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Memorandum

TO: Representative Mark Neuman
FROM: Patricia Young, Manager *Py*
DATE: September 9, 2010
RE: Rockies Express Pipeline Cost Analysis
LRS Report 11.024

You asked our agency to obtain detailed information on the actual costs of the Rockies Express Pipeline, which became fully operational in November 2009.

Stretching 1,679 miles from northwestern Colorado to eastern Ohio and with a carrying capacity of 1.8 billion cubic feet of gas per day, the Rockies Express Pipeline (REX) is one of the largest natural gas pipelines ever constructed in North America. Originally estimated at \$3 to \$4 billion, the finished project cost \$6.8 billion. The attached statistical report was provided by Allen Fore, director of community relations with Kinder Morgan Energy Partners, L.P.¹ Kinder Morgan considers all other information we requested to be proprietary, although a news article at the time of completion cited Mr. Fore as the source of the following information:

- 42-inch high pressure steel pipeline, 1 to 1½ inches thick, externally coated with fusion bond epoxy, has a life expectancy of 70-80 years;
- Covered by a minimum of five feet of ground. Much deeper, especially under rivers, for example, it goes as deep as 100 feet under the Wabash River; and
- Maximum pressure of 1,480 pounds per square inch.²

John Eagleton, Kinder Morgan's vice president of business development notes that dynamics such as terrain, delivery infrastructure, availability of workforce, the price of raw steel both nationally and internationally, and pipeline mill space can affect cost dramatically. For example, when the REX project began, steel prices were at \$1,000 to \$1,500 per ton but had risen to over \$3,300 per ton before the project was completed; additionally, because the project used most of the domestic mill capacity available, some pipe had to be manufactured in Germany.

Cost estimates for Alaska's Stand Alone Gas Pipeline project are based on the 753-mile, preferred route following the Trans Alaska Pipeline (TAPS) along the Dalton Highway corridor from Deadhorse to Livengood, and then continuing south along the Parks Highway to the Cook Inlet area. Certainly, the ability to use existing transportation corridors is among the significant differences between TAPS and the proposed bullet line; however, it may be illustrative to note that the final tally of \$8 billion for the 800-mile TAPS—when expressed in 2010 dollars—would be \$23.8 billion.³

We hope this information is helpful. If you have questions or need additional information, please let us know.

¹ Kinder Morgan Energy Partners, L.P., Sempra Energy, and ConocoPhillips jointly developed the REX.

² Howard Greninger, "Massive Pipeline Nearing Completion," *The Tribune-Star*, October 1, 2009.

³ We note, however, that changes in construction costs may not match the rate of general inflation. We account for inflation using the Anchorage Consumer Price Index (CPI), available on the Alaska Department of Labor and Workforce Development website at <http://laborstats.alaska.gov/>.



Rockies Express Pipeline (REX) Statistics

The Basics

REX is one of the largest natural gas pipelines constructed in North America—and one of the most significant in the last 25 years.

➤ Gas Delivery

- 1.8 billion cubic feet of gas (Bcf)

➤ Cost

- Total project cost: \$6.8 billion


Pipeline/Infrastructure

➤ Construction

- 1,679 miles of pipe
- 8,865,120 feet of pipe
- 110,814 sections of 42" pipe
- 325 lbs per foot of steel pipe
- 26,000 lbs (13 tons) per joint of 42" steel pipe
- 1.4 million tons of steel pipe used on REX
- 15 compressor stations (Seven compressor stations on REX-West, Eight compressor stations on REX-East)
- 22 meter stations (9 meter stations on REX-West, 13 meter stations on REX-East)
- 83 mainline valves (41 mainline valves on REX-West, 42 mainline valves on REX-East)

➤ Right-of-way

- Approximately 21,850 acres of agricultural land temporarily affected during REX construction on REX-West and REX-East
 - » Approximately 10,800 acres of agricultural land temporarily affected during REX-West construction
 - 3,285 acres will be affected by operation

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- 90 acres associated with the aboveground facilities
 - » Approximately 11,050 acres of agricultural land temporarily affected during REX-East construction
 - 4,320 acres will be affected by operation
 - 81 acres associated with the aboveground facilities
 - 4,843 land tracts on all of REX
 - » 1,739 total land tracts on REX-West
 - » 3,104 land tracts on REX-East
 - 6,530 landowners on all of REX
 - » 2,707 landowners on REX-West
 - » 3,823 landowners on REX-East
 - 75 railroad crossings on all of REX
 - » 39 railroad crossing on REX-West
 - » 36 railroad crossing on REX-East
 - 1,455 road crossings on all of REX
 - » 775 road crossings on REX-West
 - » 680 road crossings on REX-East

➤ Compression

- 15 Stations
 - » 460,000 Horsepower Installed
 - » 12 Gas Turbine Driven Compressors
 - » 8 Electric Motor Driven Compressors
 - » 23 Reciprocating Gas Engine Driven Compressors
- Engineering
 - » 2 Engineering Companies utilized
 - » 300+ assigned workers
 - » 125,000 hours expended
- Construction
 - » 2 Construction Contractors utilized
 - » 7 crews
 - » 120+ employees per crew – peak
 - » 1,500,000+ man hours expended


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- Operations
 - » 4 full time local employees per site

➤ Environmental/Regulatory

- Identified 1,485 surface water body crossings
- Major Environmental Permits, Licenses, Authorizations, and Clearances
 - » Federal (FERC, USACE, Fish and Wildlife)
 - 13 Federal permits
 - » State (EPA, DNR, SHIPO)
 - 41 permits over 6 state project area
- Ecological and Cultural surveys
 - » Surveys completed on approximately 15,515 acres across 640 miles of ROW
 - 62 cultural sites eligible for listing in the National Registry for Historic Places (NHRP) were identified along the project route.
 - 47 of these were successfully mitigated with the remaining 15 successfully avoided.
- Negotiated a “Not likely to adverse affect” decision by implementing appropriate and revolutionary methods to protect the Indiana bat and its habitat.
- Negotiated an agreement with the USFWS to avoid “take” of migratory birds and/or their habitat.

➤ Engineering

- 28 HDD crossings on all of REX
- REX WEST- Horizontal Directional Drill Crossings
 - » Total of four HDDs ranging in length from 1680 ft. to 2842 ft.
- REX EAST- Horizontal Directional Drill Crossings
 - » 24 crossings installed by HDD on REX-EAST
 - » HDD crossings passed beneath 19 rivers, 3 archeological sites and several highways and railroads.
 - » 2 of the river crossings are installed under wild and scenic rivers: Big Darby Creek and Little Miami River.
 - » The longest crossing is the Walnut Creek HDD with a length of 3846 feet. The shortest has a length of 1528 feet.

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- » The total length of all the HDD is a little over 12 miles. Average crossing length is ½ mile.
 - » All HDD under rivers provide a minimum depth of cover under the river bottom of 35 feet and a maximum depth of cover of 300 feet.
 - » HDD are installed in soils varying from soft sand to hard limestone.

- Engineering Staffing

- » 152 engineers, designers and support personnel used on REX
- » More than 560,000 man hours
 - REX-West 80 engineers, designers and support personnel
 - REX-West Man-hours 310,000 +
 - REX-East 72 engineers, designers and support personnel.
 - REX-West Man-hours 250,000 +

- Alignment Drawings

- » More than 3800 alignment sheets, construction details, site specifics, permit drawing, etc. developed for REX
 - REX-West 1800+
 - REX-East 2000+

- Plats

- » Approximately 6,000 plats prepared for property of easement acquisition on all of REX
 - REX-West approximately 2,000 plats prepared
 - REX-East approximately 4,000 plats prepared
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- Murray Mining – Long Wall Coal Mining Subsidence

- » 46,700 of heavy wall pipe to accommodate potential additional stress related long wall mining activity.
- » Six experts in various fields of expertise such as pipe stress, coal reserves, long wall mining subsidence, pipeline design, pipeline construction, etc.



➤ Economic Impact

- Total number of jobs at peak of construction: Nearly 15,000 employees on all of REX (approx 5,000 on REX-West, 10,000 on REX-East)
 - » Inspection employees: 396
 - » Construction/welding employees: approx 4,000
 - » Survey employees: 114
 - » Technicians/Operators/Laborers/Managers/Misc.: 548
 - » Engineers: approx 450 (includes mainline and facilities)
- Total number of man-hours: More than 26 million man-hours on REX (to date)
 - » Total man-hours on REX-West: 7,865,601
 - » Total man-hours to date (as of October 2009) on REX-East: 19,038,476
- States impacted: 8 states.
 - » 5 states on REX-West (Wyoming, Colorado, Nebraska, Kansas, Missouri)
 - » 4 states on REX-East (Missouri, Illinois, Indiana, Ohio)
- Counties impacted: 63 counties.
 - » 28 counties on REX-West
 - » 35 counties on REX-East



➤ Public Outreach/Support

- Since the beginning of the REX project we have contacted at least 1,350 elected officials and more than 450 officials from nongovernmental organizations.
- REX arranged nearly 300 public meetings with county commissioners, farm bureaus, state legislative and regulatory committees, city councils, township boards, chambers of commerce, and service clubs to update them on the project and solicit feedback that officials have received from their constituents.
- 40 proclamations and letters of support from local elected officials and key stakeholders
- REX held 28 open houses to give the public an opportunity to learn about and to ask questions about the proposed REX project.
- Over the course of the REX project, the public Web site has averaged 150 page views per day. Since the REX project Web site went live in late 2005, the site has received more than 300,000 page views.
- REX stories in nearly 100 media outlets including print, TV, radio, and trade.
- Media hits with a combined circulation of more than 2 million in addition to several television and online placements that do not provide circulation numbers.