EXECUTIVE SUMMARY

This Executive Summary summarizes the Environmental Assessment (EA) process used to evaluate the proposed operation of the petroleum products pipeline system (System) owned by Longhorn Partners Pipeline, L.P. (Longhorn). The EA was prepared by the US Department of Transportation (DOT) and the US Environmental Protection Agency (EPA), referred to as the "Lead Agencies," in association with their third-party contractor, URS Corporation (formerly Radian International). The EA is consistent with the National Environmental Policy Act (42 U.S.C. §§ 4321-4347) and the March 1999 settlement agreement (Settlement) between the parties to a lawsuit initiated in the spring of 1998.[1]

A three-volume draft EA and finding of no significant impacts was issued by the Lead Agencies in October 1999. Over the next 12 months, more than 6,000 comment letters and hundreds of oral comments at six public meetings were reviewed by the Lead Agencies. The comments are combined and responded to in Volume 4 of the final EA. The comments resulted in several new analyses and extensive changes to the EA and the Longhorn Mitigation Plan (LMP).

CHAPTER 1—INTRODUCTION

The EA evaluated the potential environmental and safety impacts of the Longhorn proposal to transport gasoline and distillate products through the pipeline system. The System includes the 695 miles of mostly 18-inch diameter mainline pipe between Houston and El Paso, a 28-mile 8-inch diameter lateral to Odessa, and another 8 miles of planned laterals to connect the El Paso Terminal with two interstate product pipelines serving New Mexico and Arizona. Approximately 450 miles of this pipeline was constructed in 1950 and previously operated by Exxon Pipeline Company (EPC) as a crude products pipeline (from Crane, Texas to Baytown, Texas [near Houston]) from 1950 until 1995. Since 1995, this portion of the line has been idle. After the pipeline was purchased by Longhorn in 1996, it was extended by an additional 237 miles from Crane to El Paso.

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[1] The lawsuit, Ethel Spiller, *et al.*, Plaintiffs v. Robert M. Walker, *et al.*, Defendants, Civil No. A-90-CA-255-SS, was initiated by seven landowners in Kimble County, Texas, and one who resides in Hays County, and the Barton Springs-Edwards Aquifer Conservation District. Subsequently two parties sought and were granted permission to join the lawsuit as plaintiffs. These parties are the City of Austin, Texas, and the Lower Colorado River Authority. The suit was brought against the US Department of Defense, EPA, and DOT to compel the preparation of an Environmental Impact Statement (EIS) prior to the start-up of the Longhorn pipeline.

The pipeline risk assessment and pipeline integrity analysis portions of the EA assume operation of the pipeline system at its full capacity of 225,000 barrels per day (bpd), which is anticipated to occur around 2010, approximately ten years from now. The start-up capacity of the pipeline is assumed to be 72,000 bpd. In instances where data collection was incomplete or inaccessible, highest throughput and largest spill sizes were assumed to ensure a reasonable worst-case assessment of the System.

CHAPTER 2—STATEMENT OF PURPOSE AND NEED

The purpose of the proposed project is to allow Longhorn an opportunity to compete in the "El Paso Gateway Market," which includes El Paso, Texas; Juarez, Mexico; Albuquerque, New Mexico; and Phoenix, Arizona. The proposed project would increase competition in the growing markets for refined products in west Texas, Arizona, and New Mexico and nearby areas across the international border with Mexico that have traditionally been isolated from significant competition.

CHAPTER 3—DESCRIPTION OF THE PROPOSED PROJECT AND ALTERNATIVES

PROPOSED PROJECT

The Proposed Project would convert the former EPC crude oil pipeline (Crane to Baytown) and the new 237-mile pipeline (Crane to El Paso) into a products pipeline transporting primarily gasoline and diesel fuel from Houston to El Paso as well as via a lateral from Crane to Odessa, Texas.

Longhorn is proposing to initially transport 72,000 bpd of product. Two additional phases of pump station construction over an approximate ten-year period would increase the throughput of the System to 225,000 bpd of refined product. Initially, the System would use the new Galena Park pump station near the Houston Ship Channel and refurbished stations at Satsuma, Cedar Valley, Kimble County, Crane, and El Paso. The next phase of the System expansion would be the construction of four additional pump stations that would allow for 125,000 bpd throughput. The third phase would be the construction of another nine stations, for a total of 19 pump stations, thereby increasing throughput capacity to 206,000 bpd. The addition of a flow-improving agent could further increase the capacity to a maximum of 225,000 bpd. This EA does not include review of the construction or operational impacts of the additional required new pump stations because their locations and configurations are not now known. These will be addressed by DOT in a subsequent supplemental NEPA review.

SYSTEM DESCRIPTION

The System begins with 9 miles of newly constructed 20-inch diameter pipeline (segment 1 on Table ES-1) that connects the Galena Park Station in eastern Harris County, to the former EPC refurbished 20-inch pipeline at a point designated as Valve J1 or simply “J1.” From J1, the pipeline goes west for 25 miles to the Satsuma Station on the northwest side of Houston, where it connects with the existing 18-inch portion of the former EPC pipeline.

Table ES-1. Longhorn Pipeline Segments and Connecting Pipelines Providing Refined Products to New Mexico and Arizona

Segment		Status	Approx. Length (miles)	Diameter (inches)
1	Galena Park Station to EPC* connection (“J1”)	Newly built	9	20
2	J1 to Satsuma Station	Built in 1949**	25	20
3	Satsuma to Crane Station	Built in 1949**	424	18
4	Crane to El Paso Station	Newly built	237	18
5	Crane to Odessa Lateral	Newly built	28	8
6	El Paso Station to Interstate Pipelines Laterals (three and a return line)	Not yet built	8	Two 8, One 12 (one 8, return line)

*EPC denotes former Exxon Pipeline Company crude pipeline
**Pipelines are existing with refurbishment in 1998

The former EPC pipeline continues to the Crane Station, 458 miles from Galena Park Station. From Crane, the System consists of the recently constructed 18-inch pipeline segment that goes approximately 237 miles west to the El Paso Terminal, located east of the City of El Paso. Three 8.3-mile lateral pipelines and a return line are proposed for construction and would run parallel in a common right-of-way (ROW) to connect the El Paso Terminal with the Kinder Morgan and Chevron pipelines in the El Paso area. The connection to Kinder Morgan would consist of one 8-inch diameter pipeline and one 12-inch diameter pipeline. The Chevron connection would consist of an 8-inch diameter pipeline.

The System includes the recently constructed 27.7-mile, 8-inch diameter lateral pipeline that would transport refined product from Crane to Odessa and the yet-to-be constructed 2,500-ft connection between the Crane-to-Odessa Lateral and the Equilon Terminal in Odessa.

PIPELINE MILEPOSTS

Much of the geographic data about the System is based upon mileage from the point of origin, the Galena Park Station. Table ES-2 shows the mileposts (MP) across the 22 counties traversed by the pipeline.

Table ES-2. Counties Traversed by the Longhorn Pipeline with Mileposts

County	Begin MP	End MP	County	Begin MP	End MP
Harris	0.0	50.2	Menard	309.1	312.8
Waller	50.2	64.0	Schleicher	312.8	366.4
Austin	64.0	92.7	Crockett	366.4	392.3
Fayette	92.7	119.7	Reagan	392.3	420.3
Bastrop	119.7	153.5	Upton	420.3	453.8
Travis	153.5	181.3	Crane	453.8	481.5
Hays	181.3	191.4	Ward	481.5	525.4
Blanco	191.4	217.5	Reeves	525.4	559.2
Gillespie	217.5	241.1	Culberson	559.2	610.8
Mason	241.1	274.3	Hudspeth	610.8	677.7
Kimble	274.3	309.1	El Paso	677.7	694.5

ALTERNATIVE ROUTES

The Settlement requires that the EA consider several route alternatives. These include: (1) new pipeline construction around the Edwards Aquifer, Edwards-Trinity Aquifer, Colorado River Alluvium, Carrizo-Wilcox Aquifer, and Gulf Coast Aquifer (Aquifer Avoidance/ Minimization Route Alternative [AA/M Route Alternative]); (2) new pipeline construction around populated areas "in and around" the City of Austin (Austin Re-route Alternative); and (3) new pipeline construction across Fort Bliss (Longhorn proposed route) versus the alternative route along highway ROW (Montana Avenue Alternative).

The AA/M Route Alternative is identical to the Northern Alternative for the 1987 All American Pipeline reviewed at that time in a supplemental EIS conducted by the Bureau of Land Management (BLM). The AA/M Route Alternative, which is 370 miles long, begins at a point on the Longhorn pipeline approximately 90 miles west of Houston, just southwest of Brenham. This route goes northwest approximately 114 miles to a point approximately 15 miles southwest of Waco; thence, west for approximately 125 miles; then generally west-southwest for 130 miles to the tie-in point near Big Lake at approximately MP 405 on the Longhorn pipeline.

The Austin Re-route Alternative was developed by Longhorn to meet the terms of the Settlement calling for consideration of a new construction alternative that would avoid populated areas in and around Austin. It is 21 miles long and would replace 12 miles of existing pipeline running through densely populated areas in south Austin.

There are two alternative routes for the unconstructed lateral lines in El Paso. Both routes are approximately 8 miles long and consist of three parallel lateral pipelines (and a return line) in the same ROW connecting the El Paso Terminal with two existing Kinder Morgan pipelines (one 8-inch and one 12-inch diameter) and one existing Chevron pipeline (8-inch diameter). The Longhorn proposed route runs west through undeveloped desert land in Fort Bliss where it connects with the two interstate pipelines. The Montana Avenue Alternative goes west-southwest from the El Paso Terminal along Montana Avenue where it connects with the two interstate pipelines. There is developed property along that proposed route, including the El Paso International Airport and several road crossings.

CHAPTER 4—AFFECTED ENVIRONMENT

HUMAN RESOURCES

The pipeline route was evaluated for demographics to identify distribution and density of population, sensitive receptors (e.g., residences, schools, day care centers, parks, recreation centers, health care facilities, and correctional facilities), existing and planned land uses, and transportation features along the System.

An estimated 52,400 persons reside within 1,250 ft of the entire pipeline. Of these, approximately 42,000 individuals reside between MP 1 and MP 37 in Harris County. The second largest concentration of population is represented by the 9,200 persons who live within 1,250 ft of the pipeline between MP 151 and MP 188 in the Austin area. These two areas, which comprise approximately 10 percent of the System length, account for almost 98 percent of the population along the pipeline. Most of the remaining 1,200 persons along the pipeline reside between Houston and Austin. Only 60 persons reside within 1,250 ft of the pipeline over the 500-mile stretch between the Austin area and the El Paso Terminal. Approximately 14 individuals reside within 1,250 ft of the pipeline along the Crane-to-Odessa Lateral.

LAND USE

Agricultural/range land constitutes approximately 92 percent of the Houston-to-El Paso pipeline environment. Urban residential, industrial/commercial, and urban undeveloped land uses along the pipeline account for approximately 6 percent of the pipeline environment. Rural residential land uses comprise approximately 2 percent of the pipeline environment. Land uses along the 28-mile Odessa Lateral are predominantly agricultural/rangeland, although much of the area is also used for oil and gas extraction.

The Longhorn pipeline crosses Buescher and Pedernales Falls state parks and lies within 200 ft of the southern boundary of McKinney Falls State Park. Other state and regional parks and natural areas along the pipeline or in areas that could be affected by an accidental release of product include West Cave Preserve and Hamilton Pool Preserve along the Pedernales River in western Travis County; Stephen F. Austin State Historical Park along the Brazos River in Austin County; and numerous preserves, parks, and recreational areas in the Austin and Houston metropolitan areas.

GROUND WATER RESOURCES

The System crosses the recharge zones of several major and minor aquifers. These aquifers may serve as a primary or secondary potable drinking water source for public supply or domestic use. The majority of domestic, stock, and irrigation water use in some regions crossed by the pipeline is primarily from ground water resources. These domestic and agricultural uses as well as several public water supply (PWS) systems may be at risk from contamination of this aquifer system. For the purposes of the EA, the relative vulnerability of ground water resources to a pipeline leak or spill was evaluated based on two factors: (1) hydrogeologic vulnerability—how easily the aquifer could become contaminated by a spill, and how difficult it would be to remediate; and (2) proximal sensitivity—the location of PWS wells in light of localized hydrological conditions.

Seventeen municipal water systems are located within 2.5 miles of the System; seven others are within 2.5 to 25 miles. The Edwards Aquifer Balcones Fault Zone (BFZ)-Barton Springs Segment, Colorado River Alluvium Aquifer, the Carrizo-Wilcox Aquifer System, and the Edwards-Trinity Aquifer are particularly vulnerable to contamination by a gasoline spill.

SURFACE WATER RESOURCES

The Longhorn pipeline intersects Buffalo Bayou, the San Jacinto River, Brazos River, Colorado River, Pecos River, and Rio Grande basins from east to west and crosses 288 streams, ponds, or water courses including the main stems of the Pedernales and Llano rivers. A number of large tributaries of these rivers are also crossed: James River (Llano), Onion Creek and Barton

Creek (Colorado), Cottonwood Creek (Upper Pecos), and Antelope Gulch (which drains to the west Texas Salt Basin).

The Highland Lakes along the Colorado River are the major water supply source for numerous communities along the lakes and the City of Austin. The distance to the lakes from the closest pipeline stream crossing is 29 miles. The two water rights next closest to the pipeline are 33 miles away on the Llano and San Saba rivers that serve the communities of Llano and Menard. There is a large municipal water right on the Brazos River held by the Galveston County Water Authority about 50 miles downstream of the pipeline crossing of the Brazos River.

Surface waters are also valuable recreational resources. The Highland Lakes are a major recreational region for public boating and parks. The Colorado and Brazos rivers are used for fishing and other recreational purposes.

GEOLOGIC HAZARDS

Threats of seismic risks to the System are low. Landslide hazard is low with highest susceptibility areas in or near the Balcones Escarpment. In areas near Houston where significant ground water and petroleum fluid withdrawals have occurred, the subsidence has caused some damage to buildings and distortion of pipelines.

AIR QUALITY

The pipeline crosses two ozone non-attainment regions for compliance with the National Ambient Air Quality Standards (NAAQS). The Houston/Galveston area is classified as a "severe" ozone non-attainment area, and El Paso County, in far west Texas, has portions that are in serious non-attainment for ozone (O_3), and moderate non-attainment for fine particulate matter ($PM_{2.5}$) and carbon monoxide (CO). Central Texas and west Texas are currently in attainment status for all criteria pollutants. Central Texas is in danger of exceeding the O_3 standard in the near future. West Texas is currently in attainment status for all criteria pollutants, primarily because this region has relatively little industrial development and has a relatively low population density.

ECOLOGICAL RESOURCES

The Longhorn pipeline route crosses 6 of the 11 natural regions within the state. These include the Gulf Coast Prairies and Marshes, Blackland Prairies, Oak Woodlands and Prairies, Edwards Plateau, Llano Uplift, and the Trans-Pecos. Of the streams traversed by the pipeline (via 288 individual stream crossings), 10 are ecologically important. All ten water bodies support fish species indigenous to Texas, and each major game fish species within the state is represented in at least one of the ten rivers.

Initially, 24 threatened, endangered, or candidate species were identified as potentially affected by the System. Of these, the Biological Assessments (BA) prepared for the US Fish and Wildlife Service (FWS) identified the following species as potentially affected: the Barton Springs Salamander, Bald Eagle, Black-capped Vireo, Golden-cheeked Warbler, Interior Least Tern, Houston Toad, Texas prairie-dawn, Tobusch Fishhook Cactus, and Navasota ladies'-tresses.

CULTURAL RESOURCES

The cultural resources along the Houston-to-Crane segment were previously disturbed during construction around 1950 and the periodic ROW maintenance. Resources present along the alignment from Crane to El Paso and Crane to Odessa were disturbed during the 1990s.

According to the Texas Historical Commission database, there are no National Register of Historic Places sites within 1,250 ft of the existing Longhorn pipeline centerline. Historic resources that potentially could be affected as a result of an accidental release of product are likely to be limited to several cemeteries located along the existing pipeline ROW. Other important historic resources may be associated with rural towns and town sites that are scattered along the alignment.

In accordance with the recently amended 36 Code of Federal Regulations (CFR) Part 800, Protection of Historic Properties, the Texas State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officers (THPO), and other appropriate tribal officials along the pipeline ROW were invited to participate in the Section 106 of the National Historic Preservation Act process to ensure that Native American cultural interests are adequately addressed. The Mescalero Apache Tribe was the only tribal entity that expressed interest in participating in the Programmatic Agreement as they have an historic connection to the land impacted by the project. Future construction associated with additional pump stations and the remaining pipeline laterals at El Paso and Odessa will be conducted in accordance with the Programmatic Agreement signed by EPA, DOT, the Mescalero Apache Tribe, the Texas Historic Commission, and the Advisory Council for Historic Preservation.

CHAPTER 5—PIPELINE INTEGRITY ANALYSIS

An evaluation was performed to assess the physical attributes affecting system integrity and proposed operating and maintenance practices of the System. The assessment included the activities of the previous owner of the approximately 450-mile Houston-to-Crane segment, EPC, and Longhorn's current operator of the System, Williams Energy Services (WES), one of the largest pipeline system operators in the nation.

Most of the Longhorn pipeline is regulated by DOT because it is an interstate pipeline. The Odessa Lateral is intrastate and is therefore regulated by the Railroad Commission of Texas Oil and Gas Division. Interstate hazardous liquid pipelines are regulated under 49 CFR Part 195. If a spill occurs, National Oil and Hazardous Substance Pollution Contingency Plan (regulations found at 40 CFR Part 300) and Hazardous Waste Operations and Emergency Response (HAZWOPER found at 29 CFR §1910.120) are applicable.

The 450-mile EPC system, prior to shutdown in 1995, had 58 DOT-reportable spills. Of these, 10 occurred on the pipeline and 48 occurred in the pump stations or terminal. The spill frequency (spills per year per mile) is greater than the national average for crude oil (1.1×10^{-3} national average versus 2.7×10^{-3} for the EPC system). The primary cause of pipeline spills of 50 bbl or greater in size has been outside force, which includes third-party damage (70 percent of spills of 50 bbl or greater). Corrosion, incorrect operation, and unknown causes have accounted for the remaining 30 percent. Seam splits, such as those associated with low frequency electric resistance welded (ERW) pipe, have led to one spill of 50 bbl or greater on the EPC pipeline and may have been a contributing factor in an additional six smaller spills.

The fact that the pipeline system has a significant amount of pipe dating from 1950 leads to some integrity issues. The pipeline was built according to construction specifications that appear to be consistent with best practices for the time. However, much of the older pipe has low-frequency ERW seams, generally considered less reliable than fabrication welds produced with modern manufacturing processes.

Another integrity issue is possible coating deterioration and corrosion-related metal loss. Corrosion control for the EPC pipeline may have had gaps, as evidenced by cathodic protection (CP) records and in-line inspection (ILI) results. Close interval survey (CIS) inspections and annual surveys (1990, 1994, 1998, 1999) provide some indications of CP effectiveness. CP surveys revealed areas of low potentials and some possible shorted casings. Protection from atmospheric corrosion appeared inadequate at some locations, as noted during field investigations. Upgrades to the corrosion control systems are planned as described in Chapter 9.

Hydrostatic pressure testing and ILI in 1995, followed by excavations and visual inspections, revealed areas on the line that required repair or replacement. Repair procedures are consistent with good industry practices. Some sections of the original EPC pipeline have been replaced by new pipe and additional replacements are planned. Additional integrity verifications are planned as described in Chapter 9.

The proposed operating pressure profile for this pipeline is consistent with the strength associated with the pipe materials used in its construction. The profile is also consistent with the specifications for valves, fittings, and pumps. Pumps and valves have been refurbished for use in the upgraded or new pump stations. Pump stations are typical in layout and design to others in the industry. Depth of cover (i.e., soil and rock above the pipeline) is highly variable, reflecting differences in construction specifications and changes over time. Some sections of pipe are intentionally exposed and do not necessarily present additional risk. Longhorn has identified and is evaluating shallow and exposed pipe areas from a risk management perspective.

Longhorn is adapting the WES, System of Operating Manuals, to address Longhorn-specific activities. These changes will be incorporated contingent on the findings of the EA. Current and planned operations and maintenance activities meet or exceed industry-accepted good practices.

Leak detection capabilities from the control center are consistent with industry practices. Longhorn reports planned upgrades to these capabilities as are described in Chapter 9.

The System is in compliance with emergency response regulations. The Longhorn Facility Response Plan (FRP), required under the Oil Pollution Act of 1990, exceeds the regulatory requirements in a number of areas. The designation of two response zones (Hobbs and Sugar Land), and the locations of two response subcontractors based in Houston and other more distant areas, allows response time in the middle sections of the pipeline that is consistent with or exceeds typical industry practices. However, local fire departments outside of the major metropolitan areas are mostly volunteer departments and may lack the equipment and training to fight a hazardous materials fire.

CHAPTER 6—OVERALL PIPELINE RISK ASSESSMENT

Risk assessment is the core of risk management, the process of evaluating risks and allocating resources in a manner that controls risks and costs. Risk is defined in terms of an event probability and consequence as follows:

Risk = (event probability) X (event consequence)

A hazard and operability study (HAZOPS) risk evaluation methodology has been applied HAZOPS by Longhorn, and relative risk assessments have been applied independently by both WES and EPC on this System. On-going risk assessment and management are specified in Longhorn's operations and maintenance plans.

Relative and absolute risk assessments were performed for the System as part of the EA.

RELATIVE RISK ASSESSMENT

The model used to determine relative probabilities of failure ("event probability" in the above equation) is based on a well-known approach used in the pipeline industry (Muhlbauer, 1996). The EA relative risk assessment can be described as a semi-quantitative approach since both qualitative and quantitative methodologies are used. This approach provided a screening tool to assess current probability of failure (POF) and allow judgements of additional POF-reducing measures to be taken by the operator. The level of additional measures required was linked to the impact analyses portion of the study described in Chapter 7. A higher potential impact necessitated more reductions in the POF. This led to the creation of target levels for the overall POF measurements, as is described in Chapter 9.

An underlying principle in the risk assessments is that conditions constantly change along the length of the pipeline. The POF varies because of (1) varying conditions external to the pipeline system such as topography, soil conditions, potential for damaging earth movements, and potential for third-party damages; and (2) varying pipeline system characteristics such as pipe type, coating condition, operating pressures, maintenance practices, and types and dates of integrity validations. The assessment therefore considers the location-specific interaction of all critical variables in all failure modes, including any POF-reducing measures taken by the operator. The EA Model measures the POF in four categories or indexes, each corresponding to a historical failure mode: third-party damage, corrosion, design, and incorrect operations (human error). The model combines all of the pertinent environmental and operational factors into the four indexes, which are summed into an overall Index Sum score. The Index Sum represents the relative POF.

The EA Model divides the 695 miles of Galena Park Station-to-El Paso pipeline into approximately 8,000 segments of similar risk characteristics such that all parts of each segment have the same risk. A computational algorithm is used to calculate an Index Sum—the relative POF score—for each section by evaluating approximately 75 variables representing each segment's characteristics. Sources of information include data from US government databases, maintenance records, construction documents, design documents, employee interviews, expert testimonies, and inspections of facilities. Common industry practices, engineering judgement, and pipeline operations experience were used to support this effort in cases where measurable data were absent. Conservative overall assumptions were made in the absence of data or information because increased uncertainty means increased risk.

Results of the relative risk assessment show widely varying risks along the pipeline, as was expected. Portions of the former EPC pipeline generally have the higher POF scores. This is driven to a large extent by higher uncertainties regarding the corrosion potential and past integrity threats. Some of these areas are in Houston and Austin. Location-specific Index Sums are shown in the final EA Volume 3.

The results of this risk assessment were compared against a hypothetical pipeline designed, operated, and maintained to minimum DOT regulatory requirements. A direct comparison with the risk level implied by current DOT pipeline regulations is difficult since many aspects of the regulations are written in "performance language," and specific actions or acceptable conditions which would define risk levels are not mandated. The conclusion of this comparison is that the System shows a lower POF than a hypothetical pipeline, which just meets the implied minimum regulatory risk level. This comparison with the assumed DOT risk levels is *not* a measure of compliance with current regulations.

Comparisons with the previous risk assessments performed by EPC and WES illustrate that the EA relative risk methodology is used in the industry and that the methodology achieves similar results, even with differences in data specifics and assessors. The previous work also indicates an intent by operators to identify higher risk areas, and presumably, to direct resources accordingly.

While pump station leak history is evaluated in the EA, a relative risk assessment similar to one completed for the pipeline was not done for pump stations. Since pump station risk factors on this System are not as variable as conditions along the pipeline, mitigation measures for pump stations are less site-specific in nature. More general mitigation measures can be applied to all pump stations, as described in Chapter 9. New pump stations would have environmental evaluations, HAZOPS, and risk assessments performed as detailed in the LMP (Chapter 9).

ABSOLUTE RISK ASSESSMENT

Absolute risks have been estimated from data sources including historical leak incident rates and accident analyses, dispersion modeling, spill size calculations, results of relative POF analyses, and environmental impact analyses.

Estimating pipeline leak rates and leak characteristics from historical data are very problematic. Results can easily over- or understate the actual probability of future failures, due to the small amount of available data and the constantly changing environment. The probabilities calculated here are intended to complement the assessment of risk factors discussed previously.

The volume of a leak is dependent upon the size of the opening in the pipe, the product density, the pipeline pressure, topography, and leak duration. Estimated maximum or worst-case spill volumes were calculated at several selected locations. Most of these volumes fell within a range of about 3,000 to 6,000 bbl. However, a maximum release volume of 36,000 bbl was estimated at one location over the Cenozoic Pecos Aquifer (western part of the System).

The probability of an explosion from a gasoline pipeline, even in the event of a large leak or spill, is remote. Although a flash fire and subsequent pool fire can result from a large gasoline spill, the probability of a true explosion with overpressures that cause damage and injury by blast effects is remote. Even ignition is a relatively rare event. Based on review of DOT data, approximately 4 to 6 percent of gasoline pipeline accidents are accompanied by fire. Therefore, around 94 to 96 percent of the pipeline spills did not ignite, a necessary step towards any explosion.

In the analysis for thermal effects, flash fires and pool fires were modeled using a computer program that calculates and predicts the dispersion and concentration of airborne plumes from chemical releases, heat radiation profiles from fires, and overpressure magnitudes from explosions. The modeling is used to provide estimates of distances affected by fires from gasoline spills in several example spill scenarios. A modeled worst-case scenario with a radiant heat flux of 4 kw/m2—a person's discomfort level, but not hazardous for short durations—is estimated to be approximately 750 ft as measured from the pool centroid.

A corridor around the pipeline, in which detailed impacts analysis is performed, was established. The corridor width represents a potential "zone of impact" and is based on mathematical modeling of preliminary dispersion and fire effects. This resulted in a 2,500-ft wide corridor, 731 miles in length, as the study area. Scenarios can be envisioned where an impact zone could exceed this distance, but a 2,500-ft corridor is a rational and conservative width for the majority of foreseeable events.

Six distinct potential impacts were studied in this absolute risk assessment. Impacts are site-specific and sensitive to many variables, and therefore must be somewhat generalized to present a risk picture of the entire pipeline. For modeling purposes, the receptor impact is potentially affected by variables of:

- Probability of pipeline failure;
- Spill size; and
- Receptor vulnerability and sensitivity.

Estimated frequencies of occurrence of potential impacts of the pre-mitigation pipeline are summarized in Table ES-3. As shown, if the industry average reportable leak rate would apply to the Longhorn pipeline, a total of 35 leaks would be predicted to occur over the pipeline's entire length during a 50-year period. However, if the Longhorn pipeline were to experience the same leak rate as the EPC pipeline experienced in the past (i.e., pre-mitigation), a total of approximately 70 (69.7) leaks would be predicted to occur over the pipeline's entire length during a 50-year period. Under these assumptions, there would be more than two (2.45) instances of recreational water contamination, more than one (1.44) instance of wetlands contamination, and a single (0.93) instance of prime agricultural lands contamination. Other impacts are statistically estimated to occur less than one time over 50 years of future operation of the System. Table ES-3 shows a frequency of 0.23 for drinking water contamination, 0.14 for a fatality, and 0.63 for an injury. As shown later in this Executive Summary, the effect of the required mitigation measures is to reduce these estimated frequencies.

Table ES-3. Overall Impact Frequencies (Before Mitigation)

if…	Average Leak Rate per Mile-Year	Predicted Leak Count for 700 Miles and 50 Years	Impact	Overall Risk	
				Frequency of Impact over Life of Project	Annual Frequency (x1000) for Impact
Industry average reportable leak rate applies	0.001	35	Drinking water contamination	0.27	5.35
			Fatality	0.16	3.21
			Injury	0.72	14.42
			Recreational water contamination	2.80	55.96
			Prime agricultural contamination	1.06	21.14
			Wetlands contamination	1.65	32.92
Pre-mitigation leak rate continues*	0.00199	69.7	Drinking water contamination	0.23	4.69
			Fatality	0.14	2.82
			Injury	0.63	12.65
			Recreational water contamination	2.45	49.06
			Prime agricultural contamination	0.93	18.53
			Wetlands contamination	1.44	28.86

* Includes leaks smaller than industry average leak rate shown in row above.

CHAPTER 7—POTENTIAL IMPACTS ANALYSIS

Impacts from accidents may result from a variety of leak sizes ranging from a small leak, where product escapes the pipeline for an extended period of time until detected, to a large pipeline rupture, where refined product is pumped into the environment until the pipeline is shut down. The leak size with higher consequences varies depending on the receptor and the environmental conditions in the vicinity of the accidental release.

Impacts and potential impacts from pipeline construction, operation and maintenance, and accidents were evaluated with respect to human health and safety, ground water, terrestrial and aquatic biology, surface water, geology, air quality and noise, transportation, land use, archeological and paleontological resources, cumulative impacts, and possible serious spill scenarios. These are discussed below

Human Health and Safety. During construction and normal operations, no major impacts to human health and safety are anticipated. The potential for accidental releases, particularly within highly populated areas along the pipeline, poses a risk to human health and safety. A release could result in a flash fire or pool fire, and it could expose local habitants to hazardous concentrations of benzene and other constituents. Population at risk includes those living within the 2,500-ft wide corridor used for defining population sensitivity along the pipeline, individuals temporarily in the area of the pipeline at the time of the accident, and those who may be downstream along any streams or drains which might transport released product following an accident.

Sections of the pipeline were rated sensitive or hypersensitive because of the risk of human health and safety impacts resulting from a pipeline accident. A population density of 20 residences along any 1-mile section of pipeline resulted in a classification of that section as sensitive. A population density of 100 or more residences along any 0.1-mile section of pipeline resulted in a classification of that section as hypersensitive, identifying primarily those areas where multi-family units are located.

Along the proposed route, approximately 44.9 miles of population sensitive and 5.3 miles of population hypersensitive areas were identified. Use of the Austin Re-route Alternative would avoid 11 miles of population sensitive and 0.1 miles of population hypersensitive areas, replacing it with a 21-mile alignment which when surveyed in early 1999 had only 70 residences within 1,250 ft. However, this area is expected to develop rapidly. The AA/M Route Alternative would avoid the high-density residential population characteristic of south Austin but would not avoid the Houston area population. The Montana Avenue Alternative in El Paso has greater potentially exposed population than a route across Fort Bliss.

Ground water. Minor or no impacts to ground water are anticipated during the construction or operation of the Longhorn pipeline. Potential impacts from an accidental release could include contamination of private wells used for domestic, agricultural, and stock purposes; contamination of wells used for public drinking water supplies; contamination of springs and impacts to associated ecosystems; and contamination of rivers or streams which recharge from ground water. Evaluation of the potential impacts from a spill is complicated by the uncertainty of contaminant transport and dilution within karst aquifers, which underlie much of the pipeline throughout central Texas. Methyl tertiary-butyl ether (MTBE) poses a much greater risk to drinking water potability than other gasoline constituents (e.g., benzene) because of its mobility, low taste and odor threshold, and persistence in aquatic environments.

Aquifer vulnerability ratings were used to rate the sensitivity of stretches of pipeline to contamination. Scoring of ground water sensitivity was based on the potential for contamination from a pipeline release to reach PWS wells.

Two segments totaling 8 miles along the pipeline were rated as hypersensitive for potential ground water quality impacts, due to the likelihood of impacts to PWSs and the difficulty of remediating karst aquifers. An additional 44.9 miles were rated as sensitive because of a lower probability of impacts. A spill which caused a large volume of contaminants to enter the Balcones Fault Zone of the Edwards Aquifer would have an impact on recreational uses of Barton Springs in Austin, as well as on the Barton Springs Salamander. Large spills of product in the area of caves, which are ubiquitous in karst areas of central and west Texas, could also impact recreational use of caves. However, no commercial or otherwise publicly accessible caves are known to be vulnerable to spills from this pipeline. Contamination of aquifers could limit agricultural and stock uses of well water, but is not expected to eliminate such uses.

Use of the Austin Re-route Alternative would increase the number of pipeline miles over the vulnerable Balcones Fault Zone, and potentially increase the risk to ground water. The AA/M Route Alternative would largely eliminate potential impacts to the highly vulnerable karst areas of central and west Texas, but it would cross areas potentially recharging the planned San Antonio Water System wells in the Simsboro formation of the Carrizo-Wilcox Aquifer. Some additional, although less sensitive, ground water systems could be impacted by this alternative. Neither the Fort Bliss Route or the Montana Avenue Alternative in El Paso is expected to pose any risks to ground water.

Terrestrial and aquatic biology. Several threatened and endangered species are in areas potentially affected by the pipeline. Of particular concern is habitat for the Houston Toad in Bastrop County, and the potential for contamination of Barton Springs in Travis County, which is the sole habitat for the endangered Barton Springs Salamander. Through adherence to the stipulations of the Phase I BA and Biological Opinion (dealing with construction and maintenance of the pipeline and ROW), and the Phase II BA and FWS Concurrence Letter (dealing with potential accidental releases along the pipeline), there are no potential significant impacts to these species. The location of future pump stations will be studied prior to construction in order to avoid impacts to sensitive species.

Construction and maintenance of the ROW will necessitate routine minor impacts to local flora. Any accidental release could temporarily damage ecosystems through the introduction of contaminants as well as if a fire were to occur. Impacts to game birds and fish could result from contamination of aquatic environments.

Construction and operation of the Austin Re-route Alternative could increase potential impacts to the ground water in the Balcones Fault Zone and increase risks to the Barton Springs Salamander. Construction of the Austin Re-route Alternative would also require clearing a new ROW in areas containing potential Golden-cheeked Warbler and Black-capped Vireo habitat. The AA/M Route Alternative would also require new ROWs crossing Golden-cheeked Warbler and Black-capped Vireo habitat. It would avoid any threat to the Barton Springs Salamander but would pose risks to the Concho Water Snake. No sensitive species are found in the vicinity of the proposed route or its alternative route in El Paso.

Surface water. The Longhorn pipeline crosses watershed for the Buffalo Bayou, three major river basins (Brazos, Colorado, and Rio Grande), as well as drainage to the West Texas Salt Basin. The majority of potential surface water impacts occur in the Colorado basin, because of the numerous river and stream crossings across the watershed and because of the large surface water reservoirs downstream from the pipeline crossings.

In the event of a spill, the peak concentration of contaminants in a river or stream will decrease downstream from the site of an accident, due to volatilization, dilution, and adsorption onto soils. The effect of volatilization and varying flow stages in the river on downstream concentrations was evaluated for three crossings – Colorado River, Onion Creek, and Pedernales River. The effect of volatilization, historical flow conditions, and dilution were modeled in a separate exercise to determine potential peak concentrations in surface layers in Lake Travis and at the penstocks of Mansfield Dam.

A large pipeline spill could result in communities or riparian users of Colorado or Brazos river water east of Austin being unable to use intakes for a period of one to two days, due to potential contamination levels of benzene and MTBE. Lake Travis is particularly sensitive to contamination by MTBE, and to a lesser extent, benzene, from a release in the Pedernales watershed. Modeling was conducted to evaluate potential impacts to Lake Travis.

If an accidental spill occurs during mean flow or drought conditions in the Pedernales River and its tributaries, no impacts to the use of Lake Travis for drinking water should result. However, if an accidental spill containing 15 percent MTBE occurs during flood stages in the Pedernales, impacts to both Lake Travis water users (including communities such as Lago Vista and Lakeway) and to the City of Austin intakes on Lake Austin would be possible. Even if there is no MTBE in the pipeline, a complete pipeline rupture near the Pedernales crossing during the modeled flood stages in the Pedernales (a flow rate which occurs approximately 0.5 percent of the time) could cause benzene levels at Lago Vista in excess of the 5 ppb drinking water standard for approximately a month, with the exceedance beginning approximately two months after the accident. No significant impacts to the City of Austin PWS are expected to result from a large uncontrolled release in the Pedernales watershed.

In addition to affecting drinking water supplies, a major release to surface waters would temporarily limit recreational uses of the waterways, could cause fish kills, and could cause downstream contamination of karst or alluvial aquifers. An improperly remediated accidental spill could cause continual surface water quality impacts following the accident.

Sensitive and hypersensitive areas for surface waters were defined using two methods. The potential for impacts to public drinking water supplies from a spill into each river or stream crossed by the pipeline was evaluated. Places where a major spill could limit the use of a PWS intake for more than one or two days were rated as sensitive or hypersensitive, depending on the likelihood of a large mass of contaminants reaching the intake. This is a function of the size of the upstream watershed (influencing the transport rate of the contaminants) and the distance to downstream PWS intakes.

In addition to river and stream crossings, gasoline from an accidental release could flow down culverts, ditches, or simply downgrade on open terrain to reach a surface water body. The sensitivity of each point along the pipeline was assessed based on the probability of a large volume of contaminants from a spill reaching a surface water body and the potential for contamination of that surface water body to result in impacts to a PWS. Points along the pipeline that were more likely (due to terrain, soil characteristics, land cover, and distance of travel) to result in impacts to sensitive and hypersensitive surface water bodies were rated as sensitive for impacts.

Places along the pipeline identified as sensitive or hypersensitive tend to lie in bands crossing the pipeline along rivers, streams, or channels. Rivers and streams generally have wider bands, reflecting the possibility of drainage from adjacent lands into the surface waters, while normally dry channels and ditches have more narrow bands reflecting the effects of volatilization and adsorption of gasoline which would take place prior to reaching and diluting into major surface water bodies. A number of points upstream of parks and state natural areas were also rated as sensitive or hypersensitive with respect to surface water contamination.

The pipeline crosses or lies adjacent to 105 riverine and 846 palustrine wetlands, with the greatest concentration in the eastern portion of the pipeline, between Harris and eastern Travis County. Approximately 25 percent of the riverine wetlands are along lower perennial streams, while the rest are along intermittent streams. Approximately 36 percent of the palustrine wetlands are classified as open water, 21 percent are classified as emergent vegetation, and 11 percent are classified as forested. Impacts to these wetlands in the event of a pipeline accident could include acute or chronic effects to biota in the area, depending on spill quantities and wetland types affected.

The Austin Re-route Alternative would increase the number of sensitive surface water crossings. Development of the AA/M Route Alternative would put a number of reservoirs in the Brazos and Colorado river basins at greater risk for contamination of PWSs. Outside the Edwards Aquifer there is a greater reliance on surface water for both domestic and municipal uses. However, because of terrain, these reservoirs tend to be much smaller than Lake Travis, and therefore, more susceptible to contamination of a feeder river or stream. The PWS reservoirs at greatest risk from this alternative route include (along with potentially affected PWS) the Twin Buttes Reservoir (San Angelo), Waco Lake (Waco), Lake Somerville (Brenham), and Cameron City Reservoir (Cameron). There are no surface waters which are expected to be affected by a major release either along the proposed Fort Bliss Route or along the Montana Avenue Alternative.

Air quality and noise. Impacts to air quality will occur during the remaining few miles of construction (emissions of particulate matter and volatile organic compounds [VOCs] from construction equipment) and during operation (VOCs from storage facilities and from pump stations). These will be minimal. The storage at both ends of the pipeline, Houston and El Paso, are in airsheds which are currently non-attainment for NAAQS. Currently, the terminals comply with NAAQS, but as the El Paso Terminal is expanded to meet full pipeline operation capacity, VOCs will exceed the major source threshold and the terminal will be subject to Non-attainment New Source Review, requiring the implementation of Best Available Control Technology to achieve the Lowest Achievable Emission Rate for VOCs, a precursor to ozone formation.

Construction may result in temporary noise-related impacts, but these will occur only during daylight hours and will be short in duration. Operational noise impacts will occur near pump stations due to pump operation, but these have been located away from populated areas.

Construction of either the Austin Re-route Alternative or the AA/M Route Alternative would cause an increase in construction-related air quality and noise impacts. Construction of either El Paso route alternative would require mitigation to minimize air impacts due to particulate matter.

Transportation. Transportation may be impacted during construction (local disruptions at road crossings, regional disruptions from transport of pipeline and construction equipment). During normal operations, the only impacts to transportation will be from the movement of gasoline tanker trucks in the El Paso area from the terminal to customers and from a small increase in the commuting workforce. In the event of a major spill anywhere along the pipeline, short-term local transportation may be restricted to reduce the dangers to human health and safety.

Land use. The ROW for the current pipeline is well defined. New pipeline or station construction will require establishment of a new ROW, potentially involving condemnation proceedings against private landowners, modification of local land use plans, conversion of agricultural lands, and permanent alteration of land within developed recreational facilities.

During an accidental release, land use may be impacted due to damage to private property from soil contamination, fire, or remedial activities. Longhorn would be financially responsible for these damages. Use of parks and other recreational areas crossed by the pipeline could be restricted following an accident until remediation is completed. Literature studies indicate that pipeline ROWs have little impact to long-term property values.

The Austin Re-route Alternative largely crosses privately held lands, including 11 miles in Austin's "Desired Development Zone." Any new corridor across these lands would limit the amount of land available for development within this zone. Except for lands owned by the University Fund in Reagan County, all of the land involved along the AA/M Route Alternative is privately owned. Uses of these lands include hunting, farming, and ranching, as shrub and rangeland represents about 40 percent of the land that would be crossed by the pipeline. In El Paso County, the route alternative along Montana Avenue would have greater impacts to land use due to the need to establish a pipeline corridor within commercial areas.

Archeological and paleontological resources. The Programmatic Agreement for the EA documents the actions to be taken by Longhorn to comply with Section 106 of the National Historic Preservation Act. Impacts to archeological or paleontological resources from the construction of the Austin Re-route Alternative or the AA/M Route Alternative are not determinable without a substantial amount of field study to define the presence of any such resources. In El Paso, the Fort Bliss Route was adjusted to avoid a set of unclassified sites on the base. No survey of the Montana Avenue Alternative route has been conducted.

Cumulative impacts. Cumulative impacts were studied with respect to the increase in risk of pipeline accidents due to other flammable gas and hazardous liquids pipelines sharing the Longhorn pipeline corridor or crossing the pipeline. The probability of such an event is too low to be quantified. However, there are potential benefits of a shared corridor, notably additional surveillance.

Possible serious spill scenarios. Since all major impacts related to the construction and operation of the Longhorn pipeline are due to the potential for an accidental release, a number of accidental release scenarios were evaluated in Chapter 7 in order to conceptualize the magnitude of the danger posed by these releases. These scenarios reflect places along the pipeline judged as representative of the greatest risks to certain receptors. These included:

- Impacts to population, including nearby schools, from an accident in northwest Houston;
- Impacts to prime agricultural farmlands from an accident in Austin County;
- Impacts to surface water quality from an accident at the Pedernales River crossing; and
- Impacts to ground water quality from an undetected slow release accident over the Edwards-Trinity aquifer, near Eldorado.

CHAPTER 8—ENVIRONMENTAL JUSTICE

An environmental justice (EJ) analysis was conducted for the proposed project to determine if there would be any disproportionately high and adverse human health or environmental effects on minority or low-income populations. The analysis was based on relative failure probabilities of 1-mile pipeline system segments which included potential impacts expected to occur from normal operation of the System and the potential for impacts resulting from pipeline failure. Based on results of the EJ analysis, the proposed project would not result in disproportionately high and adverse effects to minority or low-income populations.

CHAPTER 9—MITIGATED PROJECT AND COMPARISON OF ALTERNATIVES

The first eight chapters of the EA focus primarily on the proposed System without the implementation of additional mitigation measures that have been agreed to by Longhorn. In Chapter 9, the EA considers those mitigation measures and their effect on potential impacts.

MITIGATION OF THE PROPOSED PROJECT

The Lead Agencies determined that there were potential impacts associated with the proposed project and that mitigation measures are necessary to reduce the potential impacts of the proposed project to a level of insignificance. These mitigation measures, in many cases, go substantially beyond the legal requirements that apply to US hazardous liquid pipelines. The LMP consists of detailed commitments that Longhorn has made to address environmental and safety concerns raised by the Lead Agencies, other federal agencies, and the general public.

The approach to the development of mitigation measures focuses on reducing the probability and consequences of potential leaks and spills through application of mitigation measures over the entire System with increasingly more stringent measures over the 112 miles of sensitive areas including 22 miles designated as hypersensitive areas. Mitigation measures were identified to reduce POF to a level proportionate to the potential impacts, as determined by target levels from the EA relative risk assessment model. This approach acknowledges that additional and more stringent mitigation measures are required in sensitive ("Tier 2") and hypersensitive ("Tier 3") areas. The Tier 1 (all remaining sections of the pipeline), Tier 2, and Tier 3 target levels are used as a starting point in determining appropriate means of reducing risks associated with the pipeline. Although achieving the applicable EA Risk Model target score was treated as a minimum requirement for all segments of the pipeline, achieving that target score was not treated as sufficient to establish that failure-related risks had been adequately mitigated. Instead, after ensuring that the target scores were achieved, the Lead Agencies' focus shifted to ensuring that appropriate combinations of protective measures were in place with respect to each pipeline segment.

In the LMP, Longhorn has made a number of specific commitments that address failure mechanisms in all four categories of pipeline failure: third-party damage, corrosion, design, and incorrect operations. In addition, Longhorn made several commitments that address the detection and containment of pipeline leaks, thereby reducing potential consequences.

In addition to the list and description of the 40 specific mitigation measures, the LMP includes the Longhorn Partners System Integrity Plan (LPSIP). The Longhorn Integrity Management System (LIMS) and the Operational Reliability Assessment (ORA) are both parts of the LPSIP. All WES operations and maintenance procedures, policies, and manuals that relate to the Longhorn System are included within the LIMS program. The ORA is a set of processes and calculations that establishes integrity verification intervals. Longhorn has adopted the LMP for all subsequent years of operations. A graphical depiction of the LMP is shown in the approximately 200 annotated alignment sheets that comprise Volume 3 of the EA. These sheets illustrate mitigation measures to be implemented at particular locations.

Longhorn will submit progress reports on the mitigation plan to DOT on a quarterly basis during the first two years of operation and annually thereafter. These progress reports, which Longhorn will make available to the public on its website, will address the status of each mitigation commitment, results of mitigation-related studies and analyses, and any problems anticipated in meeting the LMP. It is DOT's policy to enforce each pipeline against DOT regulations and each company's own procedures. Because the LMP is part of Longhorn's operations and maintenance procedures, it will be enforceable under DOT’s enforcement process.

While no guarantees of leak-free operation over many years can be made, the LMP is designed to significantly reduce the failure potential of this pipeline. This is accomplished via three steps that, while not unique to the Longhorn pipeline, go substantially beyond common practice in their thoroughness as specified in the LMP. These three steps are:

1. Verify current pipeline integrity;
2. Identify and prioritize all possible failure mechanisms using risk assessment techniques; and
3. Adopt extensive measures to address each failure mechanism.

The comprehensiveness of these three steps minimizes the probability of pipeline failures when the LMP is fully implemented. Long stretches of some US hazardous liquid pipelines can be found operating for many years with no failures and while probably not employing nearly as much mitigation as is called for in the LMP. This provides some evidence that very low failure rates are possible.

The following discussion shows how failure modes in general are addressed in the LMP. These lists are intended to show where the LMP specifies measures that exceed minimum regulatory compliance and common industry practice.

Third-Party Damage

This failure mode involves damages caused by human activities near the pipeline. The most common damages arise from various forms of excavations including digging, boring, and drilling. Third-party damage is a category of failures that is often viewed as the most random and, hence, the least controllable through mitigation. Seven out of 26 historical leaks on this pipeline (under EPC operation) were categorized as being caused by "third-party damage." LMP provisions to reduce the potential for future third-party failures include the following:

Higher frequency patrols—daily, every 2.5 days, or weekly, depending on tier. Increased surveillance should eliminate a large portion of potential damage scenarios since the patrol will also be looking for indications such as pending activity and recently completed activity.

Concrete cap in specific areas. A red-colored reinforced concrete slab should offer a physical barrier against excavations as well as a visual alert to excavators. Such slabs are to be installed in conjunction with the pipe replacements through the Edwards Aquifer area as well as wherever Longhorn's on-going risk management program identifies the need for such additional protection.

New pipe with increased safety factor, in specific areas. Heavier walled or higher-grade pipe offers additional strength to resist external forces. Damages to this pipe are less likely to result in loss of containment. New, heavier walled pipe will replace existing pipe over a 19-mile segment of pipeline through the Edwards Aquifer area and contributing zone. Other areas for potential installation of new pipe may be identified through Longhorn's on-going risk management program.

Increased depth of cover in specific areas. Additional depth of cover puts the pipeline out of reach of certain excavation activities, and the depth of cover will be increased in selected areas. New, heavier walled pipe will replace existing pipe over a 19-mile pipeline segment across the Edwards Aquifer and contributing zone. The pipe will be buried to a depth of 7 ft. Other selected areas where increased depth of cover would be potentially needed may be identified from Longhorn's on-going risk management program.

Annual door-to-door visits to adjacent residents in Tier 2 and Tier 3. Regular personal contact with neighbors should increase the number of "pipeline-aware" individuals, thus reducing the number of damaging activities and perhaps even enlisting the support of such individuals in reporting potentially damaging activities when observed.

Placement of more ROW markers. Additional signs and markers in Spanish and English should increase the chances of an excavator becoming aware of the pipeline's presence and contacting Longhorn or the One-call center.

ROW kept in "excellent" condition. A clear ROW offers an additional indication of the pipeline's presence, enhances surveillance, and increases accessibility to the pipeline in the event of a spill.

Annual mailings. Regular contact via mailed pamphlets and promotional materials should increase the number of "pipeline-aware" individuals, thus reducing the number of damaging activities and perhaps even enlisting the support of such individuals in reporting potentially damaging activities when observed.

Depth-of-cover program—risk based. This program should preferentially increase depth of cover where it is most beneficial to do so. This on-going program considers both probability of third-party damage and consequences of a spill.

Integrity verifications (hydrostatic test). Verifying a defect-free pipe and establishing a margin of safety between the System strength and its intended operation increases the likelihood that the System will operate leak-free under normal operations and can also tolerate some unintended forces.

Integrity verifications (ILI). Regularly ensuring a defect-free pipe increases the likelihood that the System will operate leak-free.

Integrity re-verifications based on ORA including third-party activity considerations. Conservatively re-verifying System integrity ensures that defects not prevented or detected by other means are found before they cause a loss of containment. Conservative assumptions in the ORA ensure more frequent verifications.

When notification is received, continuous on-site supervision of third-party activities while pipeline is exposed. Direct supervision of a potentially damaging excavation ensures that minor damages such as coating scratches or metal scrapes are avoided or at least repaired before re-burial.

Annual public education, contractor, public officials meetings. Regular direct contact via meetings and presentations should increase the number of "pipeline-aware" individuals, thus reducing the number of damaging activities and perhaps even enlisting the support of such individuals in reporting potentially damaging activities when observed.

Close interval pipe-to-soil surveys to find coating damages from previous strikes. CIS is primarily a corrosion-control measure, but can also help detect previous coating damages from third-party activities. Such minor damages can lead to more serious threats to pipeline integrity if not detected and addressed. They might indicate more severe damage that should be immediately investigated and impact the ORA-driven integrity verification schedule.

Surge pressure limitations to reduce chance of undetected previous damage leading to leak. In association with integrity verifications, the surge pressure limitations ensure that the System is not exposed to internal pressure-induced stresses and “shocks” that it cannot withstand. Until previous third-party damage is detected and addressed, the System could be more vulnerable to failure from unintended stresses.

Root cause analyses to identify special situations. Investigations of previous leaks and repairs that lead to identification of underlying causes and procedural shortcomings should help prevent similar scenarios in the future.

Corrosion

This failure mode involves the various forms of metal deterioration including atmospheric, internal, and buried-metal (galvanic) corrosions. Corrosion is of concern because any metal loss invariably means a reduction in structural integrity with an associated increase in the risk of failure. The potential for pipeline failure caused either directly or indirectly by corrosion is perhaps the most familiar hazard associated with steel pipelines. Only 2 of the 26 historical leaks on the EPC were attributed to corrosion; however, causes of 9 of the 26 leaks were not identified. Based on general US pipeline leak experience and assumptions regarding past leak reporting practices, it is reasonable to assume that many of the unspecified leak causes were related to corrosion. Therefore, corrosion prevention measures are warranted. LMP provisions to reduce the potential for corrosion-related failures include the following:

Integrity verifications (hydrostatic test). Verifying a defect-free pipe and establishing a margin of safety between the System strength and its intended operation increases the likelihood that the System will operate leak-free under normal operations and can also tolerate some unintended forces.

Integrity verifications (ILI). Regularly ensuring a defect-free pipe increases the likelihood that the System will operate leak-free.

Integrity re-verifications based on ORA including corrosion considerations. Conservatively re-verifying System integrity ensures that defects not prevented or detected by other means are found before they cause a loss of containment. Conservative assumptions in the ORA ensure more frequent verifications.

Reburials, if coating repair/replacement is involved. In many cases, the older external coating will be damaged by the handling required in a lowering or reburial process. This will require a re-coating or repair-of-coating of the section, improving the corrosion resistance.

Close interval pipe-to-soil surveys. These surveys are among the best tools to ensure that adequate CP is reaching all portions of the System.

Additional test lead readings. While not as complete a survey as CIS, the test lead reading surveys also help detect CP deficiencies. The more frequent surveys specified shorten the time period between detection opportunities.

Internal corrosion coupons. A third line of defense behind product corrosion specifications and inhibitor injection is the corrosion coupon program where a metal strip is placed inside the pipeline to detect any potential internal corrosion problems before it can threaten pipe integrity.

Surge pressure limitations to reduce chance of undetected previous damage leading to leak. In association with integrity verifications, the surge pressure limitations ensure that the System is not exposed to internal pressure-induced stresses and “shocks” that it cannot withstand. Until previous corrosion damages are detected and addressed, the System could be more vulnerable to failure from unintended stresses.

Root cause analyses to identify special situations. Investigations of previous leaks and repairs that lead to identification of underlying causes and procedural shortcomings should help prevent similar scenarios in the future.

Studies/remediation—stress corrosion cracking. While stress-corrosion cracking is a very rare phenomenon for this type of pipeline in this climate, the study provides assurance that stress-corrosion cracking issues have been considered and operating personnel have been alerted to those issues.

New pipe with increased safety factor, in certain locations. Heavier walled pipe offers additional strength to resist external forces and extends the pre-failure detection opportunity for possible metal loss from corrosion. Damages to such pipe are less likely to result in loss of containment. Nineteen miles of existing pipe in the Edwards Aquifer and contributing zone will be replaced with new, heavier walled pipe. Other selected segments where new pipe may be considered as replacement for existing pipe could be identified through Longhorn’s on-going risk management program.

Design

LMP provisions to reduce the potential for failures related to “design” issues, as defined in the EA, include the following:

Stopple removals. A stopple is a specialized fitting installed in a pipeline to allow work to be done on the pipeline without completely clearing it of product. The fittings are often left in the pipeline after the work is completed. Historically, older stopple fittings have been leak prone. Removal of these eliminates a potentially problematic pipeline component.

New pipe with increased safety factor. Heavier walled pipe offers additional strength to resist external forces. Damages to such pipe are less likely to result in loss of containment.

Integrity verifications (hydrostatic test). Verifying a defect-free pipe and establishing a margin of safety between the System strength and its intended operation increases the likelihood that the System will operate leak-free under normal operations and can also tolerate some unintended forces.

Integrity verifications (ILI). Regularly ensuring a defect-free pipe increases the likelihood that the System will operate leak-free.

Fatigue monitoring program as part of ORA. Fatigue cycles are a mechanism by which cracks in metal can grow larger due to many loadings, eventually reaching an integrity-threatening size. Measuring pressure cycles allows calculations to be performed so that new integrity tests or inspections can be more accurately scheduled.

Surge pressure limitations to reduce chance of undetected previous damage leading to leak. In association with integrity verifications, the surge pressure limitations ensure that the System is not exposed to internal pressure-induced stresses and "shocks" that it cannot withstand. Until all defects are detected and addressed, the System could be more vulnerable to failure from unintended stresses.

Integrity re-verifications based on ORA including crack considerations. Conservatively re-verifying System integrity ensures that defects not prevented and undetected by other means are found before they cause a loss of containment. Conservative assumptions in the ORA ensure more frequent verifications.

Studies/remediation—span. An engineering assessment has been performed of all pipeline spans to determine if the pipe is overstressed or likely to become overstressed due to additional loadings or loss of support. Analyses and subsequent remediation ensure that the likelihood of such overstressing is greatly reduced.

Studies/remediation—landslide. While landslide activity is a very rare failure mode for this type of pipeline in this topography, this study provides assurance that landslide issues have been considered and operating personnel have been alerted to those issues.

Studies/remediation—seismic. While seismic activity is a very rare failure mode for this type of pipeline in this region, the study provides assurance that seismic issues have been considered and operating personnel have been alerted to those issues.

Studies/remediation—scour. An engineering assessment has been performed of scour-susceptible pipeline stretches (e.g., at a river or stream crossing) to determine if the pipe is likely to become unsupported. Analyses and subsequent remediation ensures that the likelihood of this failure mode is greatly reduced.

Studies/remediation—subsidence. An engineering assessment has been performed of the possibility for some portions of the pipeline to lose support due to soil subsidence. Analyses and subsequent remediation ensure that the likelihood of this failure mode is greatly reduced.

Monitoring of aseismic faulting in Houston area. An engineering assessment has been performed of all portions of the pipe near to active aseismic faults to determine if the pipe is likely to be overstressed from additional loadings or lack of support. Analyses, monitoring, and subsequent remediation ensures that the likelihood of this failure mode is greatly reduced.

Root cause investigation program. Investigations of previous leaks and repairs that lead to identification of underlying causes and procedural shortcomings should help prevent similar scenarios in the future.

Incorrect Operations

This failure mode involves human error as a prime cause of a failure and is perhaps the most difficult to quantify. Safety professionals are emphasizing behavior as possibly the key to a breakthrough in accident prevention. Of the failure causes listed for the 26 historical leaks on this pipeline, only one was directly attributed to human error. Although human error can play a role in every other failure mode, it is examined here as a primary initiator. LMP provisions to reduce the potential for failures relating to human error include the following:

Surge limitations. In association with integrity verifications, the surge pressure limitations ensure that the System is not exposed to internal pressure-induced stresses and "shocks" that it cannot withstand. Human actions can often precipitate a surge event; therefore, this is a risk-reducer for human error issues.

Risk management program. Identification of hazards and assessment of risks should help to focus resources appropriately to reduce leaks, especially in higher consequence areas.

HAZOPS for hazard identification. The very structured and comprehensive nature of HAZOPS ensures that complex systems, such as a pump station and its associated control logic, are thoroughly assessed. Hazards, complications, or inadequacies related to operations sequencing and shutdown systems should be identified and addressed through this program.

Training program. Training is viewed as the first line of defense against human error, and effectively reducing accidents. A Longhorn training program will be developed that contains the following components: product characteristic awareness, pipeline material stresses and associated component mechanical design limitations, pipeline corrosion awareness, pipeline control devices and operating knowledge, and maintenance awareness. This training should mitigate potential errors in operation.

Management of change program. This process forces an evaluation for any proposed change to a system. This should ensure that a desired change does not lead to an unintended consequence.

Root cause investigation program. Investigations of previous leaks and repairs that lead to identification of underlying causes and procedural shortcomings should help prevent similar scenarios in the future.

Camera surveillance of pump stations. This provides the ability to visually inspect the pump station grounds for signs of abnormal conditions. It should also provide opportunities for control room personnel to better coordinate with field personnel in performing station activities.

Heavier walled pipe. Heavier walled pipe offers additional strength to resist unintended stresses from operational upsets. Such pipe is less likely to be damaged and is therefore also less likely to result in loss of containment.

Integrity verifications (hydrostatic test). Verifying a defect-free pipe and establishing a margin of safety between the System strength and its intended operation increases the likelihood that the System will operate leak-free under normal operations and can also tolerate some unintended forces.

Integrity verifications (ILI). Regularly ensuring a defect-free pipe increases the likelihood that the System will operate leak-free.

Mitigation Measures to Reduce Impact Severity

Several mitigation measures have been developed to reduce the potential consequences of a spill from the pipeline. These are listed and described below:

Leak detection—hydrocarbon-sensing cable. Leak detection offers the opportunity to react to a spill and thereby reduce the severity of consequences. The sensing cable adds the capability to detect very small leaks, undetectable by other means. Such leaks, if allowed to continue, could otherwise result in large volume spills with far-ranging impacts.

Leak detection—transient model, Supervisory Control and Data Acquisition (SCADA) based. The transient model adds the capability to detect smaller leaks than conventional SCADA equipment alone can detect. This reduces the number of leak scenarios that could continue undetected for long periods of time.

MTBE removal. At very low concentrations, MTBE makes drinking water non-potable, and it is one of the most difficult product components to remediate. Its removal from the pipeline reduces the potential long-term impact associated with many spill scenarios. Additionally, due to its unique properties, MTBE in a release complicates the emergency response effort. Its removal will simplify the situation in the field and expedite the remediation.

Leak detection—increased patrol. A shortened time between surveillance actions provides the opportunity to more rapidly detect a leak and thereby reduce spill volumes.

Leak detection—increased public awareness program. Increased public education should increase the number of pipeline-aware individuals among the public. This has the potential benefit of enlisting many observers in the leak detection process, thereby increasing the chances of early reporting of a leak.

Secondary containment along certain stretches of ROW. Design provisions to capture and retain spilled product (not allowing it to migrate from the ROW) should reduce the chances of spills reaching any sensitive receptors along selected stretches of the ROW.

Additional check valve installations. The potential spill volume is often heavily influenced by the draindown potential. Fast-acting valves such as check valves can greatly reduce the amount of product spilled from a pipeline.

Enhanced emergency response plan. This should provide the plans and procedures to ensure that an optimum response to a spill is conducted. This plan exceeds common practice.

New emergency response center. This should decrease the response time to a spill, thereby increasing the opportunities to take consequence-reducing actions such as evacuation and containment.

Risk management program to direct resources in proportion to area sensitivities. Identification of hazards and assessment of risks should help to focus resources appropriately to reduce leaks, especially in higher consequence areas.

Leak detection—water quality monitoring. This measure adds the capability to detect very small leaks, undetectable by other means. Such leaks, if allowed to continue, could otherwise eventually result in large volume spills with far-ranging impacts.

Surveillance personnel all trained to Occupational Health and Safety Administration Hazardous Waste Operations and Emergency Response (OSHA HAZWOPER) first responder level. This training ensures that personnel (other than control room personnel) who are most likely to detect an abnormal condition know what actions should be immediately taken to reduce potential consequences.

Secondary containment at Cedar Valley pump station. Preventing movement of spilled product away from the pipeline is the intent of this mitigation. This should prevent offsite receptors from being impacted by a spill.

Camera surveillance of pump stations. This provides the ability to visually inspect the pump stations grounds for signs of abnormal conditions. It is also another diagnostic tool to assist the control room in identifying leaks or determining the need to halt product movements.

Contingency plans for alternate water supplies. As a means of reducing the impact of a spill, the LMP specifies the provision of alternate water supplies to affected communities and private well owners until cleanup is completed and permanent water supplies are restored.

Reduction of flow in periods of flooding. To reduce the possibility of contamination of drinking water supplies in Lake Travis, Longhorn commits to reducing throughput during flood events, a condition that could otherwise result in lake water contamination in the event of a large spill.

Pollution Liability Insurance. Longhorn will maintain pollution legal liability insurance of no less than $15 million to cover claims arising from spills. This is a means of assuming compensation for losses and cleanup costs.

The LMP provides for a large measure of public disclosure. There will be quarterly reports from Longhorn to DOT (available on Longhorn's website) that will provide progress reports on implementation of the LMP, results of ORA, and other updates of interest to the public. Similarly, the public would be notified of any proposed change to the LMP.

Post-Mitigation Risks

Risks remaining after implementation of the LMP cannot be precisely quantified. However, the Lead Agencies estimate that proposed mitigation measures will result in more than a twenty-fold reduction in risk from the pre-mitigation levels (from about 70 to about 2 or 3 spills over 50 years). Support for this estimate is provided by consideration of several facts and scenario analyses in addition to a semi-quantitative analysis linking the EA relative POF results with leak frequency estimates.

Calculations have been performed to estimate frequencies and probabilities of nine different potential impacts along the Longhorn pipeline length. The calculations consider numerous scenarios involving various combinations of leak frequencies, spill sizes, and receptor vulnerabilities. The resulting probability estimates are summarized in Table ES-4.

Table ES-4. Post-Mitigation Impact Probabilities

Average Leak Rate per Mile-Year	Predicted Leak Count for 700 Miles and 50 Years	Potential Impact	Overall Risk		Segment-specific Risk	
			Probability of One or more Events over the Life of the Project (%)	Annual Probability of one or more Events during the Life of the Project (%)	Probability of One or more Events over the Life of the Project (%)	Annual Probability of One or more Events during the Life of the Project (%)
0.00007	2.6	Drinking water contamination	0.5	0.010	0.00035	0.00001
		Drinking water, no MTBE	0.3	0.005	0.00017	0.00000
		Fatality	0.5	0.011	0.00036	0.00001
		Injury	2.3	0.047	0.00160	0.00003
		Recreational water contamination	8.3	0.17	0.006	0.00012
		Prime agricultural contamination	3.5	0.070	0.002	0.00005
		Wetlands contamination	4.9	0.10	0.005	0.00009
		Lake Travis drinking water supply	0.02	0.0004	0.000013	0.00000026
		Edwards Aquifer water contamination	0.02	0.0004	0.000013	0.00000026

The "overall risk" numbers in Table ES-4 show the probabilities of various impact scenarios occurring over the entire pipeline, after mitigation, for a period of 50 years. As shown, a total of approximately 3 (2.6) leaks would be predicted to occur over the pipeline's entire length during a 50-year period. This estimate compares with a predicted 70 leaks in an unmitigated condition (previously shown in Table ES-3). Table ES-4 shows that, with mitigation, there is a less than 1 percent (0.5 or 0.3) percent probability of drinking water contamination with or without MTBE being transported, respectively. The probabilities of a fatality or an injury during the pipeline's 50-year operation, with mitigation, are approximately 1 (0.5) or 2 (2.3) percent, respectively. The table indicates that there is an approximately 8 (8.3) percent chance that there will be a spill that would impact recreational waters (this could range from the mere creation of a visible sheen on the surface of a stream used for fishing to a large-scale fish kills and closing of lakes to swimming and recreational boating). Similarly, there is an approximately 4 (3.35) or 5 (4.9) percent probability, respectively, of contamination of prime agricultural lands or wetlands somewhere along the pipeline's length during a 50-year period.

The probabilities that these events will occur along any one segment are much lower. The segment-specific risk is the probability that one of the nine listed impacts would occur after mitigation over the course of 50 years and over a 2,500-ft segment. This is similar to the risk that an individual living near the pipeline would experience. Thus, for example, the post-mitigation probability of a fatality to an individual is 3.6 chances in one million (0.00036 percent) while the post-mitigation probability of an injury to an individual is 16 chances in one million (0.00160 percent). This compares, for example, with an individual's probability of death or injury in a motor vehicle over a 50-year period of 8,130 chances in one million or 500,000 chances in one million, respectively. The probability of a death of an individual occurring along a 2,500-ft segment on the mitigated Longhorn pipeline is similar to the probability of death from a tornado.

ALTERNATIVES TO THE PROPOSED PROJECT

In addition to the pollution control (or mitigation) measures described above, the Settlement required that the No-Action Alternative and various route alternatives be evaluated.

Evaluation of the No-Action Alternative

The No-Action Alternative is no operation of the Longhorn pipeline. If the Longhorn pipeline were left idled, (1) there would be no construction-related impacts since there would be no need for the remaining new construction of the System (pipe and pump stations) and (2) there would be no impacts from pipeline operation. However, the No-Action Alternative would not provide the direct economic benefits to gasoline and other refined product consumers that would logically be expected from additional competition in the El Paso Gateway Market.

The benefits of the No-Action Alternative would only result in incremental benefits to human and environmental receptors along the route of the Longhorn pipeline. The majority of the population and environmentally sensitive areas along the route is already exposed to multiple hazardous liquid pipelines in the same general pipeline corridor. In parts of the Houston area, the Longhorn pipeline is one of approximately 15 hazardous liquid pipelines sharing a common corridor. Through central and west central Texas there are two additional parallel pipelines—one transporting crude oil and one transporting natural gas liquids.

If the No-Action Alternative were to be implemented, the increasing demand for refined products in the El Paso Gateway Market would be satisfied through some means other than the Longhorn pipeline. Any of these could pose environmental risks and potential impacts that could equal or surpass those of the mitigated Longhorn pipeline. These other means to substitute for the absence of the Longhorn pipeline include one or more of the following:

- Expanded refining capacity in these markets;
- Construction and operation of new pipelines (i.e., connecting the Texas Gulf Coast with the El Paso area); and/or
- Alternative transportation modes connecting the refined product supply points and these markets.

According to Longhorn, if the company were not allowed to operate its already constructed pipeline, its next best economic return would result from the resumption of crude oil shipments from west-to-east on the Crane-to-Houston former EPC pipeline, including use of the Crane-to-El Paso newly constructed segment and the Crane-to-Odessa Lateral.

A return to crude oil shipment operation is feasible and it is unlikely that valuable pipeline infrastructure would be abandoned. The Resumption-of-Crude-Oil-Shipments Alternative represents the most likely scenario if for any reason the proposed project does not occur. The comparison between the proposed project and the Resumption-of-Crude-Oil-Shipments Alternative is summarized below.

<u>Advantages of the Mitigated Proposed Project over the Partially Mitigated Resumption-of-Crude-Oil-Shipments Alternative</u>:

- Reduced probability of spills over the entire pipeline with much lower probabilities of spills on the Houston-to-Crane segment (i.e., the majority of the pipeline and its most sensitive areas) due to the more comprehensive mitigation measures.
- Reduced long-term soil and water contamination consequences because crude oil is more persistent in the environment than gasoline and because the leak detection and emergency response mitigation measures will tend to limit spill size.
- Reduced need for construction of new refining capacity to serve the El Paso Gateway Market (west Texas, northern Mexico, New Mexico, and Arizona). The construction and operation of the new or expanded refineries would result in air, water, and solid waste impacts.
- Reduced need for new refined product pipeline construction and operation to serve the El Paso Gateway Market. New pipelines would pose greater construction impacts because the proposed project is 99 percent constructed, whereas new pipelines would need to be sited, the ROW cleared and constructed.
- Reduced risk to health and safety if the demand for petroleum products in the market areas to be served by the Longhorn pipeline were to be met by trucking of refined products. In particular, more than 2,000 gasoline tanker trucks per day would be required to transport the 225,000 bpd capacity of the Longhorn pipeline

resulting in more traffic congestion, air pollution, noise, and higher costs of transport.

- Operational impacts that could be equal, greater, or less than operational impacts of a new pipeline, depending upon the degree of mitigation measures applied to any new pipeline and the sensitivity of the affected environment.

<u>Advantages of the Partially Mitigated Resumption-of-Crude-Oil-Shipments Alternative over the Fully-Mitigated Proposed Project:</u>

- Considering the likelihood that the proposed project would probably transport larger quantities than would the Resumption-of-Crude-Oil-Shipments Alternative, the consequences of a large spill would be somewhat less for the Resumption-of-Crude-Oil-Shipments Alternative assuming equal leak detection, valve closure time, and response time.
- In the event of a spill, probability of a fire or explosion from spilled crude oil shipments under the Resumption-of-Crude-Oil-Shipments Alternative is less than would be the case for a gasoline under the proposed project because crude oil is less likely to be ignited than gasoline.
- In the event of a spill, short-term impacts to surface and ground water would be less under the Resumption-of-Crude-Oil-Shipments Alternative than they would be under the proposed project because gasoline, with its higher concentrations of benzene, poses a greater risk to drinking water quality and spreads more rapidly than an equal amount of crude oil.
- Depending on the flow rates and hydraulic profile, portions of the pipeline could have lower pressure levels. This would result in lower stress levels and corresponding reduced failure probabilities.

Route Alternatives to the Proposed Project

The Lead Agencies do not have statutory authority to prescribe the location or routing of pipeline facilities. However, this limitation does not preclude consideration of alternative routes as part of the NEPA process. There are three alternatives to the route of the proposed project.

Evaluation of the AA/M Route Alternative. The Settlement requires that the EA evaluate a route that avoids the following: Edwards Aquifer, Edwards-Trinity Aquifer, Colorado River Alluvium, Carrizo-Wilcox Aquifer, and Gulf Coast Aquifer. As discussed in Chapter 3 of the final EA, the AA/M Route Alternative is not an economically feasible (i.e., not a reasonable) alternative and, therefore, did not meet the project purpose and need. For this reason, it was not assessed in the same degree of detail as the proposed project route.

It is not possible to completely avoid several of these aquifers because they cross the state in wide, sweeping bands that parallel the Gulf of Mexico from northeast to southwest. It is possible to avoid some critical aquifers and minimize exposure to others via a route that was developed more than a decade ago as the "Northern Alternative" to a proposed extension to the All American Pipeline.

One major difference between the Longhorn proposed project and the All American Pipeline proposed project is that the Longhorn System is already built, while the All American Pipeline would have required completely new construction for any of the three routes that BLM could have selected. The Lead Agencies in the EA, which involves an already constructed pipeline, face a completely different decision than did BLM with regard to the All American Pipeline, which did not involve an already constructed pipeline. The AA/M Route Alternative would replace 313 miles of the 458 miles of the existing Galena Park Station-to-Crane segment of the System with a new pipeline that would avoid and reduce possible impacts to several aquifers.

The principal advantages and disadvantages of the AA/M Route Alternative are listed below:

<u>The advantages of the AA/M Route Alternative</u>:

- It would avoid the Edwards Aquifer, the Colorado Alluvium and three other minor aquifers (Hickory, Ellenburger-San Saba, and Marble Falls) and therefore eliminate the possibility of spills to these aquifers and to surface waters along the route.
- It would avoid the entire Austin area with attendant risks to population and natural resources.
- Because of the installation of new pipe for the entire route, the higher uncertainties associated with the integrity of the older pipe would be eliminated. Additionally, associated improvements in pipe strength, corrosion prevention (new coating system), ROW (cleared with no encroachments), and greater depth of cover would reduce risks of pipeline operation.

<u>The disadvantages of the AA/M Route Alternative</u>:

- It would require 370 miles of new construction with attendant construction-related and short-term impacts to the following resources: ground water, surface water, topographic alterations and karst terrain, aquatic and terrestrial biology, threatened and endangered species, cultural and historic resources, land use and recreation, and transportation. Also the acquisition of the AA/M Route Alternative ROW could result in condemnation proceedings.

- It would pose risks of spills and leaks to surface water and other rural and small town populations that are not now subject to these risks (by contrast, the elimination of the Longhorn pipeline does not remove the risks from the other pipelines that lie in the same pipeline corridor as the Longhorn pipeline).
- It would be proximal to and could potentially affect planned City of San Antonio well fields in the Carrizo-Wilcox Aquifer in Bastrop and Lee counties.

Because this routing alternative is economically infeasible (it would cost approximately $300 million and would result in 18 to 24 months delay), it is not considered a reasonable alternative requiring more detailed analysis.

Evaluation of the Austin Re-route Alternative. The Settlement requires the evaluation of an alternative route that would avoid "populated areas in and around the City of Austin." Longhorn identified a route that would minimize population exposure and that would take into account environmental concerns and other factors that would normally be considered in siting a new pipeline. The route departs from the existing Longhorn pipeline southwest of the Austin-Bergstrom International Airport and extends south of the existing Longhorn pipeline into northern Hays County before heading north and rejoining the existing pipeline west of Austin.

The Austin Re-route Alternative would replace a 12-mile segment in south Austin with a 21-mile segment that loops further south. This alternative route is shown in Figure 3-1 and in Figures 9-1 and 9-2**.** Its purpose is to avoid populated areas in and around Austin. In accordance with the Settlement, Longhorn developed a route that minimized population exposure. It is estimated that the 12-mile segment of the existing pipeline that would be replaced by the Austin Re-route Alternative lies within 1,250 ft of 8,750 residents. By comparison, the Austin Re-route would come within 1,250 ft of only 550 residents, more than a 90 percent reduction.

Following is a comparative evaluation of the Austin Re-route compared to the proposed route:

<u>The advantages to the Austin Re-route Alternative</u>:

- It accomplishes the goal of substantially avoiding population in the short term.
- It would use new pipe (possibly heavier walled) with new coating with increased depth of cover and other risk reductions associated with new pipeline.

- It would be easier to re-establish a clear ROW given that there are several encumbrances that have been allowed to develop over the existing pipeline ROW.
- It would provide increased contaminant travel distances to Barton Springs Pool, a valuable resource for drinking water, endangered species habitat, and recreation. This would allow more time to respond to spills and possibly greater dilution of contamination.

<u>The disadvantages to the Austin Re-route Alternative</u>:

- Northern Hays County is undergoing rapid growth. Capitol Area Planning Council cites a 3 percent per annum growth in Hays County since 1997, and the same growth rate is predicted for the town of Buda, which is within 0.5 mile of the Austin Re-route Alternative. This puts the pipeline in the path of development with increased risk of third-party damage and creates the possibility that at some point in the future the population along the Austin Re-route Alternative will equal or exceed the current population along the pipeline.[2] Approximately one-half of the Re-route lies in the City of Austin's "Desired Development Zone" under the City's Smart Growth Initiative.
- Many pipeline risks are directly proportional to length of a pipeline. The Austin Re-route Alternative is 9 miles longer than the portion of the proposed project route.
- Establishing new ROW for the Austin Re-route Alternative will require clearing of approximately 15 miles through potential Golden-cheeked Warbler habitat; a maximum of 180 acres of wildlife habitat would be affected during construction, and 45 acres would be permanently lost through ROW maintenance.
- The Austin Re-route Alternative does not reduce the number of pipeline miles crossing hypersensitive leached/collapsed and Kirschberg Evaporite members of Edwards Aquifer (BFZ). Also, by increasing the number of crossings of creeks in the recharge zone (new crossings of Little Bear Creek and Bear Creek will occur), there is increased potential for damages to the Edwards Aquifer from a release.
- Since the Austin Re-route Alternative would pass approximately 5 miles south of the proposed project route through the Edwards Aquifer (BFZ), and since ground water movement in this zone is south to north, the Re-route would increase the number of private and public wells at risk of contamination from a release.

In summary, the Austin Re-route Alternative raises several new environmental issues. Compared to a fully mitigated (including some pipe replacement) pipeline over the existing route, construction and operation of the Austin Re-route appears to present incremental impacts.

[2] Between the time that the Austin Re-route was mapped in the spring of 1999 and the final EA was developed in the fall of 2000, several major residential and commercial developments were announced that would conflict with this route.

Evaluation of the El Paso Lateral Alternatives

Longhorn's proposed route for the yet-to-be constructed 8.3-mile-long laterals connecting the El Paso Terminal to the Kinder Morgan and Chevron pipelines would pass through Fort Bliss. Longhorn has developed an alternative route that would be used if the US Army were not to approve the use of Fort Bliss property for a ROW. This alternative to the Fort Bliss route, the Montana Avenue Alternative, runs west from the El Paso Terminal to the Kinder Morgan and Chevron pipelines along Montana Avenue.

Both routes would entail temporary impacts associated with pipeline construction. These include short-term noise, dust, and interruption of traffic flow. However, because the Montana Avenue Alternative would be constructed along a busy El Paso arterial, it would have greater impacts.

Furthermore, should an accident occur on the three laterals and the return line, there would be more persons at risk along the Montana Avenue Alternative. An estimated 3,755 persons live within 1,250 ft of the Montana Avenue Alternative as compared to 232 persons within 1,250 ft of the Fort Bliss Route.

Based on biological and cultural resource surveys already completed, the Fort Bliss Route poses no impacts to these resources. Fort Bliss has completed biological and cultural resources investigations along the proposed Fort Bliss Route and has determined that federally protected resources would not be adversely impacted.

CONCLUSIONS

Pipeline experts, within the Lead Agencies' staff and on the EA team, have determined that the LMP represents a combination of pipeline pollution control and response measures that is unprecedented in the pipeline industry. The final EA and final LMP are markedly different than the October 1999 draft EA and the previous LMP, reflecting many minor and several substantive changes—some in response to public comments and outside expertise. These changes make the final LMP more protective than the October 1999 LMP. Each of the potential causes of pipeline failure has been addressed by multiple mitigation measures that collectively are comprehensive and often overlapping. In other words, there are many measures to guard against a single failure mode.

In the collective professional judgement of the Lead Agencies' staff and EA team, the required mitigation measures meet or exceed best industry practices and embody state-of-the-art techniques.