Table 9-1. Comparison of Other Environmental Impacts: Proposed Project versus AA/M Route Alternative

Attribute	Proposed Project	AA/M Route Alternative
Distance	313 miles of existing pipeline	370 miles from beginning at Milepost 93 to end at Milepost 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 protected species. Temporary construction dust. Possibility of destruction of archeological 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 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	Relative 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 danger to humans and buildings because of route passage through relatively densely populated southern Travis County.	Relatively less risk of fire danger 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. Lower risks – new pipe and improved welding technology.

Table 9-2 Effectiveness and Applications of the Longhorn Mitigation Commitments

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
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. See Mitigation Appendix, Item 1 and Item 9 of the Longhorn Mitigation Plan.	As a result of this testing, the probability of failure due to risks from outside-force damage, corrosion and material defects is reduced. Leaks and spills, with their associated impacts on population and environment (ground water, surface water, sensitive species) in the sensitive and hypersensitive areas, are reduced as a result. This test takes place at a pressure equivalent to 125 percent of the MOP. The highest pressure that the Tier III area will be exposed to during operation is the MOP. Tier II areas will not be exposed to pressures in excess of the MASP. Since the test pressure substantially exceeds the maximum internal pressure anticipated during operation, the test confirms the integrity of the system. This testing also identifies any areas of failure that will then be repaired (usually by replacing the existing pipe with new pipe).	This hydrostatic testing will be done in all Tier II and Tier IIII 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 J-1 Valve to Crane Station that have not been hydrostatically tested pursuant to Mitigation Commitment No. 1. See Mitigation Appendix, Item 2 of the Longhorn Mitigation Plan.	As a result of this testing, the probability of failure due to risks from outside-force damage, corrosion and material defects is reduced. Leaks and spills are reduced as a result of this testing. Impacts of these occurrences on population, ground water and surface water drinking supplies, and sensitive species, while not as severe in the Tier I areas, are also reduced as a result of the testing. The proof test is done at 110 percent of the MOP. This pressure is the highest internal maximum pressure that the system is expected to see. Pipeline failures that occur at this test pressure will be repaired (usually by replacing those areas of pipe that fail during the test).	This hydrostatic testing will be done in all areas not tested in Longhorn Mitigation Commitment (LMC) No. 1. The testing will be done in Tier I areas. The testing will be completed prior to the startup of the system.

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
3	Longhorn shall replace three miles of the existing pipeline over the Edwards Aquifer recharge zone with thick-walled pipe. See Mitigation Appendix, Item 3 of the Longhorn Mitigation Plan.	The segment includes populated areas of Austin and western Travis County. Leaks could endanger this population. Spills in this area could reach and seriously impact the Edwards Aquifer and contaminate private and public drinking water wells supplied by this aquifer. The Barton Springs Salamander, an endangered species, could also be affected by spills in this pipeline segment. The probability of such spills occurring, with consequent impacts on the human population, water resources, and sensitive species is reduced by this mitigation measure. The probability of leaks and spills will be reduced as a result of this action. The use of thick-walled pipe will provide greater protection against outside-force damage and corrosion across this environmentally sensitive area. Unlike a new pipeline, pipe replacement will have few impacts because the work will be done in an existing ROW.	The pipe will be replaced over a three-mile area over the recharge zone of the Edwards Aquifer (MP 170.5 to MP 173.5). This measure will be completed prior to startup of the system.
4	Longhorn shall perform the following additional cathodic protection mitigation work:	As a result of these mitigation measures, the probability of failure due to risks from external corrosion of the pipe is reduced. Leaks and spills, with their associated potential impacts on population and the environment (ground water, surface water, recreational areas, and sensitive species) in all areas along the pipeline, including the sensitive and hypersensitive areas, are reduced as a result. External corrosion of the pipe is reduced, or prevented, by cathodic protection and by surface coating on the pipe. Both of these measures are generally employed in the pipeline industry. The pipe coating is designed to isolate the pipe from the soil (electrolyte). If the coating were perfect, no external corrosion would occur along the pipeline. However, since it is unlikely that any coating is, or will remain, perfect, cathodic protection is also employed as an additional protection against external corrosion of the pipe.	These additional cathodic protection measures will be performed at the specified locations prior to startup of the system.
	a) Install 13 additional cathodic protection ground beds at the locations described in Mitigation Appendix, Item 4, of the Longhorn Mitigation Plan.		
	b) Perform interference testing at 20 locations, if necessary, as described in Mitigation Appendix, Item 4, of the Longhorn Mitigation Plan.		
	c) Replace at least 600 feet of coating identified by the cathodic protection survey analysis at the locations described in Mitigation Appendix, Item 4, of the Longhorn Mitigation Plan.		
	d) Repair or replace, as necessary, 13 shorted casings identified by the cathodic protection survey analysis at the locations described in Mitigation Appendix, Item 4, of the Longhorn Mitigation Plan.		

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
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 Longhorn Mitigation Plan.	Shallow or exposed pipe locations were identified in the sensitive (Tier II) and hypersensitive (Tier III) areas. By covering (and also reconditioning, if needed) the exposed pipe at these locations, the probability of failure is reduced. This action will increase the protection against the probability of pipe failure from outside force damage, corrosion, and material defects at these locations. This will have the effect of reducing leaks and spills with the associated potential impacts on population and the environment (ground water, surface water, recreational areas, and sensitive species) in the areas of concern. In addition, maintenance work will be performed on the crossing at Marble Creek, which is an elevated span. This maintenance will reduce the probability of pipeline failure and subsequent spills into Marble Creek, which flows into Onion Creek. Thus the probability of environmental impacts on the flora and fauna in and bordering Marble Creek and Onion Creek is also diminished. In all cases, except the Marble Creek crossing, the exposed segments of the pipeline will either be lowered to a minimum depth of cover of 5 feet from the top of pipe or to an equivalent of 5 of cover. At Marble Creek, the entire section of pipe spanning the creek will be recoated, the pipe supports will be modified too provide additional lateral support and safety gates will be added on either side of the crossing.	This mitigation measure will be applied to exposed pipe in 12 locations in an area from stationing 863306 to 1249899 (ft). The Marble Creek will also be mitigated. This measure will be completed prior to startup.
6	Longhorn shall remove stopple fittings at the following locations: Stations Nos. 9071+36, 8936+35 and 8796+99. See Mitigation Appendix, Item 6, in the Longhorn Mitigation Plan.	Three potential stopple fittings have been identified from internal inspection data. These fittings will be removed because of the potential for leaks. The probable reduction in leaks resulting from this mitigation measure will lead to a reduction in potential for adverse environmental impacts to population, ground water resources, sensitive species, and recreational areas in the vicinity of the segments to be mitigated.	This measure is applied to three fittings in the area bounded by MP 166.6 and MP 171.8. All are in Tier II locations. This measure will be completed prior to the unit startup.

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
7	Longhorn shall excavate the pipeline at two locations, near Satsuma Station and in Austin County, indicated by the 1995 in-line inspection and determine condition and repair, if necessary. See Mitigation Appendix, Item 7, in the Longhorn Mitigation Plan.	Internal inspection tools indicated the possibility of corrosion at these two locations. The pipe at these two locations will be exposed and examined. If corrosion is present, the corroded pipe segment will be removed and replaced with new pipe. If this occurs, the probability of leaks and spills will be reduced. As a result, the potential impacts on the nearby population and environment will also be reduced.	This measure will be completed prior to the startup of the unit.
8	Longhorn shall replace the pipeline at the crossing of Rabb's Creek and investigate at least 5 dent locations identified by Kiefner, based upon the 1995 in-line inspection, and repair, if necessary. See Mitigation Appendix, Item 8 of the Longhorn Mitigation Plan.	The replacement of the pipeline at Rabb's Creek crossing and the repair of any significant dents at the 5 specified locations will reduce the probability of pipeline failure at these locations by replacing damaged pipe with new pipe. As a result, the probability of leaks at these locations will be reduced, as will the impacts on environment and populace in the vicinity.	Possible dents will be examined at MP 39.2, 44.5, 59.5, 239.9, and 266.6. The pipeline at Rabb's Creek will also be replaced. This measure will be done before the unit 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 that the Surge Pressure Analysis indicates could exceed maximum allowable surge pressures. The hydrostatic test will requalify the portions of the pipeline that will be tested to a MASP that is within permissible limits as established by the most recent Surge Pressure Analysis. See Mitigation Appendix, Item 9, in the Longhorn Mitigation Plan.	By testing the line at higher pressures and replacing any segments that fail, the probability of pipeline failure in the tested sections will be reduced. The probability of environmental impacts on the nearby population, ground water, surface water, sensitive species and recreational areas will be similarly reduced. Conducting this mitigation measure will demonstrate the integrity of the pipeline at higher pressures, such that the pressure in any portion of the line will be below 110% of the MOP resulting from the hydrostatic test. If any segments fail during the hydrostatic testing, they will be replaced with new pipe.	Hydrostatic testing of 4 segments of pipeline totaling 81.6 miles, including Tiers I, II, and III areas will be conducted prior to startup of the system.

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
10	Longhorn shall, following the use of sizing and (where appropriate) geometry tools, perform an in-line inspection of the existing pipeline (Valve J-1 to the Crane Station) with a transverse field inspection crack tool to examine longitudinal weld seams for flaws and to examine pipe body for cracks and remediate any problems identified. Until Mitigation Item 10 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 System Integrity Plan at Section 3.5.2 of the Longhorn Mitigation Plan.	This tool will accurately detect several types of pipe anomalies including hook cracks, lack of fusion, narrow axial external corrosion, dents with coincidental cracks and gouges, and long narrow metal loss. Through the detection and repair of serious anomalies, the probability of pipe failure along the J-1 to Crane Station length of pipeline is reduced. As a result, the incidence of leaks and spills will also be reduced, thus lowering the impacts on population, ground water, surface water, recreational areas, and sensitive species along the pipeline.	This tool will be used to inspect the entire length of pipeline from valve J-1 to Crane Station. The testing will be done within the first 3 months of operation. The schedule for additional testing will be determined from the OEA.
11	Longhorn shall, following the use of sizing and (where appropriate) geometry tools, perform an in-line inspection of the existing pipeline (Valve J-1 to the Crane Station) with a high resolution magnetic flux leakage tool to evaluate the pipeline for the presence of corrosion, then remediate any problems identified. See the Longhorn Pipeline System Integrity Plan at Section 3.5.2 of the Longhorn Mitigation Plan.	A high-resolution magnetic flux tool can detect the presence of corrosion along the pipeline. Through the detection and repair of serious corrosion areas, the probability of pipe failure along the J-1 to the Crane Station length of pipeline is reduced. As a result, the incidence of leaks and spills will also be reduced, thus lowering the impacts on population, ground water, surface water, recreational areas, and sensitive species along the pipeline.	This tool will be used to inspect the entire length of pipeline from valve J-1 to Crane Station. The testing will be done at intervals determined with 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 J-1 to Crane) with an ultrasonic wall measurement tool to verify wall thickness and locate laminations and other mill-related anomalies and remediate any problems identified. See the Longhorn Pipeline System Integrity Plan at Section 3.5.2 of the Longhorn Mitigation Plan.	Through the detection and repair of serious defects, the probability of pipe failure along the J-1 to the Crane Station length of pipeline is reduced. As a result, the incidence of leaks and spills will also be reduced, thus lowering the impacts on population, ground water, surface water, recreational areas, and sensitive species along the pipeline.	This tool will be used to inspect the entire length of pipeline from valve J-1 to the Crane Station. The testing will be done at intervals determined with the ORA.

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
13	Longhorn shall install an enhanced leak detection and control system that will include a transient model based leak detection system utilizing 7 meter stations (5 clamp on meters and 2 turbine meters). Additionally, a leak detection system will be installed over the Edwards Aquifer Recharge Zone that will detect a leak of one barrel/hour in less than 30 minutes. That leak detection system will be a vapor detection, buried cable, or equivalent leak detection system that will meet the leak detection capability described in the preceding sentence. The system is designed to achieve emergency shut down within 5 minutes of a probable leak indication. See Mitigation Appendix, Item 13, of the Longhorn Mitigation Plan.	The installation of the enhanced leak detection system for the entire pipeline will allow the earlier detection of leaks and the detection of smaller leaks along the pipeline. This will not reduce the frequency of leaks, but will result in smaller volumes of product being spilled. In turn, depending on the location of the leak, the impact on population, ground water, surface water, sensitive species, and/or recreational areas will be reduced. Very small leaks will be detectable over the 3 mile Edwards Aquifer Recharge Zone (from MP 170.5 to 173.5). By quickly detecting small leaks in this area, spills can be limited to small volumes. Contamination of the Edwards Aquifer and local karst areas can be kept to a minimum. Potential damage to populated areas, as well as impacts on the Barton Springs Salamander, should also be minimized or prevented.	This system will be installed before project startup, and calibration and fine-tuning will be completed within 6 months of startup.
14	Longhorn shall perform close interval surveys to survey (a) hypersensitive areas and (b) pipeline segments that were not surveyed by the 1998 close interval survey (Station Nos. 10564+05 – 10605+50, 8897+08 – 8943+80, and 1721+05 – 1726+62), 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, of the Longhorn Mitigation Plan.	Certain areas were not surveyed during the 1998 close interval study, and these will be surveyed. Deficiencies may trigger internal inspection, test station installation, coating rehabilitation, pipe inspection (excavation), or other testing or mitigation activities. These measures will reduce the probability of pipe failure due to corrosion, and will reduce the probability of leaks and spills. As a result, the potential impact on population, ground water, surface water, sensitive species, and/or recreational areas will also be reduced.	All previously unsurveyed segments of the pipeline will be surveyed prior to the startup of the project

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
15	(a) Longhorn shall provide engineering documentation that verifies that all pipeline spans are adequately supported and protected from external loading and documentation or other analytical confirmation of the pipe grade of the pipeline across the Colorado River. (b) Longhorn shall replace one 671 ft section of pipe (Station Nos. 16992+41 – 16999+12) that contains several shorter sections of pipe characterized as Grade B; replacement shall be pursuant to the specifications stated in Mitigation Appendix, Item 34 of the Longhorn Mitigation Plan.	By checking and verifying the engineering design of pipeline spans, any problems that might have previously been overlooked can be detected. If problems are found and corrected, the probability of failure across the spans will be reduced. If, as expected, the designs are found to be valid, there will be no impact on the failure probability.	The engineering design documentation will be provided to the Lead Agencies prior to startup.
16	Longhorn shall remove all encroachments along the pipeline right-of-way 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. Encroachment Procedures of the Longhorn Pipeline System Integrity Plan in the Longhorn Mitigation Plan.	The removal of encroachments in general would reduce the impacts of leaks and spills by allowing emergency response teams to get to the areas of encroachment sooner. Potential leaks from outside force damage may also be reduced, since encroachments may be associated with increased activity near the pipeline. Thus, potential leaks and the impacts of leaks on the local population and environment should be reduced. The area between MP 164 and MP 168 is included in the Austin Metropolitan Area, and contains a variety of dwellings. The area includes the Colorado River Alluvium at Onion Creek and several crossings and sensitive watersheds. Thus, the removal of any encroachments should increase the ability of response teams to get into these areas quickly to deal with any spill or leak that occurs.	These encroachments will be identified and removed within one year of project startup
17	Longhorn shall clear the ROW to excellent condition. (ROW encroachments shall be resolved by Longhorn pursuant to Mitigation Commitment 16). See Mitigation Appendix, Item 17 of the Longhorn Mitigation Plan	Increased aerial patrols are used as a means of further mitigating the potential impacts of the pipeline by detecting smaller leaks within 48 to 72 hours. Clearing the ROW will increase the effectiveness of this surveillance by allowing closer and clearer visual inspection. As a result, smaller leaks should be detected sooner, and the impacts of these smaller leaks should be reduced	The right of way will be cleared prior to startup.

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
18	Longhorn shall inspect and repair or replace, as necessary, 26 locations identified by Williams in its risk assessment model as areas requiring further investigation. See Mitigation Appendix, Item 18, in the Longhorn Mitigation Plan.	Shallow or exposed pipe locations were identified in 26 locations in addition to those found in the sensitive (Tier II) and hypersensitive (Tier III) areas (and discussed in LMC-5). By covering (and also reconditioning, if needed) the exposed pipe at these locations, the probability of failure is reduced. This action will increase the protection against pipe failure from outside force damage, corrosion, and material defects at these locations. This will reduce leaks and spills with the associated potential impacts on population and the environment (ground water, surface water, recreational areas, and sensitive species) in the areas of concern. In all cases, the exposed segments of the pipeline will either be lowered to a minimum depth of cover of 5 feet from the top of pipe or to an equivalent of 5 of cover.	This measure will be completed, in all 26 areas identified, prior to startup of the system
19	Longhorn shall perform studies, with appropriate remediation/mitigation performed in accordance with the Longhorn Pipeline System Integrity Plan and The Operational Reliability Assessment, evaluating each of the following matters. (See Mitigation Appendix, Item 19 of the Longhorn Mitigation Plan.	Studies in these areas will be conducted by Longhorn. All of the studies will result in the identification of any areas or practices that could cause an increased probability of failure along the pipeline. By identifying these potential causes and providing mitigation methods for each, the probability of failures and consequent impacts on population and environment should be reduced.	These studies will be completed prior to startup of the system
	a) Stress corrosion cracking potential along the pipeline.		
	b) Scour, erosion, subsidence, seismic activity, and landslide-induced stress potential along the pipeline.		
	c) Root cause analysis on all historical leaks and repairs along the pipeline.		

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
20	Longhorn shall increase the frequency of patrols in hypersensitive and sensitive areas to every 2 and one-half days, daily in the Edwards Aquifer area, and weekly in all other areas. See the Longhorn Pipeline System Integrity Plan, Section 3.5.4, of the Longhorn Mitigation Plan	Larger leaks will be detected by the enhanced leak detection system, but smaller leaks will usually be detected by visual means. By increasing patrols, the smaller leaks can be detected within 48 to 72 hours in the more sensitive areas. The earlier detection will reduce the volume of product lost from the smaller leaks. Remediation should be accomplished quicker and more effectively. As a result, the impacts of such leaks and spills should be reduced for adjacent population, ground water, surface water, sensitive species, and recreational areas.	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 and one-half days in sensitive and hypersensitive areas. Additionally, 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. See Mitigation Appendix, Item 21 of the Longhorn Mitigation Plan.	At pump stations, smaller leaks can occur from the aboveground facilities as well as from the subsurface pipe. These leaks should be discovered earlier through the proposed more frequent inspections and the continuous surveillance by video camera. Early discovery should lead to reduced volume of product lost, more rapid remediation, and reduced impacts on the environment and ecological resources in the vicinity of the pump stations.	At the present time, the only pump station that is located in the Tier II or Tier III areas is the Cedar Valley station. The inspections will be initiated at system startup. The video camera will be installed at the station within 6 months of startup.
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, on the basis of the study, with DOT/OPS concurrence, that additional valves will be beneficial (modifications to be complete within 6 months of notice from OPS). See Mitigation Appendix, Item 22 of the Longhorn Mitigation Plan.	This study will assess the effects of additional block valves on the potential for spill reduction at the listed water crossings. The study may find some benefit of block valves at some locations. If so, and if the valves are installed, the potential volume of product that might be spilled into the stream in the event if pipe failure near the crossings should be reduced. The impacts on the stream and downstream population, environmental, and ecological resources should be similarly lowered.	This study will be implemented within 3 months of startup.

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
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.. 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 of the LMP.)	Longhorn will acquire resources to assure full response to leaks and spills within 2 hours for sensitive areas and within 1 to 2 hours for hypersensitive areas. By responding within these time intervals, the response teams will be able to start and complete remediation activities within shorter periods of time. The more rapid remediation will potentially reduce the impacts of spills on nearby population and environmental resources.	A response center will be developed at a location that will assure attainment of the proposed response times. This center will be in service by startup of the project.
24	Longhorn's shall revise its facility 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 of the Longhorn Mitigation Plan.)	Longhorn will develop a revised Facilities Response Plan that will better define the roles of firefighting agencies, particularly those in more rural areas. By accomplishing this measure, the time to reach and control potential fires that could occur due to pipeline failure should be reduced. The reduction in the time to control fires will potentially reduce the impacts of any fires that occur on nearby population and environmental resources.	
25	Longhorn shall develop enhanced public education/ damage prevention programs to, inter alia, (a) ensure awareness among contractors and potentially impacted 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, and Mitigation Appendix, Item 25, of the Longhorn Mitigation Plan.	The development of these public education and damage prevention programs should have the effect of reducing the probability of pipeline damage from outside forces and the impact of leaks if they occur. Increasing the awareness of both contractors and nearby population should have the effect of reducing both the probability of damage from outside forces and the size of spills. An aware and knowledgeable public should be able to alert Longhorn and others of activities along the pipeline that might potentially result in damage from outside forces. [Similarly, a watchful public should be able to detect smaller leaks in a relatively timely manner, resulting in smaller volumes of product being spilled, with a consequent reduction in impacts.]	These programs will be developed prior to startup and implemented continuously thereafter. The effectiveness of these programs will be regularly monitored.

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
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 of the Longhorn Mitigation Plan.).	The implementation of detailed response plans for areas of potentially sensitive receptors, such as parks and schools, that are on or adjacent to the pipeline could prevent or reduce injuries in the event of a leak with subsequent ignition or explosion. These plans could be reviewed with officials at the schools and parks, so that they know how and when to implement evacuation plans. Response plans could include evacuation plans for each facility, practice drills at the individual sites, tabletop exercises, etc.	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 API 650.	The provision of secondary containment, such as dikes and liners, will prevent product releases and spills from migrating away from the spill site or from passing into aquifers and other water resources. Currently, the only locations with storage tanks are Crane and El Paso. A relief tank is located at the Satsuma Station.	Verification of secondary containment around storage tanks will be provided before project start.
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 & Wildlife Service's (FWS) Barton Springs Salamander Recovery Plan. See Mitigation Appendix, Item 28 of the Longhorn Mitigation Plan.	In making the facility response plan consistent with the City of Austin and FWS plans, common and complementary actions can be taken by Longhorn, the City, and the FWS in the event of a release from the Longhorn Pipeline. These actions should reduce the spill impacts on Barton Springs, the Barton Springs Salamander, and Town Lake.	The Longhorn FRP will be made consistent with the response plans of the City and the FWS as soon as the latter plans have been approved
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. See Mitigation Appendix, Item 29 of the Longhorn Mitigation Plan.	The implementation of this mitigation measure will allow relatively small leaks from the pipeline at or near any of the 13 crossings to be detected at an early stage. Thus, the leak site can be identified and repaired before large quantities of product are released. [In this way, contamination of the streams, with associated downstream damage to the stream environment.]	This measure will be implemented at the time of the project startup. The monitoring program is scheduled to continue for two years.

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
30	Longhorn shall prepare a contingency plan to provide alternate water supplies to municipalities along Longhorn pipeline with sensitive water resources. See Mitigation Appendix, Item 30 of the Longhorn Mitigation Plan.	Contingency plans, developed for each potentially affected municipality, provide for an initial response that will start cleanup procedures to prevent contamination from reaching the public water supply wells. In the event tat these wells do become contaminated, the contingency plan provides for the installation of a system to treat the affected wells. The contingency plan also provides for alternate water supplies that can be used until the affected wells are remediated. Thus, this plan ensures that potentially affected municipalities will have an adequate supply of potable water. A preliminary analysis by Longhorn indicates that water supplies of two municipalities, Eldorado and Sunset Valley, could potentially be affected by a spill from the pipeline.	The contingency plans for Eldorado and Sunset Valley 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 that 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. Additionally, Longhorn will prepare an environmental analysis that will assess any environmental effects associated with the construction and operation of the new pump stations.	This measure assures that a surge pressure analysis will be performed at any time the system is altered in a way that could cause the surge pressure profile to change. In this way, there will be no unexpectedly high surge pressures encountered at any point. Thus the pipe will not be subjected to pressures above the MOP (in Tier III) or the MASP (in Tiers I and II). By avoiding unexpected high surge pressures, the probability of failure due to high sure pressure spikes does not increase when the system is altered. Thus, the probability of spills will not increase with system changes.	A surge pressure analysis will be performed anytime the system is altered in a manner that has the capability of c 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). See Longhorn Pipeline System Integrity Plan, Section 3.5.1, of the Longhorn Mitigation Plan.	By performing the pipe-to-soil surveys twice a year, those areas where cathodic protection has deteriorated can be quickly identified. These areas can be evaluated for potential corrosion, and if corrosion is detected, repairs can be made. The probability of pipe failure due to corrosion is reduced, as is the probability of spills and consequent impacts on population and the environment.	This measure will be initiated within six months of the project startup. Surveys will be made semi-annually thereafter.

Table 9-2. (Continued)

Longhorn Mitigation Commitment			
No.	**Description**	**Effectiveness**	**Timing**
33	(a) Longhorn shall provide the necessary funding to establish an adequate refugium and captive breeding program for the Barton Springs Salamander, at an established and qualified research facility, such as the one at Southwest Texas State University or the one at the U.S. Fish and Wildlife Service, 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 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. See Mitigation Appendix, Item 33 in the Longhorn Mitigation Plan.	(a) In the event of a release, permanent harm to the Barton Springs Salamander will be prevented by this mitigation measure. (b) By consulting with the FWS, conservation measures can be developed and implemented that will prevent adverse effects to listed species or their habitat during future construction and maintenance along the pipeline.	(a) This mitigation measure will be completed prior to startup. (b) The conservation measures will be implemented at any time that construction and maintenance activity could have an adverse effect on listed species or their habitat.
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 replacement of the pipe at the following locations: 6752+06 – 6758+40 and 10489+47 –10490+00. See Mitigation Appendix, Item 34 of the Longhorn Mitigation Plan.	Under current Federal Regulations, surge pressures in the pipeline would be allowed to reach 110 percent of the MOP. By limiting the surge pressure to the MOP in the hypersensitive (Tier III) areas, a 10 percent safety margin above normal operation has been added in the Tier III areas. Additionally, by not allowing the surge pressure to rise above the MOP, the probability of pipe failures due to fatigue will be reduced. The implementation of this mitigation measure will reduce the probability of leaks and spills in the hypersensitive areas. As a result, the impacts of such leaks and spills in these areas should be reduced for adjacent population, ground water, surface water, sensitive species, and recreational areas.	This measure will be implemented by the time the system is started up.

Table 9-3. 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. aesthectics, 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
Enhanced emergency response	23, 24	X	X	X	X	X		X	X	X
Site specific emergency response	26, 28			X						
FWS and TDPW pre-construction consultations	33				X					
Fugitive emissions control							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 right-of-way 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						
Special species conservation measures	33			X	X					
Surge pressure limits	34	X	X	X	X	X		X	X	X

* No potentially significant impacts identified for noise or transportation.

Table 9-4. "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