant to EPG, Dr. Bender is currently analyzing the socioeconomic baseline of the Gateway South Transmission Line. The proposed line is a 500-kV AC (alternating current) transmission line starting in Wyoming (moving through northwestern Colorado) and going to central Utah, then extending through southwestern Utah into Nevada. Several route configurations are being considered, including a reference case capable of delivering up to 3,000 megawatts. The target in-service date is 2014. The project area is partially located within 17 counties. Socioeconomic sections have been submitted for inclusion in the draft EIS.

Booz Allen Hamilton, BLM, Socioeconomics for the development of EIS/RMP for the Pinedale Field Office. Dr. Bender was recently the lead socioeconomist conducting the Socioeconomic Affected Environment and the Environmental Consequences analysis associated with considerable increases in natural gas development and production for the Pinedale Field Office, Wyoming. A regional economic model, IMPLAN, was used to determine labor income, employment and Gross Regional Product changes to this area as a result of the proposed BLM alternatives. Other socioeconomic indicators were also analyzed, including demographics, personal income, population, crime, traffic, industry mortality rates, quality of life, community stability, boom and bust cycles, and many others. Additionally impacts to non-market values were also assessed qualitatively.

Booz Allen Hamilton, EPA Region 8 and Bureau of Indian Affairs—Environmental Impact Analysis and Associated EJ Tier 1 Analysis. Dr. Bender advised and contributed to an EJ analysis for the Affected Environment and Impact Analysis for the Final EIS and the supplemental Tier 1 EJ analysis for the Three Affiliated Tribes Clean Fuels Refinery on tribal lands. This included an assessment of the potential disproportionate and adverse environmental, human health, and socioeconomic impacts to minority and low income populations residing within the study area as a result of the refinery.

Wyoming and Colorado Oil and Gas Economic Contribution Studies. Dr. Bender led two projects to estimate the economic contribution of oil and gas activities in Wyoming and Colorado. This included a significant data collection effort from operators and service companies across the states for information related to well development investments and private mineral royalties payments. The IMPLAN model was customized and used to determine the direct, indirect and induced economic impacts of production and development activities. A fiscal model was created to assess the sales and use tax receipts of oil and gas activities. Additionally, extraction tax information was collected from state and Federal government sources (for example, the Minerals Management Service, the WY Department of Revenue) to estimate the jobs and income associated with these tax receipts to State and local government units.

CHRISTOPHER DIXON, AICP Economic Analyst

Mr. Dixon specializes in social and economic analysis, database management, GIS analysis, and environmental planning. While at Louis Berger, Mr. Dixon has supported several socioeconomic analysis studies for the NPS, USACE, U.S. Navy, BPA, and Federal Energy Regulatory Commission (FERC). Mr. Dixon has prepared numerous social and economic baseline assessments, which involved gathering and analyzing socioeconomic baseline information, assessing local and regional socioeconomic impacts, and identifying potential environmental justice populations using U.S. Census data and GIS software and through conducting interviews. He has also used his database and GIS skills to evaluate land use changes and impacts to property values. Mr. Dixon has also met with Native American Tribes throughout the Missouri River Basin to discuss the socioeconomic consequences of the restoration of the Missouri River on these tribes. He has worked with economic models to determine the social and economic impacts of project-related spending for projects for both the Army and Navy.

FIRM Louis Berger Group

EDUCATION

- MURP, Urban and Regional Planning
- MBA, Business Administration
- BS, Environmental Economics and Management

YEARS OF EXPERIENCE 4
YEARS WITH FIRM 3

RELEVANT PROJECT / WORK EXPERIENCE

Evaluation of Volatile Organic Compounds from Oil and Gas Operations. Mr. Dixon assisted in gathering data and compiling industry survey responses on the possible impact of regulations focused on the emissions of volatile organic compounds (VOCs) which are subject to Regulation No. 7, Section XVI.C.4, promulgated by Colorado Air Quality Control Commission. The analysis considered the cost estimates associated with pollution control equipment on lean burn RICE operating in the 8-hour Ozone Control Area, as required by Colorado Air Quality Control Commission, Regulation No. 7, Emission of Volatile Organic Compounds (VOC). As a part of this project, Mr. Dixon contacted a number of industry service providers and equipment manufacturers to obtain detailed information on air quality monitoring services and equipment that could be associated with this regulation.

USACE, Hangar EIS, Fort Wainwright, Alaska. Planner. Mr. Dixon was the lead author of the socioeconomic analysis section of the Environmental Impact Statement for the disposition of Hangars 2 and 3 on Ft. Wainwright. He has collected and analyzed socioeconomic information about the project area and consulted with cultural historians to determine the economic impact of retaining or removing historic structures.

USACE, Oswald U.S. Army Reserve Command (USARC) Reuse EA. Planner. Mr. Dixon was the lead author for the socioeconomic section of the EA for the Oswald USARC in northeastern Washington State. Using the USACE's Economic Impact Forecasting System, he analyzed and described the socioeconomic impacts that were forecast to occur as a result of this project.

USACE and U.S. Fish and Wildlife Service, Missouri River Ecosystem Restoration Plan. Planner. Mr. Dixon has supported the Missouri River Ecosystem Restoration Plan in a number of ways. He collected and analyzed considerable socioeconomic data for the 100 counties along the mainstem of the River for the baseline assessment. He designed a database to organize, collect and update socioeconomic and environmental justice data for this project. Mr. Dixon participated in the Tribal outreach team which discussed the social, cultural, and economic implications of the Missouri River restoration with 15 Tribes. He also categorized the Tribal comments into themes and issues, and documented these Tribal Perspectives in a report for the project's lead agencies.

U.S. Army Environmental Command (USAEC), Net Zero EIS, Fort Bliss, Texas. Planner. Mr. Dixon was the lead author of the socioeconomic analysis section of the Fort Bliss Net Zero Environmental Impact Statement for the implementation of policies, procedures, and practices that would allow Fort Bliss to have a net zero impact electrical, water, and waste systems. As a part of this analysis, Mr. Dixon determined both the socioeconomic and Environmental Justice impacts that would arise from the implementation of these systems at Fort Bliss.

FERC, EA for Application for Amendment of License, Shoreline Management Plan. Planner. Mr. Dixon collected relevant data and characterized the Affected Environment section of the draft EA. He also supported the socioeconomic impact analysis, which included an assessment of the evacuation of 400 mobile home and condominium owners on Crescent Bar Island in central Washington State on the Columbia River. As part of this analysis, he assessed impacts associated with lease payments, property and leaseholder taxes, visitor and household spending, health and safety public services, and implementation costs.

BPA, Hooper Springs Substation and Transmission Line EIS. Planner. Mr. Dixon supported the data collection, analysis, and writing of the draft Socioeconomic Resource Report for the construction and operation of the Hooper Springs Substation and Transmission Line in southeastern Idaho which transverses private, USFS, and BLM lands. Issues of concern that were analyzed included: construction workforce analysis, population, housing, agricultural production, recreation and tourism, EJ, property values, fiscal resources, and public services.

NPS, Herring River Dike Removal EIS, Cape Cod National Seashore, Massachusetts. Planner. Mr. Dixon played a support role in collecting information for describing the Affected Environment, which included considerable GIS analysis to identify properties, structures and other landscaping and infrastructure that could potentially be affected by restoring tidal exchange in the Herring River. He has held interviews with shellfishing and finfishing experts to identify the expected beneficial impacts associated with improving water quality in the Wellfleet Harbor associated with this project. He has also analyzed property value impacts associated with improving open-water viewscape in the region.

LEO TIDD, AICP Environmental Support

Mr. Tidd's work at Louis Berger has been focused on conducting environmental analyses for proposed projects and preparing documents to demonstrate compliance with state and federal environmental laws and regulations. He has been lead author and editor of complex transportation project EISs required as a result of prior environmental litigation. On these projects Mr. Tidd has served as the primary author, synthesizing the work of various technical specialists into a logical and concise narrative that addresses regulatory compliance and documents that the transportation agencies took the requisite "hard look" at environmental issues. In addition, he is responsible for technical environmental analyses on topics that include air quality, noise, and indirect and cumulative impacts. Mr. Tidd's transportation air quality and/or noise experience includes a new connector roadway to the Atlantic City International Airport, a greenhouse gas emissions analysis for a four mile new highway and bridge in Vermont, and a regional emissions sensitivity analysis for a 20-mile interstate widening in New Hampshire. Mr. Tidd has extensive experience and training with transportation-related emissions modeling and dispersion modeling with MOVES2010, CAL3QHC/R and AERMOD, including research at the national level to develop guidance and templates to increase the efficiency of quantitative particulate matter hot spot analysis. Mr. Tidd has also completed training on FHWA's latest Traffic Noise Model (TNM2.5) and FTA's transit noise and vibration impact assessment procedures.

FIRM Louis Berger Group

EDUCATION
- MPA, Environmental Science and Policy
- BS, Environmental Studies

REGISTRATIONS / CERTIFICATIONS
- American Institute of Certified Planners

YEARS OF EXPERIENCE 7
YEARS WITH FIRM 7

RELEVANT PROJECT / WORK EXPERIENCE

BPA, Hooper Springs EIS, Idaho. Task manager. Mr. Tidd prepared the air quality resource report for the Hooper Springs EIS, which is examining alternatives to help Lower Valley Energy improve the stability and reliability of the transmission system in southeastern Idaho. Mr. Tidd identified the relevant airsheds and assessed air quality monitoring data to characterize the affected environment. Operation and construction phase air quality impacts were assessed qualitatively. The cumulative impact assessment prepared by Mr. Tidd considered the impacts from various federal land management plans in the study area and phosphate mining and processing.

Natural Resources Defense Council. Review and Preparation of Comments on NYSDEC's Hydrofracking SGEIS. Task manager. Mr. Tidd was the lead author of a report summarizing the findings of a team of technical experts commenting on New York's hydraulic fracturing environmental review on behalf of a coalition of environmental groups. Mr. Tidd also wrote technical comments on the SGEIS covering topics such as noise, vibration, visual impacts, land use, transportation and community character. A key objective in the development of the comments was to not simply criticize the environmental document, but rather to suggest constructive and practical solutions to remedy the deficiencies identified.

NPS, Yellowstone National Park Winter Use Plan/EIS, Wyoming, Montana and Idaho. Planner. Mr. Tidd wrote the EIS sections addressing the impacts of various levels of snowmobile and snowcoach use on air quality, visibility and natural soundscapes as part of the Yellowstone Winter Use Plan 2011 DEIS. Using modeling performed by the NPS Natural Sounds Program and ARS, Mr. Tidd assessed air quality and visibility impacts consistent with the criteria in NPS's Technical Guidance on Assessing Impacts to Air Quality in NEPA and Planning Documents. One key challenge in this effort was identifying the potential for cumulative impacts from actions by others, including oil and gas development in the region, aircraft overflights, and population growth/land development. Mr. Tidd is currently documenting the air quality and soundscapes topics for the Yellowstone Winter Use Plan 2012 SEIS. 2010-2012. 3,472 square miles.

U.S. Army, Real Property Master Plan for the Presidio of Monterey Installation, Monterey, California. Planner. Mr. Tidd provided an independent technical review of EIS noise analyses prepared by another contractor and implemented the suggested revisions to increase the accuracy and defensibility of the environment review document.

Montana Department of Transportation, Assessing the Extent and Determinates

of Induced Growth. Project manager. Mr. Tidd is leading a research study to develop screening criteria and a detailed methodology for assessing indirect land use effects in Montana. The indirect effects guidance will reduce the time spent attempting to determine the appropriate level of analysis and methodology appropriate to the project context. It will also assist practitioners with locating the relevant data, saving time and money during the environmental review process.

Alabama Department of Transportation, Birmingham Northern Beltline Indirect Effects and Cumulative Impacts Technical Report, Alabama. Editor. Contributing author and editor of a technical report evaluating the potential indirect and cumulative environmental impacts of a four-lane, 52-mile, limited-access expressway facility proposed by the Alabama DOT to complete a circumferential route around the City of Birmingham. Authored key sections of the document and revised the document in response to comments to the satisfaction of Alabama Department of Transportation (DOT) and FHWA.

Monmouth County, Transportation Audit and Sustainable Transportation Plan, Monmouth County, New Jersey. Task manager. Mr. Tidd used ICLEI's Clean Air and Climate Protection Software (CACP 2009) as part of an inventory of Monmouth County's transportation-related greenhouse gas emissions. The inventory of county government is being conducted in accordance with the recently released Local Government Operations Protocol Version 1.1. As part of this study, Louis Berger is developing recommendations for reducing greenhouse gas emissions from county vehicles and services.

NPS, Lake Meredith National Recreation Area Off-Road Vehicle Management Plan EIS, Texas. Planner. Mr. Tidd wrote the EIS chapter describing the existing condition of natural soundscapes within two ORV areas based on monitoring data of percent time audible and sound levels. Mr. Tidd contributed to the development soundscapes impact thresholds for the various action alternatives under consideration in the management plan and prepared the soundscapes impact assessment section of the EIS based on modeling conducted by others.

MATTHEW JACOBS Model Development

Mr. Jacobs is a senior economist with Louis Berger, specializing in market research, regional economics, economic development, and socioeconomics. His experience also includes facilitating economic development planning and business attraction initiatives, smart growth and commercial real estate development.

FIRM Louis Berger Group

EDUCATION

- MS, Political Economy and Development
- BS, Business Management and Marketing

YEARS OF EXPERIENCE 14
YEARS WITH FIRM 4

RELEVANT PROJECT / WORK EXPERIENCE

Port Authority of New York and New Jersey (PANYNJ), Toll Revenue Forecast Model, City, New York and New Jersey. Economist. Created long- and short-term forecasts which adjusted future traffic flows for price sensitivity based on new pricing schedules for interstate crossings. Project involves evaluation of time-series traffic and regional economic indicator data in order to construct a functional model of traffic and revenue. Maintain the design and process of an automated spreadsheet-based toll revenue forecasting model to assist PANYNJ staff in projecting toll revenue on six interstate bridge and tunnel crossings connecting New Jersey and New York City. Update and maintain data processing routines to produce detailed monthly reports and three-year short-term forecasts summarizing revenue by mode, toll plaza, payment method, and time of day.

New Hampshire Department of Transportation and FHWA, New Hampshire Transportation Model Update, City, New Hampshire. Senior economist. Assisted in updating the New Hampshire Transportation Model utilizing GIS based analysis of changes to land use patterns. The analysis included specific parcel level data of proposed interchanges and calculating the induced employment shifts caused by the proposed interchanges. The number of land acres that would be required to support employment growth was calculated using employment forecasts and municipal regulations governing land use and development. The generated employment forecasts were then incorporated into the NHDOT's statewide traffic network model.

Metropolitan Washington Airports Authority, Economic Impact, Washington, DC. Senior planner/economist. Estimating the economic contribution of Washington Dulles and Reagan National Airports, the Dulles Toll Road operation, and the construction activity associated with the MetroRail Project to the regional and state economies in 2009. Visitor spending impacts and airport related impacts of firms utilizing the airport for air freight shipments are considered. Specific tasks include conducting economic development survey of the region, creating a demographic profile, and estimating tax impacts of Metropolitan Washington Airports Authority activity.

USACE, Economic Impact of USACE Stimulus Spending, Nationwide. Economist. Estimating economic impact of the spending of the $4.6 billion appropriated for USACE Civil Works Program by the American Recovery and Reinvestment Act. Analysis will involve customization of the IMPLAN input-output modeling system to estimate the impact of more than 800 projects on national, state and regional economies. Desktop and online tools will be developed to allow USACE users throughout the U.S. to estimate the economic impact of American Recovery and Reinvestment Act (ARRA) spending and spending related to other USACE projects. Responsibilities focused on the Formerly Utilized Sites Remedial Action Program (FUSRAP) projects.

St. Louis County, Energy Efficiency and Conservations Strategy, St. Louis, Missouri. Senior economist. Conducted program and project selection strategy to produce the top performing projects to complete the Department of Energy's Energy Efficiency and Conservation Strategy (EECS). Performance metrics included greenhouse gas reduction, employment creation, and energy cost savings. The selection process involved creating a defensible methodology and tool to assist the client in weighting their sustainability planning priorities, grading the projects, then

ranking the projects based on their ability to meet the weighted criteria. In addition, we provided employment impact estimates for each of the projects being evaluated and provided an economic development strategy for creating a stronger green economy in the region.

DCOP, BRAC Study, Walter Reed Medical Center, Washington, DC. Senior economist. Completed an economic impact report of the closing of the Walter Reed facility on the District of Columbia. The study included a market analysis of the neighborhoods and Wards which included retail sales leakage, business counts, and demographic profiles. The impacts were measured by using the BEA RIMS Input Output model which was adjusted by several different primary and secondary sources to reflect specific qualities of the impacts to the region and the District specifically. The analysis also provided the District of Columbia's Office of Planning with a comprehensive assessment of the economic impacts associated with other BRAC base relocations on the District, Ward, and neighborhood levels.

Economic Partnership and the District of Columbia Office of Planning, Green Collar Jobs Demand Analysis, Washington, DC. Senior economist. Developed estimates of future demand for green collar jobs resulting from Washington, DC's Green Building Act and other green initiatives and programs. Created detailed profiles of occupations arising from green initiatives, including education, training, skills requirements and wage levels. The demand model, along with training and user guides, was handed off to the WDCEP and DC Office of Planning (DCOP) for use as a tool to support both workforce development programming and green economic development efforts. Also created a report on best practices of programs focused on green industries, green collar workforce development, and on bringing hard to employ populations into the workforce.

New York City Economic Development Corporation and New York City Mayor's Office, PlaNYC 2030 Employment Impact Study, New York, New York. Senior economist. Completed an analysis of the employment impacts generated by the Mayor of New York City's PlaNYC, a plan outlining environmentally friendly development strategies for New York City. The study was comprised of 65 individual initiatives and projects encompassing land use, the city's water network, water and air quality, transportation, and energy. The analysis for each initiative was generated by conducting interviews and reviewing capital and operations budgets. The study measured both the direct and indirect impacts of each initiative and provided an occupational profile of permanent employees.

South Jersey Transportation Authority, Energy Management Plan, City, New Jersey. Senior economist. In continuation with Louis Berger's energy audit of South Jersey Transportation Authority (SJTA), the planning process facilitates rapid and thorough analysis of energy conservation opportunities at ACY International Airport and other SJTA operations. The plan includes a framework for greening the airport's vehicle fleet. The plan resulted in programs that improve energy efficiency and conservation and work towards attaining goals and action items set forth in the New Jersey State Energy Master Plan, resulting in greenhouse gas emission reductions, lower energy costs and a boost in sustainability initiatives. As significant portion of the plan focused on funding sources through federal, state, local, and utility providers to assist in covering capital costs for the planned projects and gain revenue sources after the project is completed.

Project Approach

PROJECT APPROACH

Production from the Bakken has surged in the past decade, and North Dakota has surpassed California and Alaska now producing the second largest amount of onshore oil in the United States behind Texas. Production has occurred primarily in five counties in the western part of the State and has been concentrated where the resource is most accessible and where existing technology is best suited to extract the resource. As oil production from the Bakken formation continues to unfold, bringing with it increasing infrastructure needs and public service demands, North Dakota's fiscal policy in terms of how well the State collects and distributes tax revenues derived from this production and how the State is capturing wealth to ensure long-term economic benefit is key to sustainable development.

The following section outlines Louis Berger's approach in helping the North Dakota Legislature understand what this important economic activity means to the state and how to plan for its continued success.

TASK 1 – KICK-OFF MEETING

A kick-off meeting is an important first step to establish a plan for coordinating efforts between the North Dakota Legislative Management and Louis Berger. To this end, Louis Berger proposes a half-day meeting that will be structured to establish internal project communication and coordination procedures and to advance the work required in subsequent tasks. Important topics to be discussed include:

- Establish a common understanding about the study approach and methodology;
- Establish procedures and processes for managing the volume and flow of information and work products;
- Identify a structure for collaboration and coordination across various levels of the project and among key staff to maintain situational awareness throughout the life of the project;
- Define the frequency and method(s) of providing status updates on project execution;
- Refine and finalize the proposed work plan, including schedule of key milestones and deliverables; and
- Additional topics as needed.

Louis Berger recommends the kick-off meeting be held in person with web-based capability provided by the firm to facilitate off-site participation if necessary. The firm will work with North Dakota legislative staff to arrange a location for the kickoff meeting. Louis Berger will also provide a draft agenda to the project manager for initial review and input and will incorporate feedback received in a final draft to be submitted to meeting participants at least three days prior to the kick-off meeting. The team will provide staff to take meeting notes and will provide summaries of all meeting documentation to team members no more than one week after the kick-off meeting.

TASK 2 – EVALUATION OF TAX STRUCTURE RELEVANT TO OIL AND GAS OPERATIONS.

Describing in detail the North Dakota tax structure, incentives, deductions, and distributions is key to understanding the baseline conditions relevant to assess any changes needed in fiscal policy for oil and gas development and production in North Dakota. As such, this task will focus on:

- Evaluate North Dakota's tax policies and incentives for oil and gas operations and activities
- Identify distributions and beneficiaries of tax revenues
- Provide case studies from other states, such as Wyoming, Colorado, Montana, and others
- Suggest changes in taxing policies for oil and gas activities, as necessary

This task will initially evaluate the current tax polices related to oil and gas production in the state. What is known to date is that North Dakota currently charges a gross production tax on gas and oil, and these rates are revised annually. In addition, an oil extraction tax is levied on the extraction of oil from the earth, based on the gross value; there are reduced rates and exemptions for qualifying wells, including those in the Bakken formation.

There are various reduced rates and/or exemptions for new vertical and horizontal wells, new wells drilled on Indian land, workover wells, stripper wells, two-year inactive wells, horizontal reentry wells, enhanced recovery wells, and qualifying Bakken formation wells. These reduced rates and exemptions will be identified and described. Based on the past decade of production, Louis Berger will evaluate the effects of these incentives and reduced rates on development and production activity.

Approximately 30 percent of gross production tax revenues are deposited in the State Legacy Fund, and the remainder are distributed, via formula, to the Oil and Gas Impact Fund and political subdivisions within state, including State General Fund. 30 percent of the revenues from the extraction tax are credited to Legacy Fund, and the remaining revenues are allocated as follows:

- 20 percent credited to Resource Trust Fund
- 10 percent credited to Common Schools Trust
- 10 percent credited to Foundation Aid Stabilization
- 60 percent credited to State (distributed via formula)

The analysis will calculate an effective tax rate for each type of tax, if possible, to better understand the impact of the exemptions on tax rates and actual tax receipts. Effective tax rates are estimated through assessing actual tax receipts as a portion of gross oil and gas valuation or gross receipts.

In addition, the State receives half of the revenues from leases, bonuses, and federal mineral royalties collected by the DOI Office of Natural Resource Revenues from federal mineral production. Trust funds managed by the North Dakota State Land Department also collect taxes and lease bonuses from State oil and gas production.

According to research by Headwaters Economics, in fiscal year 2010, the State's effective tax rate on oil and natural gas of 10.1 percent ranked below Wyoming (11.4 percent) and Montana (10.5 percent), but higher than Colorado (4.4 percent). An analysis will be undertaken to assess any changes to these effective rates as well as the impact of effective tax rates on development and production activity.

Another issue that will be evaluated is the impact of property and sales taxes on oil and gas development. This is especially relevant when evaluating enhanced oil recovery (EOR) for secondary and tertiary production.

Tax incentives regarding oil and gas equipment for EOR may encourage tertiary development and production, such as those on equipment used for CO2 capture, compression and pipelines to transport the CO2 from the emission site to the EOR injection site. Exemptions for this equipment for carbon capture, compression, and pipeline, perhaps for pollution control (injecting carbon dioxide into deep oil fields) would be analyzed to assess the revenue and incentive tradeoffs. EOR production has the potential to generate considerable incremental oil production, which contributes production tax receipts to the State, including production and extraction taxes, sales and property taxes, and Federal mineral royalties. These future tax collections could exceed the taxes that might be levied on non-revenue generating carbon capture and transportation equipment.

Tax incentives and subsides purportedly attract oil and gas investment. However, the pace and location of oil and gas investments are largely driven by geology, technology, and price of oil and gas. Since the end of 2009, oil production has more than doubled in North Dakota where the production is generating high returns while by comparison Montana's production, where the tax rate is much less, has declined by 14 percent.

Through a thorough examination and review of literature and reports and interviews with State tax policy experts, this task will describe in detail the current oil and gas tax structure for North Dakota, describe tax structures and policies for other high energy producing states such as Montana, Colorado, and Wyoming, and provide examples of tax incentives and policies that have provided sufficient funding for needed investments in infrastructure and public services, while also successful in encouraging sustainable and diverse oil and gas investment. Tax rates, incentives, deductions, and distributions (including those into permanent funds) will be evaluated for each state. Again, the effective tax rate is an important measure since it analyzes actual tax receipts from oil and gas production to the State and can provide information on whether overall rates have had any effect on oil development and incentives.

Upon conclusion of this task, Louis Berger will prepare Technical Memorandum 1 which will describe the results. The North Dakota Legislative Management will have the opportunity to review and comment on the memorandum. Upon receipt of all comments, Louis Berger will prepare a revised Technical Memorandum that will be incorporated into the Final Report.

TASK 3–FORECAST OF OIL AND GAS DEVELOPMENT AND PRODUCTION BY REGION, WHILE CONSIDERING CHANGES IN TECHNOLOGIES

Unlike conventional oil extraction, unconventional oil resources, such as those found in the Bakken, involve a much more complicated extraction effort. In addition, after an initial rush of production, the flow out of unconventional wells tends to decline quickly: a typical Bakken horizontal oil well can produce half the oil in the second year of production compared to the first. Development in the Bakken will likely include ongoing drilling, hydraulic fracturing, and often re-fracturing of producing wells.

North Dakota's Industrial Commission estimates 6.5 billion barrels of recoverable oil are available in the Bakken and Three Forks formations. Only 244 million barrels have been recovered so far. Additionally, the Commission recently released a study that concluded that 95 percent of drilling in North Dakota targets the Bakken and Three Forks formations, and according to the Energy Information Administration, the Bakken accounts for 90 percent of North Dakota's oil production.

Some industry experts have indicated that advanced oil recovery strategies will be required to realize the full potential of the formations in North Dakota over the next few decades. It has been estimated that primary oil recovery methods centered on horizontal drilling and hydraulic fracturing will leave 90 to 95 percent of the Bakken and underlying Three Forks oil resource in the ground. It is likely that EOR will play a critical function in the secondary development of the Bakken resource. However, industry officials and researchers have indicated that it's unclear how effective and affordable these advanced techniques will be in the Bakken, raising a major uncertainty about the formation's ultimate production contribution. USGS, the U.S. Energy Information Administration and other industry experts would be consulted to provide various scenarios for the long-term outlook for development and production of the oil and gas resources in North Dakota for the next 50 years. Interviews with experts in the Energy and Environmental Research Center at North Dakota University and the National Energy Technology Laboratory will be conducted to evaluate production scenarios for North Dakota, including scenarios for the emergence of EOR for secondary and tertiary production of the Bakken. Additionally, industry experts on EOR in oil shale resources would also be interviewed, such as those at Denbury Resources and Advanced Resources International. Active oil and gas companies in North Dakota would also be consulted to provide information on their long-term projections for oil and gas production in North Dakota. Given the uncertainty of these secondary techniques, it is likely that a number of plausible scenarios would be identified under which secondary

production of the oil shale fields would occur.
Upon conclusion of this task, Louis Berger will prepare Technical Memorandum 2 which will describe the results. The North Dakota Legislative Management will have the opportunity to review and comment on the memorandum. Upon receipt of all comments, Louis Berger will prepare a revised Technical Memorandum that will be incorporated into the Final Report.

TASK 4 – DEVELOPMENT OF A MODEL TO PROVIDE TAX REVENUE FORECASTS

Under task 4, Louis Berger proposes to develop a model to estimate annual and total tax revenue receipts given various scenarios based on research and analysis completed under tasks 2 and 3. The structure and capabilities of the model will in part depend on the needs of the North Dakota Legislative Management. Louis Berger will work with staff at the North Dakota Legislative Management to develop a base model that can forecast tax revenues given different scenarios for oil and gas production and other parameters if data is available. The advantage to having a model is that as information becomes available or more certain, the North Dakota Legislative Management would be able to change or verify inputs, resulting in updated tax revenue forecasts. This model would be developed in Microsoft Excel with an easy to use interface in which model parameters are identified and changed. Louis Berger would create methodology and user manuals to facilitate the ongoing use of the model.

While it is anticipated that this task would develop a model that can forecast tax revenues from expected oil and gas development, further model developments are discussed under an optional task provided at the end of this approach section.

TASK 5 – INFRASTRUCTURE AND SOCIAL AND PUBLIC SERVICE NEEDS

The steep decline in production for individual Bakken wells requires that more wells will be drilled to extract all the recoverable oil from the Bakken. In order to maintain production, a typical well will be re-fractured a number of times. Since much of the infrastructure and public service needs associated with oil and gas activity are associated with the drilling and hydraulic fracturing of the oil wells, industrial and community impacts of the Bakken are likely to be greater and more continuous than impacts from development of conventional oil fields.

As a result of considerable oil and gas development activities in North Dakota, State funding for infrastructure and public service needs play an important role in the sustainable economic development and quality of life of North Dakota residents. The following infrastructure and service requirements will be evaluated and described for the State:

- Transportation projects and infrastructure improvements to enhance safety and traffic movements, including reliever routes, traffic signage, reduced damage to roads, and manage traffic dust
- State policies/funding to encourage and expedite interstate pipeline development to remove trucks from roads
- Housing infrastructure (State grants from the North Dakota Department of Trust Lands) and low income and affordable housing development (tax credits from North Dakota Housing finance Agency)
- Residential planning and growth
- Law enforcement (North Dakota Highway Parole, North Dakota Department of Transportation)
- Emergency management services
- School enrollment growth

Louis Berger would consult with the following State agencies to assess the infrastructure and public service needs associated with current and projected development and production.

- North Dakota Department of Commerce
- North Dakota Housing Finance Agency
- North Dakota DOT
- North Dakota Department of Trust Lands
- North Dakota Water Commission
- North Dakota Health Department
- Upper Great Plains Transportation Institute
- North Dakota Highway Patrol

In addition, research and reports will be reviewed to assess the future needs for the state. Drill rig counts, well spacing, water resource needs, and others would play a role in specifying the relationships between the impacts of oil development and completion activities on population growth and transportation and other social and public services requirements. If possible, local funding requirements for various development and production scenarios will be provided based on these parameters and current experience in other high producing similar states (such as the Marcellus shale), and projected well re-stimulating estimates.

Upon conclusion of this task, Louis Berger will prepare Technical Memorandum 3 which will describe the results. The North Dakota Legislative Management will have the opportunity to review and comment on the memorandum. Upon receipt of all comments, Louis Berger will prepare a revised Technical Memorandum that will be incorporated into the Final Report.

TASK 6 – ENVIRONMENTAL CONSIDERATIONS

The significant, rapid increase in oil development in western North Dakota can create additional strains on other natural resources in and around the area. Under this task, Louis Berger will examine the potential environmental implications this development is having now and in the future on various natural and environmental resources. Specific resources to be evaluated include:

- Water requirements for current oil production technologies (average of two million gallons per well according to North Dakota State Water Commission)
- Water requirements for EOR oil production technologies
- Oil drilling and production waste disposal trends and innovations in the recycling of fracture water with mobile water treatment technologies

- Changes in air emissions for oil and gas production facilities (VOCs, NOx, SO2, methane), including the potential impact of changes in regulatory permitting requirements
- Changes in air emissions from mobile sources tied to oil and gas development
- Potential for CO2 EOR to provide carbon sequestration and possible ways in which CO2 EOR could be affected if/when the U.S. adopts climate change legislation that requires CO2 mitigation
- Wildlife habitat impacts from well development and associated infrastructure (access roads, pipelines etc.)
- Land use impacts from oil and gas operations
- Others as identified

Through review of studies and reports and interviews with experts and State agencies, Louis Berger will try and quantify where possible these environmental concerns. Where quantification is not possible, we will qualitative describe the potential impact.

Louis Berger will also provide a summary of possible mitigation strategies that can be implemented by the State and operators to minimize potential environmental impacts of increased oil and gas development. Potential mitigation strategies being utilized in other states and basins will be reviewed to determine their relevance to the situation in North Dakota.

Upon conclusion of this task, Louis Berger will prepare Technical Memorandum 4 which will describe the results. The North Dakota Legislative Management will have the opportunity to review and comment on the memorandum. Upon receipt of all comments, Louis Berger will prepare a revised Technical Memorandum that will be incorporated into the Final Report.

TASK 7 – FINAL REPORT AND MODEL DEVELOPMENT

Louis Berger will prepare a full report describing the results of the study under Task 7. The draft report will incorporate all the previous technical memorandums and comments received from the North Dakota Legislative Management. Included in the draft report will be a section titled "Recommendations for Changes to Tax Structure and Distribution of Funds" which will address specific approaches to solving existing challenges the State is facing with oil and gas development. For instance, past studies have recommended that the State revise its fiscal policy relative to oil and gas development to improve sustainability of this economic activity. Louis Berger will fully explore this and other issues likely to arise from this proposed study.

Louis Berger will provide a Draft Report to the North Dakota Legislative Management for their review and comment. Upon receipt of those comments, Louis Berger will prepare a Final Report incorporating all comments where necessary.

In addition, Louis Berger will make a formal presentation to the North Dakota Legislative Management with the results of the study.

OPTIONAL TASK – MODEL ENHANCEMENT

The approach described above includes the required tasks to evaluate the tax policy relevant to oil and gas operations in North Dakota now and in the future. The analysis includes an assessment of the infrastructure needs and the environmental concerns resulting from increased development and whether the State will have the resources to mitigate impacts while continuing to support this important economic activity. In order to help the State plan for changes that may occur in the future, Louis Berger suggests building a model that can help in forecasting production levels for oil and gas using various production technologies and the resulting tax revenues that may be generated from this oil and gas production under different tax policy scenarios. Under an optional task, Louis Berger suggests further refining the model and planning tool in two important ways:

- Refine production forecasts by including additional factors likely to affect development and production (i.e. commodity prices)
- Develop a module that will help predict changes in population due to sustained oil and gas development

These enhancements are discussed further below.

Inclusion of Commodity Price Forecasts

Estimating potential reserves requires a number of assumptions regarding such things as geologic conditions and available technologies. However, one of the biggest factors determining whether reserves are economically viable is commodity prices. One way to further enhance the forecasts of oil and gas production in North Dakota would be to tie these estimates to price forecasts from the Energy Information Agency (EIA). EIA publishes a 30-year price forecasts for a number of energy sources, including oil and gas. These forecasts are available through an interactive website for a variety of scenarios (http://www.eia.gov/oiaf/aeo/tablebrowser/). Using the base model, Louis Berger could enhance the forecasting capabilities to account for market and economic conditions over the foreseeable future. This would give the state the ability to run different scenarios and sensitivity analyses to determine how development activities may vary over time.

Population Forecasts Tied to Changes in Employment

The infrastructure, public and social service needs of State and local communities is associated with the oil and gas development and the individuals that are coming to the State to support this development. The increases in population are directly and indirectly tied to the development that is ongoing. Louis Berger proposes to improve the infrastructure and public and social services assessment by including a module in the model that will estimate changes in population caused by increases in employment in industries serving the oil and gas industry.

Investments or spending on oil and gas development requires sector-specific employment as well as indirect and induced employment needs (i.e., indirect jobs are associated with the industries supporting the drilling and completion activities, and induced jobs are associated with these direct and indirect workers spending their wages in the local economy). The translation of industry spending into jobs can be based on industry-specific employment coefficients, which are employment-to-output ratios adjusted for changes in productivity, from the Bureau of Labor Statistics' labor requirements matrix from their nominal input-output data. The employment coefficients equal the amount of labor needed per one million dollars of investment in a specific industry. Louis Berger will combine estimates of industry investment with employment coefficients to estimate changes in employment. In order to accurately calculate the employment effects of spending, the spending amount can be adjusted to the most current labor requirement matrix year utilizing the Bureau of Labor Statistics Producer Price Index as a price deflator.

The State may also be interested in understanding how changes in employment will affect certain occupations. This information is often useful in planning education and training programs to help the industry meet their employment needs. The model can modify total employment forecasts to look at demand for certain occupations. Occupations are defined based on the federal Standard Occupational Classification (SOC) system used by the Bureau of Labor Statistics, which includes 801 occupations combined in 23 major occupational groups. Occupations can be estimated by applying an industry-occupation matrix to the oil and gas employment demand. The national industry-specific occupational employment and wage estimates (i.e., an industry-occupation matrix), which are based on the Bureau of Labor Statistics' Occupational Employment Statistics (OES) survey, can be used to translate employment by industry into employment by occupation. The industry-occupation matrix provides the occupational composition for industries at the five-digit NAICS code level and reflects the national average occupational breakdown.

The employment estimates can be used to predict changes in population for different counties and regions of the state from the oil and gas development activities. The population estimates can be used to better estimate needs for infrastructure and public and social services over time for State and local government entities.

Relevant Project Experience

Relevant Project Experience

RELEVANT PROJECT EXPERIENCE

INTRODUCTION

Louis Berger has included links to two of the firm's most comparable studies. While Louis Berger considers the CO2-Enhanced Oil Recovery Fiscal Analysis for the Denbury Resources a very comparable example, the study is confidential and therefore cannot be released.

Relevant experience summary sheets of these work samples, as well as summary sheets of other relevant projects, are included on the following pages.

(Note: Please copy and paste the website links into a separate browser, rather than clicking the link within the PDF file.)

Work Sample: *Wyoming Heritage Foundation, Oil and Gas Economic Contribution Study*

Why it is relevant: As a subconsultant to Booz Allen Hamilton, Louis Berger was part of the team that evaluated the economic contribution of the oil and gas industry to the State of Wyoming during 2007. This project, commissioned by the Wyoming Heritage Foundation, was designed to evaluate the economic contribution of the oil and gas industry to the state of Wyoming in terms of employment, income, gross revenues, and taxes.

Link: http://www.westernenergyalliance.org/wp-content/uploads/2009/05/WYHF_O_G_Economic_Study_FINAL.pdf

Work Sample: *USACE Institute of Water Resources, Economic Effects of USACE Programs, the American Recovery and Reinvestment Act, and Civil Works Spending on Local Regional, and National Economies*

Why it is relevant: Louis Berger supported the USACE Institute for Water Resources in developing an economic modeling tool for estimating employment, income, and other economic impacts of USACE stimulus and civil works spending on national and regional economies. The economic impact modeling tool, which is known as RECONS, has been provided in both desk-top and on-line versions.

Link: http://www.iwr.usace.army.mil/Missions/Economics/RegionalEconomicSystem(RECONS).aspx

Link to award: http://www.iwr.usace.army.mil/Media/NewsStories/tabid/11418/Article/11038/iwr-awards-excellence-at-annual-awards-ceremony.aspx

WYOMING OIL AND GAS ECONOMIC CONTRIBUTION STUDY

Wyoming

FIRM Louis Berger Group

COST $20,000

COMPLETION 2008

CLIENT
Wyoming Heritage Foundation

WHY IS THIS PROJECT RELEVANT?

- Study of oil and gas economic contributons

As a subconsultant to Booz Allen Hamilton, Louis Berger was part of the team that evaluated the economic contribution of the oil and gas industry to the State of Wyoming during 2007. This project, commissioned by the Wyoming Heritage Foundation, was designed to evaluate the economic contribution of the oil and gas industry to the state of Wyoming in terms of employment, income, gross revenues, and taxes. The approach built off the Colorado Oil and Gas Economic Impact Study conducted for the Colorado Energy Research Institute at the Colorado School of Mines conducted by the same authors. The team used a regional economic modeling methodology to evaluate the economic contribution of oil and gas development and production activities in Wyoming. The approach included an extensive effort to gather site specific information needed to complete the analysis, such as capital investments, expenditures to drill and complete a well, production costs, private royalty and lease payments, and service company costs. Secondary source data were also obtained, including number of wells drilled and completed for each basin, oil and gas prices, oil and gas production, extraction taxes, and much more. The study involved identifying data needs and requirements, designing the data collection process, and collecting primary data from local operators and service industry entities working within the state. The primary and secondary data were then used in combination with a common regional economic model, IMPLAN, to estimate economic contributions. Additionally, a separate fiscal model was developed to estimate sales and use taxes associated with oil and gas activities in Wyoming.

The oil and gas industry is generally comprised of two primary activities, development and extraction. Development activities consist of drilling, completing, and recompleting wells. Recompletion activities involve restimulating or reactiviting the wells after they have been producing for a period of time. Extraction or production is the act of removing the oil or gas from the mineral formations, and it occurs continually over a longer period of time. Taxes and royalties are paid to the state on the value of the production. Royalties are also paid to the owners of the minerals from which the production occurs: state government, Federal government, or private households and businesses. All of these taxes and royalties are reported through various state sources except the ones paid to private households and businesses. The study utilized an "off the shelf" input-output software and database model, IMPLAN, and customized the model with data provided by industry and secondary

sources. As a result, the economic contribution of oil and gas capital investments, extraction (production), and private mineral royalties in terms of employment, labor income, and economic output was estimated for the state. Additionally, a fiscal analysis was developed to estimate the state and local tax contribution of the oil and gas industry across Wyoming. This included a regional economic impact analysis of severance, property, federal and state royalty tax receipts on the state economy, in terms or jobs, income, and gross state product.

A separate analysis was conducted on the contribution of oil and gas activities on sales and use tax receipts within the state of Wyoming. Louis Berger was responsible for much of the fiscal analysis for the project.

ECONOMIC EFFECTS OF USACE PROGRAMS, THE AMERICAN RECOVERY AND REINVESTMENT ACT, AND CIVIL WORKS SPENDING ON LOCAL, REGIONAL, AND NATIONAL ECONOMIES

Various Locations

FIRM Louis Berger Group

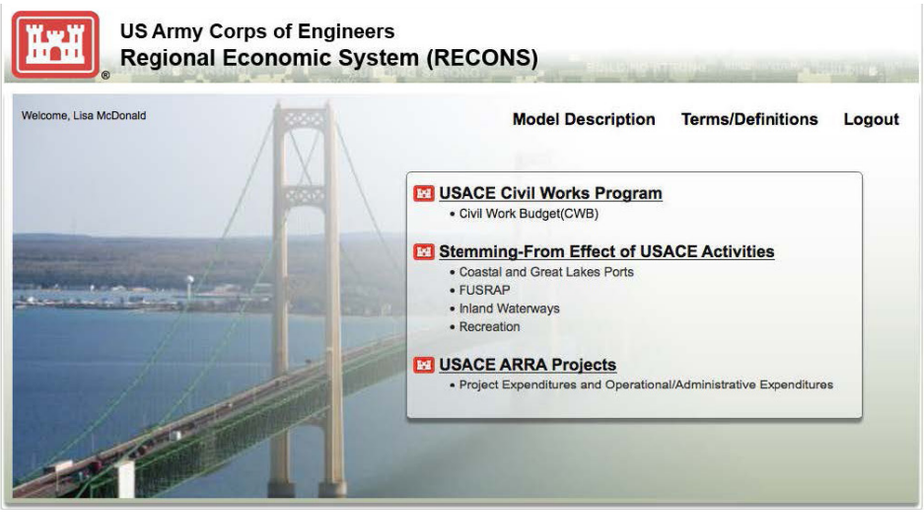
COST $1.4M

COMPLETION 2011

CLIENT
USACE

WHY IS THIS PROJECT RELEVANT?

- Development of economic modeling tool for estimating employment, income, and other economic impacts
- Work with federal and state governments



Louis Berger supported the USACE Institute for Water Resources in developing an economic modeling tool for estimating employment, income, and other economic impacts of USACE stimulus and civil works spending on national and regional economies. The economic impact modeling tool, which is known as RECONS, has been provided in both desk-top and on-line versions. The Team included two economists from Michigan State University specializing in recreation economics.

The impetus for this project was to satisfy the reporting and transparency requirements of the American Recovery and Reinvestment Act (ARRA), signed by President Barack Obama in February 2009. Thus, Louis Berger has developed a methodology to efficiently, accurately, and defensibly estimate and report the associated economic impacts—specifically, employment, income, sales and gross regional product—that will be created or retained. RECONS also has been designed to estimate all USACE Civil Works spending at the national and regional levels and, thus, can demonstrate the importance of the USACE's operations, maintenance, and construction works to the nation's economy. Numerous documents and reports were written to support RECONS development and implementation, including a methodology manual, spending profile methods, ARRA report, and user manual. The methodology was reviewed by a number of independent regional economists.

Another focus of the project was to estimate the economic impacts of industries and users who benefit, are dependent on, or are protected by USACE programs and infrastructure, where these benefits can reasonably be associated and assessed. These "stemming from" or more secondary effects are often difficult to attribute fully to certain USACE programs or existence of certain infrastructure. The Louis Berger Team reviewed the USACE business lines to determine the feasibility of attributing economic contributions to USACE programs, infrastructure or services. Analysis and reports on these secondary effects were developed for navigation (ports and inland waterways), hydropower, flood risk management, and recreation. **RECONS won the Institute of Water Resources Model of the Year in 2011.** The project is being deployed to economists across USACE offices.

DENBURY RESOURCES, WYOMING CO2-ENHANCED OIL RECOVERY FISCAL ANALYSIS

Wyoming

FIRM Louis Berger Group

COST $15,000

COMPLETION 2013

CLIENT
Denbury Resources

WHY IS THIS PROJECT RELEVANT?

- Completion of fiscal analysis that compares the production tax revenues associated with enhanced oil recovery with ad valorem tax receipts of CO2 capture

Using CO2 in EOR is a proven technology that has great potential to increase domestic oil production, but future EOR projects will require a large, stable supply of CO2. A promising source of CO2 for EOR is the vast amounts emitted from industrial complexes and power plants. The use of CO2 for EOR from these industrial sources thus has two benefits. It can help offset the significant costs associated with the installation and operation of CO2 pollution control equipment (capture, compression, and transportation) while providing a CO2 source for future EOR projects. Applying property, sales and/or use taxes can further add to the pollution control costs making development in future industrial projects less likely and limiting the beneficial uses of CO2 such as EOR.

At the industrial source, equipment used for CO2 capture, compression and pipelines to transport the CO2 from the emission site to the EOR injection site is subject to ad valorem assessment if it is not deemed to be pollution control equipment, which is currently exempt. Thus the levying of ad valorem or property tax on pollution control equipment results in a direct increase in the cost of managing CO2 emissions, which is struggling to develop at the current capital and operating cost levels.

Louis Berger completed a fiscal analysis for Denbury Resources which compares the production tax revenues associated with the potential EOR in three basins in Wyoming with the ad valorem tax receipts associated with the CO2 capture, compression, and pipeline equipment. The fiscal analysis demonstrates that even with a relatively small amount of EOR production, the production tax revenues are two to five times more than the property tax receipts associated with the pipelines and equipment investments.

EOR production generates considerable incremental oil production, which contributes production tax receipts to the state of Wyoming, including severance, ad valorem taxes, and Federal mineral royalties (the state receives 50 percent of Federal mineral royalties). Tax revenues from oil and gas production totaled almost $2B in 2008, providing a large portion of the state's revenue. The study completed by Louis Berger shows that the state of Wyoming would financially benefit from applying its pollution control ad valorem tax exemption to carbon capture, compression and transportation equipment, which would allow incremental oil production to occur, spurring considerable production tax revenues for the state. Without this tax exemption, significant EOR operations will likely not occur, or will be significantly delayed, forgoing the incremental oil production and its fiscal benefits to the state in the near future.

ANTELOPE VALLEY STATION TO NORTHWEST NORTH DAKOTA 345 KV TRANSMISSION LINE

Williston and Tioga, North Dakota

FIRM Louis Berger Group

COST $232,000

COMPLETION 2013

CLIENT
Basin Electric Cooperative
Rural Utility Service
Western Area Power Administration
U.S. Forest Service

WHY IS THIS PROJECT RELEVANT?

- Collaboration with state government entities
- Socioeconomic impact analysis

Louis Berger is preparing a third-party EIS for the Rural Utility Service (RUS), Western Area Power Administration (Western) and the U.S. Forest Service (USFS) on the Basin Electric Cooperative's (Basin) proposed Antelope Valley Station to Neset 345-kV Transmission Project. Basin proposes to construct, operate and maintain the project in order to serve the long-term electrical needs of northwestern North Dakota. Increases in electricity demand in Northwest North Dakota area being driven by oil development associated with the Bakken shale. The level of development that has occurred and is planned for the future will require an increase in electrical transmission capacity and reliability. RUS has determined that providing financial assistance to the project constitutes a major federal action that requires an EIS. RUS is the lead federal agency preparing the EIS while Western and the USFS are cooperating agencies.

The firm is preparing the EIS which will evaluate two alternative routes for the proposed transmission project. Both alternatives will originate at the Antelope Valley Power Station near Beulah, North Dakota and connect with the Charlie Creek, Williston, and Nest substations and the newly proposed Judson and Tande 345-kV substations and are between 195 and 210 miles long. The proposed project crosses National Forest lands and the Little Missouri and Missouri Rivers. The USFS is also a cooperating agency and additional analyses have been developed to ensure the proposed action is consistent with the plan guiding the management of the Dakota Prairie National Grassland. Louis Berger developed the DEIS from survey results and corresponding resources reports developed by Basin's environmental consultant. Issues associated with the transmission project that are addressed in the EIS include: aesthetics and viewsheds; cultural resources; land use; socioeconomics; recreation; and wildlife and habitats. Louis Berger is also providing support to the project for public scoping and hearings, agency coordination, comment evaluation and response and document preparation.

The socioeconomic impact analysis included as assessment of the temporary workforce requirements, employment, income, housing, public services, as well as a discussion of the boom and bust and cumulative impacts.

SOCIOECONOMIC ANALYSIS OF THE ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Wyoming, Utah, Colorado

FIRM Louis Berger Group

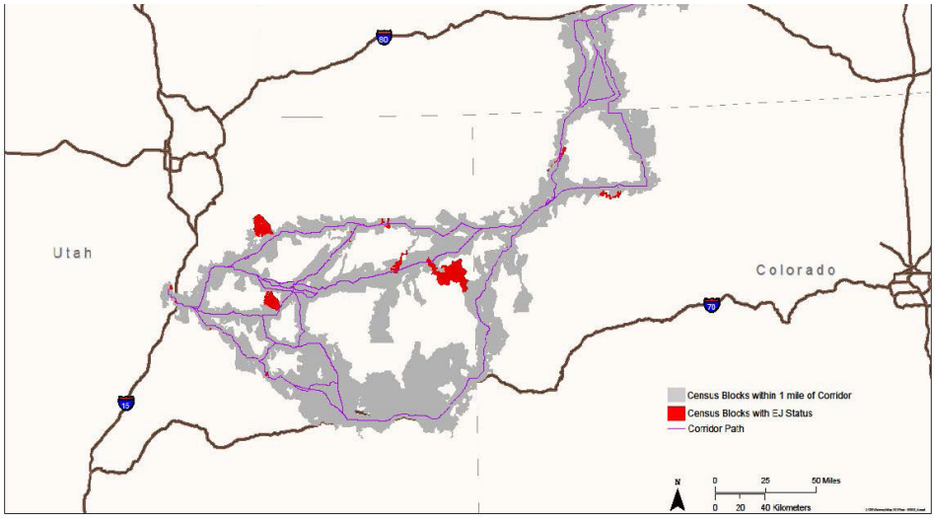
COST $67,693

COMPLETION 2013

CLIENT
EPG (PacifiCorp is the ultimate client)

WHY IS THIS PROJECT RELEVANT?

- Socioeconomic analysis



In the desert Southwest and Rocky Mountain regions, two of the fastest growing areas of the country, escalating demand for electricity will soon outstrip the capability to deliver it where and when it is needed. To help meet these growing needs, PacifiCorp announced the development of the new Gateway South Transmission line in 2007. The proposed line is a 500-kV AC (alternating current) transmission line starting in Wyoming (moving through northwestern Colorado) and going to west-central Utah. Several route configurations are being considered, including a reference case capable of delivering up to 3,000 megawatts. The target in-service date is 2014. As a subconsultant to EPG, Louis Berger is leading a socioeconomic analysis of the proposed Energy Gateway South Transmission Project. The socioeconomic analysis is currently being integrated as part of the EIS as required by NEPA.

All the potential alternative routes for the Gateway South Transmission Project (Project) are situated in three states, Colorado, Wyoming, and Utah. Initial routes also included an extension to Las Vegas, Nevada, although all current routes now have a western border in Clover, Utah. The project area is partially located within seventeen counties. These 17 counties comprise the socioeconomic study area for this project, an area of 69,000 square miles. A detailed socioeconomic baseline assessment was completed in 2011, which covered a large geographic area. The socioeconomic baseline section described, and where possible, measured:

- Community characteristics, including geographic and population characteristics, population density and growth.
- Demographic characteristics, including ethnicity, age, and historic changes.
- Economic characteristics including labor force, unemployment, employment trends, employment by industry.
- Housing, including housing occupancy, and average values of homes
- Public infrastructure and services, including emergency services, transportation routes and fatalities, school enrollment and capacity rates, social services, government services, etc.
- Property valuation
- Fiscal analysis of property taxes and other fiscal receipts.

The impact analysis is currently underway and is evaluating the potential socioeconomic impacts (both direct and indirect) associated with the proposed development and operational activities. Impact topics include: property valuation; property taxation and other fiscal impacts; labor force and employment, with a focus on construction activities; housing; public services, such as schools and emergency services; and impacts to important sectors of the economy, including recreation and tourism and oil and gas development.

Additionally, an extensive EJ assessment was undertaken of the Census blocks along the proposed routes. Louis Berger conducted an EJ analysis to determine if any of the potential EJ populations could be disproportionately and adversely impacted by the proposed development and operation of the transmission line. The EJ analysis will be conducted in compliance with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations and follow guidance of the U.S. Environmental Protection Agency (EPA, 2004).

SOCIOECONOMIC ASSESSMENT OF THE SONORAN SOLAR PROJECT

Arizona

FIRM Louis Berger Group

COST $28,300

COMPLETION 2009

CLIENT
EPG (Ultimate client was Boulevard Associates, LLC)

WHY IS THIS PROJECT RELEVANT?

- Socioeconomic analysis/ assessment

Boulevard is proposing to construct and operate the Sonoran Solar Energy Project (SSEP or Project Area) in Maricopa County, Arizona. The SSEP would be located almost entirely on Bureau of Land Management (BLM)-administered land in the Little Rainbow Valley, located approximately 15 miles southwest of the City of Goodyear and 23 miles northeast of the Town of Gila Bend in Maricopa County, Arizona. The SSEP is located within the Town of Buckeye's jurisdiction, although the main part of the town lies to the north of the Project Area. The Project Area includes almost 4,000 acres of land which would consist of the proposed power blocks, solar fields, evaporation ponds, heat-transfer fluid (HTF) land treatment areas, and all linear facilities such as the access road(s), transmission line, water pipelines, well field, and gas pipelines. As a subconsultant to EPG, Louis Berger is leading a socioeconomic analysis of the proposed SSEP. The evaluation is intended to provide a description and discussion of existing socioeconomic conditions of the study area (Baseline) and an evaluation of all socioeconomic impacts (positive and negative) of developing and operating the solar facilities. The socioeconomic baseline section described and where possible measures:

- Community characteristics, including geographic and population characteristics, population density and growth.
- Demographic characteristics, including ethnicity, age, and historic changes.
- Economic characteristics including labor force, unemployment, employment trends, earnings by industry.
- Housing, including housing occupancy, and average values of homes
- Public infrastructure and services, including emergency services, transportation school enrollment and capacity rates, social services, government services, etc.
- Fiscal analysis of county and state tax revenues. In addition to the assessment discussed above, Louis Berger will complete an EJ analysis to determine if any EJ populations are present within the study area that could be potentially impacted by the proposed development and operation of the solar project.

The EJ analysis will be conducted in compliance with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations and follow guidance of the U.S. Environmental Protection Agency (EPA, 2004). Louis Berger also evaluated the impacts of the SSEP under two phases: construction and operation. The analysis first evaluated the impacts during the construction of the plant that is expected to take approximately 39 months. The impact analysis evaluated the number and type of workers needed for the construction of the specialized facility and where those employees are likely to be located. From the analysis of employment, Louis Berger was able to evaluate impacts to population in local communities, community services and schools. In addition, the impact analysis included an evaluation of how the SSEP would impact fiscal conditions of relevant county and state government entities. Socioeconomic impacts of operations of the SSEP evaluated the same parameters as discussed under the construction phase.

DAVIS GRAHAM & STUBBS, COST ANALYSIS OF THE PROPOSED CHANGES IN AIR POLLUTION REPORTING AND PERMITTING REQUIREMENTS FOR OIL AND GAS OPERATIONS

Colorado

FIRM Louis Berger Group

COST $47,000

COMPLETION Ongoing

CLIENT
Davis Graham & Stubbs

WHY IS THIS PROJECT RELEVANT?

- Cost analysis of proposed changes in air pollution reporting and permitting requirements for oil and gas operations

The Colorado Department of Public Health and Environment, Air Pollution Control Division (APCD) has initiated a series of stakeholder meetings to discuss possible revisions to the Air Quality Control Commission's Regulations Numbers 3, 6, 7 and Common Provisions. These rule changes are directed at oil and gas operations throughout the state and include air pollutant emission notice reporting, construction permit thresholds and additional control measures for oil and gas operations and equipment.

Louis Berger is conducting a cost analysis of the proposed changes in air pollution reporting and permitting requirements for oil and gas operations in Colorado. The assignment includes the development of an industry survey to help determine the cost of compliance with rule changes proposed by the Division. This task includes coding and processing of all responses, follow-up interviews with industry representatives, statistical analysis of cost data, and evaluation of qualitative information with the goal of further understanding changes in business practices and costs of the proposed rule changes.

Louis Berger is also conducting an independent data collection effort to obtain the most recent and relevant cost data for leak detection and repair technologies proposed by the division and other reasonable technologies that may be utilized for methane leak detection. In addition, cost information will be obtained for Presumptive Best Available Control Technology (PBACT) technologies being considered in the proposed regulations. This will include technologies such as multi-phase production, vapor recovery units (VRUs), flares, HPL separators, buffer bottles and other reasonable technologies. Data and information will be obtained from vendors, internet searches, reviews of other regulatory cost analyses and interviews with individuals from the client team or other experts. The goal will be to collect data and information that would allow an evaluation of the full cost of installing and implementing these technologies for well production facilities in various basins in Colorado.

The results of this work will be used to support expert testimony in the Air Quality Control Commission's rule making process which is tentatively scheduled for February, 2014.

References

REFERENCES

The Louis Berger team has provided references for similar projects below:

Client	Contact	Phone and Email
Denbury Resources, Inc.	Greg Schnacke Executive Director, Government Relations	972.673.2324 Greg.schnake@denbury.com
Davis, Graham & Stubbs	John Jacus Attorney at Law	303.892.7305 John.jacus@dgslaw.com
USACE Institute for Water Resources	Wen Chang	703.428.7214 Wen-hueii.chang@usace.army.mil

Cost

Cost

COST PROPOSAL

Basis for Price

This quotation will be performed on a firm fixed price basis. Louis Berger's price quotation represents our best estimate of the resources required to perform this effort. During performance, Louis Berger reserves the right to vary hours and effort actually utilized as necessary among tasks to meet technical requirements. Detailed cost estimates for each task are provided at the end of this cost proposal.

The cost of the base proposal is $121,085 and includes all labor and direct costs. An optional task has also been submitted with a cost of $33,555.

Travel and Other Direct Costs

We anticipate that travel and other direct costs (ODCs) will be necessary in the performance of this project, and accordingly they have been included in our firm fixed price proposal. Assumptions on these costs are provided in the individual tables for each task.

Invoicing and Payment

Louis Berger will invoice upon deliverable acceptance of scheduled deliverables with supporting data for each payment requested. The North Dakota Legislative Management will reimburse Louis Berger upon receipt of a proper invoice at the address specified in any resulting delivery order.

Assumptions

The following are detailed assumptions used to develop the cost proposal are summarized in each task table as appropriate. In addition, the cost proposal is subject to the following assumptions:

GENERAL ASSUMPTIONS

- If this proposal is accepted, it will be incorporated into the delivery order.
- Acceptance criteria for deliverables will include an assessment of whether the deliverables meet the Scope of Work (SOW) requirements and whether they employ approved standards, regulations, tools and methods.
- Government personnel and data will be available in a timely manner to facilitate the proposed project schedule and required analysis.
- The quotation will be performed on a firm, fixed price basis, including travel and ODCs.
- Monthly progress reports will be submitted electronically.
- Key personnel are not assumed to be dedicated 100 percent over the duration of the project, and will not be removed/replaced from the project without written notification to the assigned government project manager.
- Louis Berger's price quotation represents the firm's best estimate of the resources required to perform this effort. During performance, Louis Berger reserves the right to vary the labor hours and effort actually utilized among tasks as necessary to meeting technical requirements.

TASK SPECIFIC ASSUMPTIONS

Task 1: Kick-off Meeting

- Louis Berger assumes a half-day meeting at the office of the North Dakota Legislative Management in Bismarck, North Dakota
- The assigned Louis Berger project manager and one other staff member will attend the kick-off meeting in person.
- Other Louis Berger personnel will attend the meeting by phone if possible.
- Louis Berger staff will be responsible for preparing meeting notes and distributing those notes to appropriate parties.
- Louis Berger will utilize the state approved lodging rate of $69.30 per night plus tax.

Task 7: Report and Presentation

- Louis Berger will provide 20 written copies and one electronic copy of the report to the North Dakota Legislative Management
- The assigned Louis Berger project manager and one other staff member will travel to North Dakota for a presentation of results.
- Louis Berger will utilize the state approved lodging rate of $69.30 per night plus tax.

Summary Labor and ODC Costs by Task (Sheet A)

Task	Work Breakdown	PM	Lead Economist	Env Support	Economic Analyst 1	Economic Analyst 2	Escalation Factor	Subtotal (hrs)	Direct Costs (Details on Sheet B)	Escalation*	Labor Subtotal ($)	Sub Costs (Labor and Directs)	Indiv. Task Totals ($)	Sub Totals ($)
#	Rate	$166	$142	$107	$70	$129				Rate: 0%				
1	Kickoff Meeting	24	24		40		0.00	88	$ 1,283		$ 10,190		$ 11,473	
2	Evaluation of Tax Structure	24	40		60		0.00	124	$ -		$ 13,867		$ 13,867	
3	Forecast of Oil and Gas Production	24	40		80		0.00	144	$ -		$ 15,269		$ 15,269	
4	Tax Model Development	32			100	40	0.00	172	$ -		$ 17,473		$ 17,473	
5	Infrastructure Needs	24	60	80	40		0.00	204	$ -		$ 23,857		$ 23,857	
6	Environmental Evaluation	24		120			0.00	144	$ -		$ 16,794		$ 16,794	
7	Final Report and Presentation	40	60	40	60		0.00	200	$ 1,283		$ 23,634		$ 24,917	
	TOTALS (Base Proposal)	192	224	240	380	40	NA	1,076	$ 2,565	$ -	$ 121,085	$ -	$ 123,650	$ 123,650
	Costs Per Labor Category (in thousands)	$ 31.8	$ 31.9	$ 25.6	$ 26.6	$ 5.2		*	*		*	*	*	
8	Optional Task	40			200	100	0.00	340	$ -	$ -	$ 33,555	$ -	$ 33,555	$ -
	TOTALS (Optional Task)	40	0	0	200	100	NA	$ 340	$ -	$ -	$ 33,555	$ -	$ 33,555	$ 33,555
	Costs Per Labor Category (in thousands)	$ 6.6	$ -	$ -	$ 14.0	$ 12.9		*	*		*	*	*	
	TOTALS (Base Proposal and Optional Task)	232	224	240	580	140	NA	$ 1,416	$ 2,565	$ -	$ 154,640	$ -	$ 157,205	$ 157,205
	Costs Per Labor Category (in thousands)	$ 38.4	$ 31.9	$ 25.6	$ 40.6	$ 18.1		*	*		*	*	*	

***Escalation** - Labor costs are escalated at the rate shown at the top of the column. Rates are shown for the base year. Escalation is calculated based on the formula:

a = labor cost based on base year rates

b = escalation rate, for example 3% (actual rate used at top of escalation column)

c = escalation factor (base year = 0, year 2 = 1, year 3 = 2, etc. with weighted factor values calculated for multiple year tasks)

Cost w/ escalation =(a*(1+b)^c)

f Other Direct Costs (Sheet B)

Work Breakdown	Number of Travelers	Num. of Trips	Num. of Travel Days Per Trip (avg.)	Air/Train Travel Costs	Lodging	Rental Car	Mileage	Per Diem	Field Supplies	Print/Copy/Mai l	Misc.	Task Subtotals
Kickoff Meeting	2	1	2	$ 800	$ 139	$ 120		$ 224				$ 1,283
Evaluation of Tax Structure												
Forecast of Oil and Gas Production												
Tax Model Development												
Infrastructure Needs												
Environmental Evaluation												
Final Report and Presentation	2	1	2	$ 800	$ 139	$ 120		$ 224				$ 1,283
Base Proposal				**$ 1,600**	**$ 277**	**$ 240**	**$ -**	**$ 448**	**$ -**	**$ -**	**$ -**	**$ 2,565**
Optional Task												
Optional Task				**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Base Proposal and Optional Task				**$ 1,600**	**$ 277**	**$ 240**	**$ -**	**$ 448**	**$ -**	**$ -**	**$ -**	**$ 2,565**

Unit Costs	Rate	Unit
Meals	$ 56.00	Per day
Rental Car Cost	$ 60.00	Per day
Air Fare/Train (Average Rate)	$ 400.00	Per trip
Lodging	$ 69.30	Per day

THE LOUIS BERGER GROUP 535 16TH STREET, SUITE 600 | DENVER, CO | 80202

Celebrating 60 YEARS