**BEFORE THE PUBLIC UTILITIES COMMISSION**
**OF THE STATE OF SOUTH DAKOTA**

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| IN THE MATTER OF THE APPLICATION BY TRANSCANADA KEYSTONE PIPELINE, LP FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE KEYSTONE XL PIPELINE PROJECT | ) ) ) ) ) ) ) | HP 09-____<br><br>**DIRECT TESTIMONY OF JOHN PHILLIPS** |

**1. Please state your name and address for the record.**

Answer: My name is John Phillips. My business address is 7505 NW Tiffany Springs Parkway, Northpointe Circle I, Kansas City, Missouri 64153.

**2. What is your role with the Keystone XL Pipeline Project?**

Answer: I am the US Project Director for Universal Ensco (UEI) for the US portion of the Steele City Segment of the Keystone XL Project (Project).

**3. Please state your professional qualifications.**

Answer: I have 29 years of experience in project and construction management related to the design, construction, and operation of onshore and offshore oil and gas facilities, including pipelines, production facilities, and pipeline facilities. I am also a Registered Professional Engineer in Texas.

**4. Have you provided a resume?**

Answer: Yes, my resume and a list of representative projects is provided as Exhibit A of my testimony.

5. **What are your responsibilities on the Keystone XL Project?**

**Answer:** I am responsible for the engineering, survey, and construction management for the US-Steele City Segment of the Project.

6. **Are you responsible for portions of the application which Keystone is filing with the South Dakota Public Utilities Commission seeking a permit under the Energy Conversion and Transmission Facilities Act?**

Answer: Yes.

7. **For which portions of Keystone's application are you responsible?**

Answer: Yes, I am individually or jointly responsible for the information provided in the following sections:

- Section 1.4 – Project Schedule;
- Section 2.2.4 – Land Requirements;
- Section 2.2.5 – General Construction Procedures;
- Section 2.2.6 – Special Construction Procedures;
- Table 4 – Impact Summary Table;
- Section 5.3.4 – Soils;
- Section 5.3.5 – Erosion and Sedimentation;
- Section 5.3.6 – Seismic, Subsidence, and Slope Stability Risks;
- Section 5.4.1 – Surface Water Drainage;
- Section 5.4.3.1 –Hydrostatic Testing;
- Section 5.4.3.2 – Spill Prevention (Construction);
- Section 5.5.1.2 – Noxious Weeds;
- Section 5.6.1 – Wetlands;
- Section 5.6.2.1 – Potential Construction Impacts (Stream Crossing Methodology; Hydrostatic Testing);
- Section 5.7.4 – Local Land Use Controls;
- Section 5.8 – Water Quality and Uses;
- Section 5.9 – Air Quality;
- Section 5.10 – Solid Wastes;
- Section 6.1.1 – Employment/Labor Market, and all its subsections;
- Section 6.1.2 – Agriculture, and all its subsections;
- Section 6.2.1 – Housing;

- Section 6.2.3 – Sewer and Water;
- Section 6.2.4 – Solid Waste Management;
- Section 6.2.5 – Transportation;
- Section 6.3.1 – Health Services and Facilities;
- Section 6.3.2 – Schools;
- Section 6.3.3 – Recreation;
- Section 6.3.4 – Public Safety;
- Section 6.5.1 – Population and Demographics;
- Section 6.5.2 – Protection of Human Health and Safety;
- Section 7.1.2 – Environmental Inspection;
- Exhibit B – The Construction Mitigation and Reclamation (CMR) Plan; and
- Exhibit C – Preliminary Site-specific Crossing Plans.

**8. Could you briefly summarize the information in Section 1.4 – Project Schedule?**

Answer: Section 1.4 describes the schedule for the execution of the Project in South Dakota. Keystone proposes to commence construction of the Project in South Dakota in 2011 and to complete construction in 2012.

**9. Could you briefly summarize the information that you are responsible for in Section 2.2.4 – Land Requirements?**

Answer: I am responsible for the land requirements for the construction and operation of the project.

**10. Could you briefly summarize Section 2.2.5 – General Construction Procedures?**

Answer: Section 2.2.5 describes the general procedures for construction of the Project in South Dakota. Prior to starting construction, Keystone will finalize engineering surveys of the centerline and extra workspaces and substantially complete the acquisition of easements, as well as any property that it is necessary to acquire in fee. To manage and mitigate construction impacts, Keystone will implement its Construction, Mitigation, and Reclamation Plan (CMR Plan), which is attached to Keystone's application as

Exhibit B of the application. The CMR Plan contains construction and mitigation procedures that will be used throughout the project. Construction will proceed as a moving assembly line called a "spread." The construction process will consist of a series of activities including survey and staking of the ROW, clearing and grading, trenching, pipe stringing, bending, welding, lowering in, backfilling, hydrostatic testing, and cleanup.

**11. Could you briefly summarize the information that you are responsible for in Section 2.2.6 – Special Construction Procedures?**

Answer: In addition to standard pipeline construction methods described in Section 2.2.5, Section 2.2.6 discusses the special construction techniques that Keystone will use where warranted by site-specific conditions. Special construction techniques will be used when constructing across paved roads, highways, railroads, waterbodies, wetlands, and sand hill areas. Additional details of the special construction techniques are found in the CMR Plan.

**12. Could you briefly summarize the information that you are responsible for in Table 4 – Impact Summary Table?**

Answer: Table 4 summarizes the impacts of the Project on various resources in the State. I am responsible for the following items within Table 4:

- Soils (slope stability, CMR Plan);
- Water Resources (crossing methods, hydrostatic testing, CMR Plan);
- Vegetation (CMR Plan);
- Wildlife Resources (CMR Plan);
- Aquatic Resources (CMR Plan);
- Sensitive Species (CMR Plan);
- Land Use (CMR Plan);

- Socioeconomic Conditions (construction activities); and
- Public Health and Safety (construction activities).

**13. Could you briefly summarize the information that you are responsible for in Section 5.3.4 – Soils?**

Answer: Section 5.3.4 summarizes the soil types crossed by the Project. If not properly addressed by soil stabilization and proper topsoil handling procedures, construction activities can cause soil compaction and rutting. The CMR Plan identifies construction procedures to minimize impacts to soils. Keystone plans to minimize or mitigate potential impacts to soils by implementing the soil protection measures identified in the CMR Plan. These measures include procedures for segregating and replacing topsoil, trench backfilling, relieving areas compacted by heavy equipment, removing surface rock fragments, and implementing water and wind erosion control practices.

The CMR Plan also addressed procedures to address the potential discovery of preexisting contaminated soils during construction.

**14. Could you briefly summarize the information that you are responsible for in Section 5.3.5 – Erosion and Sedimentation?**

Answer: Section 5.3.5 discusses soils that are particularly sensitive to erosion and sedimentation. Potential impacts to these soils during construction will be minimized or mitigated by the soil protection measures identified in the CMR Plan, including procedures for implementing water and wind erosion control practices.

**15. Could you briefly summarize the information that you are responsible for in Section 5.3.6 – Seismic, Subsidence, and Slope Stability Risks?**

Answer: This section discusses areas along the Project that are prone to ground motion hazards, including seismicity, subsidence, and slope instability. The route does not cross identified active faults or areas where ground subsidence or karst hazards exist. Keystone has identified certain areas along the route where geologic conditions can cause ground movement, such as ground swelling, slope instability. In these areas, Keystone will conduct appropriate pre-construction site assessments and design facilities to account for various ground motion hazards as required by federal regulations.

**16. Could you briefly summarize the information that you are responsible for in Section 5.4.1 – Surface Water Drainage?**

Answer: Section 5.4.1 discusses potential construction impacts related to waterbody crossings. Keystone plans to use horizontal directional drilling (HDD) at three crossings in South Dakota (Little Missouri, Cheyenne, and White rivers). Since HDD does not involve any intended direct contact with the waterbody, channel bed, or banks, no impact is expected at these crossings. Keystone proposes to cross the remaining streams by the open cut method. At open cut wet crossings, the extent of increased suspended solids concentrations and downstream sedimentation impacts will depend on the flow conditions at the time of construction and the channel substrate. Measures related to managing spoil, timing, access, and equipment are included in the CMR Plan.

During construction, runoff and the resulting erosion of lands adjacent to waterbodies can lead to the introduction of solids into suspension and the deposition of

sediment in-stream. The CMR Plan includes extensive procedures to limit the extent of disturbed land adjacent to waterbodies, to control erosion, and methods to prevent sediments from entering waterbodies or wetlands.

**17. Could you briefly summarize the information that you are responsible for in Section 5.4.3.1 – Hydrostatic Testing?**

Answer: Section 5.4.3.1 summarizes information related to water used during construction for hydrostatic testing and for dust control. Hydrostatic test water withdrawals from surface waterbodies will be made at controlled rates and with equipment that will minimize impacts on stream beds and aquatic life. The water is likely to be withdrawn from water sources during summer and fall months. Keystone will coordinate with federal and South Dakota agencies to further identify such water sources and seasonal concerns. Water withdrawals will occur from the streams or rivers designated for hydrostatic test water in accordance with withdrawal permits. Similarly, water quality will not be negatively affected during construction as the pipe is new and all discharged water is required to meet water quality standards imposed by the discharge permits issued by South Dakota DENR for the permitted discharge locations. Water discharge rates will not exceed the daily discharge criteria referenced in the permits. Withdrawal rates and volumes would be designed to avoid impacts to aquatic life and downstream water users.

**18. Could you briefly summarize the information that you are responsible for in Section 5.4.3.2 – Spill Prevention (Construction)?**

Answer: This section discusses spill prevention of fuel and lubricants used during construction. Keystone will adhere to its Spill Prevention, Control, and Countermeasure (SPCC) procedures that are described in the CMR Plan. The SPCC procedures will be implemented in compliance with 40 CFR 112 (for oil spills) and corresponding state regulations.

**19. Could you briefly summarize the information that you are responsible for in Section 5.5.1.2 – Noxious Weeds?**

Answer: Section 5.5.1.2 describes noxious weeds that may occur within the Project's footprint. I am responsible for matters related to preventing the spread of noxious weeds during construction, including implementation of the weed control procedures in the CMR Plan.

**20. Could you briefly summarize the information that you are responsible for in Section 5.6.1 – Wetlands?**

Answer: Section 5.6.1 describes the mitigative measures to be implemented during construction related to crossing wetlands. Keystone will implement specific procedures as outlined in the CMR Plan to minimize and mitigate impacts to wetlands. All work shall be conducted in accordance with applicable permits.

**21. Could you briefly summarize the information that you are responsible for in Section 5.6.2.1 – Potential Construction Impacts (Stream Crossing Methodology; Hydrostatic Testing)?**

Answer: This section discusses the mitigative measures described in the CMR Plan to be implemented during construction related to crossing waterbodies and for sourcing and disposal of water for hydrostatic testing.

**22. Could you briefly summarize the information that you are responsible for in Section 5.7.4 – Local Land Use Controls?**

Answer: Section 5.7.4 indicates that the majority of the route in South Dakota is used for agricultural land uses.

**23. Could you briefly summarize the information that you are responsible for in Section 5.8 – Water Quality and Uses?**

Answer: I am responsible for the portions of Section 5.8 that relate to the use of water for hydrostatic testing and for dust control during construction. The general discharge permit for hydrostatic test water discharges will impose pollutant limits on those discharges that will be protective of the designated uses of the receiving waterbodies. In addition, construction methods for stream crossings (detailed in the CMR Plan) also will protect those streams and water bodies from exceedances of water quality standards.

**24. Could you briefly summarize the information that you are responsible for in Section 5.9 – Air Quality?**

Answer: Section 5.9 states that the construction of the pipeline, pump stations, and other ancillary facilities will require the use of mobile sources of emissions, such as commuter vehicles and construction equipment. Keystone will limit dust impacts in residential and commercial areas adjacent to pipeline construction by utilizing dust minimization techniques (primarily watering disturbed surfaces) in accordance with the CMR Plan. Wind-generated dust after construction will be controlled using land surface reclamation measures outlined in the CMR Plan.

**25. Could you briefly summarize the information that you are responsible for in Section 5.10 – Solid Wastes?**

Answer: Section 5.10 discusses the types of solid wastes that may be generated by the construction of the Project. Keystone will ensure that solid wastes are handled and dispose of properly.

**26. Could you briefly summarize Section 6.1.1 – Employment/Labor Market?**

Answer: This section generally discusses the overall pipeline construction labor force; overall labor resourcing during construction and the construction payroll by labor category; benefits to the local economy resulting from construction activity; and the potential for hiring local labor for construction.

A limited number of contract employees will be required for maintenance activities and emergency response. The total number of permanent employees will not result in significant additions to the total workforce of the region.

**27. Could you briefly summarize the information that you are responsible for in Section 6.1.2 – Agriculture?**

Answer: This section addresses construction methods set forth in the CMR Plan with respect to pastureland and rangeland; croplands; and irrigated land. Keystone will implement mitigation measures included in the CMR Plan to minimize impacts on agriculture productivity. Reclamation and revegetation will be in accordance with applicable ROW agreements. Temporary losses due to crop disturbance will be compensated.

Impacts to land uses during operations will be limited. Maintenance activities would not be significant because disturbances would be isolated, short-term, and infrequent. The primary long-term impact is the prohibition of permanent structures (e.g., homes, barns) within the 50-foot permanent ROW. The majority of existing land uses for croplands would not be affected.

**28. Could you briefly summarize in Section 6.2.1 – Housing?**

Answer: Section 6.2.1 discusses labor housing during construction. During the peak construction months between May and August, there will be up to approximately 1,400 pipeline construction workers in South Dakota. It is anticipated that many of the temporary workers will seek housing in the more populated, service-oriented towns located within a reasonable commuting distance to the work site. However, in some rural locations with limited temporary housing, Keystone is currently investigating the expansion and/or development of recreational vehicle (RV) parks to accommodate construction workers during construction of the Project. Due to the limited number of

permanent employees required for operations, no significant effects on housing are anticipated during operation of the Project.

**29. Could you briefly summarize in Section 6.2.3 – Sewer and Water?**

Answer: Section 6.2.3 states that there will be increased utilization of water and sewage facilities due to the pipeline construction offices and influx of temporary construction workers. These uses of existing facilities are not expected to cause significant impacts to existing sewer and water facilities. However, Keystone is evaluating the expanded sewer and water needs associated with the possible expansion of RV parks. No significant effects to sewer and water facilities are anticipated during the operation of the Project.

**30. Could you briefly summarize Section 6.2.4 – Solid Waste Management?**

Answer: As discussed in Section 5.10, there will be increased, temporary utilization of solid waste management facilities due to the pipeline construction offices and influx of temporary construction workers utilizing local lodging and services and solid wastes from pipeline construction. Keystone will ensure that solid wastes are handled and dispose of properly. Construction of the Project will not result in significantly effects to communities' solid waste services. No affect on solid waste management is anticipated during operation of the Project.

**31. Could you briefly summarize Section 6.2.5 – Transportation?**

Answer: This section discusses road use and maintenance during construction. Prior to construction, access roads to be utilized during construction will be identified as necessary to support state and local permitting. Keystone expects local road permitting to

be conducted at the county and township level. Keystone has initiated contacts with local permitting authorities for the purpose of establishing timelines for road approvals. During construction, traffic on highways and secondary roads will increase due to construction activities and the influx of construction workers. The primary impact will be deterioration of gravel or stone surfaced roads requiring grading and/or replenishment of the surface materials. Keystone will be responsible for repairing damage to roads and restoring them to pre-construction condition or better. No effect on transportation is anticipated during operation of the Project.

**32. Could you briefly summarize Section 6.3.1 – Health Services and Facilities?**

Answer: This section indicates that use of local health services and facilities during construction will be limited. Consequently, the impact to the local health care facilities as a result of this Project will be minor. Due to the limited number of employees required for operations, no effect on health services and facilities is anticipated during operation of the Project.

**33. Could you briefly summarize Section 6.3.2 – Schools?**

Answer: This section indicates that most workers do not travel with their families or enroll their children in the local schools. Because of this limited potential for new students, local schools should be capable of providing more than adequate opportunities and accommodations for any new students. Due to the limited number of employees required for operations, no effect on schools is anticipated during operation of the Project.

**34. Could you briefly summarize the information that you are responsible for in Section 6.3.3 – Recreation?**

Answer: This section indicates that the construction and operation of the Project will not result in significant effects to recreation in South Dakota.

**35. Could you briefly summarize the information that you are responsible for in Section 6.3.4 – Public Safety?**

Answer: In this section, public safety during construction is discussed. Law enforcement agencies in the communities adjacent to the Project will not experience a significant impact from the pipeline workers. Local law enforcement agencies should have adequate full and part-time law enforcement officers to accommodate the additional labor personnel as a result of the Project although the Project may result in a minor short-term increase in workloads for those agencies. During construction, response times to highway or construction-related accidents may be lengthy given communication, dispatch, and travel time considerations. In these areas, it may be necessary to provide on-site first responder services; however, Keystone will work with the local law enforcement, fire departments, and emergency medical services to determine the best course of action and coordinate for effective emergency response.

**36. Could you briefly summarize the information that you are responsible for in Section 6.5.1 – Population and Demographics?**

Answer: This section addresses the impact of the temporary change in local demographics due to the presence of the construction and operations labor forces.

**37. Could you briefly summarize the information that you are responsible for in Section 6.5.2 – Protection of Human Health and Safety?**

Answer: As discussed in previous sections of the application, Keystone would implement its CMR Plan, which includes a number of precautions for protecting human health and safety. Keystone and its contractors will be safety trained and will implement the SPCC Plan to reduce the likelihood and impacts of an accidental spill during construction.

**38. Could you briefly summarize the information in Section 7.1.2 – Environmental Inspection?**

Answer: This section addresses environmental inspection resourcing during construction, which will ensure that all permitting requirements are satisfied.

**39. Could you briefly summarize the information that you are responsible for in Exhibit B of the application?**

Answer: Yes, I am responsible for Exhibit B of the application, which is the CMR Plan.

**40. Could you briefly summarize the information that you are responsible for in Exhibit C of the application?**

Answer: Yes, Witness Richard Gale and I are responsible for the Preliminary Site-specific Crossing Plans.

**41. Based on your testimony above, do you have an opinion as to whether, taking into account the mitigative practices and techniques described above, the construction of the Project would pose a threat of serious injury to the environment nor to the social and economic condition of inhabitants or expected inhabitants in the siting area?**

Answer: Yes, in my opinion, taking into account the mitigative practices and techniques described above, and set forth in the CMR Plan, the construction of the Project would not pose a threat of serious injury to the environment nor to the social and economic condition of inhabitants or expected inhabitants in the siting area. Further, the Project will not unduly interfere with the orderly development of the region.

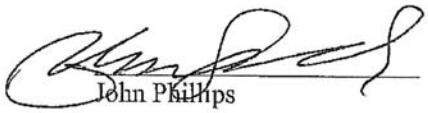
**42. Do you adopt the sections of the application identified above as your testimony in this case?**

Answer: Yes, with the caveat that some sections are the joint responsibility of myself and other witnesses.

**43. Does this complete your prepared direct testimony?**

Yes, it does.

Dated this 27 day of February, 2009.



## Exhibit A

## Resume for John Phillips

# JOHN J. PHILLIPS III

**Experience Summary:**

Twenty-nine (29) years experience in project and construction management of the design, construction, and operation of onshore and offshore oil and gas facilities, specifically pipelines, production facilities, and pipeline facilities (compressor stations, pump stations, and metering).

**Career highlights include:**

- ***Project Director***– Universal ENSCO, INC, Houston, Texas/ Beijing, PRC – Lead project management and business unit responsibilities on projects for this engineering consulting firm.

    - Keystone XL Project, US Steele City Pipeline – Engineering, Survey, and Construction Management on approximately 850 miles of 36" crude oil pipeline from Morgan, MT to Steele City, NE.

- ***Project Manager***– Chevron International Exploration & Production, Southern Africa Strategic Business Unit (Angola) – Lead project management responsibilities on numerous offshore pipeline and drilling/production platform projects for this major international oil company involving:

    - Block 0, Inner Malongo Field, Angola – Install 8,000' of 10" pipeline from 73-48 Well Jacket to GS-Alpha Platform. Install interconnecting piping and scraper traps on both platforms. Install 3-Phase Meter Skid on 73-48 Well Jacket for well testing.
    - Block 0, Takula Field, Angola – Install 8,000' of 10" pipeline from Numbi-D Well Jacket to GS-November Auxiliary Platform. Install interconnecting piping and scraper traps on both platforms.

- ***Vice President/ Project Director*** – Universal ENSCO, INC, Houston, Texas/ Beijing, PRC – Lead project management and business unit responsibilities on projects for this engineering consulting firm.

    - Conceptual and Basic Design, Long Lead Procurement Support, EPC Contractor Bid Package Preparation, Detailed Engineering and Construction Oversight, and Commissioning Oversight on a 12,000 BOPD Oil Production Facility complete with 2 Well Islands, 150-person Base Camp, and an 8" Export Pipeline to Refinery located near Adrar in southwest Algeria. The project is a Joint Venture between UEI and China Petroleum Engineering with the design work being done in Beijing, PRC.
    - Report prepared by Merrill Lynch entitled <u>Alaska Natural Gas Pipeline: Analysis of State Participation and Alternative Project and Capital Structures</u> on the following topics: Engineering Cost Estimate Accuracy, Major Reasons for Construction Cost Overruns, Risk Mitigation for Construction Cost Overruns, The need for an

Independent Engineer-of-Record Representing the State of Alaska, Alternate Contracting Methods and "Partnering."
- Assist PG &E GTN with various gas pipeline and facility projects in Idaho, Washington, and Oregon.
- Basic Engineering, Procurement, and Vendor Inspection on a 45,000 BOPD, 256,000 BWPD Production Facility, 3 Well Islands, and 30" Export Pipeline for the OXY Eden-Yuturi Project in Ecuador.
- Performed due diligence and provided testimony as an external expert witness for a pipeline operator in Colombia to determine Industry Codes and Standards compliance on design, construction, maintenance, and emergency response/preparedness of their pipeline system.

- ***Manager, Projects –*** Process Engineering Design – Lead project management responsibilities on pipeline projects for this engineering consulting firm.
  - Perform technical due diligence for Williams International on the Trans Java onshore/offshore system in East Java, Indonesia.
  - Assist PG &E GT-NW with FERC filing and detailed design on 21 miles of 42" gas pipeline and facilities from Kootenai County, ID to Spokane County, WA.

- ***Manager, Projects –*** CDI Engineering Group – Lead project management responsibilities on pipeline projects for this engineering consulting firm.
  - Working with Williams International on a proposal to the Government of Ecuador to construct approximately 300 miles of 26" pipeline to transport crude oil from Lago Agrio in the Oriente to Esmereldas on the coast in order to double Ecuador's export capacity.

- ***Senior Project Engineer –*** Williams Companies – Lead project management responsibilities on numerous natural gas and products pipelines, pump stations, and measurement projects for this gathering and processing company involving:
  - Cost estimate preparation, detailed design, permit interface, & drafting interface Material specification and requisition, Contract preparation, job showing, bid analysis, and award, Construction management and startup,
  - Performed duties of acting Pipeline Engineering Department Supervisor in 1991 and 1992 including: preparation of the department budget, review and approval of performance plan goals, & employee performance evaluations

- ***Senior Engineer*** - United Texas Transmission – Lead project management responsibilities involving the estimating, design, drafting interface, material specification, permit preparation, bid package preparation, bid analysis/award, and construction management on numerous projects for this intrastate gas pipeline company.

**Education:**

Bachelor of Science in Civil Engineering, University of Texas, Austin, Texas, 1980
Licenses: Professional Engineer, Texas, No. 66272

# PROJECT LIST

**Chevron International Exploration & Production, Southern Africa Strategic Business Unit (Angola)**

- **BLOCK 0, INNER MALONGO FIELD, Angola** – Install 8,000' of 10" pipeline from 73-48 Well Jacket to GS-Alpha Platform. Install interconnecting piping and scraper traps on both platforms. Install 3-Phase Meter Skid on 73-48 Well Jacket for well testing.
  **TOTAL COST**: $ 20,000,000

- **BLOCK 0, TAKULA FIELD, Angola** – Install 8,000' of 10" pipeline from Numbi-D Well Jacket to GS-November Auxiliary Platform. Install interconnecting piping and scraper traps on both platforms.
  **TOTAL COST**: $ 20,000,000

- **BLOCK 0, OUTER MALONGO FIELD, Angola** – Complete PRE-FEED Study on Tripod Drilling/ Production Platform to accommodate 7 wells, plus Auxiliaries including power distribution for Electric Submersible Pumps, Emergency generator, and 20 –Ton Crane .
  **TOTAL COST:** $ 500,000

**Universal ENSCO, Inc**

- **KEYSTONE XL PROJECT, US Steele City Pipeline, Kansas City, MO** – Engineering, Survey, and Construction Management on approximately 850 miles of 36" crude oil pipeline from Morgan, MT to Steele City, NE.
- **TOUAT FIELD DEVELOPMENT, Algeria/ China** – Perform the Conceptual and Basic Design, Long Lead Procurement Support, EPC Contractor Bid Package Preparation, Detailed Engineering and Construction Oversight, and Commissioning Oversight on a 12,000 BOPD Oil Production Facility complete with 2 Well Islands, 150-person Base Camp, and an 8" Export Pipeline to Refinery located near Adrar in southwest Algeria. The project is a Joint Venture between UEI and China Petroleum Engineering with the design work being done in Beijing, PRC.

- **PG &E - Gas Transmission Northwest, Idaho, Washington, and Oregon –** Complete various pipeline and facility projects including:

  - Design, Drafting, and Bid Package Preparation of launcher and receiver facilities at 8 different locations in OR to support Pipeline Integrity Projects.
  - Preliminary Study of the Umatilla River to determine the viability of doing a directionally drilled replacement in OR
  - Preliminary Study of the Pend Oreille River to determine the viability of doing a directionally drilled replacement in ID
  - Engineering and Drafting Support of FERC Filing Preparation for a Major System Expansion encompassing 5 segments including 6 river crossings in ID, WA, & OR
  - Survey and As-built mapping of a 21 mile, 42" system expansion in ID and WA

- **Construction Risk Mitigation, Alaska** - Contributed to report prepared by Merrill Lynch entitled Alaska Natural Gas Pipeline: Analysis of State Participation and Alternative Project and Capital Structures on the following topics:

  - Engineering Cost Estimate Accuracy
  - Major Reasons for Construction Cost Overruns
  - Risk Mitigation for Construction Cost Overruns
  - The need for an Independent Engineer-of-Record Representing the State of Alaska
  - Alternate Contracting Methods and "Partnering"

- **Pipeline Compliance Due Diligence and Expert Witness Testimony , Colombia** – Performed due diligence as an external expert and provided court testimony for a pipeline operator in Colombia to determine Industry Codes and Standards compliance on design, construction, maintenance, and emergency response/preparedness of their pipeline system.

- **OXY Eden-Yuturi Project, Ecuador –** Perform the Basic Engineering, Procurement, and Vendor Inspection on a 45,000 BOPD, 256,000 BWPD Production Facility complete with 3 Well Islands, and a 30" Export Pipeline

- **InterOil Preliminary Plan of Development, Papua New Guinea -** Performed the Conceptual Design and Cost Estimating for Production Facilities, Oil Gathering Lines, Natural Gas Gathering Lines, Oil Transport Pipeline, and Natural Gas Transmission Line for a multi-structure, multi-well development in Papua New Guinea.

**Process Engineering Design**

**Trans Java Gas Pipeline, Indonesia** – Perform technical due diligence for Williams International for this onshore/offshore pipeline system in East Java, Indonesia.

**PG &E - Gas Transmission Northwest, Kootenai County, ID to Spokane County, WA** – Assist with FERC filing, detailed design, and constructability on 21 miles of 42" gas pipeline and facilities.

**CDI Engineering Group**

**Lago Agrio to Esmeraldas, Ecuador –** Participated in the unsuccessful bid, including cost estimates & site visits, to install 300 miles of 26" pipeline from Lago Agrio, Sucumbios Province, west over the Andes Mountains, running south of Quito, then to the northwest to Esmeraldas on the coast.
Project cost: $ 250,000,000

**Williams Energy Services**

**Daggett County, Utah to Mesa County, Colorado** - Install 52 miles of 12" products pipeline from Brown's Park, Utah to Dinosaur Pump Station. Install 98 miles of 10" products pipeline from Dinosaur Pump Station over Baxter Pass (elevation 8422 feet) to Harley Dome Pump Station, west of Grand Junction, Colorado, including crossings of the Green River (2), White River, and Interstate 70.
Project Cost: $ 45,000,000

**Harris County, Texas** – Install 9 miles of 20" products pipeline from the GATX Terminal, near the Houston Ship Channel, north to a tie-in with an existing 20" pipeline including directional drills of Interstate 10, Market Street, and Greens Bayou. Project Cost: $ 5,250,000

**St. Charles Parish, Louisiana to Ascension Parish, Louisiana** – Install 30 miles of 12" products pipeline from the Tri-States Kenner, LA meter station to the Exxon Storage Facility at Sorrento, LA utilizing marsh pipeline construction techniques. Project Cost: $ 24,000,000

**Kopi, Papau New Guinea to Gladstone, Queensland, Australia** – Participated in the unsuccessful bid, including cost estimates & site visits, to install approximately 1200 miles of 30", 24", and 20" gas pipeline from the Chevron production facility in Papau New Guinea across the Straits of Torres, making landfall on the Cape York Peninsula, traveling parallel to the eastern coast of Australia to the Comalco Aluminum Smelter in Gladstone, Queensland, Australia. Project Cost: $ 1,750,000,000

**McMullen County, Texas** – Replace 7.6 miles of 16" gas pipeline on the West Bigfoot Lateral including the Frio River crossing. Project Cost: $ 2,000,000

**Lincoln County, Wyoming** – Install approximately 14 miles of 16" gas pipeline from the South Moxa Compressor Station to the North Moxa Compressor Station including crossings of the Hams Fork River. Union Pacific Railroad, and U.S. Highway 30. Project Cost: $ 3,500,000

**Green Canyon 205** – As Construction Supervisor, inspected 10" pipe and facilitated FAT test connecting the Sub-sea Pipeline Termination Sled with the Production Manifold in 5000' of water using a Remote-Operated Vehicle

**La Fourche Parish, Louisiana** – Install meter/regulator station with gas dehydration and odorization to provide natural gas to a Manufacturing Facility. Project Cost: $ 80,000

**Northwest Pipeline Corporation**

**Rio Blanco County, Colorado** – Replace 2,800' of 26" gas pipeline. Hydrotest, dry, & tie-in to existing 26" gas pipeline. Project Cost: $ 500,000

**Uintah County, Utah** – Replace 2,500'of 26" gas pipeline. Hydrotest, dry, & tie-in to existing 26" gas pipeline. Project Cost: $ 500,000

**Clackamas/Linn Counties, Oregon** – Install 20" bypass around 2 existing compressor stations. Hydrotest, dry, and hot tap existing 20" and 10" gas lines to tie-in bypass line. Project Cost: $ 900,000

**Whatcom County, Washington** – Install 2,600' of 12" gas pipeline to loop an existing 6" gas line. Open cut crossing of the Nooksack River. Project Cost: $ 1,150,000

**Clackamas County, Oregon** – Re-qualify 12 miles of 20" gas pipeline. Repair 22 hydrotest failures and dry line to zero degrees dewpoint. Project Cost: $ 2,500,000

**Klamath County, Oregon** – Complete final cleanup and reseeding of 12 miles of 6" gas pipeline in rugged terrain. Project Cost: $ 550,000

**Rio Blanco County, Colorado** – Replace 2 miles of 26" gas pipeline. Hydrotest, dry, & tie-in to existing 26" gas pipeline. Project Cost: $ 800,000

**Uintah County, Colorado** – Replace 3 miles of 26" gas pipeline. Hydrotest, dry, & tie-in to existing 26" gas pipeline. Project Cost: $ 1,200,000

**Clark County, Washington** – Replace 4,800' of 26" gas pipeline. Hydrotest, dry, & tie-in to existing 26" gas pipeline. Project Cost: $ 800,000

**King County, Washington** - Install 2 – 12" gas pipelines, 7,500' each, on a golf course, to bypass a damaged ravine crossing. Hydrotest, dry, and tie-in to existing 10" gas lines. Project Cost: $ 2,500,000

**Whatcom County, Washington** – Install 7 miles of 12" gas pipeline to loop an existing 6" lateral. Hydrotest, dry, and tie-in to existing 6" gas line. Project Cost: $ 4,500,000

**United Texas Transmission**

**Fort Bend County, Texas** – Directionally drill Oyster Bayou to replace 1,500' of 30" gas pipeline. Project Cost: $ 750,000

**Brazoria County, Texas** – Install scraper traps on an existing 20" gas pipeline and replace 20" mainline valve. Run MFL internal inspection tool. Project cost: $ 500,000

**Nolan County, Texas** – Design and install 800 HP reciprocating compressor for remote operation. Project Cost: $ 950,000

**Fort Bend County, Texas** – Install 7600 HP turbine compressor station in a residential area complete with 2 – 3800 HP Solar Centaurs, office/control building, warehouse, remote control panel, emergency shutdown system, natural gas distribution system, and noise reduction equipment. Project Cost: $ 6,000,000

**Chambers County, Texas** – Install 3,500' of 6" gas pipeline to loop an existing 4" lateral. Install 1,650' of 4" gas pipeline to serve a new customer with 10 MMSCFD. Fabricate 6" meter station with regulation. Project Cost: $ 300,000

**Harris County, Texas** – Install 7,000' of 12" gas pipeline to a large chemical plant. Fabricate dual 6" meter station capable of handling 30 MMSCFD complete with pressure regulation/monitoring and telemetry. Project Cost: $ 700,000

**All-American Pipeline**

**Upton County, Texas** – Install 1 mile of 24" crude oil pipeline to connect 30" crude oil line to 2 existing tank farms. Install metering facilities.

**Winkler County, Texas** – Install 4 miles of 24" crude oil pipeline to connect 30" crude oil line to 2 existing tank farms. Install metering facilities at each connection.

**Culbertson County, Texas** – Fabricate and install pressure reducing valve station with strainers and scraper traps.

**Cochise County, Arizona** – Revise pump station piping to facilitate receiving and launching scrapers.

**Kern County, California** – Fabricate and install mainline pump station with scraper traps

**Associated Pipeline Contractors**

**Berks County, Pennsylvania** – Install 18 miles of 30" and 36" gas pipeline. Modify existing compressor station piping.

**Producers Gas Company**

**Waller County, Texas** – Revise compressor station piping to facilitate receiving and launching scrapers. Project Cost: $ 120,000

**Grimes County, Texas** – Install 6 miles of 6" gas line to tie-in third party gas pipeline to an 8" loop line. Install compression, metering, and scraper facilities. Project Cost: $ 600,000

**Grimes County, Texas** – Install 1.5 miles of 8" gas line to loop an existing 4" lateral. Install scraper facilities at each end. Project Cost: $ 200,000

**Brazos County, Texas** – Install several small diameter flow lines to connect wells to the 10" mainline and laterals. Project Cost: $ 200,000

**Kerr-McGee Corporation**

**Onshore**

**St. Mary's Parish, Louisiana** – Build heliport facility with metal building and fueling station to facilitate crew change of 60 people from the Morgan City Base. Project Cost: $ 225,000

**St. Mary's Parish, Louisiana** – Install 500' of 8' seawall around existing dock. Raise and riprap levee on the Intracoastal Canal to an 8' MSL elevation. Project Cost: $ 110,000

**Offshore**

**West Cameron Area** – (Water Depth 30') – Fabricate and install two four-pile production platforms to handle 50 MMSCFD of natural gas. Purchase and install production and auxiliary equipment (separation, glycol dehydration, living quarters, cranes, etc). Project Cost: $ 8,200,000

**Offshore Louisiana** – (Water Depth 10' to 272') – Comprehensive underwater diving inspection program which checked all of Kerr-McGee's 66 major offshore structures for damage below the waterline. Project Cost: $500,000

**East Cameron Area** – (Water Depth 0' to 50') – Lay and bury 22 miles of 6" crude oil pipeline from an offshore production platform across the beach to an onshore oil storage facility. Install onshore meter station and scraper receiver.

**High Island Area** – (Water Depth 41') – Fabricate and install four-pile well protector with deck, heliport, test separator, metering, and scraper launcher. Project Cost: $ 1,200,000

**Ship Shoal Area** – (Water Depth 20') – Install 7 – 2" pipelines, totaling 15,000', to tie-in existing wells to 2 new production platforms. Install 4" and 6" pipelines, 6,000' each, from an existing well to new production platforms. Fabricate and install two-four pile production platforms with separation, water treatment, compression, generators, and living quarters with 115' bridge to an existing platform. Project Cost: $ 6,300,000

**East Cameron Area** – (Water Depth 49') – Fabricate and install four-pile well protector with deck, heliport, test separator, metering, and scraper launcher. Lay and bury 6 miles of 4" pipeline from the platform to third party platform. Project Cost: $ 2,500,000

**West Cameron Area** – (Water Depth 37') – Fabricate and install four-pile well protector with deck, heliport, test separator, metering, and scraper launcher. Project Cost: $ 1,000,000

**West Cameron Area –** (Water Depth 37') – Fabricate and install four-pile jacket to act as a well protector for free standing caissons. The jacket was designed to accept a future deck with production facilities. Project Cost: $ 1,500,000

**Breton Sound Area** – (Water Depth 10') – Fabricate and install a four-pile scraper platform. Hot tap an existing 20" crude oil line. Install 500' of 16" pipeline from the hot tap to the new scraper platform. Cut existing 20" crude oil pipeline and tie-in two risers to the new platform. Project Cost: $ 1,500,000

**Ship Shoal Area** – (Water Depth 10') – Fabricate and install four-pile well protector over new well. Set manifold on existing well. Install 2 – 4" pipelines, 4,500' each, to tie-in the new wells to the manifold. Project Cost: $ 1,000,000

**Ship Shoal Area** – (Water Depth 12') – Fabricate and install four-pile well protector over new well. Set manifold on existing well. Lay and bury 4 miles of 8" pipeline from the new well to an existing production platform. Project Cost: $ 1,300,000

**Ship Shoal Area** – (Water Depth 12') – Fabricate and install four-pile well protector over new well. Set manifold on existing well. Lay and bury 4 miles of 4" pipeline from the new well to an existing production platform. Project Cost: $ 750,000

**Ship Shoal Area** – (Water Depth 12') – Lay and bury 3.6 miles of 4" pipeline from a new well to an existing production platform. Project Cost: $ 620,000

**Ship Shoal Area** – (Water Depth 120') – Repair 8" oil pipeline utilizing Big Inch Marine Flex-Forge System. Project Cost: $ 750,000

**Breton Sound Area** – (Water Depth 12' and 8') – Install 250-barrel storage tank, pump, and instrumentation on an existing platform and tie-in to a new pipeline to replace an oil storage barge. Install 500-barrel oil storage tank, pump, and instrumentation on an existing platform and tie-in to a new pipeline, to replace an oil storage barge. Project Cost: $ 800,000