

**Table 9-1. Applications of the Longhorn Mitigation Commitments**

<b>Longhorn Mitigation Commitment</b>		<b>Application</b>
<b>No.</b>	<b>Description</b>	
1	Longhorn shall hydrostatically test the hypersensitive (Tier 3) and sensitive (Tier 2) 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 maximum allowable surge pressure (MASP). See Mitigation Appendix, Item 1 and Item 9.	This hydrostatic testing will be done in all Tier 2 and Tier 4 areas. The testing will be completed prior to the startup of the system.
2	Longhorn shall “proof test” all portions of the pipeline from the J1 Valve to Crane Station that have not been hydrostatically tested pursuant to Longhorn Mitigation Commitment No. 1. See Mitigation Appendix, Item 2.	This hydrostatic testing will be done in all portions of the pipeline between the J1 valve and Crane Station not tested in Longhorn Mitigation Commitment (LMC) 1. The testing will be completed prior to the startup of the system.
3	Longhorn shall replace approximately 19 miles of the existing pipeline over the Edwards Aquifer recharge and contributing zones with thick walled pipe; the pipe will be buried to a minimum depth of 5 feet (ft) and protected by a concrete barrier. See Mitigation Appendix, Item 3.	The pipe will be replaced over a three-mile area over the recharge zone of the Edwards Aquifer (approximately MP 170.42 to MP 173.6). The pipeline east of the Edwards Aquifer Recharge Zone from approximately MP 169.88 to MP 170.42 and across the Edwards Aquifer. Contributing Zone approximately from MP 143.6 to MP 188.8 will also be replaced. This measure will be completed prior to startup of the system.
4	<p>Longhorn shall perform the following additional cathodic protection (CP) mitigation work:</p> <ul style="list-style-type: none"> <li>a) Install 13 additional CP ground beds at the locations described in Mitigation Appendix, Item 4, of the Longhorn Mitigation Plan (LMP).</li> <li>b) Perform interference testing at 20 locations, if necessary, as described in Mitigation Appendix, Item 4, of the LMP.</li> <li>c) Replace at least 600 ft of coating identified by the CP survey analysis at the locations described in Mitigation Appendix, Item 4, of the LMP.</li> <li>d) Repair or replace, as necessary, 12 shorted casings identified by the CP survey analysis at the locations described in Mitigation Appendix of LMP, Item 4.</li> </ul>	These additional CP measures will be performed at the specified locations prior to startup of the system.
5	Longhorn shall lower, replace, or recondition, if necessary, the pipe at 12 locations per the Environmental Assessment (including Marble Creek). See Mitigation Appendix, Item 5, in the LMP.	This mitigation measure will be applied to exposed pipe in 12 locations shown in the table in Item 5 of the Mitigation Appendix. The Marble Creek crossing will be refurbished and replaced with new pipe. This measure will be completed prior to startup.

**Table 9-1. (Continued)**

<b>Longhorn Mitigation Commitment</b>		<b>Application</b>
<b>No.</b>	<b>Description</b>	
6	Longhorn shall remove stopple fittings at the following locations: Stations Nos. 9071+36, 8936+35, and 8796+99 (MP 171.86, MP 169.25, and MP 166.61). See Item 6, in the LMP.	<p>This measure is applied to three locations in the area bounded by MP 166.6 and MP 171.9.</p> <p>This measure will be completed prior to the unit startup.</p>
7	Longhorn shall excavate the pipeline at two locations, near Satsuma Station and in Waller County, indicated by the 1995 in-line inspection and determine condition and repair, if necessary. See Item 7.	Possible corrosion areas examined at Station 1821+62, MP 34, 50 and 2737+37, MP 21.84. If corrosion is present where indicated, Longhorn will remove and replace the corroded pipe. This measure will be done prior to start up.
8	Longhorn shall replace the pipeline at the crossing of Rabb's Creek and investigate at least 5 dent locations identified by Kiefner, based on the 1995 in-line inspection, and repair, if necessary. See Mitigation Appendix Items 8 and 19.	The exposed pipeline crossing at Rabb's Creek will be replaced. The 5 dent locations with worst score indications will be excavated, inspected, and replaced, if necessary. If dents are confirmed at any of these 5 locations, the remaining locations identified previously will also be excavated and inspected. This will be done before startup.
9	Longhorn shall remediate any 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. The hydrostatic test will re-qualify the portions of the pipeline which will be tested to a MASP which is within permissible limits as established by the most recent surge pressure analysis. Further, Longhorn will implement appropriate measures in all Tier 2 and Tier 3 areas of the pipeline to eliminate the possibility of conditions causing a surge pressure which would exceed maximum operating pressure. See Mitigation Appendix, Item 9 of the LMP and LMC 34.	Hydrostatic testing of 4 segments of pipeline totaling 81.6 miles, including all Tier 2 and Tier 3 areas will be conducted prior to startup of the system.
10	Longhorn shall, following the use of sizing and (where appropriate) geometry tools, perform an in-line inspection of the existing pipeline (Valve J1 to Crane) with a transverse field magnetic flux inspection tool and remediate any problems identified. See the Longhorn Pipeline System Integrity Plan (SIP) at Section 3.5.2 and the associated Operational Reliability Assessment (ORA) at Section 4.0.	This tool will be used to inspect the length of pipeline from valve J1 to Crane Station. The testing will be done at such intervals as are established by the ORA, provided that an inspection shall be performed no more than 3 years after system startup in Tier 2 and Tier 3 areas.

**Table 9-1. (Continued)**

<b>Longhorn Mitigation Commitment</b>		<b>Application</b>
<b>No.</b>	<b>Description</b>	
11	Longhorn shall, following the use of sizing and (where appropriate) geometry tools, perform an in-line inspection of the existing pipeline (Valve J1 to Crane) with a high resolution magnetic flux leakage tool and remediate any problems identified. Until LMP 11 has been completed, an interim MOP (MOPi) shall be established for the existing pipeline at a pressure equal to .88 times the MOP. (Note: 1.25 times the MOPi is equal to the Proof Test Pressure discussed in Mitigation Item 2 above). See the Longhorn Pipeline SIP at Section 3.5.2 and the ORA at Section 4.0.	This tool will be used to inspect the length of pipeline from valve J1 to Crane Station. The testing will be done within three months of startup and thereafter at intervals established by the ORA.
12	Longhorn shall, following the use of sizing and (where appropriate) geometry tools, perform an in-line inspection of the existing pipeline (Valve J1 to Crane) with an ultrasonic wall measurement tool to verify wall thickness and remediate any problems identified. See the Longhorn Pipeline SIP at Section 3.5.2 and the associated ORA at Section 4.0.	This tool will be used to inspect the entire length of pipeline from valve J1 to Crane Station. The testing will be done at intervals determined with the ORA.
12A	Longhorn shall perform an in-line inspection of the existing pipeline (Valve J1 to Crane) with a “smart” geometry inspection tool and remediate any problems identified. See the Longhorn Pipeline SIP at Section 3.5.2 and the associated ORA at Section 4.0.	At intervals established by the ORA, but at least every three years.
13	Longhorn shall install an enhanced leak detection and control system which will include a transient model based leak detection system utilizing 9 meter stations (6 clamp on meters and 3 turbine meters). Additionally, a leak detection system will be installed over the Edwards Aquifer Recharge Zone and the Slaughter Creek watershed in the Edwards Aquifer Contributing Zone that will detect a leak of extremely minute volume in 12 to 120 minutes from contact, depending upon the product sensed by the system. That leak detection system will be a buried hydrocarbon sensing cable system designed to meet the leak detection performance specifications described in the preceding sentence. The pipeline system is designed to achieve emergency shut down within five minutes of a probable leak indication. See Mitigation Appendix, Item 13.	This system will be installed before project startup, and operational within six months of startup.
14	Longhorn shall perform close interval pipe to soil potential surveys to survey (a) hypersensitive areas, and (b) pipeline segments which were not surveyed by the 1998 close interval survey [Station Nos. 10753+40 – 10811+06 (MP 203.66 – MP 204.75), 8897+60 – 8945+40 (MP 168.52 – MP 169.42), and 1729+24 – 1734+81 (MP 32.75 – MP 32.86)], and remediate corrosion related conditions identified by the surveys as necessary. See Mitigation Appendix, Item 4 (Areas 12, 13 and 15) and the Longhorn Pipeline System Integrity Plan, Section 3.5.1.	All previously unsurveyed segments of the pipeline will be surveyed prior to the startup of the project.

**Table 9-1. (Continued)**

<b>Longhorn Mitigation Commitment</b>		<b>Application</b>
<b>No.</b>	<b>Description</b>	
15	Longhorn shall perform an engineering analysis to verify that all pipeline spans are adequately supported and protected from external loading. Longhorn shall implement the recommendations of such analysis to ensure the stability of such spans. Longhorn shall provide documentary or analytical confirmation of the pipe grade of the pipeline across the Colorado River. See Mitigation Appendix, Item 15.	The engineering analysis will be provided to the Lead Agencies prior to startup.
16	Longhorn shall remove all encroachments along the pipeline right-of-way (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 Longhorn's ability to promptly detect leaks or other problems. Potential encroachments have been identified in Travis County between MP 164 and MP 168. These and other potential encroachments will be evaluated using the guidelines found in Section 3.5.5, <i>Encroachment Procedures of the Longhorn Pipeline System Integrity Plan</i> .	These encroachments will be identified and removed within one year of project startup.
17	Longhorn shall clear the right-of-way to excellent condition (ROW encroachments shall be resolved by Longhorn pursuant to Mitigation Commitment 16). See Mitigation Appendix, Item 17.	The ROW will be cleared prior to startup, and will be continuously maintained thereafter.
18	Longhorn shall inspect and repair or replace, as necessary, 26 locations identified by Williams (WES) in its risk assessment model as areas requiring further investigation. See Mitigation Appendix, Item 18.	This measure will be completed, in all 26 areas identified, prior to startup of the system.
19	Longhorn has performed studies evaluating each of the following matters along the pipeline, and shall implement the recommendations of such studies in accordance with the Longhorn Pipeline SIP and the ORA (see Mitigation Appendix, Item 19):  a) Stress corrosion cracking potential along the pipeline; b) Scour, erosion, and flood potential; c) Seismic activity; d) Ground movement, subsidence, and aseismic faulting; e) Landslide potential; f) Soil stress; and g) Root cause analysis on all historical leaks and repairs along the pipeline.	These studies will be completed prior to startup of the system.
20	Longhorn shall increase the frequency of patrols in hypersensitive and sensitive areas to every 2.5 days, daily in the Edwards Aquifer area, and weekly in all other areas. See the Longhorn Pipeline System Integrity Plan, Section 3.5.4.	These patrols will be started at the time of the system startup and will be continuous thereafter.
21	Longhorn shall increase the frequency of inspections at pump stations to every 2.5 days in sensitive and hypersensitive areas. Additionally, remote cameras for monitoring pump stations will be installed within six months of startup for existing stations and at future stations prior to startup. See Mitigation Appendix, Item	The inspections will be initiated at system startup. The video cameras will be installed at all existing pump stations within six months of startup. Future stations will have remote cameras installed prior to station startup.

**Table 9-1. (Continued)**

<b>Longhorn Mitigation Commitment</b>		<b>Application</b>
<b>No.</b>	<b>Description</b>	
	21.	
22	Longhorn shall commission a study that quantifies the costs and benefits of additional valves at the following river and stream crossings: Marble Creek; Onion Creek; Long Branch; Barton Creek; Fitzhugh Creek; Flat Creek; Cottonwood Creek; Hickory Creek; White Oak Creek; Crabapple Creek; Squaw Creek; Threadgill Creek; and James River. Longhorn shall install additional valves if it determines, with DOT concurrence, that additional valves will be beneficial. See Mitigation Appendix, Item 22.	If it is determined that additional valves will be beneficial, such changes will be completed within six months of notice from DOT.
23	Longhorn shall develop a response center in the middle area of the pipeline which will include available response equipment and personnel such that under normal conditions, a maximum two-hour, full response can be assured. See Mitigation Appendix, Items 23, 24 and 26. (Items 23, 24, and 26 are grouped under the heading "Enhanced Facility Response Plan" in the Mitigation Appendix.)	Response resources will be developed at several locations to assure attainment of the proposed response times. This resource will be in place prior to system startup.
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. See Mitigation Appendix, Items 23, 24, and 26. (Items 23, 24, and 26 are grouped under the heading "Enhanced Facility Response Plan" in the Mitigation Appendix.)	The revised and enhanced Facilities Response Plan will be developed prior to the system startup.
25	Longhorn shall develop enhanced public education/damage prevention programs to, inter alia, (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. See the Longhorn Pipeline System Integrity Plan, Section 3.5.4. See Mitigation Appendix, Item 25.	These programs will be developed prior to startup and implemented continuously thereafter. The effectiveness of these programs will be regularly evaluated.
26	Longhorn shall revise its facility response plan to provide for more detailed response planning for areas where high populations of potentially sensitive receptors are on or adjacent to the pipeline right-of-way. See Mitigation Appendix, Item 23, 24 and 26. (Items 23, 24 and 26 are grouped under the heading "Enhanced Facility Response Plan" in the Mitigation Appendix.).	The revised and enhanced facility response plan will be developed prior to startup.
27	Longhorn shall provide evidence (as-built engineering drawings and similar such documentation) that secondary containment was installed, during construction, under and around all storage and relief tanks, in accordance with (NEPA 30). Longhorn shall install secondary containment at the Cedar Valley pump station in Hays County.	Verification of secondary containment around storage tanks will be provided before project start.

**Table 9-1. (Continued)**

<b>Longhorn Mitigation Commitment</b>		
<b>No.</b>	<b>Description</b>	<b>Application</b>
28	Longhorn shall revise its Facility Response Plan, 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 and Wildlife Service’s Barton Springs Salamander Recovery Plan. See Mitigation Appendix, Item 28.	The Longhorn Facility Response Plan will be made consistent with the response plans of the city and the US Fish and Wildlife Service (FWS) prior to startup or as soon as these latter plans have been developed.
29	Longhorn shall provide funding for a contractor (employing personnel with the necessary education, training, and experience) to conduct water quality monitoring upstream and downstream of each of 12 stream crossings in proximity to stream crossings of the pipeline to determine the presence of gasoline constituents. See Mitigation Appendix, Item 29.	This measure will be implemented at the time of the project startup. The monitoring program is scheduled to be conducted for two years.
30	Longhorn shall provide alternate water supplies to certain municipalities and private well users as detailed in Longhorn’s contingency plans. See Mitigation Appendix, Item 30.	The contingency plan will be developed prior to the project startup.
31	Longhorn shall perform a surge pressure analysis prior to any increase in the pumping capacity above those rates for which analyses have been performed or any other change which has the capability to change the surge pressures in the system. Longhorn will be required to submit mitigation measures acceptable to DOT prior to any such change in the system, which mitigation measures will adequately address any MASP problems on the system identified by the surge pressure analysis.	A surge pressure analysis will be performed prior to any change in the system that has the capability of changing the surge pressure profile.
32	Longhorn shall perform pipe-to-soil potential surveys semi-annually over sensitive and hypersensitive areas (which is twice the frequency required by DOT regulations – 49 CFR §195.416), and corrective measures will be implemented, as necessary, where indicated by the surveys. See Longhorn Pipeline System Integrity Plan, Section 3.5.1.	This measure will be initiated within six months of the project startup. Surveys will be made semi-annually thereafter.
33	<p>(a) Longhorn shall provide the necessary funding to establish an adequate refugium and captive breeding program for the Barton Springs Salamander, to offset any losses that might occur in the highly unlikely event of a release that caused the loss of individual salamanders. This program will be conducted in coordination with the Austin Ecological Services Field Office of the FWS; and</p> <p>(b) Longhorn shall perform conservation measures developed in consultation with the FWS 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. See Mitigation Appendix, Item 33.</p>	<p>(a) Will be completed within 30 days of startup</p> <p>(b) These measures will be implemented any time that pipeline construction or operating activities could have an adverse effect on listed species or on their habitat.</p>

**Table 9-1. (Continued)**

<b>Longhorn Mitigation Commitment</b>		<b>Application</b>
<b>No.</b>	<b>Description</b>	
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 MOP in sensitive and in hypersensitive areas. Such system changes shall include (a) replacement of the pipe at the following locations: 6752+06 – 6758+40 (MP 127.88 – MP 128.00) and 10489+47 – 10490+00 (MP 198.66 – MP 198.67) and (b) installation of pressure activated by-pass systems at the Brazos, Colorado, Pedernales and Llano rivers. In addition, Longhorn shall replace one 671 ft section of pipe [Station Nos. 16992+41 – 16999+12 (MP 321.83 – MP 321.95)] which contains several shorter sections of pipe previously characterized as Grade B. See Mitigation Appendix, Item 34 and LMC 9.	These system changes will be implemented prior to startup.
35	Longhorn shall not transport products through the pipeline system which contain the additive methyl tertiary butyl ether (MTBE) or similar aliphatic ether additives (e.g., TAME, ETBE, and DIPE) in greater than trace amounts. This limitation will be incorporated into the Longhorn product specifications.	This commitment is made for the duration of the operation of the pipeline.
36	Longhorn shall prepare site-specific environmental studies for each new pump station planned for construction. These studies shall be responsive to National Environmental Policy Act requirements as supplements to the Environmental Assessment of the proposed Longhorn pipeline system. For each pump station, Longhorn shall submit the site-specific environmental study to DOT no less than 180 days prior to commencement of construction.	These studies will be implemented prior to construction of any pump station not included in the current EA of the proposed Longhorn pipeline system
37	Longhorn shall maintain pollution legal liability insurance of no less than \$15 million to cover on-site and off-site third-party claims for bodily injury, property damage, and costs of response and cleanup in the event of a release of product from the Longhorn Pipeline System.	The insurance will be in place prior to startup and will remain in place for the life of the project.
38	Longhorn will submit periodic reports to DOT that will include information about the status of mitigation commitment, implementation, the character of interim developments, and results of any mitigation-related studies and analyses. The reports should also summarize developments related to its ORA. These reports will be available to the public.	This measure will be performed quarterly for the first 2 years of system operation and annually thereafter for the operational life of the pipeline system.
39	Any changes or modifications proposed by Longhorn to the Longhorn Mitigation Plan shall be for the purpose of adapting to changing technology and circumstances while maintaining equivalence to those adopted by Longhorn at the start up of its pipeline. Proposed changes or modifications to the LMP along with Longhorn’s justifications therefore shall be made available to the public (and the mayors of Houston, Austin, and El Paso, and the General Manager of the LCRA) at the time it is submitted to DOT for approval and written concurrence.	This measure will be implemented for the operational life of the pipeline system.

**Table 9-1. (Continued)**

<b>Longhorn Mitigation Commitment</b>		<b>Application</b>
<b>No.</b>	<b>Description</b>	
40	Longhorn will monitor the river gauge at the Pedernales River to anticipate the possibility of a flood event. When the river stage reaches 100,000 cfs at the gauge, Longhorn will immediately shut down the pipeline until the river has receded below the action level (100,000 cfs) at the gauge. Longhorn personnel shall inspect the pipeline to determine whether it is safe before resuming pipeline operations.	This measure will be implemented for the operational life of the pipeline system.



**Table 9-2. Impacts and Mitigation Measures and How They Apply to Impact Topic Areas\***

Mitigation Measure	Mitigation Measure LMC No.	Environmental Impact Topic Area								
		Human	Ground Water	Aquatic Biology	Terrestrial Biology	Surface Water	Air Quality	Land Use	Cultural Resource	Other (e.g., socioeconomics, soils)
Testing	1, 2, 9, 14	X	X	X	X	X		X	X	X
Repair and replacement	5, 6, 8, 18	X	X	X	X	X		X	X	X
Third-party damage prevention	25	X	X	X	X	X		X	X	X
Enhanced leak detection	13	X	X	X	X	X		X	X	X
Contingency planning for alternative water supplies	30	X	X							X
Enhanced emergency response	23, 24	X	X	X	X	X		X	X	X
Site specific emergency response	26, 28	X	X	X	X	X				
FWS and TDPW pre-construction consultations	33			X	X					
EAs for new pump stations	36	X	X	X	X	X	X	X	X	X
Heavy wall pipe	3	X	X	X	X	X		X	X	X
Increase CP protection	4, 32	X	X	X	X	X		X	X	X
Repair replace CP system components	4	X	X	X	X	X		X	X	X
Inspections	7, 10, 11, 12, 15, 18	X	X	X	X	X		X	X	X
Enhance ROW maintenance	16, 17	X	X	X	X	X		X	X	X
Special studies of selected cause factors	19	X	X	X	X	X		X	X	X
Enhanced patrols	20, 21	X	X	X	X	X		X	X	X
Formal study of valves at selected river crossings	22			X		X				
Secondary containment	27		X	X	X	X				
Water quality monitoring	29			X		X				
Surge pressure analysis	31	X	X	X	X	X		X	X	X
Research/threatened species refuge and breeding program	33			X						

**Table 9-2. (Continued)**

Mitigation Measure	Mitigation Measure LMC No.	Environmental Impact Topic Area								
		Human	Ground Water	Aquatic Biology	Terrestrial Biology	Surface Water	Air Quality	Land Use	Cultural Resource	Other (e.g., socioeconomics, soils)
Special species conservation measures	33			X	X					
Surge pressure limits	34	X	X	X	X	X		X	X	X
Elimination of MTBE from pipeline	35	X	X			X				
Liability insurance	37	X	X			X		X		X
Site-specific environmental studies for new pump stations	36	X	X	X	X	X	X	X	X	X
Reduce or stop flow in pipeline during certain flood conditions	40	X		X		X				

\* No potentially significant impacts identified for noise or transportation.

**Table 9-3. “Before” and “After” Mitigation Comparisons of Index Sum Score  
for Score for Various Pipeline Segments  
(Scores are Not Length Weighted)**

Section	Before Mitigation				After Mitigation (10/00 Data)			
	Count of Segments	Max	Avg	Min	Count of Segments	Max	Avg	Min
All	7806	258	195	139	6115	363	296	238
Galena Park Station - J1	106	254	238	185	104	340	329	311
J1 - Crane	6820	246	188	139	5444	363	294	238
Crane - El Paso	880	258	245	186	567	339	305	283
Hypersensitive areas	586	258	186	162	372	363	313	280
Sensitive + hypersensitive areas	1590	258	189	139	1428	363	301	260
<b>Travis County:</b>								
All	487	231	188	142	332	348	291	257
Hypersensitive areas	113	206	183	168	41	348	305	282
Sensitive + hyper areas	371	231	185	168	245	348	297	263
<b>Harris County:</b>								
All	587	252	195	159	641	340	287	238
Hypersensitive areas	59	236	182	164	56	339	297	280
Sensitive + hypersensitive areas	307	252	191	159	365	340	298	260

**Table 9-4. Overall Impact Frequencies\* for Cases 3 and 4**

Case	If...	Average Leak Rate per Mile-Year	Estimated Leak Count for 700 Miles and 50 Years	Impact	Frequency of Impact over Life of Project	Annual Frequency for Impact over Life of Project (No. per thousand)	Notes
3	Pre-mitigation leak rate continues	0.00199 <sup>1</sup>	69.7	Drinking water contamination	0.23	4.68	
				Fatality	0.14	2.81	2
				Injury	0.63	12.6	2
				Recreational water contamination	2.45	47.9	
				Prime agricultural land contamination	0.93	18.36	
				Wetlands contamination	1.44	28.4	
4	Post-mitigation leak rate estimate	0.00007 <sup>3</sup>	2.6 <sup>3</sup>	Drink water contamination	0.005	0.102	
				Drinking water contamination, no MTBE	0.003	0.051	
				Fatality	0.005	0.11	2
				Injury	0.024	0.47	2
				Recreational water contamination	0.087	1.74	
				Prime agricultural land contamination	0.035	0.70	
				Wetlands contamination	0.051	1.01	5
				Lake Travis water supply contamination	0.00019	0.004	4
Edwards Aquifer water contamination	0.00019	0.004					

\* Overall impact frequency = (number in 50 years over 700 miles)

\* Overall impact frequency, annual = (number per year over 700 miles)

Notes

1 26 leaks (some less than 50 bbl) over 450 miles in 29 years

2 Fatality and injury rates are based on DOT fatality and injury rates per reportable leak, applied to 700 miles

3 Leak estimate is for any leak, including < 50 bbl; Approximate leak count for > 50 bbl (reportable) = 1.1 in 50 years

4 Pedernales watershed

5 3,372 ft special length for this receptor

**Table 9-5. Segment-specific Impact Frequencies for Cases 3 and 4**

Case	If...	Average Leak Rate per Mile-Year	Estimated Leak Count for 700 Miles and 50 Years	Impact	Impact Frequencies for Specific Locations*		Notes
					Frequency of Impact over Life of Project (No. per million)	Annual Frequency for Impact over Life of Project (No. per million)	
3	Pre-mitigation leak rate continues	0.00199 <sup>1</sup>	69.7	Drinking water contamination	159	3.17	
				Fatality	95	1.90	2
				Injury	428	8.55	2
				Recreational water contamination	1659	33.2	
				Prime agricultural contamination	48.9	0.98	
				Wetlands contamination	1315	26.3	5
4	Post-mitigation leak rate estimate	0.00007 <sup>3</sup>	2.6 <sup>3</sup>	Drinking water contamination	3.5	0.069	
				Drinking water contamination, no MTBE	1.7	0.035	
				Fatality	3.6	0.071	2
				Injury	16.0	0.320	2
				Recreational water contamination	58.8	1.175	
				Prime agricultural land contamination	23.8	0.475	
				Wetlands contamination	46.2	0.925	5
				Lake Travis water supply contamination	0.13	0.003	4
				Edwards Aquifer water contamination	0.13	0.003	

\* Impact frequency for specific locations = (number per 2,500 ft in 50 years)

\* Annual impact frequency for specific locations = (number per 2,500 ft in one year)

Notes:

- 1 26 leaks (some less than 50 bbl) over 450 miles in 29 years
- 2 Fatality and injury rates are based on DOT fatality and injury rates per reportable leak, applied to 700 miles
- 3 Leak estimate is for any leak, including < 50 bbl; Approximate leak count for > 50 bbl (reportable) = 1.1 in 50 years
- 4 Pedernales watershed

5 3,372 ft special length for this receptor

**Table 9-6. Overall Impact Probabilities for Cases 3 and 4**

Case	If...	Average Leak Rate per Mile-Year	Estimated Leak Count for 700 Miles and 50 Years	Overall Impact Probability*		Annual Probability of One or More Impacts over Life of Project	Probability Chances in a Thousand	Annual Chances in a Thousand	Notes
				Impact	Probability of One or More Impacts over Life of Project				
3	Pre-mitigation leak rate estimate	0.00199 <sup>1</sup>	69.7 <sup>3</sup>	Drinking water contamination	20.9%	0.47%	209	4.68	
				Fatality	13.1%	0.28%	131	2.81	2
				Injury	46.9%	1.26%	469	12.6	2
				Recreational water contamination	91.4%	4.79%	914	47.9	
				Prime agricultural land contamination	60.4%	1.8%	604	18.36	
				Wetlands contamination	76.4%	2.84%	764	28.4	5
4	Post-mitigation leak rate estimate	0.00007 <sup>3</sup>	2.6 <sup>3</sup>	Drinking water contamination	0.5%	0.010%	5.10	0.102	
				Drinking water contamination, no MTBE	0.3%	0.005%	2.55	0.051	
				Fatality	0.5%	0.011%	5.25	0.105	2
				Injury	2.3%	0.047%	23.38	0.473	2
				Recreational water contamination	8.3%	0.17%	83.20	1.736	
				Prime agricultural land contamination	3.5%	0.070%	34.50	0.702	
				Wetlands contamination	4.9%	0.10%	49.42	1.013	5
				Lake Travis water supply contamination	0.02%	0.0004%	0.19	0.004	4
				Edwards Aquifer water contamination	0.02%	0.0004%	0.19	0.004	

\* Overall impact probability is probability of one or more events in 50 years over 700 miles

\* Overall impact probability, annual, is probability of one or more events in 1 year over 700 miles

Notes:

- 1 26 leaks (some less than 50 bbl) over 450 miles in 29 years
- 2 Fatality and injury rates are based on DOT fatality and injury rates per reportable leak, applied to 700 miles
- 3 Leak estimate is for any leak, including < 50 bbl; Approximate leak count for > 50 bbl (reportable) = 1.1 in 50 years
- 4 Pedernales watershed
- 5 3,372 ft special length for this receptor

**Table 9-7. Segment-specific Impact Probabilities for Cases 3 and 4**

Case	If...	Average Leak Rate per Mile-Year	Estimated Leak Count for 700 Miles and 50 Years	Impact Probability for Specific Locations*		Annual probability of one or More Impacts over Life of Project	Probability Chances in a Million	Annual Chances in a Million	Notes
				Impact	Probability of One or More Impacts over Life of Project				
3	Pre-mitigation leak rate estimate	0.00199 <sup>1</sup>	69.7 <sup>3</sup>	Drinking water contamination	0.0118%	.0002352%	118	2.35	
				Fatality <sup>2</sup>	0.0095%	0.000190%	95	1.90	2
				Injury	0.0428%	0.000855%	428	8.55	2
				Recreational water contamination	0.166%	0.00332%	1658	33.2	
				Prime agricultural land contamination	0.0096%	0.000193%	96	1.93	
				Wetlands contamination	0.132%	0.00263%	1315	26.3	
4	Post-mitigation leak rate estimate	0.00007 <sup>3</sup>	2.6 <sup>3</sup>	Drinking water contamination	0.00035%	0.00001%	3.5	0.069	
				Drinking water contamination, no MTBE	0.00017%	0.00000%	1.7	0.035	
				Fatality	0.00036%	0.00001%	3.6	0.071	2
				Injury	0.0016%	0.00003%	16.0	0.32	2
				Recreational water contamination	0.006%	0.00012%	58.8	1.175	
				Prime agricultural land contamination	0.002%	0.00005%	23.8	0.475	
				Wetlands contamination	0.005%	0.00009%	46.2	0.925	5
				Lake Travis water supply contamination <sup>4</sup>	0.000013%	.00000026%	0.13	0.003	4
				Edwards Aquifer water contamination	0.000013%	0.00000026%	0.13	0.003	

\* Impact probability for specific locations is probability of one or more events in 50 years per 2,500 ft

\* Impact probability for specific locations, annual, is probability of one or more events in 1 year per 2,500 ft

Notes:

- 1 26 leaks (some less than 50 bbl) over 450 miles in 29 years
- 2 Fatality and injury rates are based on reportable leak frequency - 700 miles
- 3 Leak count is for any leak, including < 50 bbl. Approximate leak count for > 50 bbl (reportable) = 2 in 50 years
- 4 Pedernales watershed
- 5 3,372 ft special length for this receptor

**Table 9-8. Comparison of Other Environmental Impacts:  
Proposed Project versus AA/M Route Alternative**

<b>Attribute</b>	<b>Proposed Project</b>	<b>AA/M Route Alternative</b>
Distance	313 miles of existing pipeline	370 miles from beginning at Milepost (MP) 93 to end at MP 406 (about 20 percent longer than the existing line).
Construction Impacts: Hydrology	None	Temporary disruption of shallow aquifers with minor impacts to ground water. Increased sediment loads to stream beds from trenching and disturbed area runoff. Karst area trenching – sinkhole collapse.
Construction Impacts: Other	None	Short-term impacts to fish and benthic organisms from sedimentation. Loss of habitat and wildlife including effects to threatened and endangered species. Temporary construction dust. Possibility of destruction of archaeological sites. Minor land use conflicts in commercial and residential areas (probably no more than 1 to 2 percent of route). Possible need to involve current landowners in condemnation proceedings to obtain ROW.
Operation Impacts: Ground Water	Crossings of hypersensitive regions in south Austin and in Schleicher County. Crossings of creeks contributing to Colorado River Alluvium.	The public water supply (PWS) wells for Rockdale are located within 2 miles of the proposed AA/M Route in the sensitive Carrizo-Wilcox Aquifer.
Operational Impacts: Surface Water	Relatively greater risks and consequences of product spills and leaks because of older pipe and welding technology and more sensitive hydrological receptors.	Seven potentially impacted PWS surface water supplies, including four PWS reservoirs within 20 miles downstream for river or stream crossings.
Operational Impacts: Human Health and Safety	Relatively greater risk of fire risk to humans and buildings because of route passage through relatively densely populated southern Travis County.	Relatively less risk of fire risk because the route alternative does not traverse densely populated areas.
Operational Impacts: Other	Threat to endangered Barton Springs Salamander from a major release over Edwards Aquifer-BFZ. Product spills and leaks could affect nearby plants and animals, aquatic organisms, historic structures, soils, and property loss from fires.	No specific threats to threatened or endangered species from pipeline releases. Product spills and leaks could affect nearby plants and animals, aquatic organisms, historic structures, soils, and property loss due to fire or emergency cleanup activities. Risks – new pipe and improved welding technology, but without full mitigation for proposed project.