Environmental Assessment of the Proposed Longhorn Pipeline System

U.S. Department of Transportation

Research and Special Programs Administration

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 two primary defendants in the lawsuit, the U.S. Department of Transportation (DOT) and the U.S. Environmental Protection Agency (EPA), referred to as the "Lead Agencies," in association with third-party contractor, 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]

The EA is based on the condition of the pipeline as it existed at the commencement of this process in the spring of 1999, and includes (1) a description of the proposed project; possible alternatives, including 'no action' and rerouting; (2) a description of the affected environment; (3) an analysis of the effects on safety and the environment, including a pipeline integrity analysis and risk assessment; (4) consideration of comments from the public, the parties, the cooperating agencies; and, (5) mitigation measures and other components. The initial view of the Lead Agencies is that the EA supports a Finding of No Significant Impact (FNSI), when accompanied by the substantial mitigation elements detailed in the EA, and that no significant impacts to the human environment will result from the operation of the pipeline. The FNSI would be contingent upon operation of the proposed project with mitigation measures that would be implemented prior to, and following, start-up of the pipeline.

The EA is being released, together with the Lead Agencies' initial view of an appropriate decision option based on available information, and a request for comment on that preliminary option and other possible options. Publication of the notice of availability of the EA in the Federal Register initiated the 30-day period of public review and comment, which includes five public comment meetings to be held in Houston, Bastrop, Austin, Fredericksburg, and El Paso, Texas. Public comment is being solicited on the information contained in the EA, the alternatives examined, the Lead Agencies' preliminary view that a FNSI is appropriate, and the specific mitigation measures discussed in the EA, during the public meetings and comment

[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.

process. The Lead Agencies are especially interested in any evidence of likely significant impacts from the mitigated project, specifically comments on:

(i) whether the mitigation measures set out in the EA would have to be supplemented in order to support a FNSI and, if so, how?
(ii) whether even with supplemental mitigation measures, the operation of the project would result in significant impacts to the human environment. If this is found to be the case, an Environmental Impact Statement (EIS) would then be issued.
(iii) if an EIS is necessary, on which particular potential impacts should the analysis focus?
(iv) whether the mitigation measures set out in the EA are too onerous and a FNSI determination should be based on a lesser set of mitigation measures.

Upon completion of the public review and comment period, a Statement of Findings (SOF) will be issued containing the Lead Agencies' decision on whether the FNSI should be finalized, or whether an EIS should be prepared. A final decision on all issues will be made after public comment has been received and taken into consideration.

CHAPTER 1—INTRODUCTION

The EA evaluated the potential environmental and safety impacts of the Longhorn proposal to transport gasoline and distillate products over the pipeline system, which extends over approximately 700 miles between Houston and El Paso. Approximately 450 miles of this pipeline was constructed in 1950 and previously operated by Exxon Pipeline Company (EPC) as a crude products pipeline from 1950 until 1995. Since 1995, this portion of the line has been idle. After the line was purchased by Longhorn in 1996, the pipeline was extended by an additional 237 miles between Crane and El Paso.

Work performed on the pipeline during the preparation of the EA, as well as planned future work, has not been taken into account in the assessment of the baseline condition of the pipeline. The work being performed on the pipeline and planned future work, also known as mitigation measures, are discussed separately in Chapter 9 of the EA. The Lead Agencies have considered the effect of the mitigation measures on reducing the potential impacts from the project. Furthermore, the pipeline risk assessment and pipeline integrity analysis portions of the EA contemplate operation of the pipeline system at its full capacity of 225,000 barrels per day (bpd), which is anticipated to occur around 2009, approximately ten years from now. The start-up capacity of the pipeline is anticipated at 72,000 bpd. In instances where data collection was

incomplete or inaccessible, worst-case scenarios were adopted in order to ensure a worst-case assessment of the system based on the information available.

CHAPTER 2—STATEMENT OF PURPOSE AND NEED

The purpose of the proposed operation of the System, as outlined by the project proponent Longhorn, is to transport refined petroleum products from the Galena Park, Texas, (GATX) Terminal at Houston, to third-party terminal facilities in Odessa and to a newly constructed terminal in El Paso. From El Paso, there are further connections to third-party common carrier pipelines accessing markets in New Mexico and Arizona, such as El Paso; Phoenix; Tucson; Ciudad Juarez, Mexico; and other cities. The System would increase competition in the west Texas, Arizona, and New Mexico fuel markets through access to refineries located in the Gulf Coast area which can produce the cleaner-burning fuels required for improving air quality in southwest markets.

CHAPTER 3—DESCRIPTION OF THE PROPOSED PROJECT AND ALTERNATIVES

Proposed Project

The Proposed Project would convert the former EPC crude oil pipeline transporting crude oil from Crane to Baytown, Texas (near Houston) into a products line transporting primarily gasoline and diesel fuel from Houston to El Paso. The 237-mile portion of the pipeline from Crane to El Paso has been constructed and Longhorn is proposing to initially transport 72,000 bpd of product.

Two 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. The initial phase would use the new pump station at GATX, and refurbished stations at Satsuma, Cedar Valley, Kimble County, Crane, and El Paso. The first phase of the System expansion would be the construction of four additional pump stations that would allow for 125,000 bpd throughput. The second 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 is based upon a proposed maximum throughput of 225,000 bpd, so as to take into account “reasonable worst-case spill” scenarios. However, it does not include review of the construction or operational impacts of the additional required new pump stations. Those would need to be addressed in a subsequent supplemental EA review prior to their construction.

System Description

The System includes a 723-mile-long pipeline consisting of 694.6 miles of interstate pipeline, and 27.7 miles of intrastate pipeline. The System begins with 9 miles of newly constructed 20-inch diameter pipeline (Segment 1 on Table ES-1) that connects the GATX station in Harris County, to the former EPC refurbished 20-inch pipeline at a point designed valve 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	GATX terminal 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)	Not yet built	8	Two 8, One 12

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

The former EPC line continues to the Crane Station, 458 miles from GATX. 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. The total distance from GATX to the El Paso Terminal is 694.6 miles.

Three 8.3-mile lateral pipelines are proposed for construction and 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, GATX. 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	694.4

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 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 Aquifer Avoidance/-Minimization Route is identical to the Northern Alternative for the 1987 All American Pipeline reviewed at that time in an Environmental Impact Statement (EIS) conducted by the Bureau of Land Management. The Aquifer Avoidance/Minimization route is 370 miles long, starting at a point approximately 90 miles west of GATX, just southwest of Brenham, the 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 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 lines 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 8-inch Chevron pipeline. The proposed Fort Bliss 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 route of the 723-mile System was evaluated for demographics to identify distribution and density of population, sensitive receptors (e.g., residences, schools, day care centers, parks, health care facilities, and correctional facilities), existing and planned land uses, and transportation features along the System.

The Longhorn pipeline crosses 22 counties and four incorporated areas. Three of these areas are in Harris County: Houston, Galena Park, and Jacinto City; the fourth is in Travis County: Austin. The pipeline is adjacent to several rural, unincorporated neighborhoods and subdivisions, mainly in the Bastrop and Austin areas. The El Paso Terminal is located 4 miles east of the El Paso municipal boundary.

An estimated 52,700 persons reside within 1,250 ft of the entire pipeline. Of these, 41,950 individuals reside between MP 1 and MP 37 in Harris County. The second largest concentration of population is represented by the 8,930 persons who live within 1,250 ft of the pipeline between MP 160 and MP 180 in the Austin area. These two areas, which comprise less than 8 percent of the System length, account for more than 96 percent of the population along the pipeline. Most of the remaining 1,800 persons along the pipeline reside between Houston and Austin. Only 500 persons reside within 1,250 ft of the pipeline between Hays County 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 constitute 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 695 miles between Houston and El Paso. Rural residential land uses comprise approximately 2 percent of land uses along the pipeline. 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 parks and natural areas along the pipeline or in areas that could be affected by an accidental release of product include Harmonie Park in the community of Shelby, in Austin County; ColoVista Country Club, in Bastrop County; West Cave Preserve and Hamilton Pool Preserve along the Pedernales River in western Travis County; and Stephen F. Austin State Historical Park along the Brazos River in Austin County.

Ground Water Resources

For the purposes of this EA, the relative sensitivity of ground water resources to a pipeline leak or spill was estimated in two ways: (1) hydrogeologic sensitivity - the sensitivity of an aquifer based on how easily the aquifer could become contaminated by a spill, and how difficult it would be to remediate; and (2) proximal sensitivity - the proximity to and likelihood of pollution by a spill or leak and importance of public water supply wells.

Ground water is used for agricultural and domestic purposes. Seventeen municipal water systems are located within 2.5 miles of the System; seven others are within 2.5 to 25 miles. 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 and stock water use in the region relies solely upon ground water resources. Several public water supplies may also be at risk from contamination of this aquifer system.

The Edwards Aquifer Balcones Fault Zone (BFZ)-Barton Springs Segment, Colorado River Alluvium Aquifer, and Edwards-Trinity have been identified as particularly vulnerable to contamination by a spill. The Colorado River Alluvium Aquifer is an important source of ground water along the Colorado River southeast of Austin. Other vulnerable aquifers include: Carrizo-Wilcox Aquifer System, Queen City and Sparta aquifers, and Cenozoic Pecos Alluvium.

Surface Water Resources

The Longhorn pipeline intersects the San Jacinto River, Brazos River, Colorado River, Pecos River, and Rio Grande river basins from east to west, and crosses 288 streams or water courses including the main stem of the Pedernales and Llano rivers. A number of large tributaries of these rivers are also crossed: James River (Llano), Onion Creek (Colorado), Cottonwood Creek (Upper Pecos), and Antelope Gulch (which drains to the west Texas Salt Basin).

The Highland Lakes are the major water supply source for numerous communities along the lakes. The distance from the lakes to the closest pipeline stream crossing ranges from about 26 to 35 miles. The next two closest water rights 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. The Highland Lakes are a major recreational region for public boating and parks.

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 six of the eleven 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 288 stream crossings, ten 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.

Twenty-four threatened, endangered, or candidate species were identified as potentially affected by the System. The four aquatic species are the Barton Springs Salamander, Texas Blind Salamander, Pecos Pupfish, and Devil's River Minnow (candidate species). The terrestrial species are Attwater's Greater Prairie Chicken, Bald Eagle, Black-capped Vireo, Golden-cheeked Warbler, Southwestern Willow Flycatcher, Houston Toad, Texas prairie-dawn, Tobusch fishhook cactus, Texas snowbells, puzzle sunflower, Guadalupe fescue, gypsum wild-buckwheat, and Sneed pincushion cactus. In addition to these, six invertebrate species (Bee Creek Cave Harvestman, Bone Cave Harvestman, Kretschmarr Cave Mold Beetle, Tooth Cave Ground Beetle, Tooth Cave Pseudoscorpion, and Tooth Cave Spider) are included as representatives of rare, endemic species known to be present within the area.

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) 800, Protection of Historic Properties, the Texas State Historic Preservation Officer (SHPO) and Tribal Historic Preservation Officers (THPO), and other appropriate Tribal officials, Native American tribes 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 proposed Programmatic Agreement was sent to tribes that may have a historic connection to the land impacted by the project for possible identification of tribal interests of religious and cultural significance that should be considered for inclusion in the

Programmatic Agreement, and to document whether the Tribe wishes to be a concurring party to the Agreement.

Future construction associated with additional pump stations and the remaining pipeline laterals at El Paso and Odessa will be conducted in accordance with a Programmatic Agreement with the Texas Historic Commission and the Advisory Council for Historic Preservation.

CHAPTER 5—PIPELINE INTEGRITY ANALYSIS

Regulatory Issues

The primary regulator of the Longhorn system is the DOT. Interstate hazardous liquid pipelines are regulated under Title 49, Part 195 of the Code of Federal Regulations. When an accident actually occurs, Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations take effect.

The pipeline integrity analysis examined the overall approach to operations, the existing condition of the System, and its ability to transport refined petroleum products with due regard for the health and safety of both people and the environment along the pipeline. The assessment included the activities of the previous owner of the 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.

Overall, the EPC pipeline has experienced a greater than average frequency of leaks and spills as compared to national average data. The record also shows a decline in spill incidence in the years preceding the operational shutdown in 1995. Longhorn is now implementing physical and operating practice improvements to substantially reduce the potential for failure and to mitigate the potential consequences of such failures. Additional mitigation measures are addressed in Chapter 9 of this EA.

Longhorn is adapting the WES, System of Operating Manuals, for the pipeline to address Longhorn-specific activities. These changes will be developed contingent on the findings of the EA. Current and planned operations and maintenance activities are consistent with industry-accepted good practices. Based on reviews of materials of construction, inspection results, maintenance reports, and past leak history, the most likely areas of concern in the older portions of the subject pipeline are the seam weaknesses associated with low-frequency electric resistant weld pipe corrosion wall loss, and dents and gouges. Hydrostatic testing and in-line inspections

(ILI) in 1995, followed by digs and visual inspections, revealed areas on the line that required or will require repair or replacement.

There is the potential for girth weld susceptibility to failure associated with pipeline welding manufacturing processes in certain older portions of the pipeline. There are uncertainties about lower girth weld "acceptability" criteria in older portions of the pipeline.

Spill Response

The estimated maximum (worst case) spill volumes were calculated for several selected locations. Most of these volumes were within a range of about 3,000 to 6,000 barrels (bbl). However, a maximum potential release volume of 36,000 bbl was estimated at one location over the Cenozoic Pecos Alluvium Aquifer.

The Longhorn pipeline is substantially in compliance with emergency response regulations. Longhorn's planning is consistent with that for the pipeline industry in general and exceeds that level in some areas.

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 industry practices. However, local fire departments outside of the major metropolitan areas are mostly volunteer departments and might lack the equipment and training to fight a hazardous materials fire. Also, there are sensitive environmental areas and special land use areas that do not have detailed response plans in the current FRP. Longhorn is addressing these issues.

Corrosion Control

Corrosion control effectiveness for the EPC pipeline was intermittent, as evidenced by cathodic protection (CP) records and ILI results. Inspections and annual surveys (1990, 1994, 1998-99) provide some indications of CP effectiveness.

Past EPC corrosion control practices are questionable based on the need for relatively high levels of CP voltage and current, which indicate relatively low coating effectiveness in some

areas. CP surveys revealed some areas of shorted casings and low potentials, and the protection from atmospheric corrosion appears inadequate at some locations. The 1995 hydrostatic pressure test and follow-up activities removed existing flaws above a certain size, and the 1995 ILI detected and allowed for removal of certain types of flaws. No significant causes of fatigue existed since 1994, so certain types of flaw growth should not have occurred since the 1995 tests.

Leak History

The EPC system, prior to shutdown in 1995, had 60 spills of 50 barrels or more, 12 for the pipe and 48 for the pump stations. DOT reportable spills include any accident resulting in a spill of 50 or more barrels; $50,000 or more in property damage; fire; explosion; or death or bodily injury. The overall spill frequency was greater than the national average for hazardous liquid pipeline operators. Other findings regarding the history of leaks and spills on the Houston-to-Crane EPC line are discussed below.

The primary cause of pipeline spills of 50 bbl or greater in size has been outside force, including third party damage (58 percent of spills of 50 bbl or greater). Corrosion is the second highest cause at 17 percent. Seam splits, such as those associated with pre-1970 pipe, have led to two reportable spills of 50 bbl or greater on the EPC pipeline. Spill frequency declined over 29 years of EPC operation, as shown by 5-year averages of accidents.

Some portions of the pipeline experienced a higher repeat rate of repairs than other portions. Some sections of the original EPC pipeline have been replaced by new pipe. A formal risk assessment is being used to set priorities for repair activities. Depth of cover (i.e., soil and rock above the pipeline) is highly variable, reflecting, in part, subsurface terrain characteristics and changes over time. Some sections of pipe are intentionally exposed. Longhorn has identified and is evaluating shallow and exposed pipe areas. Pump stations are typical in layout and design to others in the industry. Pumps and valves have been refurbished for use in the upgraded or new pump stations.

Much of the EPC pipeline dates from about 1950 and has seam welds that are generally considered less reliable than fabrication welds after 1970. The pipeline was built according to construction specifications that are consistent with best practices at the time, but not necessarily consistent with current practices. The operating pressure profile for this pipeline is within limits consistent with the specified yield stress associated with the pipe strengths reportedly used in its construction. The profile is also consistent with the specifications for valves, fittings, and pumps.

Integrity of the weld seam areas of the pipe is unknown since the ILI technique Longhorn used in 1995 was not the type that could detect cracks, which is a key issue in determining Electronic Resistance Weld (ERW) integrity. However, the hydrostatic testing provided some measure of the integrity of these welds at the time it was performed. The only identified age-related deterioration mechanisms are fatigue and corrosion. Previous integrity verifications provided a measure of confidence that deterioration mechanisms had not compromised pipeline integrity as of the test dates. No significant causes of fatigue have been present since 1995, therefore, crack growth should not have occurred since the 1995 tests.

CHAPTER 6—OVERALL PIPELINE RISK ASSESSMENT

The relative risk assessment tool used in this EA process to identify potential problem areas is the EA Model which is based on a methodology described in Pipeline Risk Management Manual, (Muhlbauer, 1996), a well-known approach used in the pipeline industry. The risk assessment tool makes some assumptions such as (1) a greater release quantity increases risk; (2) a greater spread area of released product increases risk; (3) hazards associated with a product can be acute (immediate) or chronic (long-term), or both; (4) increased probability of failure increases risk; and, (5) objects closer to the pipeline are at greater risk.

The relative risk assessment uses a scoring technique that compares the relative risk of occurrence of leaks or spills for different segments of the overall pipeline. The probabilistic or absolute risk assessment estimates the probability of spills and of fires that could result from some of the spills. The relative risk assessment allows setting priorities for mitigation of spills. The absolute risk assessment allows the comparison of the risk at specific locations with other societal risks. The risks are based on the pipeline before the mitigation measures presented in Chapter 9 are applied. The consequences factor of the risk equation is discussed in Chapter 7.

The EA Risk Model

The EA Model divides the 695 miles of GATX to El Paso pipeline into approximately 7,800 sections with similar risk characteristics such that all parts of each segment have the same risk. Sectioning criteria include pipe attributes such as diameter, wall thickness, coating type, and others. For each section, a relative risk computational algorithm is used to calculate a relative risk score.

The relative risk score is a numerical product of probability and consequence factors discussed in Chapter 7. The probability of failure is divided into four categories or indices, each corresponding to a possible failure mode: third party damage, corrosion, design, and incorrect operations. The model captures the probability factors in terms of corresponding index scores, which are summed into an overall Index Sum score. The range of values for the Index Sum is 0 to 400, where 0 represents the lowest safety level (highest risk)—imminent failure. At the opposite end of the scale, 400 is a theoretical value representing the most failure-proof system (i.e., the highest safety, lowest risk system possible). Therefore, the Index Sum can be viewed as a "safety scale," whereby increasing points mean increasing safety.

In summary, risk varies along the pipeline 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, normal operating pressure, and types and dates of integrity validations. The Index Sum scores are meaningful only in relation to the index scores of the other portions of the System. They are not meant to imply that the risks are either high or acceptable.

Probabilistic or Absolute Risk Assessment

As noted above, absolute, or probabilistic risk, looks at the probability that a certain sized spill will occur at any point along the System. The risks of accidents on this pipeline to specific individuals is less than the probability ranges for other common risks. For example, a fire (not necessarily resulting in death or injury) associated with a 500-to-1,500 bbl spill has a probability in the range of one chance in 14,000 to 140,000 over fifty years for the population sensitive areas along the pipeline. This compares with an individual probability (based on nationwide statistics), over 50 years, of a 1 in 2 chance of injury in an auto accident; a 1 in 82 chance of death in an auto accident; a 1 in 3700 chance of death in a recreational boating accident; or a 1 in 45,500 chance of dying in a tornado.

The probabilistic risk assessment shows that there is considerable variation in the absolute risks faced by different locations along the pipeline. The areas potentially affected by a fire along the pipeline range in distances from a few hundred up to approximately 2,000 ft, depending on the size of a spill and site specific drainage conditions. Comparatively, gasoline fires affect distances about 20 percent farther than crude oil fires.

Table ES-3 below shows different locations along the pipeline with the probability of an event occurring over a 50-year period. An event may be a spill, a spill resulting in a fire, or a spill resulting in an explosion. Note that the probability of a fire from a gasoline spill is less than

the probability of a spill without a fire. Similarly, the probability of an explosion is even less than that of a fire. From the table, one can see that the chance of a spill occurring along any given mile of the pipeline is 1.4E-03 or 0.14 percent over a 50-year period. As an example of a specific location, the probability of a spill occurring over the pipeline crossing of the Colorado River is 2.6E-05, or 0.0026 percent over a 50-year period.

Table ES-3. Probabilistic Risk Assessment Results for Selected Areas

Sensitive Area	Route Area/Type	Event Probability Ranges Over 50-Year Operational Span of Pipeline		
		Leak/Spill	Fire	Explosion
Fonwood Elementary, Northwood Elementary and Langstead Primary Schools	Houston/Urban	3.7E-04	1.2E-05 to 9.1E-05	9.2E-06
Buescher State Park	Bastrop/Rural	1.4E-03	5.4E-05 to 4.3E-04	4.3E-05
Colorado River	River Crossing	2.6E-05	8.2E-07 to 6.5E-06	6.6E-07
Hillcrest Elementary School	Austin/School	1.1E-04	3.6E-06 to 2.8E-05	2.8E-06
Brown Schools	Austin/Medical	2.5E-04	7.8E-06 to 6.2E-05	6.2E-06
Karst Preserve	Edwards Aquifer	1.1E-04	3.5E-06 to2.8E-05	2.8E-06
Shiloh Subdivision	Austin/Neighborhood	1.1E-03	3.5E-05 to 2.8E-04	2.8E-05
Cedar Valley Pump Station	Edwards Aquifer	2.6E-02 to 5.6E-02	1.7E-03 to 6.6E-03	1.3E-03 to 6.6E-04
Edwards Aquifer - General	Edwards Aquifer	1.0E-02	3.2E-04 to 2.6E-03	2.6E-04
Cenozoic Pecos Aquifer	Cenozoic Pecos Aquifer	8.6E-02	2.7E-03 to 2.1E-02	2.1E-03
Any Mile	Any	1.4E-03	4.3E-05 to 3.4E-04	3.5E-05

Notes:

The first entry above, 3.7E-04, means 0.00037 or 0.037 percent probability of a spill occurring on the pipeline near one of the listed Austin schools.

The above probabilities were calculated without taking into account any of the mitigation measures being added on the line.

CHAPTER 7—POTENTIAL IMPACTS ANALYSIS

Observations and Assumptions

The impacts that could result from the operation of the pipeline before mitigation were evaluated by category: human, ground water, geology, soils, aquatic biology, terrestrial biology, surface water, air quality, transportation, land use, and noise. Various types of events were studied for each impact category and subcategory identified. Event types include normal operation, a small persistent leak, a large instantaneous leak, a large leak plus ignition; and pipeline or pump station construction. Because gasoline generally results in impacts greater than those from other refined products, spills are assumed to be for gasoline with the following observations.

Compared to crude oil, gasoline spills may have higher impacts to drinking water for both ground water and surface water, because of the effects of benzene and methyl tertiary-butyl ether (MTBE), and because transport characteristics make it more likely to reach a drinking water source in the event of a release.

Crude oil may have slightly higher impacts to long-term water quality in ground water, because the higher viscosity, sorbability, and specific gravity make a crude oil release more likely than gasoline to sink deeper into the ground water column, to resist natural dilution and transport through flushing, and to be less likely to volatilize. This difference in impact varies by aquifer type.

Except in those potential cases involving ignition, crude oil may have greater impacts to long-term land use than gasoline. In the absence of an ignition, a large oil release would result in more severe long-term impacts to land use because of the slower movement rates and absence of the volume removal effects of evaporation. If ignition occurs, gasoline will impact a larger radius and potentially cause more damage to land use.

Gasoline is more likely to ignite than crude oil, and because of the rapid heat release and the wider area of spread from a comparable volume released, a gasoline fire would be expected to result in greater damage than a fire involving crude oil.

Potential Impacts to Humans

Impacts to human health and safety from a spill include property damage, reduced property values, injuries, or death. For any individual 2,500-foot segment of pipeline, which represents a span for which any spill in the segment could potentially affect an individual residing at the midpoint of the segment, there is a 1 in 16,200 probability of a large spill (5,000 bbl or larger) per year. This represents an approximate worst case risk of exposure for any individual residing or working proximal to the pipeline.

Normal pipeline operation is not likely to result in impacts to human health and safety. A small leak is not expected to cause major direct impacts to human health and safety. Due to the highly volatile nature of gasoline, any conditions that pose risk to human health would become a nuisance, requiring response, before significant health effects were achieved. Even a large leak, in the absence of a fire, is not expected to cause major direct impacts to human health and safety. While there would be some short-term impacts due to inhalation of gasoline fumes, exposure should be limited, as the population would evacuate the area.

The following areas were identified as being a risk to major health and safety or public property-related impacts if a spill with an ignition were to occur at that point in the pipeline. Areas with 20 or more residences per linear mile, or other receptors such as schools, within 1,250 feet of the pipeline, were considered to be sensitive to fires. These areas are largely confined to the Houston Metropolitan Area, small subdivisions in Austin and Bastrop counties, and urban and suburban areas in Travis County.

Mitigation of Potential Impacts to Humans

In order to reduce the potential for impacts to human populations, the mitigation measures that address pipeline safety could include:

- Mitigation measures designed to reduce the overall risk of pipeline failure through testing and, if necessary, repair or replacement of pipe and components in specific areas;
- Mitigation measures designed to locate potential problems during the service life of the pipeline, such as ongoing testing programs and enhanced leak detection capabilities;
- Mitigation measures directed towards prevention of third-party damages in highly populated areas; and

- Mitigation measures aimed at reducing the impacts to health and safety if an accident does occur, such as improved emergency response procedures.

Potential Impacts to Ground Water

The entire Edwards Aquifer (BFZ) through south Austin is an area subject to special consideration for potential impacts to ground water as a drinking water resource resulting from a release. Any release along this stretch of pipeline could result in potential contamination of drinking water wells between the pipeline and Town Lake. An additional segment of pipeline over the Edwards-Trinity Aquifer is considered sensitive for drinking water: MP 341 – MP 346. This karstic area is potentially upgradient from public drinking water wells which supply the City of Eldorado less than 2.5 miles north of the pipeline. Other areas are slightly less sensitive for drinking water. These include:

- Section MP 163.48 – MP 164.91 of the pipeline that crosses the Onion Creek watershed in eastern Travis County;
- Section MP 492 – MP 495 of the pipeline that crosses the Cenozoic Pecos Alluvium downstream of the City of Pecos public water supply (PWS) wells, but upstream of the PWS wells for Grandfalls;
- Section MP 356 – MP 361 of the pipeline that crosses the Edwards-Trinity Aquifer within 2.5 miles of an wells for the Upton County Water Supply Corporation; and
- An area from MP 410 to MP 428 within 20 miles of wells for the Reagan County Fresh Water Supply District, which services the City of Big Lake.

Aside from these areas, the rest of the pipeline has a low proximal sensitivity to public drinking water supplies.

Impacts of releases of gasoline or crude oil from a pipeline depend on the line conditions and the length of pipeline being evaluated. The likelihood of a large (5,000 bbl or greater) spill occurring along any 1-mile stretch of pipeline is about 1 in 730 over the 50-year pipeline service life. In any given year, the risk of a 5,000 bbl leak occurring is about 1 in 7,600. These risks can be scaled to evaluate the risk posed to any specific aquifer feature. For example, the risk of a major spill occurring over the hypersensitive formations of the Edwards Aquifer (BFZ) is about 1 in 210 over the life of the project, and 1 in 2,200 in any given year.

Despite the two major releases of crude oil that have occurred over the Edwards Aquifer (BFZ) in the past 10 years (one from the EPC line), no long-term damage to the Edwards Aquifer

(BFZ), or major impacts to drinking water wells, or to Barton Springs, have been documented. Thus, the probability of major damage resulting from a release is lower than the probability of a release itself.

Normal pipeline operations and construction activities present little or no impacts to ground water resources. There may be some impacts due to silting from construction or maintenance activities, but these are considered minor. There is a potential for damage to ground water from a large release of crude oil or gasoline along much of the pipeline. A limited portion of the pipeline is considered sensitive for impacts to drinking water resources. The potential impacts of a large release to other portions of the pipeline are considered to be minor. Impacts from a release of gasoline to agricultural use of ground water, or to recreational caves, are expected to be minor. A release of crude oil could result in greater impacts to the use of ground water for agricultural purposes.

There are a number of aquifer features where an event involving a large release of crude oil or gasoline could potentially cause major negative impacts to drinking water supplies. Impacts could include human health risks posed by benzene, toluene, and other organic compounds present in gasoline, and to a lesser extent, crude oil. Additionally, exceedance of the Texas maximum concentration levels (MCL) for any of these constituents would cause problems for communities relying on the contaminated portion of an aquifer for drinking water supply. The presence of MTBE in a release of gasoline could also cause nuisance problems which render ground water non-potable.

Longhorn has declared that it will not transport pure MTBE, but may carry gasoline with up to 15 percent MTBE. MTBE is a known nuisance factor because of a low taste and odor threshold in water. It is not likely to cause a health risk to the public because at levels where MTBE causes water to become so objectionable that people will not drink it, the MTBE concentration is 1/40,000 the level where health effects could occur. MTBE is being phased out and therefore may not be an issue in the future. In July 1999, EPA announced a phase out of MTBE. This phase out will reduce the amount of MTBE that could reach drinking water supplies in the event of a release, and thus reduce the magnitude of impacts to drinking water supplies from a release.

Mitigation of Potential Ground Water Impacts

Any measures that reduce the probability or potential volume of a gasoline release to sensitive aquifers would have a positive impact on reducing risk to these resources posed by the pipeline. In particular, capabilities for enhanced detection and location of smaller leaks is more critical in protecting ground water supplies, as a small leak can release a considerable volume of product over time if undetected.

In addition, enhanced emergency response could provide an additional factor of safety in the event of a release, in order to reduce the amount of gasoline from a release which may reach a downstream or underlying sensitive aquifer. Emergency response procedures will need to include contingency planning for provision of drinking waters to municipalities whose drinking water wells could be rendered non-potable from leaks.

Potential Impacts to Surface Water

As a conservative estimate, a 0.12-mile stretch of pipeline over each crossing was assumed to represent the area where a release would immediately impact the water body crossed. For any 0.12-mile stretch of pipeline, based on historical statistics from the EPC line, there exists a 1 in 6,000 chance of a large spill during the 50-year life of the pipeline, or a 1 in 63,000 chance in any one year.

The potential for a release causing impacts to surface water bodies may be greater, due to the potential for overland flows which can flow for more than 100 meters downgradient to reach a river or stream. These overland flows can encounter competing mechanisms, such as vegetative cover and soil adsorption processes, which limit the volume which might actually reach the surface water body. Overland flow pathways were analyzed and classified as sensitive where appropriate.

There should be minimal, if any, surface waters impacts associated with the construction and routine operation of the pipeline. Impacts to agricultural use of surface waters following a release of gasoline or crude oil are expected to be minor. A number of minor recreational impacts could occur if a release occurred which contaminated the Colorado or Brazos rivers, due to temporary suspension of use of these water bodies. Releases to the Highland Lakes could also cause surface slicks that temporarily limit lake usage; it is expected that these impacts would be greater with a release of crude oil than of gasoline, as gasoline concentrations in the environment would more rapidly dissipate due to volatilization.

Adverse impacts could result in the improbable event of a major release at a limited number of sites along the line. These sites include specific crossings upstream of the Highland Lakes, where a very large release of MTBE-containing refined product could disrupt use of Lake LBJ or Lake Travis water for drinking water purposes. In addition, releases at a number of crossings upstream of public recreation areas, including state parks, state natural resource areas, nature preserves, and Barton Springs Pool, could cause short-term cessation of use of those recreational areas, or at least portions of those areas along the affected streams or rivers.

Mitigation of Potential Impacts to Surface Water

Any measures that reduce the probability or potential volume of a gasoline release to surface waters would have a positive impact on reducing risk to these resources posed by the pipeline. In particular, capabilities for enhanced detection and location of smaller leaks may be valuable in protecting water resources from the impacts of continuous low volume releases. An additional factor of safety in the event of a release could be provided through enhanced emergency response to reduce the amount of gasoline reaching surface waters and downstream impacts.

Potential Impacts to Aquatic Organisms

An accidental release of product that would enter a water body is likely to affect aquatic organisms at the release site and downstream. The extent of such impacts would be contingent upon the amount of product and temporal and spatial factors that could range from short-term and confined to a limited reach of the river or stream, to long-term and extensive that could reach several miles downstream.

Releases to karst areas that are crossed by the existing pipeline system could impact troglodytic (cave-dwelling), and aquifer-dependent species such as karst (cave-dwelling) invertebrates and the Barton Springs Salamander.

Normal pipeline operations will pose minimal, if any, adverse impacts to aquatic biology. There is some potential for impacts to aquatic populations in the improbable event of a release at any point where the pipeline crosses a stream or river, or where a release from the pipeline could drain toward a surface water body. It is not anticipated that long-term major impacts to aquatic populations would result.

There is a possibility of some damage to the Devil's River Minnow, which is a candidate for listing as an endangered species, but the distance downstream to the habitat makes it unlikely that during the pipeline service life a release would have an adverse impact on the species. In addition, it is likely that a release of crude oil would have impacts equal to or greater than gasoline impacts to Devil's River Minnow habitat. Pecos Pupfish are located in some of the side channels to the Pecos River downstream of the pipeline crossing, but these channels would not be affected by a release at the Pecos River crossing.

If a spill were to occur over the Edwards Aquifer (BFZ), there is the possibility for adverse impact to the Barton Springs Salamander. It is possible that a release of gasoline would create a higher potential than crude oil to reach the aquifer and be transported to Barton Springs, where impacts to the Salamander populations would occur. It is also possible that potential impacts from a release of crude oil to Barton Springs would be higher than potential impacts from a release of gasoline product. The possibility is a combination of factors, including the potential for the contents of a gasoline or crude oil release to pool on the surface versus transport directly into the aquifer. There is currently no way to quantitatively differentiate between the impacts to the Barton Springs Salamander from a release of gasoline or crude oil at worst-case locations within the Edwards Aquifer (BFZ) recharge zone or contributing zone.

Mitigation of Potential Impacts to Aquatic Biology

The one identified major potential impact to threatened and endangered species is the possibility for a release of gasoline or crude oil to contaminate Barton Springs Pool where it could damage Barton Springs Salamander populations. Therefore, Longhorn should implement mitigation measures to mitigate the risk to the Salamander population by reducing the chance and potential volume of a release over the Edwards Aquifer (BFZ) recharge zone. Leak detection enhancement measures could also prevent possible damages to the Salamander population, as well as incorporation of any other means of reducing emergency response times. At a minimum, Longhorn mitigation measures should ensure that emergency response plans are consistent with the City of Austin's Barton Springs Oil Spill Contingency Plan and the U.S. Fish & Wildlife Service (FWS) Barton Springs Salamander Recovery Plan.

Potential Impacts to Terrestrial Biology

Minor and infrequent impacts will occur to terrestrial species, including endangered and threatened species, during normal pipeline ROW maintenance. These might include temporary seasonal disturbance of nesting bird habitat, and prevention of species from maturing within the

ROW itself. These impacts would be equivalent whether gasoline or crude oil is transported in the pipeline. The six invertebrate species that could not be affected by pipeline operations or an accidental release of product are included as representatives of rare endemic species and are known to be present within the area, but will not be affected because they reside upgradient from the pipeline in the Jollyville Plateau area.

Greater overall impacts to species could result if a major release occurs along the pipeline, due to disruption of habitat from soil and water contamination, and contamination due to subsequent cleanup activities. Also, these impacts would be equivalent whether crude oil or gasoline was released. No major impacts are projected to sensitive terrestrial species along the pipeline ROW due to normal operations.

Mitigation of Potential Impacts to Terrestrial Biology

To eliminate or reduce the potential for adverse impacts due to construction of planned pumping stations, consultation with the FWS and the Texas Department of Parks & Wildlife (TDPW) should take place prior to siting and construction of stations. The implementation by Longhorn of risk reduction, enhanced leak detection, and emergency response measures undertaken for prevention of large releases along the line, will reduce the risk of potential impacts to terrestrial species.

Potential Impacts to Air Quality

All emissions from pump stations, valves, and construction of pump stations along the line will be minor in nature. None, including impacts of hazardous air pollutants, will exceed 10 percent of the Texas Effects Screening Level (ESLs) thresholds, at which the Texas Natural Resource Conservation Commission (TNRCC) projects nuisance or hazardous conditions as a result of an emissions source.

Under the proposed 72,000 bbl per day startup case, emissions from the El Paso Terminal tank farm will be minor, as they will not exceed 20 percent of the Texas ESLs, and will not be in excess of the threshold emissions rate for new sources in a non-attainment area. As the capacity of the line increases, operation of the El Paso Terminal as currently projected will exceed the major source thresholds and require compliance with EPA's best available control technology (BACT) and lowest achievable emission rates (LAER) levels. Therefore, no impacts are anticipated from construction or operation of the pipeline itself.

Mitigation of Potential Impacts to Air Quality

In order to remain below the major source threshold levels for the El Paso Terminal as throughput levels increase, Longhorn may need to implement additional controls on fugitive emissions, such as modifications to reduce volatile emissions from storage tanks or from tanker truck loading.

Potential Impact to Noise Levels

Lands around the Odessa Lateral, the pipeline entering El Paso, and near proposed pump stations are sparsely populated. Similarly, pump stations are not located or planned in areas of high population density. The continuously generated noise will not be greater than 65 A-weighted decibels (dBA) at any sensitive receptors, although station noise may be audible at some receptors depending on background conditions. The 65 dBA day-night average is a level set by EPA below which no health or nuisance related noise impacts are believed to occur. Longhorn should consider surrounding land uses when siting future pump stations.

Potential Impacts to Transportation

Additional personnel associated with the System operations would not affect local transportation activities in Houston, Austin, El Paso, and pump stations and related facilities. The System would be remotely operated; therefore, the number of employees required for routine operations would be limited to periodic site visits for monitoring, maintenance, and repair purposes along the extent of the pipeline.

Gasoline distribution from the El Paso Terminal would be with 8,500-gallon tanker trucks. Approximately 160 tanker trucks daily would be loaded at the facility during initial years of operation. By 2010, tanker truck activity is expected to reach approximately 209 trips per day and by 2020, daily tanker truck trips could reach approximately 248, or more than 10 per hour assuming continuous transport.

In the improbable event of an ignition or large leaks in a densely populated area, temporary traffic impacts would result because of safety concerns and access for emergency response crews. No long-term problems should result from such incidents. No major transportation impacts were identified in this analysis. Most impacts would be minimal and/or of short duration.

Potential Impacts to Land Use

One possible consequence of the Proposed Project is that several recreational facilities are crossed by the pipeline and could suffer major impacts from a large release, with or without ignition.

Parts of the pipeline cross parks or natural areas, or streams contributing to the parks or natural areas. For some of the parks considered, such as Buescher or Pedernales Falls, the major attractions are centered around water-based activities. At Enchanted Rock State Natural Area (SNA), severe impacts to Sandy Creek would in effect cut the facility off from public access until cleanup was completed, even though there is no pipeline crossing of the SNA itself.

Potential Impacts to Cultural Resources

Because the Proposed Project is 99 percent complete, relatively little new construction would occur. Therefore, impacts to archeological and historic resources are unlikely. Where new pipeline or pump station construction will occur, a Programmatic Agreement (PA) is appropriate in documenting compliance with Section 106 of the National Historic Preservation Act. EPA and DOT propose to comply with Section 106 through a PA. EPA and DOT value the views of interested persons and invite the comments on the draft PA and participation in the Section 106 process in accordance with 36 CFR Part 800.

The draft PA is under review by interested parties, including Tribes and Indian Nations, as a part of this EA process. Review will be made based on comments received, and the final PA will be executed prior to completion of the EA process. Once the PA is executed, the potential for adverse impacts on cultural resources is eliminated through the stipulations in the PA.

Other Potential Impact Areas

Other NEPA categories that were investigated during this study included soils, visual resources, and geology. None of these resources will be damaged under normal operation of the pipeline.

CHAPTER 8—ENVIRONMENTAL JUSTICE

An environmental justice (EJ) evaluation was conducted for the Proposed Project to determine if potential major impacts may be predominately or disproportionately borne by minority or low-income populations. The analysis was based on relative failure probabilities of 1-mile pipeline system segments which included potential major impacts expected to occur from

normal operation of the System and the potential for major impacts resulting from pipeline failure.

Based on results of an EJ analysis, the Proposed Project would not result in disproportionately high and adverse impacts to minority and low-income populations during normal pipeline operation scenarios.

CHAPTER 9—ALTERNATIVES AND MITIGATION

Alternatives to the Proposed Project

The Settlement identifies alternatives to the Proposed Project that must be considered in this EA:

- The "No-Action Alternative";
- Re-routing alternatives; and
- Pollution prevention alternatives (mitigation measures).

No-Action Alternative

The Lead Agencies have determined that the No-Action Alternative is the resumption of crude oil transport through the former EPC pipeline between Crane and Houston (J1). There is considerable evidence that a return to crude oil operation is feasible and the Lead Agencies believe it is unlikely that valuable pipeline infrastructure would be abandoned. The No-Action Alternative does *not* include transport of crude oil between El Paso and Crane since there was no previous pipeline operation there.

If the Longhorn pipeline were to be converted back to crude oil pipeline, the approximately 450-mile Crane-to-Houston (J1) portion of the pipeline would be used to carry west Texas crude oil. For purposes of evaluating the impacts of the Proposed Project under the NEPA, the EA compares the Crane-to-Houston portion of the Proposed Project with mitigation measures to an unmitigated No-Action Alternative over this same 450-mile segment.

Route Alternatives: The Aquifer Avoidance/Minimization Route (AA/M)

The Settlement requires that the EA evaluate a route that avoids the Edwards Aquifer, Edwards-Trinity Aquifer, Colorado River Alluvium, Carrizo-Wilcox Aquifer, and the Gulf Coast Aquifer. The route of the 1987 All American Pipeline "Northern Alternative" completely avoids the Edwards Aquifer Balcones Fault Zone (BFZ) and avoids and reduces its traverse across other aquifers. The Northern Alternative was not constructed and operated. Because of the similarities with the Longhorn pipeline route, the proposed route by All American Pipeline was selected as the alternative to be considered in this EA to satisfy the objectives of the Settlement. 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 were evaluated.

On balance, the impacts of construction of 370 miles of new pipeline, together with the potentially higher surface water impacts do not justify designating the AA/M Route as the environmentally preferred alternative, especially in light of the extensive mitigation proposed for the Proposed Project.

Route Alternatives: The Austin Re-route

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 to the south of the existing Longhorn pipeline into northern Hays County before heading north and rejoining the existing pipeline west of Austin. In summary, the Austin Re-route Alternative raises several new environmental issues. Compared to a heavily mitigated pipeline over the existing route, the net environmental impacts of the construction and operation of the Austin Re-route are questionable.

Route Alternatives: El Paso

Longhorn's proposed route for the three 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 Fort Bliss authorities were not to approve the use of Fort Bliss property for a ROW. This route alternative, the Montana Avenue Alternative, runs west from the El Paso Terminal to the Kinder Morgan and Chevron pipelines along Montana Avenue.

The Fort Bliss routes affects fewer residents and would pose fewer impacts to transportation and utility lines than would the Montana Avenue Alternative which is more developed. Based on biological and cultural resource surveys already completed, the Fort Bliss Route poses no impacts to these resources. Similar studies have not been conducted along the Montana Avenue Route Alternative. However, because much of the area along the route has been previously disturbed for development, any cultural resources and biological resources that would have been impacted would have already been affected by road and infrastructure construction. The Fort Bliss route is clearly the superior route alternative for the extension of the lateral lines.

Mitigation Measures

There are potential impacts associated with the Proposed Project that arise from the risk of pipeline failure. Mitigation measures are designed to avoid or reduce adverse impacts. The Lead Agencies have determined that mitigation measures are necessary to reduce the potential impacts of the Proposed Project to a level of insignificance. These mitigation measures (described in detail below) in many cases, go substantially beyond the legal requirements that apply to United States hazardous liquid pipelines.

This EA concludes that the Proposed Project does not pose significant impacts when the System is operating in a routine manner. That is, there are no significant impacts that are certain to occur at any given location, such as unacceptable noise from pump stations; routine releases of unacceptably high levels of air contaminants from valves, flanges, or product tanks; hazardous liquid effluent discharges or solid waste generation; or disturbance of threatened or endangered species.

Rather instead, there are varying probabilities that accidents could occur along the System. Should these accidents occur, impacts to the environment and human health and safety could be significant. The most effective way to mitigate risks is to reduce spill probability. Reducing spill consequences involves the reaction to a leak, which is often less effective than preventing the leak. The mitigation measures reduce the probabilities of failure with even greater risk reductions in those areas along the pipeline where environmental sensitivities and population densities are highest.

Based on guidelines developed by the Lead Agencies, Longhorn prepared the Longhorn Mitigation Plan (LMP) which met and exceeded the guidelines. Table ES-4 lists 34 Longhorn Mitigation Commitments (LMC). Collectively, these measures reduce the potential impacts from

the Proposed Project to a level of insignificance. This is accomplished through a mix of measures that would:

- Focus on reducing probability of spills and leaks through pollution prevention measures, but also decrease the consequences of a spill once it has occurred; increase the capability of detecting a leak along the pipeline; and decreasing the response time to remediate the consequences of a spill or leak.
- Apply to all parts of the System more stringent requirements for sensitive and hypersensitive areas. The measures that apply to the entire line are referred to as Tier I measures; those that apply to the 102 miles of sensitive areas are referred to a Tier II measures; and those that apply to the 22 miles of hypersensitive areas are referred to as Tier III measures.

An indication of how well the mitigation measures reduce the risk of pipeline failures is reflected in the increase in EA Risk Model scores between the pre-mitigation condition of the System and the post-mitigation condition. These are shown in Table ES-5 which presents various pre-mitigation minimums, averages, and highest scores for the entire pipeline and various segments of the pipeline. For example, the top row shows the average and lowest pre-mitigation scores for the entire pipeline (GATX to El Paso) are 195 and 139. Following the application of the mitigation measures, the scores rise to 279 and 237. The table also shows that the greatest increases in risk scores occurred in the areas where the greatest concerns were: the population-based hypersensitive areas in the Houston area, and the environmental and population-based hypersensitive areas in the south Austin area.

Volume 3 of this EA provides 184 sheets that contain aerial photographic strips (alignment sheets) of the entire pipeline. These annotated alignment sheets show precisely what mitigation would occur at specific points along the line including measures that apply broadly across the entire pipeline or pipeline segments. These sheets also show those pipeline segments that are considered non-sensitive (Tier I measures apply); sensitive (Tier II measures apply); and hypersensitive (Tier III measures apply).

Conclusions

The Lead Agencies have prepared this expanded environmental assessment (EA) to evaluate the impacts of the proposed project and its alternatives on the existing environment. On the basis of the available information, including information provided by Longhorn, along with comments presented by the plaintiffs and other interested parties, the Lead Agencies have made a preliminary finding that the human and natural environments will not be significantly impacted by the proposed pipeline project, provided it is accompanied by the mitigation measures detailed in the EA.

Construction

Most of the remaining construction will occur in relatively non-sensitive areas, some of which have been previously disturbed, e.g., the Fort Bliss pipeline corridor. Replacement of pipeline in the Barton Springs recharge zone for mitigation purposes will occur in a hypersensitive area, but only within the previously disturbed ROW for the existing pipeline. A supplemental EA will be required prior to construction of the additional pump stations needed to incrementally increase the delivery capacity of the pipeline because the specific locations are not presently known. The construction may also require consultation under the National Historic Preservation Act and Endangered Species Act, and the imposition of additional air quality controls on the El Paso Terminal.

Operation

Ordinary operation of the pipeline will not significantly affect environmental quality because it will entail no significant routine emissions of air contaminants or discharges of pollutants. Nor will it significantly increase ambient noise levels. ROW maintenance activities in areas where threatened or endangered species may be present will be scheduled and conducted to avoid potential harm.

Potential Risks

Potential risks posed by the proposed project are primarily associated with the possibility of a serious accident resulting in a spill. Determining whether such risks are significant requires consideration of two elements (1) probability of occurrence and (2) consequences or the degree of harm which could result from an occurrence. The Lead Agencies employed a process designed to identify and reduce both the risk of spills and their potential consequences, and tentatively conclude that the combination of mitigation measures developed through that process will adequately mitigate the risks posed by serious accidents.

A mathematical model based on known causes of pipeline failure was developed to evaluate the probability of a spill due to pipeline failure at each segment along the pipeline. Three tier target levels were established with the goal of providing ample protection for the entire length of the pipeline, but also with the goal of providing greater protection in more sensitive areas. Progressively higher model target levels were set in areas with higher sensitivities to assure the probability of accidents would be lowest in areas where the human and natural environment is most vulnerable. Generally, the area traversed by the old Exxon pipeline contained the areas of greatest relative sensitivity and vulnerability, rendering the potential consequences of a spill more severe in portions of that area, e.g., the Barton Springs recharge zone.

Mitigation

The Lead Agencies requested that Longhorn develop a mitigation plan, based on guidance from the Lead Agencies, which would address the specific causes contributing to the risk of spills in each pipeline segment and the consequences of spills. Longhorn developed and submitted a mitigation plan that exceeded the Lead Agencies' risk goals in every area. In addition to decreasing the risk of spills, the mitigation plan includes measures which will limit spill consequences, rendering their effects temporary and localized.

Longhorn will increase the frequency of patrols in sensitive and hypersensitive and the Edwards Aquifer areas. In addition to improved leak detection, a benefit of the increased frequency of patrolling will be the improved detection of third party activity in the pipeline ROW. Further, the system is designed to shut down within five minutes of a leak indication, with enhanced detection capabilities over the Edwards Aquifer recharge zone. The primary benefit of this system is reduced times between detection and shutdown that would limit the quantity of product released to the environment. Longhorn will also prepare a contingency plan to provide alternate water supplies to municipalities with sensitive water resources along the pipeline ROW. The cumulative effect of these mitigation measures, including those listed above, substantially reduces the likelihood that large spills would occur and are fully described in Table 9-2.

Potential Impacts

In summary, it is the preliminary finding of the Lead Agencies that the combination of proposed mitigation measures when implemented reduces the potential impacts of the Proposed Project to an insignificant level. The assessment process utilized in this matter has eliminated the potentially significant effects of the pipeline project and will avoid the potentially significant effects of the "no action" alternative which would return the old Exxon pipeline to crude oil transport. Resumption of crude oil transport between Houston and Crane could result in less overall protection to the human and natural environment because DOT could not require implementation of the specified mitigation measures, which exceed the requirements of substantive law.

Also, transportation of the refined products from the Texas Gulf Coast to the El Paso Gateway Market by large tanker trucks would introduce higher risks than those of pipelines, as discussed in Chapter 6. In particular, the number of deaths from tanker truck fires and explosions is more than 80 times greater than the number of deaths from pipeline accidents based on an equivalent number of gallon-miles shipped. Although the probabilities of tanker truck spills are higher than for pipelines, the quantity of product released to the environment is limited to the 8,500-gallon capacity of the tanker trucks.

The proposed action is compatible with the existing land uses in the area. The proposed pipeline shares the ROW with several other pipelines and would not result in a major change in land use, nor would its addition elevate adverse conditions to a level that is significant. If Longhorn operates the pipeline in accordance with its mitigation plan, the enhanced surveillance of its own pipeline will also enable detection of leaks from other pipelines in the rights-of-way and enable quicker response times and reduction of potential risks to the environment.

Table ES-4. Summary of Longhorn Mitigation Measures

Longhorn Mitigation Commitments	
Summary Description	**(Timing of Implementation) Risk(s) Addressed**
LMC 1 - Longhorn shall hydrostatically test the hypersensitive (Tier III) and sensitive (Tier II) areas of the pipeline and those portions of the pipeline identified by the Surge Pressure Analysis as being potentially subject to surge pressures in excess of current MASP.	(Prior to startup) Outside Force Damage, Corrosion, Material Defects, and Previous Defects; Establish Safety Factor
LMC 2 – Longhorn shall "proof test" all portions of the pipeline from the J-1 Valve to Crane Station that have not been hydrostatically tested pursuant to LMC.	(Prior to startup) Outside Force Damage, Material Defects, Corrosion and Previous Defects
LMC 3 – Longhorn shall replace three miles of the existing pipeline over the Edwards Aquifer recharge zone with thick walled pipe.	(Prior to startup) Outside Force Damage, Corrosion, Material Defects and Operator Error
LMC 4 – Longhorn shall: Install additional cathodic protection ground beds, perform interference testing at twenty locations, replace at least 600 ft of coating identified by the cathodic protection survey analysis, and repair or replace, as necessary, shorted casings identified by the cathodic protection survey analysis.	(Prior to startup) Corrosion
LMC 5 – Longhorn shall lower, replace or recondition, if necessary, the pipe at 12 locations.	(Prior to startup) Outside Force Damage, Corrosion and Material Defects
LMC 6 – Longhorn shall remove stopple fittings at various locations.	(Prior to startup) Material Defects
LMC 7 – Longhorn shall excavate the pipeline at two locations and determine condition and repair, if necessary.	(Prior to startup) Material Defects and Corrosion
LMC 8 – Longhorn shall replace the pipeline at the crossing of Rabb's Creek and investigate at least 5 dent locations.	(Prior to startup) Material Defects, Corrosion and Outside Force Damage
LMC 9 – Longhorn shall remediate any maximum allowable surge pressure (MASP) problems identified by Longhorn's most recent Surge Pressure Analysis by hydrostatically testing those portions of the pipeline which the Surge Pressure Analysis indicates could exceed maximum allowable surge pressures.	(Prior to startup) Material Defects and Corrosion
LMC 10 - Longhorn shall, perform an in-line inspection of the existing pipeline (Valve J-1 to Crane) to examine longitudinal weld seams for flaws and to examine pipe body for cracks and remediate any problems identified.	(Within 3 months of startup and thereafter at such intervals as are established by the Operational Reliability Assessment) Material Defects, Corrosion, Outside Force Damage and Previous Defects
LMC 11 - Longhorn shall, perform an in-line inspection of the existing pipeline (Valve J-1 to Crane) with a high resolution magnetic flux leakage tool to evaluate the pipeline for the presence of corrosion and remediate any problems identified.	(At such intervals as are established by the Operational Reliability Assessment) Corrosion, Outside Force Damage and Previous Defects

Table ES-4. (Continued)

Longhorn Mitigation Commitments	
Summary Description	**(Timing of Implementation) Risk(s) Addressed**
LMC 13 - Longhorn shall install an enhanced leak detection and control system over the Edwards Aquifer Recharge Zone to detect leaks of one barrel/hour in less than 30 minutes.	(System installation prior to startup and system operational within 6 months of startup) Leak Detection and Control
LMC 14 - Longhorn shall perform close interval cathodic protection surveys to survey (a) hypersensitive areas, and (b) pipeline segments not surveyed by the 1998 close interval survey, and remediate corrosion-related conditions identified by the surveys.	(Prior to startup) Corrosion
LMC 15 - (a) Longhorn shall verify that all pipeline spans are adequately supported and protected from external loading confirm the pipe grade of the pipeline across the Colorado River. (b) Longhorn shall replace one 671-ft section of pipe that contains several shorter sections of pipe characterized as Grade B.	(Prior to startup) Material Defects, Outside Force Damage and Corrosion; Establish Safety Factors
LMC 16 – Longhorn shall remove all encroachments along the pipeline ROW that could reasonably be expected to obstruct prompt access to the pipeline for routine or emergency repair activities or that could reasonably be expected to hinder Long-horn's ability to promptly detect leaks or other problems.	(Within one year of startup) Outside Force Damage, Leak Detection and Control
LMC 17 - Longhorn shall clear the ROW to excellent condition.	(Prior to startup and continuously thereafter) Outside Force Damage, Leak Detection and Control
LMC 18 - Longhorn shall inspect and repair or replace, as necessary, 26 locations identified requiring further investigation.	(Prior to startup) Outside Force Damage, Material Defects, Corrosion and Previous Defects
LMC 19 - Longhorn shall perform studies, with appropriate remediation/mitigation, evaluating each of the following matters: (a) Stress corrosion cracking potential along the pipeline; (b) Scour, erosion, subsidence, seismic activity and landslide induced stress potential along the pipeline; and (c) Root cause analysis on all historical leaks and repairs along the pipeline.	(Prior to startup) Outside Force Damage, Corrosion and Material Defects, and Operator Error
LMC 20 - Longhorn shall increase the frequency of patrols in hypersensitive and sensitive areas to every two and one-half days, daily in the Edwards Aquifer area, and weekly in all other areas.	(Continuously after startup) Outside Force Damage, Corrosion, Material Defects, Leak Detection and Control
LMC 21 – Longhorn shall increase the frequency of inspec-tions at pump stations to every two and one-half days in sensi-tive and hypersensitive areas. Remote cameras for monitoring pump stations in sensitive and hypersensitive areas will be installed within 6 months of startup for existing stations (Cedar Valley), and at future stations located in sensitive and hypersensitive areas prior to startup.	(Continuously after startup) Outside Force Damage, Corrosion, Material Defects, Leak Detection and Control

Table ES-4. (Continued)

Longhorn Mitigation Commitments	
Summary Description	**(Timing of Implementation) Risk(s) Addressed**
LMC 22 - Longhorn shall commission a study that quantifies the costs and benefits of additional valves at various river and stream crossings. Longhorn shall install additional valves if it determines on the basis of the study and with DOT concurrence, that additional valves will be beneficial (modifications to be complete within 6 months of notice from DOT).	(Within 3 months of startup) Outside Force Damage, Corrosion, Material Defects, and Leak Detection and Control
LMC 23 - Longhorn shall develop a response center in the middle area of the pipeline that will include available response equipment and personnel such that under normal conditions, a maximum two-hour full response can be assured.	(Prior to startup) Leak Detection and Control
LMC 24 - Longhorn shall revise its facilities response plan to better address firefighting outside of metropolitan areas (Houston, Austin, and El Paso) where HAZMAT units do not exist.	(Prior to startup) Leak Detection and Control
LMC 25 - Longhorn shall develop enhanced public education/ damage prevention programs to (a) ensure awareness among contractors and potentially affected public, (b) promote cooperation in protecting the pipeline, and (c) to provide information to affected communities with regard to detection of and responses to well water contamination.	(Continuously after startup) Outside Force Damage, Leak Detection and Control
LMC 26 – Longhorn shall revise its facility response plan (FRP) to provide for more detailed response planning in areas where high populations or potentially sensitive receptors are on or adjacent to the pipeline ROW.	(Prior to startup) Leak Detection and Control
LMC 27 – Longhorn shall provide evidence that secondary containment was installed, during construction, under and around all storage and relief tanks, in accordance with API 650.	(Prior to startup) Leak Detection and Control
LMC 28 - Longhorn shall revise its FRP, if necessary, to make it consistent, to the extent practicable, with the City of Austin's Barton Springs oil spill contingency plan and the US Fish & Wildlife Service's Barton Springs Salamander Recovery Plan.	(Prior to startup or as the referenced plans are developed) Leak Detection and Control
LMC 29 - Longhorn shall provide funding for a contractor (to be selected by Longhorn with LCRA's approval) to conduct water quality monitoring upstream and downstream of each of 13 stream crossings of the Longhorn pipeline to determine the presence of gasoline constituents.	(For a period of two years after startup to evaluate the effectiveness of the program and thereafter as dictated by the Longhorn Operational Reliability Assessment - See Section 4.0). Leak Detection and Control
LMC 30 - Longhorn shall prepare a contingency plan to provide alternate water supplies to municipalities along Longhorn pipeline with sensitive water resources.	(Prior to startup) Leak Detection and Control
LMC 31 - Longhorn shall perform a surge pressure analysis prior to any increase in the pumping capacity. Additionally, Longhorn will prepare an environmental analysis that will assess any environmental effects associated with the construction and operation of the new pump stations.	(Prior to any change in the system that has the capability to cause surge pressures to occur on the system.) Material Defects

Table ES-4. (Continued)

Longhorn Mitigation Commitments	
Summary Description	**(Timing of Implementation) Risk(s) Addressed**

LMC 32 - Longhorn shall perform pipe-to-soil potential surveys semi-annually over sensitive and hypersensitive areas.	(No more than six months after startup and semi-annually thereafter) Corrosion
LMC 33 - (a) Longhorn shall provide the necessary funding to establish an adequate refuge and captive-breeding program for the Barton Springs Salamander. This program will be conducted in coordination with the Austin Field Office of the U.S. Fish and Wildlife Service; and (b) Longhorn shall perform conservation measures developed in consultation with the US Fish and Wildlife Service to mitigate potential impacts to threatened and endangered species in the highly unlikely event that future pipeline construction activities and operation may adversely affect such species or their habitat.	([a] Prior to startup) Harm to the Barton Springs Salamander ([b] At any time such activity could have an adverse effect on listed species or their habitat.) Adverse effects to listed species or their habitat
LMC 34 - Longhorn shall implement system changes, through system and equipment modification and/or observance of operating practices, to limit surge pressures to no more than maximum operating pressure (MOP0 in sensitive and in hypersensitive areas. Such system changes shall include replacement of the pipe at various locations.	(Prior to startup and thereafter) Outside Force Damage, Corrosion, Operator Error and Material Defects

Table ES-5. "Before" and "After" Comparisons of Index Sum Score for Score for Various Pipeline Segments

Section	Before Mitigation				After Mitigation (10/1/99 Data)			
	Count Of Segments	Max	Avg	Min	Count Of Segments	Max	Avg	Min
All	7806	258	195	139	8059	350	279	237
GATX - J1	106	254	238	185	118	348	331	316
J1 - Crane	6820	246	188	139	7055	350	277	237
Crane - El Paso	880	258	245	186	886	313	291	261
hypersensitive areas	586	258	186	162	418	350	298	280
sensitive + hypersensitive areas	1590	258	189	139	1507	350	291	261
Travis County:								
All	487	231	188	142	525	349	288	257
hypersensitive areas	113	206	183	168	110	349	311	280
sensitive + hyper areas	371	231	185	168	356	349	294	270
Harris County:								
All	587	252	195	159	631	348	292	237
hypersensitive areas	59	236	182	164	50	336	295	284
sensitive + hypersensitive areas	307	252	191	159	316	348	300	263