



United States Department of the Interior
Bureau of Land Management

Albuquerque Field Office
Albuquerque, New Mexico

April 2003



Draft – Volume I

Environmental Impact Statement

Shell's New Mexico Products Pipeline

BLM Serial # NMNM 106570



Cooperating Agency

Bureau of Indian Affairs

BLM MISSION STATEMENT

The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times.

Management is based upon the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife, wilderness, air and scenic, scientific, and cultural values.



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

New Mexico State Office

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March 13, 2003

Dear Reader:

Enclosed is the Draft Environmental Impact Statement (EIS) for the proposed New Mexico Products Pipeline (NMPP) project, prepared by the Bureau of Land Management, Albuquerque Field Office. Shell Pipeline Company LP (Shell) proposes to build and operate a 16-inch-diameter refined petroleum products pipeline system between distribution terminals in Odessa, Texas, and Bloomfield, New Mexico. The system would have a design capacity of 85,000 barrels per day of a combination of gasoline, diesel, jet fuel, or other petroleum products. The NMPP project would include the retrofit of an existing 16-inch pipeline, construction of new pipeline extensions on each end of the existing pipeline, installation of pump stations, and the construction of an intermediate distribution terminal in Moriarty, New Mexico.

The NMPP system would require electrical powerline and facility upgrades in multiple locations along its route. While Shell would not perform and would not be responsible for the permitting of new powerlines and facility construction activities required for the NMPP, these activities are considered connected to Shell's NMPP project. Consequently, the potential environmental impacts of such activities have been evaluated in this EIS.

The Draft EIS analyzes the direct, indirect, and cumulative impacts associated with the Proposed Action and the No Action Alternative. The EIS also evaluates several pipeline and powerline alternatives. Alternatives that were considered but were subsequently eliminated from detailed analysis are described along with the rationale for their elimination.

Comments on the alternatives and the adequacy of the impact analysis are most useful when they address one or more of the following:

- Errors in the analysis;
- New information that would have a bearing on the analysis;
- Misinformation that could affect the outcome of the analysis;
- Requests for clarification; and
- A substantive new alternative whose mix of allocations differ from any of the existing alternatives.

Where possible, refer to the pages and paragraphs on which you are commenting.

Comments on the Draft EIS can be sent to the address below to the attention of Mr. Joseph Jaramillo, Project Manager. Comments should be postmarked by May 19, 2003, to ensure consideration in the Final EIS. Public comments also may be provided at the following public hearings

| | | |
|---|---|---|
| <ul style="list-style-type: none"> • April 22, 2003 7:00-9:00 p.m. Bernalillo School Gymnasium Bernalillo Public School 250 Isidro Sanchez Rd Bernalillo, NM 87004 | <ul style="list-style-type: none"> • April 23, 2003 7:00-9:00 p.m. Moriarty Civic Center 201 Broadway Moriarty, NM 87035 | <ul style="list-style-type: none"> • April 24, 2003 7:00-9:00 p.m. Woolworth Community Library 3rd and Utah Street Jal, NM 88252 |
|---|---|---|

FREEDOM OF INFORMATION ACT CONSIDERATIONS: Public comments submitted for this EIS review, including names and street addresses of respondents, will be available for public review at the Albuquerque Field Office during regular business hours (7:45 a.m. to 4:30 p.m.), Monday through Friday, except holidays. Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses and from individuals identifying themselves as representatives or officials of organizations or businesses will be made available for public inspection in their entirety.

The Final EIS for the proposed NMPP project will consider the comments received during the public review and comment period.

The BLM encourages readers to retain their copies of the Draft EIS since there is a chance that the Final EIS may be an abbreviated Final EIS.

If you would like any additional information, please contact Mr. Joseph Jaramillo at:

Mr. Joe Jaramillo
Bureau of Land Management
Albuquerque Field Office
435 Montano Blvd. NE
Albuquerque, NM 87107
Phone - (505) 761-8779

Sincerely,

A handwritten signature in cursive script that reads "Linda S.C. Rundell".

Linda S.C. Rundell
State Director

Enclosure

EXECUTIVE SUMMARY

INTRODUCTION

Shell Pipeline Company LP (Shell; formerly Equilon Pipeline Company LLC) proposes to construct and operate a refined petroleum products pipeline from Odessa, Texas, to Bloomfield, New Mexico. The project, known as the New Mexico Products Pipeline (NMPP), would initially deliver about 30,000 barrels per day (bpd) of refined petroleum products (i.e., gasoline, diesel, and aviation fuels) from the Odessa, Texas, area to distribution terminals serving Albuquerque, Santa Fe, and the Four Corners region of New Mexico. The pipeline is designed to carry up to a maximum average throughput of 85,000 bpd.

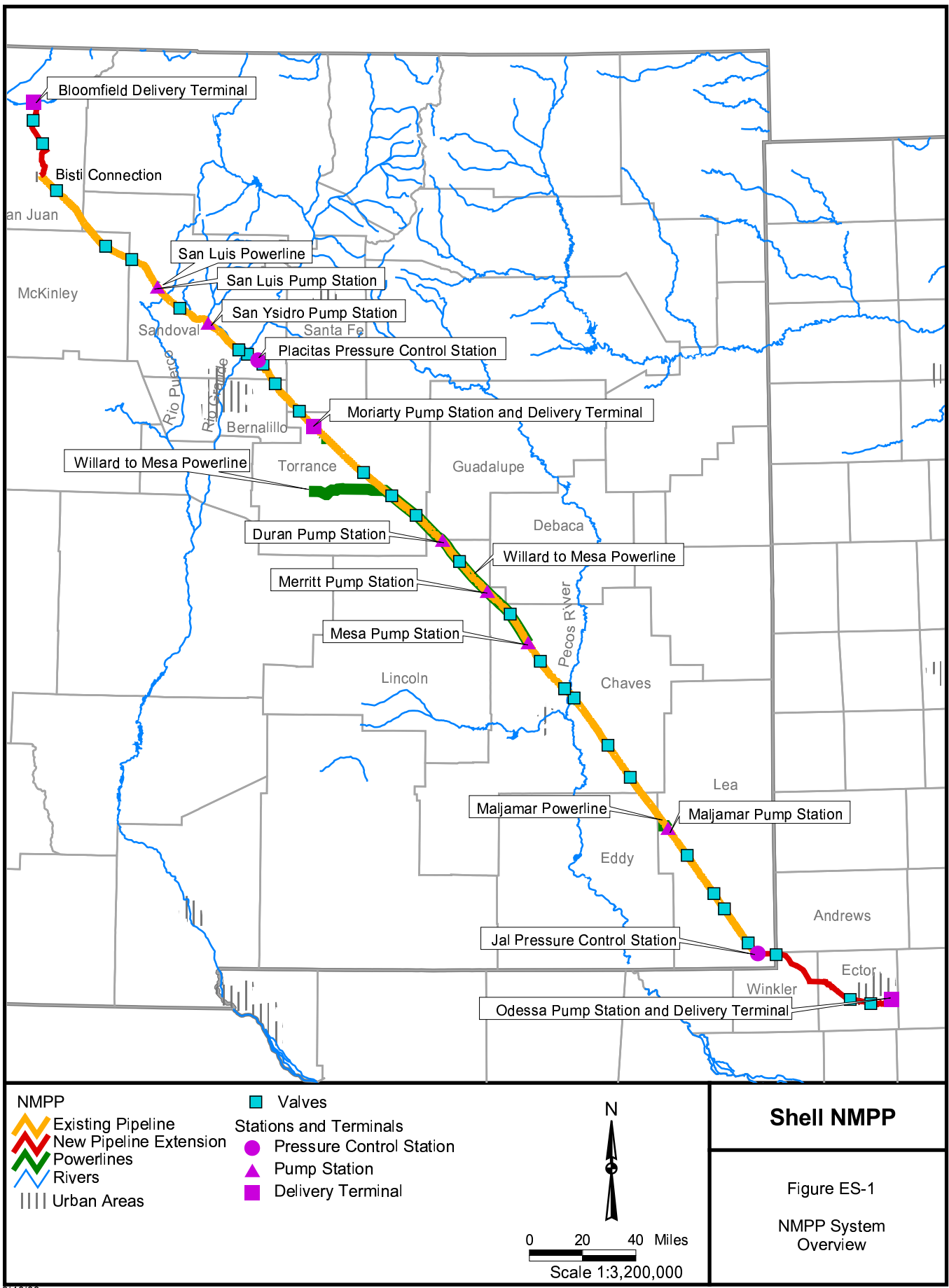
Because the proposed NMPP project crosses federal lands, it is considered a federal action, and, therefore, must be analyzed under the National Environmental Policy Act (NEPA). The Bureau of Land Management (BLM) Albuquerque Field Office has been designated as the lead federal agency for the preparation of the Environmental Impact Statement (EIS), while the Bureau of Indian Affairs (BIA) is a cooperating agency.

PURPOSE AND NEED

Shell's purpose is to provide a cost-effective, efficient pipeline system that would transport refined petroleum products from Texas refineries to Albuquerque, Santa Fe, and the Four Corners area of New Mexico. Demand for petroleum products in New Mexico has increased 2 percent per year over the past decade. It is assumed for the sake of this analysis that demand is likely to continue to grow at a similar rate in the foreseeable future. Simultaneously, local crude oil supplies previously available to New Mexico refineries are declining at an estimated 7 to 8 percent per year. The combination of increased fuel demand and declining crude oil availability to local refineries in New Mexico represents the need for additional fuel supply.

PROPOSED ACTION

The NMPP project would utilize Shell's existing 406-mile, 16-inch-diameter pipeline from Jal, New Mexico, to a point located approximately 18 miles south of Bisti, New Mexico (**Figure ES-1**). Shell proposes to reverse the flow direction of the existing pipeline and, with the addition of two new 16-inch-diameter pipeline extensions, would transport refined products from Odessa, Texas, to Bloomfield, New Mexico. The southern pipeline extension would connect the existing pipeline at Jal, New Mexico, to the existing distribution terminal in Odessa, Texas, and would be 60 miles in length. The northern pipeline extension would connect the existing pipeline at Bisti, New Mexico, to an existing truck loading terminal at Bloomfield, New Mexico; this extension would be 33 miles in length. Shell intends to test and repair the existing pipe so that the pipe would be in optimal condition prior to operation. In addition to the new pipeline extensions, the NMPP project would require the construction of pump stations, pressure control stations, an intermediate distribution terminal at Moriarty, as well as the installation of numerous valves and meters. Shell proposes to begin construction in 2003.



Bloomfield Delivery Terminal

Bisti Connection

San Luis Powerline

San Luis Pump Station

San Ysidro Pump Station

Placitas Pressure Control Station

Moriarty Pump Station and Delivery Terminal

Willard to Mesa Powerline

Duran Pump Station

Merritt Pump Station

Mesa Pump Station

Willard to Mesa Powerline

Maljamar Powerline

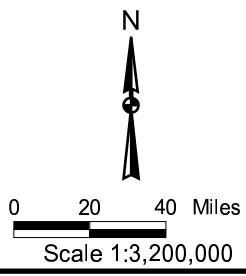
Maljamar Pump Station

Jal Pressure Control Station

Odessa Pump Station and Delivery Terminal

- NMPP
- Existing Pipeline
 - New Pipeline Extension
 - Powerlines
 - Rivers
 - Urban Areas

- Stations and Terminals
- Valves
 - Pressure Control Station
 - Pump Station
 - Delivery Terminal



Shell NMPP

Figure ES-1
NMPP System Overview

For the new pipeline extensions, Shell is requesting a grant, lease, or easement for a 50-foot permanent right-of-way (ROW) from the affected landowners. Shell also is requesting a 25-foot-wide strip adjacent to the permanent ROW to be used as temporary use areas for construction purposes. Prior to using this 25-foot-wide strip outside of the permanent ROW, Shell would acquire temporary use authorizations as required. For the existing pipeline, Shell would need to obtain new permanent ROW grants from the BLM and easements from the BIA for the intermediate pump stations on federal or Tribal lands. In addition to acquiring the ROW grants, Shell must acquire all of the necessary permits or licenses from the federal and state agencies with jurisdiction by law.

The NMPP system would require electrical transmission powerline and facility upgrades in several locations along its route (**Figure ES-2**). Shell would not construct and would not be responsible for the permitting of new electrical transmission line and facility construction activities required for the NMPP. Rather, the local power providers would be responsible for obtaining any necessary approvals or authorizations from federal, state, and local governments. The construction and operation of these powerlines are considered connected actions under NEPA, and are therefore evaluated within this EIS for the NMPP project. The electrical powerlines are not addressed in Shell's application for ROW approval by BLM and would not be included in the Record of Decision (ROD) for the NMPP project. The impacts of powerline construction and operation are discussed separately at the end of this chapter in **Table ES-8**.

Land ownership for the NMPP project is summarized in **Table ES-1**.

**Table ES-1
Ownership of Land Crossed by the NMPP Project**

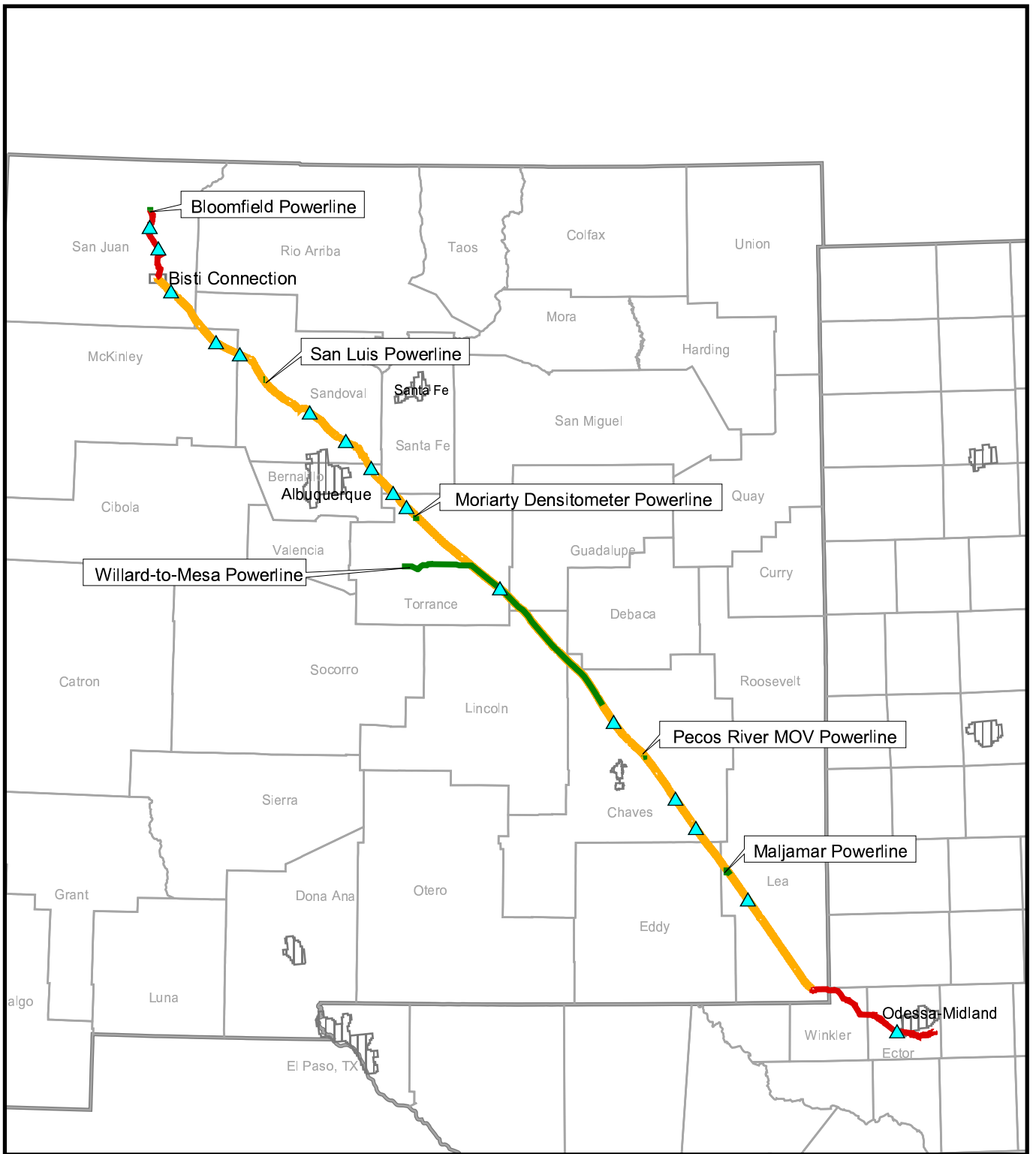
| | BLM | U.S. Forest Service (USFS) | Tribal | State | Private | Total¹ |
|-----------------------------|------------|-----------------------------------|---------------|--------------|----------------|--------------------------|
| Southern pipeline extension | 3 | 0 | 0 | 0 | 57 | 60 |
| Existing pipeline | 119 | 4 | 54 | 65 | 165 | 407 |
| Northern pipeline extension | 26 | 0 | 0 | 1 | 6 | 33 |
| Pipeline Total | 148 | 4 | 54 | 66 | 228 | 499 |
| Powerline | 28 | 0 | 0.1 | 8 | 81 | 117 |

¹Slight discrepancies in total values due to rounding.

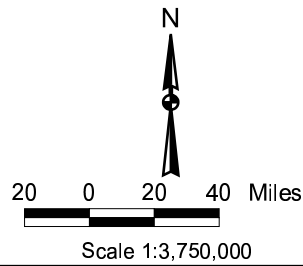
FEDERAL REVIEW AND APPROVAL PROCESS

The EIS is not a decision document; its intent is to disclose the consequences of constructing and operating the proposed NMPP system. The decision regarding the project will be documented in a separate Record of Decision signed by the responsible BLM official. Simultaneously with a separate ROD giving project approval, the BIA would issue individual ROW easements.

If approved, the following documentation would be attached to the RODs and the subsequent ROW grant issued by the BLM and easements by the BIA: 1) environmental protection measures for federal and Tribal lands; 2) the U.S. Fish and Wildlife Service (USFWS) Biological Opinion for threatened and endangered



- NMPP
- Existing Pipeline
- New Pipeline Extension
- Powerlines
- Service Drop
- Urban Areas



Shell NMPP

Figure ES-2
Electrical Powerlines
Overview

species, if required under formal Section 7 consultation; 3) the New Mexico and Texas State Historic Preservation Officers (SHPOs) and appropriate consulting parties concurrences with the proposed treatment of cultural resources; and 4) additional mitigation measures or permit conditions required by the BLM, BIA, and USFWS.

The BLM is the primary agency responsible for granting ROWs across federal lands. The primary decisions to be addressed and made by the BLM include:

- Shall a 30-year ROW grant that may include stipulations and mitigation measures be issued for a permanent pipeline ROW that will support pipeline construction and operation on federal lands?
- Shall Temporary Use Permits be granted for roads and temporary work areas needed for project construction on federal lands?

The BIA is the primary agency responsible for granting ROW easements across Tribal lands. The primary decisions to be addressed and made by the BIA include:

- Shall a 30-year BIA easement that may include stipulations and mitigation measures be issued for a permanent pipeline ROW that will support pipeline construction and operation on Tribal lands?
- Shall Temporary Use Permits be granted for roads and temporary work areas needed for project construction on Tribal lands?

ISSUES

An agency scoping meeting and five public scoping meetings were held by the BLM in December 2001 and January 2002. Written comments and concerns also were received during the public comment period. The BLM reviewed the public and agency comments and identified major issues for evaluation in the EIS. Most comments and concerns were broadly categorized as issues related to the protection of public safety, water quality, and threatened and endangered species.

Other public comments and concerns were considered by the BLM and information related to these particular comments and concerns can be found within the EIS document. Some public comments that were received were commentary, opinions, or beyond the scope of the NEPA process. These comments were not addressed within the EIS.

MANAGEMENT COMMON TO ALL ALTERNATIVES

The future operational safety of Shell's existing out-of-service pipeline that would be refurbished to transport petroleum products is the primary issue addressed in this EIS. The Shell pipeline was constructed in 1958, and consists of pre-1970 electric resistance welded (ERW) pipe. Historically, this type of pipe has experienced a higher rate of failure than other types of pipe due to inconsistent welding along the longitudinal seam.

BLM's approach to evaluating this issue was to assemble a Technical Panel of experts (a member from the Office of Pipeline Safety (OPS), members of BLM's technical and management team responsible for oversight of the TransAlaska Pipeline, and a materials science specialist) to: 1) review the operating history of the NMPP pipeline, 2) consider Shell's plans for complying with the OPS new integrity management rules; 3) review past and recent pipeline integrity testing conducted on the pipeline; 4) conduct independent analyses of Shell's proposed pipeline testing and operation parameters; and 5) provide additional measures that would further ensure pipeline operational safety.

The following section provides a summary of the major safety factors that have been considered by the Technical Panel and Shell to insure a high level of safety for this pipeline. As indicated above, the integrity management and operational limitations identified in this section would be applied to any of the action alternatives evaluated. Included here are discussions of the regulatory responsibilities of both the BLM and the OPS for maintaining pipeline safety, a review of the factors that influence the safety of pre-1970 ERW pipe, pipeline integrity inspections and testing that have been completed to date, Shell's committed pipeline integrity measures compared to those required by OPS, future pipeline integrity testing, and pipeline operating pressure plans and designs.

Pipeline Integrity and Public Safety

The Mineral Leasing Act (30 USC § § 181 – 263) authorizes the BLM to grant pipeline ROWs and permits through federal lands. Section 185 of the Mineral Leasing Act also requires the BLM to protect public safety and environmental resources. If a ROW grant or permit were issued, the BLM would include stipulations and other requirements to ensure that the pipeline and related facilities were operated in a manner that would protect the safety of workers and protect the public from sudden ruptures and slow degradation of the pipeline. A ROW grant may be suspended or terminated for noncompliance with these requirements.

The key federal regulation ensuring the safe operation of petroleum product pipelines through design, construction, and operation standards is USDOT 49 CFR Part 195 – Transportation of Hazardous Liquids by Pipeline: Minimum Federal Safety Standards. Federal regulations governing pipeline operation and maintenance specify the pipeline's acceptable operating pressure, require personnel training, and require operators to perform inspection, monitoring, and testing to ensure that the pipeline operates in a safe manner, and to minimize the chance of spills. Other pertinent regulations include 49 CFR Part 194 (federal requirements for emergency response plans for onshore oil pipelines) and 40 CFR Parts 109, 110, 112, 113, and 114 (federal requirements for Spill Prevention, Control, and Countermeasures Plans). The Oil Pollution Act (OPA 90) and the Oil Pollution Liability and Compensation Act of 1989 are additional federal laws providing cleanup authority, penalties, and liability for oil spills.

Recent legislation has been enacted that substantially broadens the OPS regulatory authority to ensure that hazardous liquid pipelines are maintained and operated in a safe manner, particularly in high consequence areas (HCAs), i.e., high-density population areas, waters where commercial navigation currently exists, and areas unusually sensitive to environmental damage. Portions of the Shell NMPP pipeline are subject to this "Integrity Management Rule for High Consequence Areas." The regulation will result in increased inspection,

enhanced damage prevention, improved emergency response, and other measures to prevent and mitigate pipeline leaks. The OPS is responsible for enforcement and has emphasized their responsibility and commitment to this program (65 FR 75378).

With the exception of the No Action Alternative, all alternatives would be governed by the same federal regulations, stipulations, and permitting processes to ensure safe pipeline construction, operation, and maintenance and proper care of environmental resources.

If approved, it is anticipated that Shell would immediately begin refurbishment activities on the existing pipeline and construction of new pipeline extensions and facilities would start soon after. Refurbishment activities would include recoating, reburial of exposed portions of the pipe, replacement of small portions of pipe, removal of sleeves, and removal of some valves. Currently, the pipe is largely sufficient to pass OPS regulations and would require few structural modifications in order to prepare it for transportation of product. Nevertheless, the fact that the pipe is currently idle and empty creates an ideal opportunity for Shell to refurbish the pipe with minimal difficulties. Shell intends to refurbish and repair the existing pipe so that the pipe would be in optimal condition prior to operation.

In 1999, the existing pipeline was idled by the removal of existing crude oil, application of a corrosion inhibitor, and the displacement of air with nitrogen. During this process, a deformation and bend radius tool (a "caliper pig") was run through the entire pipe. From the caliper pig results, Shell identified 17 locations that would require excavation and further inspection. Since that time, Shell also has conducted additional surveys to identify other areas for repair or refurbishment. These completed surveys included a close interval survey to evaluate the efficiency of the cathodic protection system and a depth of cover survey to ensure adequate soil cover.

Existing Electric Resistance Welded (ERW) Pipe

The existing pipe in the NMPP system was fabricated in 1958 and consists of pre-1970 electric resistance welded (ERW) pipe. Historically, this type of pipe has experienced a higher rate of failure than other types of pipe due to inconsistent welding along the longitudinal seam. Not all pre-1970 ERW pipe is predisposed to failure and, overall, failure of the longitudinal seam represents less than 3 percent of all pipe failures. Nevertheless, pre-1970 ERW pipe receives special consideration in federal regulations (49 CFR Part 149) to ensure the pipe's structural soundness. Additionally, the Technical Panel and BLM closely scrutinized the incident history of the existing pipe in the NMPP system, evaluated results of two types of direct examination of the pipe to assess its current condition, and conducted several analyses to assess crack propagation through fatigue and pressure reversals.

Findings from the direct examination programs found no evidence of flaws along the longitudinal seam in the existing pipe. These integrity test findings would be augmented by future pre-operational internal inspections and hydrostatic testing to ensure pipeline integrity.

Pipe Age

The age of the pipe was evaluated to determine if older pipe is more susceptible to failure. Information from the national OPS pipeline incident database, consisting of several thousand data points, was reviewed and analyzed. Results indicate that the likelihood of an incident does not directly increase with the age of the pipe. The OPS data indicate that pipe built in the 1950s has among the lowest rates of failure (0.0009 incidents/mile*year) compared to pipe built in other decades as well as to the national average (0.0013 incidents/mile*year). These results suggest that the existing NMPP pipeline constructed in 1958 is not predisposed to a higher rate of failure due to the age of the pipe. The data also suggest that the rate of failure for pipe built in the late 1950s is not likely to increase substantially over the next 30 years.

Internal Inspection

As noted above, the existing pipeline was evaluated in 1999 using a caliper pig, an internal inspection tool that locates gross structural anomalies along the pipeline. From this caliper pig assessment, Shell located 17 areas that would be excavated, examined, and, if necessary, repaired during refurbishment activities. A caliper pig alone is not sufficient to meet the OPS requirements for internal inspection in HCAs.

After the existing pipeline was refurbished and new pipe extensions were built on either end, Shell would inspect the entire line with a high-resolution magnetic flux leakage (MFL) internal inspection tool. MFL tools can detect metal loss, such as corrosion-type defects and gouges. Through the use of a magnetic field, this tool evaluates metal thickness every 1/10th of an inch around the pipe's circumference. It provides information on the location, size, and depth of any defect it detects, both on the interior and exterior of the pipe. The MFL tool's ability to detect metal loss is related to the depth of the pit relative to the wall thickness. Shell expects to detect 90 percent of corrosion pits with depths equal to 8 percent or more of the pipe wall thickness. Deeper pits would be detected at an even higher frequency, while shallower pits would be detected less frequently. The high-resolution MFL tool is recognized as the current industry standard and the OPS considers data collected from these devices to be reliable indicators of pipeline integrity.

The MFL tool has limited abilities to detect cracks along the longitudinal weld seam or flaws within the pipe wall, hence, the need to evaluate the pipe by other means, such as direct examination during pipeline excavation and repairs and by time-to-failure analyses. Evaluation of the longitudinal seam would be an ongoing and iterative assessment process, included in Shell's compliance with the OPS new Integrity Management Rule.

Hydrostatic Testing

To qualify pipe for use in transporting petroleum products, OPS regulations mandate that existing pipelines must be hydrostatically tested (or tested by an equivalent technology, e.g., high-resolution internal inspection tools) to demonstrate the existing pipe's structural integrity beyond normal operating pressures. Hydrostatic testing is currently considered the most reliable method for detecting detrimental longitudinal weld seam anomalies as well as other types of material flaws. Since the pipeline is currently clean and idle, hydrostatic testing the pipe prior to operation would be optimal to validate the pipe's structural integrity.

Hydrostatic testing is a destructive test to evaluate the integrity of the pipe by attempting to cause critical defects that might be present in the wall of the pipe to fail. These defects could include manufacturing flaws (e.g., anomalies along the longitudinal welds), corrosion (internal or external), dents, gouges, and stress-induced cracks. If a portion of pipe leaks or ruptures during a hydrostatic test, the affected portion of pipe would be replaced with new pipe, the new pipe welded into place, all new girth weld seams would be radiographically inspected, and the entire section of pipe would be re-tested by hydrostatic testing until it met OPS criteria. Because hydrostatic tests are conducted at pressures much greater than the maximum operating pressure (MOP), pipe that survives hydrostatic testing is considered to be safe at the MOP.

Once the entire pipeline has been constructed (minus the insertion of valves), the entire NMPP (new and existing pipe) would be hydrostatically tested in accordance with 49 CFR Part 195. During hydrostatic testing, the pipe would be filled with water, the pressure would be increased to at least 125 percent of the MOP, and this pressure would be maintained for at least 8 continuous hours. The existing pipeline consists of pipe with one of two wall thicknesses: 0.250-inch and 0.312-inch. To provide an additional margin of safety beyond OPS requirements, hydrostatic test pressures would be at least 138 percent of Shell's maximum operating pressure (SOP) minus the head loss due to elevation in any area where the pipe's wall thickness is 0.250-inch. In the areas between Moriarty and the Rio Grande (the area defined by the OPS as a HCA), the Pecos River crossing, and at the Navajo Torreon Mission, the hydrostatic test pressure would be at least 162 percent of the SOP, regardless of pipe wall thickness.

Any flaws that survive the hydrostatic test are not considered to pose an imminent threat to the pipe's integrity. A pressure reversal is defined as a condition when small flaws do not fail during a hydrostatic test but subsequently fail when the pipe is re-pressurized, often at a pressure lower than the hydrostatic test pressure. To reduce the risk of pressure reversals, the BLM would require Shell to conduct hydrostatic tests for the existing pipe at pressures higher than required by federal law (**Figure ES-3**). By increasing the hydrostatic test pressure to 1.38 and 1.62 times the SOP as described above, the chance of a pressure reversal is substantially diminished. The Technical Panel calculated that with these hydrostatic test ratios, the chance of a pressure reversal would be at least 1 in 1 million in areas containing 0.250-inch pipe, the HCA (Moriarty to San Ysidro), the Pecos River, and the Torreon Mission.

Compliance with the Integrity Management Rule

To comply with the OPS Integrity Management Rule, Shell has evaluated the entire pipeline, including existing and proposed new segments, examining various safety variables such as pipe wall thickness, depth of cover, grade of pipe material, type of area, population density of area, location of the HCA and other sensitive areas, and operational factors. Consistent with the new Integrity Management Rule, Shell has identified all segments of the line that could have an impact on the OPS-defined HCA and has developed a written plan for managing pipeline integrity in these segments. As part of this overall evaluation, a hydraulic model was developed by Shell and was reviewed by the Technical Panel to ensure that operational pressures would not exceed the safety factors ensured by pre-operational hydrostatic tests.

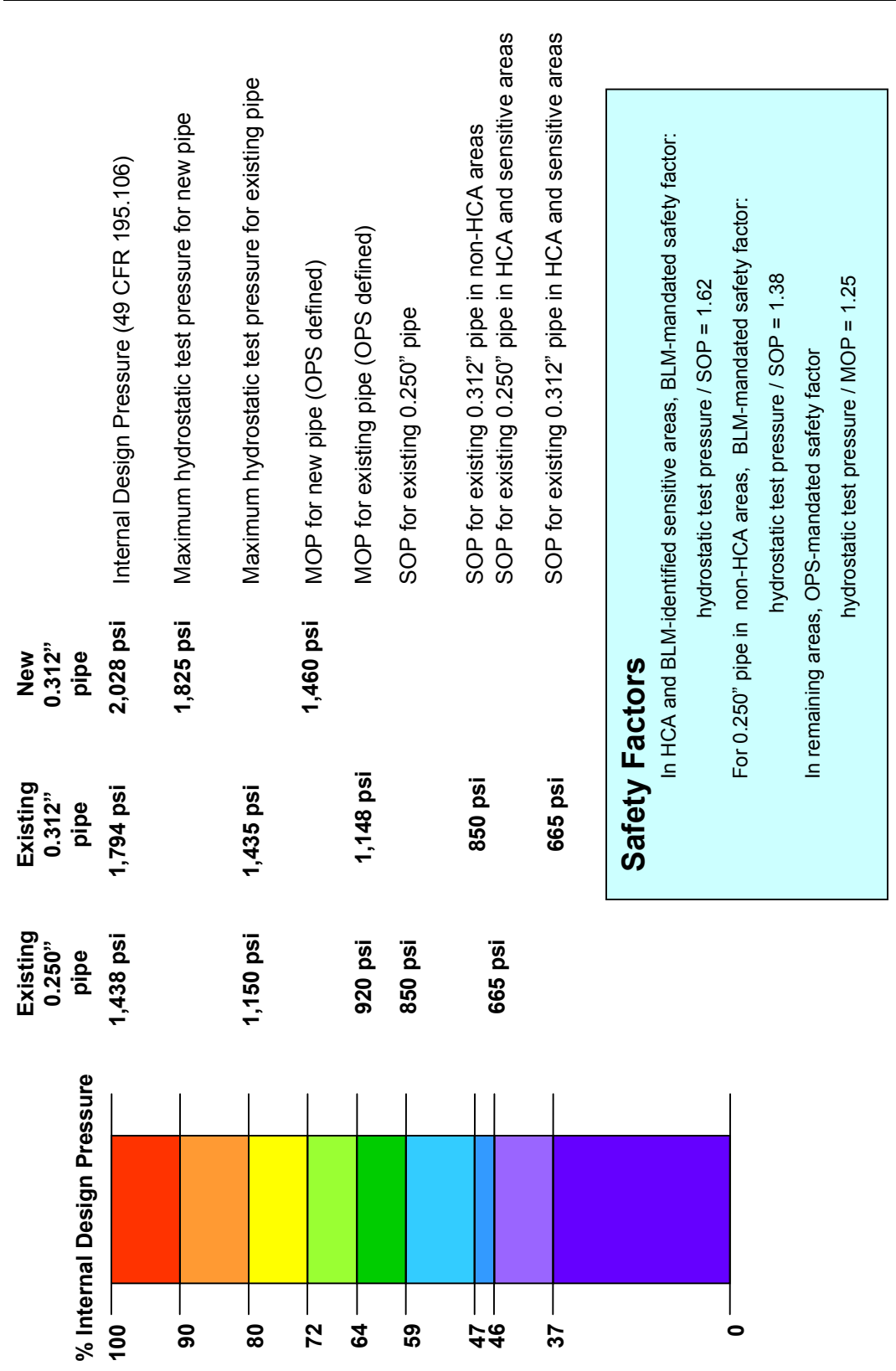


Figure ES-3. Shell's Proposed Maximum Operating Pressures (SOP) Relative to Hydrostatic Test Pressures and OPS-defined Maximum Operating Pressures (MOP)

To comply with OPS and BLM requirements, Shell would maintain records documenting routine operation and maintenance activities as well as investigations, tests, repairs, replacements, and alterations made. OPS representatives would be responsible for conducting periodic compliance audits of the proposed pipeline. If the project is approved, BLM also has committed to review various documents to ensure Shell's compliance with the ROW grant. BLM personnel familiar with pipeline operations would conduct these reviews, which would consist of evaluation of operating pressures and cycles, review of pipeline surveillance activities, evaluation of any abnormal operational conditions and associated responses, compliance with wildlife stipulations and constraint periods, compliance with cultural and paleontological resource avoidance stipulations and unanticipated discovery plans, and assessment of revegetation and noxious weed programs.

Additional operation and maintenance procedures detailed in 49 CFR Part 195 include: 1) preparing a manual for operations, maintenance, and emergencies; 2) implementing training programs to address emergencies; 3) maintaining maps and records for all facilities; 4) marking the pipeline to prevent third-party damage; 5) monitoring the pipeline periodically for external and internal corrosion; 6) maintaining and periodically testing mainline valves; and 7) inspecting overpressure safety devices and tank overfilling alarms. Shell would meet or exceed all applicable OPS requirements. **Table ES-2** summarizes some of the key integrity measures that Shell has committed to if the project is approved.

Operating Pressures

The Supervisory Control and Data Acquisition (SCADA) system analyzes the flow rate, temperature, and density of the product within the pipeline, notifying operators of any operating abnormalities. The SCADA system is linked to motor operated valve locations and allows the operator to remotely close these valves. Pipeline operating pressures would be continually monitored by Shell via the SCADA system. Pipeline pressure is dependent on product characteristics, product batch size, batch location in the pipeline, flow rate, pipeline elevation, and discharge pressure at each pump station. Assuming a higher specific gravity product (heavier) batch was following a lower specific gravity product (lighter) batch in the line, the pressure required to maintain the same flow rates would increase slowly as the heavier batch moves through a pump station. Each of Shell's pump stations along the NMPP would be equipped with a primary pressure control device with two back-ups to that device. These devices would not be affected by product type. These devices would ensure the pressure in the pipeline did not exceed the maximum operating pressure regardless of the product in the line. The pipeline would be automatically shutdown by these pressure-limiting devices if the pipeline exceeded a preset limit. As a safety precaution, these pressure-limiting devices cannot be overridden by the pipeline control center; a physical visit to the pump station or stations would be required if the pressure in the line exceeded the preset value. If a physical visit to a station were required because of a pressure "upset," the station could not be restarted until a Shell representative had physically inspected the station and that person had physically determined everything was operating properly at that station.

MOPs are stipulated by 49 CFR Part 195. These regulations specify the MOP calculated as 80 percent of the hydrostatic test pressure or, equivalently, 72 percent of the Specified Minimum Yield Strength (SMYS) for the pipe. For existing pipe within the NMPP system, the MOP would be 850 psi and the pipe would be

Table ES-2
Shell's Committed Integrity Mitigation Measures

| Shell's Committed Measure | OPS Requirement | Notes |
|--|--|--|
| Smart pig and hydrotest the existing line before startup. | Smart pig or hydrotest only in populated or environmentally sensitive areas ("High Consequence Areas") by September 2004. 49 CFR 195.452 | Shell would run both deformation and high-density magnetic flux loss smart pigs on the entire 406 miles of existing pipeline before startup. Also, pipeline would be hydrostatically tested to at least 125% of the NMPP's MOP prior to startup. |
| Smart pig or hydrotest the entire line at least every 5 years. | Smart pig or hydrotest in High Consequence Areas only at least every 5 years. 49 CFR 195.452 | Shell would run smart pigs at intervals not to exceed every 5 years. Data would be compared to initial smart pig data to look for changes. |
| Limit operating pressure in HCAs. | Not to exceed MOP under normal operating conditions. | Shell would design the pipeline system to limit the operating pressure to no more than 76% of the legal (per OPS regulations) MOP in the Moriarty, Placitas, and Bernalillo areas. |
| Conduct hydrostatic tests at elevated pressures in sensitive areas. | Conduct hydrostatic tests at pressures at least 1.25 times the MOP for the entire pipeline | For existing pipe with wall thickness of 0.25 inch, hydrostatic test pressure will be at least 1.38 times the SOP. |
| | | For existing pipe with wall thickness of 0.312 inch, hydrostatic test pressure will be at least 1.62 times the SOP in the OPS-designated HCA area, at the Pecos River crossing, and at the Navajo Torreon Mission. |
| Perform close interval cathodic protection survey over the entire existing line segment prior to startup. | None | Survey was performed in year 2000. Findings have been incorporated into Shell's action plan to be completed before startup. |
| Perform close interval cathodic protection survey every 5 years. | None | Shell would use the survey to verify the integrity of the cathodic protection corrosion protection system and to identify areas where the system may need fine-tuning. |
| During construction of pipeline (new pipe or replaced sections) 100% of all welds made would be tested. | 10% of all new construction welds must be tested. 49CFR 195.234 | Shell would use x-ray methods for weld integrity verification of all new welds. |
| Weekly aerial inspection of the pipeline ROW for surface activities which might impact the safe operation of the pipeline. | At least 26 times per year (not to exceed 3-week interval) required by 49 CFR 195.412. | Shell would aurally inspect the pipeline ROW weekly (weather permitting), which is twice the required frequency. |
| Cover all exposed pipe. | None | Shell would replace cover over exposed pipe and coating as appropriate and, where feasible, would construct barriers to help prevent recurrence. |
| Bury warning mesh over line. | None | In high traffic areas (i.e., populated areas, cultivated fields, creek crossings that have eroded in the past, etc.) where the existing line would be lowered or new line would be laid, a brightly colored warning mesh (containing the Shell name, pipeline warning, and emergency telephone number) would be placed in the trench over the pipeline to warn excavators of the presence of the line. |
| Yearly walking inspection of the entire line from Odessa, Texas, to Bloomfield, New Mexico. | None | Shell would perform an annual visual inspection of the entire pipeline looking for exposures, ROW improvement needs, and any other items that might impact the safe operation of the pipeline system. |

hydrostatically tested to pressures of at least 1,060 psi. New pipe in the pipeline extensions would be hydrostatically tested up to 1,800 psi to allow a MOP of 1,440 psi. Operating pressures would be below these levels (**Figure ES-3**).

Operating conditions (e.g., operating pressure cycles) can cause small insignificant cracks to grow over a period of time. With time, these cracks can enlarge to the point that they can eventually pose a risk to the pipe's integrity. The regular use of internal inspection tools would facilitate identification of these flaws, if they were to occur, before they reach critical size. In addition to the use of internal inspection tools, supplemental analyses were conducted by the Technical Panel to evaluate the likelihood of fatigue cracks caused by operating cycles.

Operating cycles cause normal fluctuations in pipeline temperature and internal pressure and the pipe will expand or contract accordingly. Pipe can become stressed by these changes over time, especially if the changes are severe or frequent. The Technical Panel evaluated Shell's operating regime and found that the number and magnitude of the operating cycles would be low, resulting in relatively low stress on the pipe. Given the Shell's operating regime (i.e., number of operating cycles and their magnitude), the Technical Panel found that the likelihood of pressure fatigue was remote. Outside of the HCA and along the existing line where the SOP would be 850 psig, the fatigue life was estimated to be at least 87 years. In the HCA area (from Moriarity to San Ysidro), the SOP would be 665 psig and the fatigue life was estimated to be at least 166 years. Consequently, planned operating conditions for the NMPP would not create appreciable pressure fatigue problems for the service life of the project. Shell's operation of the NMPP pipeline in the future would require periodic re-evaluation of the operating pressures and cycles to ensure the pipeline's integrity.

Pressure within a pipeline varies, depending on changes in elevation and distance from pump stations. Pressures are highest as the product is pumped from a pump station and at the bottom of hills. Pressure naturally is reduced between pump stations due to friction. Hydraulic models are used by engineers to design where pump stations are needed to keep the product moving efficiently through the system.

In some mountainous areas, pressure control stations would be installed for two primary purposes: 1) to avoid slack line¹ upgradient of the pressure control station and 2) to control pressures of product downstream. For example, in Placitas, New Mexico, product would be pumped over the Sandia Mountains and into the Placitas pressure control station. The Placitas pressure control station would maintain a minimum pressure upstream of 400 psig at the Placitas pressure control station and would release product from the station at 400 psig. This pressure stabilization would ensure that no slack line occurred upstream of the Placitas pressure control station and that pressures were limited to 665 psi across the Rio Grande (well below the MOP) to the San Ysidro pump station.

¹ Slack line refers to the condition when a pocket of vapor is formed as improperly pressurized liquids in a pipeline pour over a hill. Due to the lack of pressure at the top of the hill, product volatilizes within the pipe. As product progresses further down the pipe, product begins to pack at the bottom of the hill, pressure is increased, and product becomes a fluid again. Slack line is undesirable because it causes rapid pressure oscillations within the pipe at the point where product becomes fluid again and this process can lead to pressure-induced stress cracks.

To avoid accidental over-pressurization of the pipe, both the Placitas and Jal pressure control stations would have a series of three pressure switches. If the pipeline pressure began to rise beyond normal operating pressures, the first switch would detect the change and would attempt to normalize operating pressures using the control valve. The second switch would be triggered at a set point slightly higher than the first switch and would act as a redundant backup system in the event that the first switch did not operate correctly. The third sensor, if triggered, would cause the motorized valves to automatically shutdown. This sensor would be powered by DC-electrical current to ensure its operation even during an electrical black-out. Once shutdown, the valve could not be re-opened and flow would not be restored until the pressure control station was physically inspected by a Shell employee.

A surge relief tank would be located on the upstream side of the Placitas pressure control valve to relieve pressure in the event of a surge wave.

PIPELINE ALTERNATIVES AND NO ACTION

The three key issues (public safety, water quality, and threatened and endangered species) were used to derive alternatives to the NMPP project (Proposed Action). Two geographic alternatives (Pipeline Replacement and Pipeline Reroute) were developed. An alternative that incorporates supplemental safety measures (Proposed Action with Enhanced Safety Mitigation Measures Alternative) was considered. Finally, the No Action Alternative was evaluated. An environmental analysis was conducted on the Proposed Action and each alternative, including the No Action Alternative.

Pipeline Replacement Alternative

The intent of developing the Pipeline Replacement Alternative was to address public concerns about the existing pipeline's integrity (public safety) and the potential effects of leaks on groundwater used by the public (water quality). Pipe replacement would involve the abandonment of the existing pipeline and installation of new pipe with a minimum wall thickness of 0.312 inch parallel to the abandoned pipe within the same existing ROW.

Based on the location of sensitive areas, pipe replacement was considered a viable alternative for the following locations:

- Pecos River (1.0-mile segment immediately adjacent to the river);
- I-40 at Moriarty north through Edgewood to the west side of Placitas (38-mile segment that includes local schools and community centers); and
- Navajo Torreon Mission School (0.5-mile segment next to the school).

Figure ES-4 shows the general locations of the areas considered under the Pipeline Replacement Alternative.

Pipeline Reroute Alternative

The intent of developing the Pipeline Reroute Alternative was to address public concerns about the proximity of the existing pipeline to residences and sensitive assembly areas (e.g., schools and community centers). The alternative would reroute portions of the existing pipeline to less developed areas.

Based on the location of sensitive areas, pipe rerouting was considered a viable alternative for the following locations:

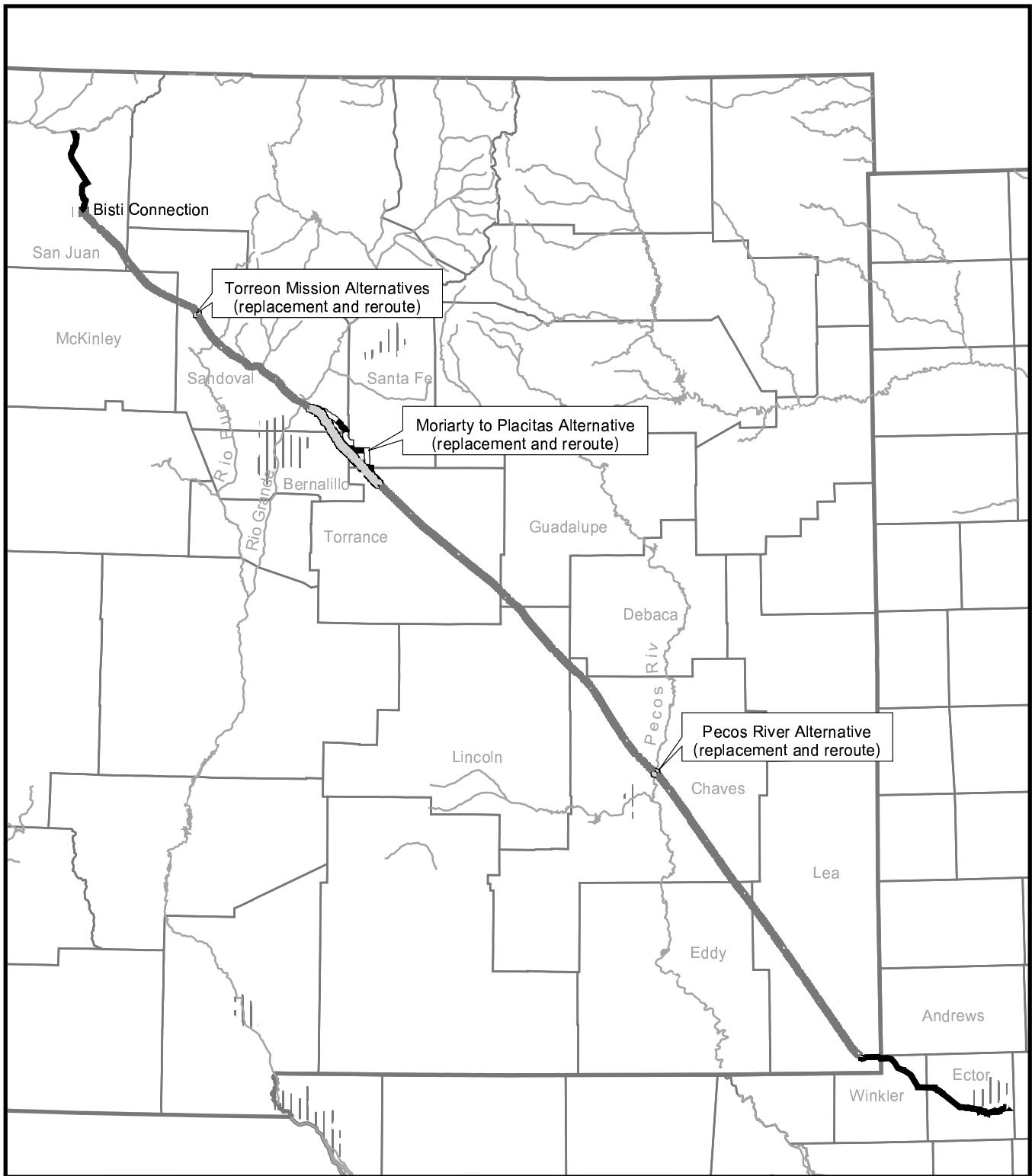
- Pecos River (1.0-mile segment immediately adjacent to the river; reroute distance would be 1.1 miles);
- I-40 at Moriarty north through Edgewood to the west side of Placitas (38-mile segment that includes local schools and community centers; reroute distance would be 43 miles); and
- Navajo Torreon Mission School (0.5-mile segment next to the school; reroute distance would be 0.6 mile).







Figure ES-4 shows the general locations of the areas considered under the Pipeline Reroute Alternative.

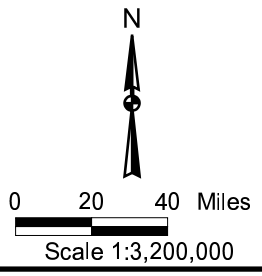
Proposed Action with Enhanced Safety Mitigation Measures Alternative

While the Proposed Action meets or exceeds federal regulations and other standards for pipeline safety (e.g., Uniform Building Code, National Fire Protection Association codes, American Petroleum Institute standards), the BLM is mandated under the Mineral Leasing Act of 1920, as amended, to ensure public safety and to protect the environment. The BLM has identified the following mitigation measures to further protect the public and the environment.

1. At intervals not to exceed 5 years, Shell would conduct internal inspections of the entire pipe using the best practical technology to detect potential crack-like flaws along the pipe's long seam. Indications that result from these inspections would be uncovered and examined. Confirmed anomalies would be removed from the pipeline, repaired, or sleeved per OPS regulations. Any portion of the pipe that is removed from service would be visually inspected for seam weld flaws and findings documented. Information obtained from these visual inspections would be integrated into the data related to the integrity of the pipe and used to aid in the advancement of current fatigue predictions.
2. As part of Shell's refurbishment activities, Shell has committed to the removal of all previously applied sleeves and replacement with new pipe. In addition, the existing pipe under the sleeve would be visually inspected, data recorded, and any findings relevant to the pipe's integrity would be integrated into fatigue prediction calculations.
3. For any critical defects that were exposed during the hydrostatic test, Shell would document the degradation mechanism and record pertinent information (crack size, shape, etc.) to aid in the advancement of current fatigue predictions for the pipeline.



- NMPP
-  Existing Pipeline
-  New Pipeline Extension
-  Pipeline Reroute Alternative
-  Pipeline Replacement Alternative
-  Rivers
-  Urban Areas



Shell NMPP

Figure ES-4
Pipeline Alternative Overview

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4. Under the Proposed Action, the nearest valves to the Pecos River crossing would be located 3.2 and 1.7 miles up and downstream of the crossing, respectively. Similarly, valves closest to the Rio Grande would be 1.1 and 2.5 miles up and downstream of the crossing, respectively. Additional valves would be installed (or the proposed valve locations would be moved) closer to the Pecos River and Rio Grande to protect surface water resources, such as drinking water, aquatic biota, and threatened and endangered species. Valves would not be installed immediately outside the floodplain;
 5. After any event that caused the pipeline pressure in sensitive areas to exceed 110 percent of the MOP, Shell would be required to run a caliper pig within 6 months of the event;
 6. For the life of the project, Shell would maintain a file of the x-rays of all girth welds and would make this file available to the BLM, OPS, or their representatives as requested;
 7. The BLM does not have authority to regulate trucking schedules from the Moriarty terminal on private land onto Highway 41. The community of Moriarty could consider adopting an ordinance to limit terminal trucking during the 0.5-hour period prior to and 0.5-hour period after the school day at Moriarty High School during the school year to reduce hazards to young, inexperienced drivers.
 8. Prior to full operation, Shell would be required to demonstrate that their pipeline system leak detection capabilities are sufficient to detect leaks of the magnitude evaluated in the Final EIS to the satisfaction of the OPS and BLM. In order to continually update their system with advancing leak detection technology, Shell would submit a report that reviews the latest leak detection technological advancements and recommended leak detection technologies every 5 years to the BLM. As part of their ROW grant, Shell would incorporate these leak detection technologies into their system, where BLM deems appropriate and feasible. Shell also would provide yearly reports of all system leaks and accidents to the OPS and BLM.

No Action Alternative

If the No Action Alternative were selected, the BLM would not issue a new ROW grant to Shell. However, Shell would retain its existing ROW grants. As a result of the No Action Alternative, Shell could elect to: 1) return the existing pipeline to service without the additional new build sections or pump stations; 2) abandon the pipeline in place; 3) retain the pipeline without returning it to service; 4) sell the pipeline; or 5) convert the pipeline to a different use (e.g., natural gas service), which could require NEPA analysis. The most probable outcomes would be that the pipeline would be sold to another company or used to transport other materials.

Under the No Action Alternative, Shell likely would continue to actively maintain the pipe's integrity through various maintenance activities, including continued cathodic protection and visual surveillance.

The No Action Alternative would eliminate the NMPP system as a potential additional source of refined petroleum products to New Mexico. Increased demand for products would be met by increasing the capacity

of existing pipelines (if possible) and increased transportation by trucking and railroad from other sources, such as existing refineries in the Texas/New Mexico region.

While the No Action Alternative would eliminate the potential hazards directly associated with the NMPP system, it is important to note that it would not necessarily result in an overall reduction in risk to the public because petroleum products would continue to be transported by other methods to these markets. All methods of petroleum product transportation involve some element of risk.

Alternatives Considered but Eliminated

Other alternatives were considered but eliminated, including pipeline, terminal, and transmission line alternatives. Alternative locations were considered for the Moriarty terminal; constructing a pipeline to Albuquerque from Moriarty as an alternative to trucking; alternative locations for the north and south pipeline extensions; and selectively replacing thinner walled pipe in certain locations in the Edgewood-Moriarty area. In these cases, the alternatives did not offer a reduction in environmental impacts, or were outside the BLM's authority to approve (i.e., the location of project facilities on Tribal lands).

ENVIRONMENTAL CONSEQUENCES FOR THE PROPOSED ACTION

The following sections provide the impact conclusions for the primary issues (public safety, water resources, and threatened and endangered species) for the Proposed Action, Pipeline Replacement Alternative, and Pipeline Reroute Alternative. A side-by-side comparison of the impacts by resource is provided in an impact summary table at the end of this chapter (**Table ES-8**). The Proposed Action with Enhanced Safety Mitigation Measures and the No Action alternatives are discussed separately.

Public Safety

The Office of Pipeline Safety (OPS) statistical database for hazardous liquid transmission pipelines was used to determine the likelihood of an incident. For the Proposed Action, the number of events predicted in a 30-year period is summarized in **Table ES-3**. Based on OPS statistics, it is predicted that there would be a total of 18 product spills, 2 injuries, and 0.2 fatalities for all NMPP facilities (pipeline, pump stations, terminals) over 30 years. Of the 18 predicted spills, 10 would be less than 150 barrels, 6 spills would be 151 to 2,000 barrels; and 2 spills would be greater than 2,000 barrels.

Based on the Technical Panel findings, the BLM would require Shell (and Shell has committed) to increase the ratio between the hydrostatic test pressure and the maximum operating pressure in sensitive areas to a ratio beyond what is required by the OPS. The greater the ratio, the less likely it is for the pipe to fail along its longitudinal seam during pressurization. The Technical Panel has concluded that the chance of a pipeline failure along the ERW longitudinal seam would be low (i.e., at least one in one million), once the pipeline was successfully tested.

Table ES-3
Number of Incidents Predicted to Occur in 30 Years Along the
Pipeline, Terminals, and Pump Stations

| Predicted Number in 30 years: | Pipeline | | Ancillary Facilities | | Total Number |
|-------------------------------|--------------|-------------------|----------------------|---------------|--------------|
| | New Pipeline | Existing Pipeline | Terminals | Pump Stations | |
| Incidents | 5 | 7 | 4 | 3 | 18 |
| Injuries | 0.3 | 1 | 0.03 | 0.005 | 2 |
| Fatalities | 0.04 | 0.2 | 0 | 0 | 0.2 |
| Fires | 0.4 | 0.3 | 0.3 | 0.4 | 1.3 |
| Explosions | 0.1 | 0.08 | 0.06 | 0.1 | 0.4 |

Based on OPS data. The sum of the numbers in each incident and facility category do not equal the total because of rounding.

Ground surface subsidence in karst terrain was the only natural hazard identified that required special consideration for detection and control during construction and operation. Pipeline damage resulting from natural hazards represents about 3 percent of all incidents.

In the event of a pipeline fire or explosion, people and buildings could be injured or damaged if they are located within the thermal impact zone. A thermal impact zone of 300 to 500 feet was used as an index to estimate the number of residences and sensitive public assembly areas at greatest potential risk. A total of 328 residences are located within 300 feet of the NMPP centerline (51 residences near 60 miles of the southern pipeline extension and 277 residences near the 406 miles of existing pipeline). Two schools (Edgewood Christian School and Torreon Mission) and one community center (Placitas Community Center) are located within 500 feet of the pipeline.

Based on statistics that evaluate accidents in relation to the date of pipeline construction, the risk of fire and explosion for new pipe are predicted to be greater than the existing pipeline during the first 10 years of operating life. For any 1000 feet of new pipeline, a fire is predicted once in 27,000 years, and an explosion once in 97,000 years. For any 1,000 feet of existing pipeline, a fire is predicted once in 80,000 years, and an explosion once in 280,000 years. One residence is located approximately 300 feet from the San Ysidro pump station. The fire and explosion risk to this residence is the same as that for a new pipeline.

Because of the large volume of flammable materials stored at terminals, a terminal explosion could cause human injuries and fatalities at distances up to 2,000 feet. There is one residence within 2,000 feet of the Moriarty terminal, and none within this distance at the Bloomfield and Odessa terminals. A terminal fire is predicted to occur once in 21,000 years, while the chance of an explosion would be once in 110,000 years.

The risk of transporting products by truck from terminals to markets in the Albuquerque and Four Corners regions is substantially greater than that estimated for the NMPP itself. Over a 30-year period, 151 spills, 71 injuries, and 4 fatalities are predicted from trucking refined products from distribution terminals.

Water Quality

Surface Water

Due to the absence of perennial waterbody crossings along the new pipeline extensions, construction would not affect water quality. Runoff and resulting sedimentation to surface waters would be controlled.

The volume of water used for cleaning and hydrostatic testing of the existing pipeline would not exceed 90 acre-feet. Water volume for the northern pipeline extension would not exceed 19 acre-feet, and volumes for the southern extension would not exceed 25 acre-feet. Water would be purchased and withdrawn from privately owned reservoirs. Water quality would not be reduced since discharged water would be required to meet water quality standards, enforceable under a discharge permit issued by the New Mexico Oil Conservation Division and/or Railroad Commission of Texas for the permitted discharge locations. Water discharges would not exceed the daily discharge volumes referenced in the permits.

The Pecos River and the Rio Grande are the only two perennial rivers crossed by the NMPP system. Tributaries to the Jemez River also are crossed. These rivers and tributaries are crossed by the existing pipeline, and no further work in the stream channels would be required. Based on OPS statistics, a spill of any size is predicted to occur in the Pecos River once in 4,900 years, the Rio Grande once in 4,000 years, and the tributaries of the Jemez River once in 2,900 years. The most stringent national drinking water standard is for benzene, at a concentration of 0.005 ppm. Based on leak scenario as low as 0.3 percent of the transported volume (or a leak of 3.75 barrels per hour), it was estimated that benzene concentrations in these rivers immediately after the spill could exceed the national standard at all stream flows.

Exceedence of the national standard from a spill into a river or stream would be transitory as material flowed downstream, evaporated, or was physically removed by cleanup efforts.

Groundwater

No construction impacts to groundwater resources are expected.

Groundwater resources could be degraded if petroleum products were released into the environment where they could reach groundwater. Approximately 167 miles of the NMPP route crosses shallow groundwater where depth to water is 100 feet or less. About 4 spills of any size are predicted over a 30-year period above aquifers with depths to groundwater of 100 feet or less. Two of these spills are predicted to be 150 barrels or less; 2 spills would be 250 to 2,000 barrels; and a very large spill is very unlikely to occur in this timeframe. Areas that contain karst terrain, which can act as a conduit to groundwater, combined with underlying aquifers may be particularly vulnerable to petroleum spills. Approximately 24 miles of existing pipe crosses karst terrain overlying the Roswell Basin aquifer in New Mexico and 30 miles of new pipe would cross karst terrain over the Edwards-Trinity aquifers in Texas. The most vulnerable aquifer that supplies drinking water via wells to residents adjacent to the pipeline is the limestone Cavernous Madera in the Estancia Basin, which underlies the community of Edgewood. The majority of the 274 residences within 300 feet of the pipeline between Moriarty and Placitas depend on wells for domestic water.

Groundwater is extremely susceptible to contamination from methyl tertiary-butyl ether (MTBE), a fuel additive. For the NMPP system, Shell has agreed to prohibit the transportation of petroleum products containing MTBE or similar aliphatic ether additives in fuel-additive concentrations. This limitation would be incorporated into Shell's NMPP product tariff specifications.

If petroleum products from the NMPP were to reach underlying drinking water aquifers, Shell would be responsible for remedial actions under the direction of the USEPA and the State of New Mexico or Texas. Until cleanup levels protective of human health were met, Shell would provide a continuing water supply. Depending on the amount of product reaching the groundwater and natural attenuation rates, a return to pre-existing groundwater quality conditions would likely take tens of years.

Threatened and Endangered Species

Surface disturbance activities would result in the incremental long-term (more than 20 years) disturbance of approximately 1,293 acres of habitat (includes surface disturbance in the ROW and pipeline facilities). However, due to the linear nature of the project over a large geographic area (approximately 499 linear miles), the acreage would represent far less than one percentage of available wildlife habitat on a regional basis. Long-term impacts also would result in an incremental increase in habitat fragmentation; limited mortality of small, less mobile species; and the temporary displacement of wildlife from the construction area as a result of increased noise levels and human presence.

Surface disturbance activities along the new northern pipeline extension would result in the incremental long-term disturbance of approximately 236 acres of badlands that may contain potentially suitable habitat for the Aztec gilia and the Brack's fishhook cactus.

Surface disturbance activities at 64 work sites would result in the long-term disturbance of approximately 45 acres of karst terrain that may provide suitable cave features for roosting bat species.

Surface disturbance activities along the new southern pipeline extension would result in short-term surface disturbance of approximately 8 acres of black-tailed prairie dog colonies. Prairie dog colonies provide potentially suitable habitat for a number of sensitive wildlife species (e.g., black-footed ferret, mountain plover, and burrowing owl).

Surface disturbance activities at 105 work sites would result in the incremental long-term disturbance of approximately 75 acres within designated lesser prairie chicken habitat. An additional 2 acres within potentially suitable lesser prairie chicken habitat would be lost as a result of the construction and operation of the Maljamar pump station.

Surface disturbance activities at 94 work sites would result in the incremental long-term disturbance of approximately 67 acres of potentially suitable sand dune lizard habitat.

Surface disturbance activities at 2 work sites would result in the incremental long-term disturbance of approximately 1 acre of potentially suitable riparian habitat for the southwestern willow flycatcher and the yellow-billed cuckoo.

Protection measures for sensitive animal species would include spatial and temporal restrictions, habitat restoration measures, and noise reduction measures. These measures would minimize impacts to these species from project-related activities.

For aquatic resources, construction and normal operations would have negligible effects on sensitive species. Abnormal operations could result in petroleum products entering perennial waterbodies containing aquatic biota. If sufficient volume of petroleum products were to reach a perennial waterbody, acute and chronic toxicity could occur if stream flow was insufficient to dilute the product. While a spill into a river could result in adverse effects to aquatic biota, the chance of a spill of any size in the Pecos River, Rio Grande, and tributaries of the Jemez River is once in 4,900, 4,000, and 2,900 years, respectively. Thus, risk to aquatic biota is considered low.

ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

Pipeline alternatives were developed in an attempt to reduce hazards to specific sensitive areas based on the primary issues identified by the BLM. To assess whether the alternatives would be expected to reduce risk, the number of spills was calculated following the same methodology used for the Proposed Action. The number of spills and the proximity to areas containing sensitive receptors (e.g., people, surface water and groundwater resources, and threatened and endangered species) for each pipeline alternative is compared to the Proposed Action in **Table ES-4**.

ENVIRONMENTAL CONSEQUENCES FOR THE PIPELINE REPLACEMENT ALTERNATIVE

Overall, the predicted numbers of incidents are slightly higher, but still relatively similar, to the Proposed Action. Residential areas and the Pecos River would be expected to be exposed to the largest increased risk. Risk of spills, fire, and explosions would be greatest in the first 10 years, then would drop to levels similar to those associated with the Proposed Action. The potential impacts of spills in these sensitive areas are expected to be greater than in other areas due to their environmental sensitivity.



















Like the Proposed Action, ground surface subsidence in karst terrain was the only natural hazard identified that required special consideration for detection and control during construction and operation. Pipeline damage resulting from natural hazards represents about 3 percent of all incidents.

As described for the Proposed Action, people and buildings could be injured or damaged if they are located within the thermal impact zone if a pipeline fire or explosion occurred. A thermal impact zone of 300 to 500 feet was used as an index to estimate the number of residences and sensitive public assembly areas at greatest potential risk. A total of 328 residences are located within 300 feet of the NMPP centerline (325 residences near 60 miles of the southern pipeline extension and 40 miles of pipeline replacement






Table ES-4
Comparison of the Estimated Number of Spills and Proximity to Sensitive Receptors

| Pipeline Alternative / sensitive areas | Miles of Pipe | Number of Predicted Incidents in 30 years | Likelihood Compared to Proposed Action | Proximity to Sensitive Receptor | Measure of Proximity |
|---|---------------|---|--|---------------------------------|---|
| Proposed Action | 499 | 18 | | | |
| <i>High Plains, Edwards-Trinity, and Pecos River Aquifers</i> | 51 | 4 | --- | --- | Crossed |
| <i>Moriarty to west of Placitas</i> | 38 | 1 | --- | --- | 274 houses; 1 community center; 1 school |
| <i>Navajo Torreon Mission School</i> | 0.5 | 0.01 | --- | --- | 1 school |
| <i>Roswell Basin Aquifer</i> | 24 | 0.6 | --- | --- | Crossed |
| <i>Estancia and Los Huertas Creek aquifers</i> | 12 | 0.3 | --- | --- | Crossed |
| <i>Pecos River</i> | 1.0 | 0.03 | --- | --- | Adjacent |
| Replacement Alternative | 499 | 21 | | | |
| <i>High Plains, Edwards-Trinity, and Pecos River Aquifers</i> | *** | Same as Proposed Action | ● | ■ | Crossed |
| <i>Moriarty to west of Placitas</i> | 38 | 3 | ● | ■ | 274 houses; 1 community center; 1 school |
| <i>Navajo Torreon Mission School</i> | 0.5 | 0.04 | ● | ■ | 1 school |
| <i>Roswell Basin Aquifer</i> | 24 | 2 | ● | ■ | Crossed |
| <i>Estancia and Los Huertas Creek aquifers</i> | 12 | 0.9 | ● | ■ | Crossed |
| <i>Pecos River</i> | 1.0 | 0.08 | ● | ■ | Crossed |
| Reroute Alternative | 504 | 24 | | | |
| <i>High Plains, Edwards-Trinity, and Pecos River Aquifers</i> | | Same as Proposed Action | ● | ■ | Crossed |
| <i>Moriarty to west of Placitas</i> | 43 | 3 | ● | ■ | 79 residences; avoids community center and school |
| <i>Navajo Torreon Mission School</i> | 0.6 | 0.05 | ● | ■ | Avoids school |

Table ES-4 (Continued)

| Pipeline Alternative / sensitive areas | Miles of Pipe | Number of Predicted Incidents in 30 years | Likelihood Compared to Proposed Action | Proximity to Sensitive Receptor | Measure of Proximity |
|---|---------------|---|---|---|--|
| <i>Roswell Basin Aquifer</i> | 24 | Same as Proposed Action |  |  | Crossed |
| <i>Estancia and Los Huertas Creek aquifers</i> | 7 | 0.5 |  |  | Crossed |
| <i>Pecos River</i> | 1.1 | 0.08 |  |  | Increased distance from river |
| Enhanced Safety Mitigation Alternative | 499 | ≤18 | | | |
| <i>Edwards-Trinity and Pecos River Aquifers</i> | *** | Same as Proposed Action |  |  | Crossed |
| <i>Moriarty to west of Placitas</i> | 38 | ≤1 |  |  | 274 houses; 1 community center; 1 school |
| <i>Navajo Torreon Mission School</i> | 0.5 | ≤0.01 |  |  | 1 school |
| <i>Roswell Basin Aquifer</i> | 24 | ≤0.6 |  |  | Crossed |
| <i>Estancia and Los Huertas Creek aquifers</i> | 12 | ≤0.3 |  |  | Crossed |
| <i>Pecos River</i> | 1.6 | ≤0.04 |  |  | Adjacent |

Notes:

-  <2 times more or less likely than the Proposed Action.
-  2 to <3 times more likely than the Proposed Action.
-  >3 times more likely than the Proposed Action.
-  Same proximity as Proposed Action.
-  Reduced proximity.

Differences between alternatives based on actual values, not rounded numbers.

segments and 3 residences near the 366 miles of existing pipeline). Two schools (Edgewood Christian School, and Torreon Mission) and one community center (Placitas Community Center) are located within 500 feet of the pipeline.

Because these segments would consist of new pipe, the BLM would not require elevated hydrostatic test pressures in these areas since the increased pressures were stipulated to reduce the chance of longitudinal seam failure in existing, pre-1970 ERW pipe. Furthermore, the SOP in pipeline replacement areas could be increased, as allowed by OPS. At this time, however, the SOP in the HCA area may be restricted by the pressure limitations for existing pipe across the Rio Grande.

Since some portions of the existing pipe (i.e., the Rio Grande and Pecos River crossings) would not be replaced, they would remain subject to the BLM's increased hydrostatic test pressure requirement for existing pipe, as discussed in the Proposed Action. Additionally, the SOP for the Rio Grande crossing would continue to be limited to 665 psig.

Based on statistics that evaluate accidents in relation to the date of pipeline construction, the risks of fire and explosion for new pipe are predicted to be greater than the existing pipeline during the first 10 years of operating life. For any 1000 feet of new pipeline, a fire is predicted once in 27,000 years, and an explosion once in 97,000 years. For any 1,000 feet of existing pipeline, a fire is predicted once in 80,000 years, and an explosion once in 280,000 years. One residence is located approximately 300 feet from the proposed San Ysidro pump station. The fire and explosion risk to this residence is the same as that for a new pipeline.

Because of the large volume of flammable materials stored at terminals, a terminal explosion could cause human injuries and fatalities at distances up to 2,000 feet. As in the Proposed Action, there is one residence within 2,000 feet of the Moriarty terminal, and none within this distance at the Bloomfield and Odessa terminals. A terminal fire is predicted to occur once in 21,000 years, while the chance of an explosion would be once in 110,000 years.

The risk of transporting of products by truck from terminals to markets in the Albuquerque and Four Corners regions is substantially greater than that estimated for the NMPP itself. Over a 30-year period, 151 spills, 71 injuries, and 4 fatalities are predicted from trucking refined products from distribution terminals, the same as for the Proposed Action.

Water Quality

Surface Water

The location of the existing pipe would be the same as the Proposed Action. While the Replacement Alternative would not require pipe replacement at the existing Pecos River and Rio Grande crossings, pipe would be replaced along the portion adjacent to the Pecos River. This alternative is nearly equivalent to the Proposed Action with respect to potential effects on surface and groundwater. The number of spills predicted to occur at river crossings would be identical to the Proposed Action. However, replacement of pipe along portions immediately adjacent to the Pecos River would be about 2.9 times more likely to fail

during the first 10 years of operation, compared to existing pipe. Consequently, risk to the Pecos River would be higher. If a spill were to enter surface waters, the potential impacts to drinking water would be the same as for the Proposed Action.

Groundwater

The aquifers crossed and associated distances would be the same as Proposed Action. There is a slightly higher spill risk from the replacement pipe segment between Moriarty and Placitas during the first 10 years of the replacement segment life, and then the spill risk would be very similar to the Proposed Action. With the exception of the Las Huertas Creek watershed near Placitas, the majority of the replacement segment overlies aquifers with depths of 200 feet or more, estimated from well depths in State Engineer records.

This alternative would cross an equivalent number of miles of shallow aquifers and karst terrain as the Proposed Action. The majority of the 274 residences within 300 feet of the pipeline between Moriarty and Placitas depend on wells for domestic water. The most vulnerable aquifer that supplies drinking water via wells to residents adjacent to the pipeline is the limestone Cavernous Madera in the Estancia Basin, which underlies the community of Edgewood. If petroleum products from the NMPP were to reach underlying drinking water aquifers, Shell would be responsible for remedial actions under the direction of the USEPA and the State of New Mexico or Texas. Until cleanup levels protective of human health were met, Shell would provide a continuing water supply. Depending on the amount of product reaching the groundwater and natural attenuation rates, a return to pre-existing groundwater quality conditions would likely take tens of years.

Threatened and Endangered Species

Surface disturbance activities would result in the incremental long-term disturbance of approximately 1,614 acres of habitat (includes surface disturbance in the ROW and pipeline facilities). However, due to the linear nature of the project over a large geographic area (approximately 499 linear miles), the acreage would represent far less than 1 percentage of available wildlife habitat on a regional basis. Long-term impacts also would result in an incremental increase in habitat fragmentation; limited mortality of small, less mobile species; and the temporary displacement of wildlife from the construction area as a result of increased noise levels and human presence.

Surface disturbance activities from pipeline construction would result in the long-term disturbance of approximately 87 acres of karst terrain. Surface disturbance at 44 work sites would result in the long-term disturbance of 31 acres of karst terrain. Karst terrain may provide suitable cave features for roosting bat species.

Construction and operation of this alternative would reduce the habitats of Aztec gilia, Brack's fish hook cactus, prairie dogs, lesser prairie chicken, sand dune lizard, southwestern willow flycatcher, and yellow-billed cuckoo to the same extent as the Proposed Action.

Protection measures for sensitive animal species would include spatial and temporal restrictions, habitat restoration measures, and noise reduction measures. These measures would minimize impacts to these species from project-related activities.

For aquatic resources, construction and normal operations would have negligible effects on sensitive species. Abnormal operations could result in petroleum products entering perennial waterbodies containing aquatic biota. If sufficient volume of petroleum products were to reach a perennial waterbody, acute and chronic toxicity could occur if stream flow were insufficient to dilute the product. While a spill into a river could result in adverse effects to aquatic biota, the chance of a spill of any size in the Pecos River, Rio Grande, and tributaries of the Jemez River is once in 4,900, 4,000, and 2,900 years, respectively. Thus, risk to aquatic biota is considered low.

ENVIRONMENTAL CONSEQUENCES FOR THE PIPELINE REROUTE ALTERNATIVE

Public Safety

Based on OPS statistics, it is predicted that there would be a total of 24 product spills, 2 injuries, and 0.2 fatalities for all NMPP facilities (pipeline, pump stations, terminals) over 30 years. Of the 24 predicted spills, 13 would be less than 150 barrels; about 9 spills would be 151 to 2,000 barrels; and 2 spills would be greater than 2,000 barrels.

Though the values are slightly higher, the overall numbers of spills, injuries, and fatalities predicted for the Pipeline Reroute Alternative are similar to the number predicted for the Proposed Action and Pipeline Replacement Alternative. However, the number of predicted spills associated with sensitive areas for the Pipeline Reroute Alternative is about 1.7 times higher than for the Proposed Action. Like the Pipeline Replacement Alternative, residential areas and the area along the Pecos River would be exposed to elevated risk. Risk of spills, fire, and explosions would be greatest in the first 10 years, then would drop to levels similar to those associated with the Proposed Action. Potential impacts of these individual spills in these sensitive areas are expected to be greater than in other areas due to their environmental sensitivity.

Like the Proposed Action, ground surface subsidence in karst terrain was the only natural hazard identified that required special consideration for detection and control during construction and operation. Pipeline damage resulting from natural hazards represents about 3 percent of all incidents.

As described for the Proposed Action, people and buildings could be injured or damaged if they are located within the thermal impact zone if a pipeline fire or explosion occurred. A thermal impact zone of 300 to 500 feet was used as an index to estimate the number of residences and sensitive public assembly areas at greatest potential risk. A total of 133 residences are located within 300 feet of the Pipeline Reroute centerline (130 residences near 138 miles of new pipeline (reroute segment and extensions) and 3 residences along 366 miles of existing pipeline). The pipeline would be relocated more than 1,000 feet from the Edgewood Christian School, Torreon Mission, and Placitas Community Center.

The Pipeline Reroute Alternative would reduce the number of residences within 500 feet and sensitive public assembly places within 500 feet by 195 homes and 2 schools in the Moriarty, Placitas, and Edgewood communities. The reroute would pass within 300 feet of 79 residences instead of 274 residences along the equivalent segment of the existing NMPP ROW. The number of residences along the new pipeline extensions would be the same as the Proposed Action. Impacts to residences and sensitive public assembly areas would be identical to those expected along the Proposed Action.

The BLM would not require elevated hydrostatic test pressures in areas containing new pipeline segments since the increased pressures were stipulated to reduce the chance of longitudinal seam failure in existing, pre-1970 ERW pipe. Furthermore, the SOP in pipeline reroute areas could be increased, as allowed by OPS. At this time, however, the SOP in the HCA area may be restricted by the pressure limitations for existing pipe across the Rio Grande.

Since some portions of the existing pipe (i.e., the Rio Grande and Pecos River crossings) would not be rerouted, they would remain subject to the BLM's increased hydrostatic test pressure requirement for existing pipe, as discussed in the Proposed Action. Additionally, the SOP for the Rio Grande crossing would continue to be limited to 665 psig.

Based on statistics that evaluate accidents in relation to the date of pipeline construction, the risks of fire and explosion for new pipe are predicted to be greater than the existing pipeline during the first 10 years of operating life. For any 1,000 feet of new pipeline, a fire is predicted once in 27,000 years, and an explosion once in 97,000 years. For any 1,000 feet of existing pipeline, a fire is predicted once in 80,000 years and an explosion once in 280,000 years. One residence is located approximately 300 feet from the proposed San Ysidro pump station. The fire and explosion risk to this residence is the same as that for a new pipeline.

Because of the large volume of flammable materials stored at terminals, a terminal explosion could cause human injuries and fatalities at distances up to 2,000 feet. Like the Proposed Action, there is 1 residence within 2,000 feet of the Moriarty terminal and none within this distance at the Bloomfield and Odessa terminals. A terminal fire is predicted to occur once in 21,000 years, while the chance of an explosion would be once in 110,000 years.

The risk of transporting of products by truck from terminals to markets in the Albuquerque and Four Corners regions is substantially greater than that estimated for pipelines. Over a 30-year period, 151 spills, 71 injuries, and 4 fatalities are predicted from trucking refined products from distribution terminals, the same as the Proposed Action.

Water Quality

Surface Water

Pipe crossings of the Pecos River and Rio Grande would be the same as the Proposed Action. Pipe would be rerouted along the portion adjacent to the Pecos River to increase the distance of the pipe from the river. Construction impacts would be the same as the Proposed Action. During the first 10 years after installation

of the reroute, the number of spills predicted to occur in proximity to the Pecos River would be increased by 2.9 times, then the risk would decrease to a level equivalent of the existing pipe. While this indicates a greater risk of spills into the Pecos River than the Proposed Action, a spill would have to be transported via overland flow to substantially affect surface water. If substantial quantities of product reached the river, impacts from spills to drinking water would be the same as for the Proposed Action.

Groundwater

This alternative would cross about 2 more miles of shallow aquifers and karst terrain compared to the Proposed Action. Residential population density is lower along the alternative route segment compared to the equivalent Proposed Action segment. The majority of the 79 residences within 300 feet of the alternative pipeline route between Moriarty and Placitas depend on wells for domestic water. The community of Edgewood would be avoided by this alternative route. If petroleum products from the NMPP were to reach underlying drinking water aquifers, Shell would be responsible for remedial actions under the direction of the USEPA and the State of New Mexico or Texas. Until cleanup levels protective of human health were met, Shell would provide a continuing water supply. Depending on the amount of product reaching the groundwater and natural attenuation rates, a return to pre-existing groundwater quality conditions would likely take tens of years.

Threatened and Endangered Species

Surface disturbance activities would result in the incremental long-term loss of approximately 1,668 acres of habitat (includes surface disturbance in the ROW and pipeline facilities). However, due to the linear nature of the project over a large geographic area (approximately 504 linear miles), the acreage would represent far less than 1 percentage of available wildlife habitat on a regional basis. Long-term impacts also would result in an incremental increase in habitat fragmentation; limited mortality of small, less mobile species; and the temporary displacement of wildlife from the construction area as a result of increased noise levels and human presence.

Surface disturbance activities from pipeline construction would result in the long-term disturbance of approximately 12 acres of karst terrain. Surface disturbance at 44 work sites would result in the long-term disturbance of 31 acres of karst terrain. Karst terrain may provide suitable cave features for roosting bat species.

Construction and operation of this alternative would reduce the habitats of Aztec gilia, Brack's fish hook cactus, prairie dogs, lesser prairie chicken, sand dune lizard, southwestern willow flycatcher, and yellow-billed cuckoo to the same extent as the Proposed Action.

Protection measures for sensitive animal species would include spatial and temporal restrictions, habitat restoration measures, and noise reduction measures. These measures would minimize impacts to these species from project-related activities.

For aquatic resources, construction and normal operations would have negligible effects on sensitive species. Abnormal operations could result in petroleum products entering perennial waterbodies containing aquatic biota. If sufficient volume of petroleum products were to reach a perennial waterbody, acute and chronic toxicity could occur if stream flow were insufficient to dilute the product. While a spill into a river could result in adverse effects to aquatic biota, the chance of a spill of any size in the Pecos River, Rio Grande, and tributaries of the Jemez River is once in 4,900, 4,000, and 2,900 years, respectively. Thus, risk to aquatic biota is considered low.

ENVIRONMENTAL CONSEQUENCES FOR THE PROPOSED ACTION WITH ENHANCED SAFETY MITIGATION MEASURES ALTERNATIVE

The Proposed Action with Enhanced Safety Mitigation Measures Alternative was developed to provide additional protection to the public and the environment. Several of these safety measures are intended to provide a mechanism to gather information about the structural integrity of the pipe. This information would be used to identify potential threats to the pipe's normal operation, such as time-dependent trends (e.g., corrosion rates). Other mitigation measures attempt to reduce specific hazards, such as moving valves closer to river crossings to reduce the potential draindown volumes that could enter the river. **Table ES-5** identified 8 enhanced safety mitigation measures, their purpose, and anticipated benefit. Although the effectiveness of these mitigation measures often cannot be quantified, the measures would presumably reduce risk.

Other than the effects discussed in **Table ES-5**, effects to other resources would be the same as for the Proposed Action and, therefore, are not discussed further in this section.

No Action Alternative

Public Safety

While the No Action Alternative would reduce or eliminate the potential hazards directly associated with the Proposed Action, analysis indicates the No Action Alternative would not result in an overall reduction in risk to the public because petroleum products would continue to be transported to these markets by other transportation methods. Results suggest that the present-day situation poses about 31 percent greater risk to public safety (in terms of spills, injuries, and fatalities) than the Proposed Action in the Moriarty, Albuquerque, and Santa Fe region (i.e., Central New Mexico). Similarly, the No Action Alternative poses about 62 percent greater risk to public safety compared to the Proposed Action in the Four Corners region.

Projections of future risk show an even greater risk to public safety over time with the No Action Alternative. In Central New Mexico, the predicted number of spills, injuries, and fatalities for the No Action Alternative would be between 50 to 60 percent greater than risk from the Proposed Action over a 30-year period. In the Four Corners region, projections of future risk show an even greater risk to public safety over time for the No Action Alternative. The predicted number of spills, injuries, and fatalities associated with the No Action Alternative in the Four Corners area would be almost three times the number for the Proposed Action.

**Table ES-5
Enhanced Safety Mitigation Measures**

| Mitigation Measure | Purpose/Benefit |
|---|---|
| <p>1. At intervals not to exceed 5 years, Shell would conduct internal inspections of the entire pipe using the best practical technology to detect potential crack-like flaws along the pipe's long seam. Indications that result from these inspections would be uncovered and examined. Confirmed anomalies would be removed from the pipeline, repaired, or sleeved per OPS regulations. Any portion of the pipe that is removed from service would be visually inspected for seam weld flaws and findings documented. Information obtained from these visual inspections would be integrated into the data related to the integrity of the pipe and used to aid in the advancement of current fatigue predictions.</p> | <p><u>Purpose.</u> To obtain information from these visual inspections that would be integrated into the pipe integrity database, and that would be used to aid in the advancement of current fatigue predictions for the pipeline.</p> <p><u>Benefit.</u> A specific reduction in spill risk cannot be estimated from the implementation of this measure. However, the frequent and additional data collected throughout the operating life of the pipeline would assist in identifying potential future problem areas, and ensuring long-term pipe integrity.</p> |
| <p>2. As part of Shell's refurbishment activities, Shell has committed to the removal of all previously applied sleeves and replacement with new pipe. In addition, the existing pipe under the sleeve will be visually inspected, data recorded, and any findings relevant to the pipe's integrity will be integrated into fatigue prediction calculations.</p> | <p><u>Purpose.</u> To obtain information from these visual inspections that would be integrated into the pipe integrity database, that would be used to aid in the advancement of current fatigue predictions for the pipeline.</p> <p><u>Benefit.</u> A specific reduction in spill risk cannot be estimated from the implementation of this measure. However, the frequent and additional data collected throughout the operating life of the pipeline would assist in identifying potential future problem areas, and ensuring long-term pipe integrity.</p> |
| <p>3. For any critical defects that are exposed during the hydrostatic test, Shell will document the degradation mechanism and record pertinent information (crack size, shape, etc.) to aid in the advancement of current fatigue predictions for the pipeline.</p> | <p><u>Purpose.</u> Information obtained from these visual inspections would be integrated into the data related to the integrity of the pipe and used to aid in the advancement of current fatigue predictions for the pipeline.</p> <p><u>Benefit.</u> A specific reduction in spill risk cannot be estimated from the implementation of this measure. However, the frequent and additional data collected throughout the operating life of the pipeline would assist in identifying potential problem areas, and ensuring long-term pipe integrity.</p> |
| <p>4. Under the Proposed Action, the nearest valves to the Pecos River crossing will be located 3.2 and 1.7 miles up and downstream of the crossing, respectively. Similarly, proposed valves closest to the Rio Grande will be 1.1 and 2.5 miles up and downstream of the crossing, respectively. Additional valves will be installed (or existing valve locations would be moved) closer to the Pecos River and Rio Grande to protect surfaces water resources, such as drinking water, aquatic biota, and threatened and endangered species. Valves will be installed outside of the floodplain.</p> | <p><u>Purpose.</u> In the event of a spill, valve relocation would ensure that a smaller volume of product would be confined between block valves at the river, and drainback volumes would be minimized.</p> <p><u>Benefit:</u> If a spill were to occur between the valves on either side of the river, the volume of product drained from the pipe could be reduced. If the total distance between the valves were reduced to 1 mile, the amount of pipe between valves would be reduced by about 4 miles for the Pecos River and about 2.6 miles for the Rio Grande. Reducing the potential draindown volume of a spill would decrease the chance of toxic effects to aquatic biota and exceedence of the human health drinking water standard.</p> |

Table ES-5 (Continued)

| Mitigation Measure | Purpose/Benefit |
|--|--|
| <p>5. After any event that causes the pipeline pressure in sensitive areas to exceed 110 percent of the MAOP, Shell will be required to run a caliper pig within 6 months of the event.</p> | <p><u>Purpose:</u> To verify pipe condition quickly after an abnormal pressurization to assist in identifying areas in the pipe that may have changed. Pipe would be repaired depending on the severity of any defects found, in accordance with the OPS Integrity Management Rule (49 CFR Part 149).</p> <p><u>Benefit:</u> The prompt evaluation of the pipe's condition and subsequent repair of critical defects, if any, would prompt the continued safe operation of the pipeline.</p> |
| <p>6. For the life of the project, Shell will maintain a file of the x-rays of all girth welds and will make this file available to the BLM, OPS, or their representatives as requested.</p> | <p><u>Purpose:</u> To maintain a long-term record of the condition of the pipeline.</p> <p><u>Benefit:</u> Agency access to records would allow independent analysis of pipeline condition.</p> |
| <p>7. The BLM does not have authority to regulate trucking schedules from the Moriarty terminal on private land onto Highway 41. The community of Moriarty could consider adopting an ordinance to limit terminal trucking during the 0.5-hour period prior to and 0.5-hour period after the school day at Moriarty High School during the school year to reduce hazards to young, inexperienced drivers.</p> | <p><u>Purpose:</u> To improve the safety of young drivers traversing the same roadway used by petroleum product tanker trucks.</p> <p><u>Benefit:</u> Accident rates would potentially be lowered on the highway segment between the terminal and the Interstate highway interchange.</p> |
| <p>8. Prior to full operation, Shell would be required to demonstrate that their pipeline system leak detection capabilities are sufficient to detect leaks of the magnitude evaluated in the Final EIS to the satisfaction of the OPS and BLM. In order to continually update their system with advancing leak detection technology, Shell would submit a report that reviews the latest leak detection technological advancements and recommended leak detection technologies every 5 years to the BLM. As part of their ROW grant, Shell would incorporate these leak detection technologies into their system, where BLM deems appropriate and feasible. Shell also would provide yearly reports of all system leaks and accidents to the OPS and BLM.</p> | <p><u>Purpose:</u> To ensure that the pipeline leak detection system performs as represented by Shell, and that the leak detection system used on this pipeline performs at a highly effective level.</p> <p><u>Benefit:</u> Evidence of leak detection performance would confirm spill risk predictions, or indicate that further improvements in the system are needed to meet the committed leak detection rates, or to improve emergency response performance.</p> |

Table ES-6 summarizes the number of spills, injuries, and fatalities that would be predicted for the Proposed Action and No Action Alternative.

Table ES-6
Comparison of Future Risk Associated with the Proposed Action and No Action Alternative

| Estimated Total Number (in 30 years) | Proposed Action | No Action |
|---|-----------------|-------------------|
| Spills | | |
| Central New Mexico ¹ | 130 | 200 to 211 |
| Four Corners Area ² | 21 | 59 |
| Total | 151 | 259 to 270 |
| Injuries | | |
| Central New Mexico | 61 | 93 to 98 |
| Four Corners Area | 10 | 27 |
| Total | 71 | 120 to 125 |
| Fatalities | | |
| Central New Mexico | 3.3 | 5.4 |
| Four Corners Area | 0.5 | 1.5 |
| Total | 3.8 | 6.9 |

¹Central New Mexico = Moriarty, Albuquerque, and Santa Fe areas.

²Four Corners Area = Bloomfield, Shiprock, and Farmington areas.

While the No Action Alternative would result in an overall increase in spills, injuries, and fatalities in New Mexico, risk to residents living adjacent to the pipeline and ancillary facilities would not increase since the pipeline would continue to contain inert nitrogen gas. Similarly, residences in the proximity of the Moriarty terminal would not have increased risk (including trucking hazards to inexperienced high school motorists) since the Moriarty terminal would not be built. However, the risk of fires and explosion for the Bloomfield and Odessa terminals would be the same as those identified for the Proposed Action because these are existing facilities.

terminal would not have increased risk (including trucking hazards to inexperienced high school motorists) since the Moriarty terminal would not be built. However, the risk of fires and explosion for the Bloomfield and Odessa terminals would be the same as those identified for the Proposed Action because these are existing facilities.

Water Quality

Surface Water/Groundwater

Although the pipeline would still cross and be adjacent to perennial rivers and most aquifers identified under the Proposed Action, it would not pose a spill risk since the pipe would continue to contain inert gas. No impacts to drinking water resources would be anticipated.

Threatened and Endangered Species

Maintenance activities along the existing pipeline would continue with continued potential impacts to plant and wildlife species. Surface disturbances associated with these activities would have the same types of impacts as discussed above for the Proposed Action work sites.

No impacts to aquatic biota would be anticipated.

CUMULATIVE IMPACTS

No projects that would be constructed within the same geographic area and time frame were identified by the BLM.

With the exception of public safety, no cumulative impacts were identified for environmental resources. In contrast to new pipeline construction, maintenance and refurbishment activities along the existing ROW would have minimal cumulative impacts on resources because the pipeline has been in place for more than 40 years; the work sites would be relatively isolated; the work sites would be located in small, discrete areas; and work would involve small crews for short time periods. No cumulative impacts were identified for the existing pipeline, other than public safety.

Potential increased risks due to NMPP co-location with other existing pipelines and due to transportation of products to other markets beyond the Four Corners region were identified as cumulative public safety impacts.

Co-located Pipelines

Along the majority of the NMPP route, the NMPP is the only pipeline within the ROW corridor. In some portions of the route where the NMPP is co-located with other pipelines, the NMPP would be the second petroleum products pipeline within the utility corridor. Consequently, the risk for the number of petroleum product spills would double in these areas and associated impacts would be similar to those described previously. The highest accident risk is located west of Placitas (beyond residential areas), where four pipelines share the same corridor. Risk from each of the four pipelines is relatively similar since all are considered hazardous liquids pipelines. Other pipelines would contain petroleum products, natural gas liquids, and carbon dioxide. The NMPP route diverges from the other pipelines north of San Luis, resulting in a lower risk for this area. Cumulative risk increases again as the NMPP rejoins two pipelines near Huerfano, New Mexico (north of the Bisti connection) and continues to Bloomfield.

While the cumulative risk would be similar for the Pipeline Replacement and Proposed Action with Enhanced Safety Mitigation Measures alternatives, cumulative risk would be greater for the Pipeline Reroute Alternative. This is because the rerouted pipeline from Moriarity to the west-side of Placitas would follow the utility corridor containing three other pipelines. The 79 residences along this alternative's route would experience a cumulative pipeline incident risk increase associated with the addition of the NMPP pipeline.

Transportation Risks Beyond the Four Corners Area

There are presently no petroleum products pipelines that can transport petroleum products to either Colorado or Utah markets from Bloomfield, New Mexico. The BLM and USFS issued a Record of Decision in July 2001 approving the conversion of an existing natural gas liquids pipeline to a petroleum products pipeline, and the construction and operation of a new petroleum products pipeline extension. If constructed, petroleum products could be transported by pipeline from Bloomfield to Salt Lake City, Utah and other regional markets in Utah and Colorado. The BLM issued a ROW grant for this project in November 2001. The BLM approval of this pipeline project is currently being challenged in court. Because of uncertainties about the transportation options from petroleum product storage in Bloomfield, the public safety risks associated with both trucking and pipeline transportation were estimated, with Salt Lake City as the most distant end-point market.

The relative risks of transporting 70,000 bpd of products by truck or by pipeline over a 30-year period are compared in **Table ES-7**. The trucking risk estimates were based on truck delivery of petroleum products to intermediate terminal locations between Bloomfield and Salt Lake City, and then distribution of products to local markets. The pipeline risk estimates were based on pipeline delivery to intermediate terminals, and then trucking to local markets. The statistical comparisons presented in **Table ES-7** indicate that the estimated overall spill risk is more than 14 times greater for trucking than for pipeline transport, and predicted fatalities from trucking are 17 times greater than those for pipelines. These risk estimates were based on a constant 70,000-barrel-per-day delivery rate over a 30-year period. Assuming market demands increase in the future, the predicted incident rates would increase proportionally to the volumes transported by either trucks or pipelines.

Table ES-7
Comparative Safety Risks Associated with Transporting Petroleum Products
by Trucks Only and Pipeline and Trucks Beyond the Four Corners Area

| Transportation Mode | Supply (bpd) | Predicted Number of Events in 30 years | | | | |
|---------------------|--------------|--|----------|------------|-------|------------|
| | | Spills | Injuries | Fatalities | Fires | Explosions |
| Trucks Only | 70,000 | 2,010 | 933 | 52 | 295 | 65 |
| Pipeline/Trucks | 70,000 | 139 | 47 | 3 | 23 | 5 |

Other markets for petroleum products also exist in Arizona, Nevada, and California with large, growing populations. It is possible that petroleum products delivered by the NMPP to Albuquerque and Bloomfield could be distributed westward into these other western states by truck, or by a future pipeline that has not yet been proposed. The opportunities to deliver products to these more remote markets would depend on competition from local refineries in those markets, and the relative transportation costs between trucks and pipelines. Additional analysis was not conducted since it would be highly speculative to estimate the volumes and associated risks for serving these markets.

Environmental Consequences for Transmission Line, Distribution Powerline, and Service Drops

Table ES-9 provides a summary of impacts for construction and operation of electrical transmission facilities. Mitigation measures identified for these facilities would be included in a separate Record of Decision.

**Table ES-8
Impact Summary for the (Pipeline System) Proposed Action, Pipeline Replacement Alternative,
and Pipeline Reroute Alternative**

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|---|--|--|--|
| Public Health and Safety | | | |
| Pipeline System Incidents over 30 years. | Product Spills: 18 Human Injuries: 2 Human Fatalities: 0.2 | Product Spills: 21 Human Injuries: 2 Human Fatalities: 0.2 | Product Spills: 24 Human Injuries: 2 Human Fatalities: 0.2 |
| Spill Size Distribution. | Less than 150 barrels: 10 151-2,000 barrels: 6 Greater than 2,000 barrels: 2 | Less than 150 barrels: 12 151-2,000 barrels: 7 Greater than 2,000 barrels: 2 | Less than 150 barrels: 13 151-2,000 barrels: 9 Greater than 2,000 barrels: 2 |
| Predicted Pipeline Incidents over 30 years for OPS High Consequence Areas. | Edwards Aquifer (50 Mi.): 4 Pecos River (1.0 Mi.): 0.03 Roswell Basin (24 Mi.): 0.6 Estancia/Las Huertas (12 Mi.): 0.3 Moriarty-Placitas (38 Mi.): 1 Placitas -Rio Grande (5 Mi.): 0.1 Torreon Mission (0.5 Mi.): 0.01 | Edwards Aquifer (50 Mi.): 4 Pecos River (1.0 Mi.): 0.08 Roswell Basin (24 Mi.): 0.6 Estancia/Las Huertas (12 Mi.): 0.9 Moriarty-Placitas (38 Mi.): 3 Placitas -Rio Grande (5 Mi.): 0.1 Torreon Mission (0.5 Mi.): 0.04 | Edwards Aquifer (50 Mi.): 4 Pecos River (1.0 Mi.): 0.08 Roswell Basin (24 Mi.): 0.6 Estancia/Las Huertas (12 Mi.): 0.5 Moriarty-Placitas (43 Mi.): 3 Placitas -Rio Grande (5 Mi.): 0.1 Torreon Mission (0.5 Mi.): 0.05 |
| Residences within 300 feet of the pipeline centerline. | Existing Pipeline: 277 New Pipeline: 51 Total: 328 | Existing Pipeline: 3 New Pipeline: 325 Total: 328 | Existing Pipeline: 3 New Pipeline: 130 Total: 133 |
| Public Assembly Places within 500 feet of the pipeline centerline. | Existing Pipeline: 3 New Pipeline: 0 Total: 3 | Existing Pipeline: 0 New Pipeline: 3 Total: 3 | Existing Pipeline: 0 New Pipeline: 0 Total: 0 |
| Fire and Explosion Risk for an Individual Residence or School along the pipeline (occurrence interval for any 1,000 feet of pipeline or pump station location – estimated from the OPS database). | <u>Fire</u> Existing pipeline : once in 80,000 years New pipeline (first 10 years): once in 27,000 years New pipeline (after 10 years): once in 80,000 years <u>Explosion</u> Existing pipeline: once in 280,000 years New pipeline (first 10 years): once in 97,000 years New pipeline (after 10 years): once in 280,000 years | <u>Fire</u> Existing pipeline : once in 80,000 years New pipeline (first 10 years): once in 27,000 years New pipeline (after 10 years): once in 80,000 years <u>Explosion</u> Existing pipeline: once in 280,000 years New pipeline (first 10 years): once in 97,000 years New pipeline (after 10 years): once in 280,000 years | <u>Fire</u> Existing pipeline : once in 80,000 years New pipeline (first 10 years): once in 27,000 years New pipeline (after 10 years): once in 80,000 years <u>Explosion</u> Existing pipeline: once in 280,000 years New pipeline (first 10 years): once in 97,000 years New pipeline (after 10 years): once in 280,000 years |
| Residences within 2,000 feet of a terminal. | Moriarty Terminal: 1 Odessa, Bloomfield Terminals: 0 | Moriarty Terminal: 1 Odessa, Bloomfield Terminals: 0 | Moriarty Terminal: 1 Odessa, Bloomfield Terminals: 0 |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|--|--|---|---|
| Fire and Explosion Risk for an Individual Residence over 30 years (Occurrence Interval for product storage terminal). | <p><u>Fire</u>: once in 21,000 years</p> <p><u>Explosion</u>: once in 110,000 years</p> | <p><u>Fire</u>: once in 21,000 years</p> <p><u>Explosion</u>: once in 110,000 years</p> | <p><u>Fire</u>: once in 21,000 years</p> <p><u>Explosion</u>: once in 110,000 years</p> |
| Petroleum Product Trucking Risk (Terminal to Market over 30 years). | <p>Truck Spills: 151</p> <p>Human Injuries: 71</p> <p>Human Fatalities: 4</p> | <p>Truck Spills: 151</p> <p>Human Injuries: 71</p> <p>Human Fatalities: 4</p> | <p>Truck Spills: 151</p> <p>Human Injuries: 71</p> <p>Human Fatalities: 4</p> |
| Air Quality | | | |
| Number of miles of new pipeline construction requiring large construction equipment. | <p>93 miles</p> <p>Construction equipment would emit CO, NOx, unburned hydrocarbons, and fugitive dust over a period of 30-60 days.</p> | <p>133 miles</p> <p>Construction equipment would emit CO, NOx, unburned hydrocarbons, and fugitive dust over a period of 30-60 days.</p> | <p>138 miles</p> <p>Construction equipment would emit CO, NOx, unburned hydrocarbons, and fugitive dust over a period of 30-60 days.</p> |
| Number of residences within 300 feet of new pipeline and pump station work areas. | <p>81 residences.</p> <p>Shell would control fugitive dust on the ROW or pump station sites within 0.25 mile of residences. Residences would be exposed to fugitive dust for 5 to 10 days (pipeline) to 30-60 days (pump station).</p> | <p>326 residences.</p> <p>Shell would control fugitive dust on the ROW or pump station sites within 0.25 mile of residences. Residences would be exposed to fugitive dust for 5 to 10 days (pipeline) to 30-60 days (pump station).</p> | <p>131 residences.</p> <p>Shell would control fugitive dust on the ROW or pump station sites within 0.25 mile of residences. Residences would be exposed to fugitive dust for 5 to 10 days (pipeline) to 30-60 days (pump station).</p> |
| Mineral Resources | | | |
| Estimated area of strippable coal resources (Coal Belt SMA) underlying the NMPP pipeline corridor. | <p>0.3 square mile.</p> <p>The NMPP is in an existing pipeline corridor at this location. If a future surface coal mine were proposed at this location, the pipelines would be moved, or the coal would not be mined for 50 years or more.</p> | <p>0.3 square mile.</p> <p>The NMPP is in an existing pipeline corridor at this location. If a future surface coal mine were proposed at this location, the pipeline would be moved, or the coal would not be mined for 50 years or more.</p> | <p>0.3 square mile.</p> <p>The NMPP is in an existing pipeline corridor at this location. If a future surface coal mine were proposed at this location, the pipeline would be moved, or the coal would not be mined for 50 years or more.</p> |
| Estimated area of gravel resources underlying the NMPP pipeline corridor near Albuquerque, New Mexico, that could not be mined during the operating life of the pipelines. | <p>2 square miles.</p> <p>The NMPP is in an existing pipeline corridor at this location. Gravel resources that could not be mined represent less than one percent of the sand and gravel resources within 20 miles of Albuquerque.</p> | <p>2 square miles.</p> <p>The NMPP is in an existing pipeline corridor at this location. Gravel resources that could not be mined represent less than one percent of the sand and gravel resources within 20 miles of Albuquerque.</p> | <p>2 square miles.</p> <p>The NMPP is in an existing pipeline corridor at this location. Gravel resources that could not be mined represent less than one percent of the sand and gravel resources within 20 miles of Albuquerque.</p> |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|--|--|---|---|
| Paleontological Resources | | | |
| <p>Miles of BLM Condition 1 and 2 Fossil Formations crossed by new pipeline on federal lands; Number of work sites located on Condition 1 and 2 Formations on federal lands.</p> | <p>Pipeline: 30 miles of Condition 1 (Northern Pipeline Extension). Work sites (less than 1 acre each): 86.</p> <p>Pipelines and work sites on federal lands would be monitored by a paleontologist to identify and recover valuable fossil material. Condition 1 and 2 fossil formations (3 miles of pipeline; 109 work sites) would not be monitored on state and private lands, and therefore excavated fossils would be destroyed. Proposed project surface disturbance represents far less than 1 percent of the outcrop area of the primary Condition 1 formations in New Mexico (Morrison, Kirtland, Fruitland, and Nacimiento Formations).</p> | <p>Pipeline: 30 miles of Condition 1 (Northern Pipeline Extension). Work sites (less than 1 acre each): 86.</p> <p>Pipelines and work sites on federal lands would be monitored by a paleontologist to identify and recover valuable fossil material. Condition 1 and 2 fossil formations would not be monitored on state and private lands (22 miles of pipeline; 109 work sites), and therefore excavated fossils would be destroyed. Proposed project surface disturbance represents far less than 1 percent of the outcrop area of the primary Condition 1 formations in New Mexico (Morrison, Kirtland, Fruitland, and Nacimiento Formations).</p> | <p>Pipeline: 30 miles of Condition 1 (Northern Pipeline Extension). Work sites (less than 1 acre each): 86.</p> <p>Pipelines and work sites on federal lands would be monitored by a paleontologist to identify and recover valuable fossil material. Condition 1 and 2 fossil formations would not be monitored on state and private lands (14 miles of pipeline; 109 work sites), and therefore excavated fossils would be destroyed. Proposed project surface disturbance represents far less than 1 percent of the outcrop area of the primary Condition 1 formations in New Mexico (Morrison, Kirtland, Fruitland, and Nacimiento Formations).</p> |
| Soils | | | |
| <p>Area of sensitive soils (difficult to stabilize or reclaim) that would be disturbed during new pipeline construction.</p> | <p>400 acres of badland, sandy, and calcareous soils.</p> <p>Wind and water erosion rates are likely to exceed background rates during the short term. Additional stabilization efforts are needed in dune areas in southeast New Mexico where past reclamation efforts have not succeeded.</p> | <p>400 acres of badland, sandy, and calcareous soils.</p> <p>Wind and water erosion rates are likely to exceed background rates during the short term. Additional stabilization efforts are needed in dune areas in southeast New Mexico where past reclamation efforts have not succeeded.</p> | <p>400 acres of badland, sandy, and calcareous soils.</p> <p>Wind and water erosion rates are likely to exceed background rates during the short term. Additional stabilization efforts are needed in dune areas in southeast New Mexico where past reclamation efforts have not succeeded.</p> |
| <p>Estimated number of pipeline spills on sensitive soils (difficult to stabilize or reclaim; agricultural lands) that would occur over 30 years.</p> | <p>9 spills. (4 on sandy soils, 3 on badlands; 2 on calcareous soils; and less than 1 on agricultural lands).</p> | <p>9 spills. (4 on sandy soils, 3 on badlands; 2 on calcareous soils; and less than 1 on agricultural lands).</p> | <p>9 spills. (4 on sandy soils, 3 on badlands; 2 on calcareous soils; and less than 1 on agricultural lands).</p> |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|--|--|---|---|
| | The spill size distribution would be same as that described above under Public Health and Safety. Contaminated soils would be cleaned up to meet state and federal standards. Maximum estimated soil cleanup is approximately 600,000 cubic yards of soil (6 feet of soil over a 58-acre site). | The spill size distribution would be same as that described above under Public Health and Safety. Contaminated soils would be cleaned up to meet state and federal standards. Maximum estimated soil cleanup is approximately 600,000 cubic yards of soil (6 feet of soil over a 58-acre site). | The spill size distribution would be same as that described above under Public Health and Safety. Contaminated soils would be cleaned up to meet state and federal standards. Maximum estimated soil cleanup is approximately 600,000 cubic yards of soil (6 feet of soil over a 58-acre site). |
| Water Resources | | | |
| Estimated risk of spills (any size) for rivers, and river tributaries crossed. | Pecos River: once in 4,900 years Rio Grande : once in 4,000 years Jemez River tributaries: once in 2,900 years. A spill volume resulting from a leak as low as 0.3 percent of transported volume (3.75 barrels per hour) could exceed national drinking water standards at all stream flows. There is one planned municipal water supply intake approximately 15 miles downstream from the Rio Grande crossing that would need to be closed promptly to avoid intake of contaminated river water. | Pecos River: once in 4,900 years Rio Grande : once in 4,000 years Jemez River tributaries: once in 2,900 years A spill volume resulting from a leak as low as 0.3 percent of transported volume (3.75 barrels per hour) could exceed national drinking water standards at all stream flows. There is one planned municipal water supply intake approximately 15 miles downstream from the Rio Grande crossing that would need to be closed promptly to avoid intake of contaminated river water. | Pecos River: once in 4,900 years Rio Grande : once in 4,000 years Jemez River tributaries: once in 2,900 years A spill volume resulting from a leak as low as 0.3 percent of transported volume (3.75 barrels per hour) could exceed national drinking water standards at all stream flows. There is one planned municipal water supply intake approximately 15 miles downstream from the Rio Grande crossing that would need to be closed promptly to avoid intake of contaminated river water. |
| Miles of shallow groundwater crossed by the pipeline. | 167 miles where depth to groundwater is 100 feet or less. | 167 miles where depth to groundwater is 100 feet or less. | 169 miles where depth to groundwater is 100 feet or less. |
| Predicted number of spills over 30 years; Spill Size Distribution. | 4 spills above aquifers with depth to groundwater of 100 feet or less. 2 spills would be 150 barrels or less; 2 spills would be between 150 and 2,000 barrels; and a spill greater than 2,000 barrels would be very unlikely. | 4 spills above aquifers with depth to groundwater of 100 feet or less. 2 spills would be 150 barrels or less; 2 spills would be between 150 and 2,000 barrels; and a spill greater than 2,000 barrels would be very unlikely. | 4 spills above aquifers with depth to groundwater of 100 feet or less. 2 spills would be 150 barrels or less; 2 spills would be between 150 and 2,000 barrels; and a spill greater than 2,000 barrels would be very unlikely. |
| Number of Residences within 300 feet largely reliant on well water from aquifers underlying the NMPP pipeline. | 274 residences (between Moriarty and Placitas). | 274 residences (between Moriarty and Placitas). | 79 residences (between Moriarty and Placitas). |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|---|--|--|---|
| | <p>The potentially most vulnerable drinking water aquifer is the Cavernous Madera in the Estancia Basin that underlies the community of Edgewood. If petroleum products from the NMPP pipeline were to reach underlying drinking water aquifers, Shell would be responsible for clean up under federal and state direction. Shell would be responsible for providing a continuing water supply until groundwater cleanup levels were met. Depending on the amount of product reaching groundwater and natural attenuation rates, a return to pre-existing groundwater quality would likely require tens of years.</p> | <p>The potentially most vulnerable drinking water aquifer is the Cavernous Madera in the Estancia Basin that underlies the community of Edgewood. If petroleum products from the NMPP pipeline were to reach underlying drinking water aquifers, Shell would be responsible for groundwater clean up under federal and state direction. Shell would be responsible for providing a continuing water supply until groundwater cleanup levels were met. Depending on the amount of product reaching groundwater and natural attenuation rates, a return to pre-existing groundwater quality would likely require tens of years.</p> | <p>The community of Edgewood would be avoided by this pipeline reroute. If petroleum products from the NMPP pipeline were to reach underlying drinking water aquifers, Shell would be responsible for clean up under federal and state direction. Shell would be responsible for providing a continuing water supply until groundwater cleanup levels were met. Depending on the amount of product reaching groundwater and natural attenuation rates, a return to pre-existing groundwater quality would likely require tens of years.</p> |
| <p>Vegetation, Livestock Grazing, Noxious and Invasive Weeds, Wetlands</p> | | | |
| <p>Acres of native vegetation disturbed/ Estimated native vegetation recovery rates/ Livestock forage reductions/ Wetlands disturbed.</p> | <p>1,293 acres, of which 141 acres would be committed to long-term aboveground facility uses. Native vegetation communities to be reclaimed would consist of 33 percent desert grassland; 64 percent low shrublands; and 3 percent juniper woodlands.</p> <p>The herbaceous component is expected to reach pre-existing ground cover in 3 to 5 years; the shrub component in 5 to 15 years; and the tree component in 25 to 50 years. About 76 animal unit months would be unavailable to livestock for a period of 3 to 5 years. Weeds would be prevented from establishing new populations, but existing populations would likely to continue to spread along the pipeline ROW regardless of the control measures applied.</p> | <p>1,473 acres, of which 141 acres would be committed to long-term aboveground facility uses. Native vegetation communities to be reclaimed would consist of 33 percent desert grassland; 64 percent low shrublands; and 3 percent juniper woodlands.</p> <p>The herbaceous component is expected to reach pre-existing ground cover in 3 to 5 years; the shrub component in 5 to 15 years; and the tree component in 25 to 50 years. About 98 animal unit months would be unavailable to livestock for a period of 3 to 5 years. Weeds would be prevented from establishing new populations, but existing populations would likely to continue to spread along the pipeline ROW regardless of the control measures applied.</p> | <p>1,527 acres, of which 141 acres would be committed to long-term aboveground facility uses. Native vegetation communities to be reclaimed would consist of 33 percent desert grassland; 64 percent low shrublands; and 3 percent juniper woodlands.</p> <p>The herbaceous component is expected to reach pre-existing ground cover in 3 to 5 years; the shrub component in 5 to 15 years; and the tree component in 25 to 50 years. About 102 animal unit months would be unavailable to livestock for a period of 3 to 5 years. Weeds would be prevented from establishing new populations, but existing populations would likely to continue to spread along the pipeline ROW regardless of the control measures applied.</p> |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|---|---|---|---|
| | About 6 acres of intermittent stream beds and 4 acres of playa basins would be temporarily disturbed by construction of the northern and southern pipeline extensions. | About 6 acres of intermittent stream beds and 4 acres of playa basins would be temporarily disturbed by construction of the northern and southern pipeline extensions. | About 6 acres of intermittent stream beds and 4 acres of playa basins would be temporarily disturbed by construction of the northern and southern pipeline extensions. |
| Wildlife and Fisheries | | | |
| Wildlife habitat reductions. | 1,293 acres of general wildlife habitat over a distance of 499 miles, 50 acres of pronghorn fawning habitat, and 65 acres within wildlife management areas representing less than 1 percent of the major vegetation communities or wildlife management areas crossed by the project. Consequently, no population-level changes to any wildlife species are expected. Habitat reductions would be long-term for shrub and woodland habitats because of long recovery times. Ninety-three miles of new pipeline extensions would add to regional habitat fragmentation. | 1,614 acres of general wildlife habitat over a distance of 499 miles, 50 acres of pronghorn fawning habitat, and 65 acres within wildlife management areas representing less than 1 percent of the major vegetation communities or wildlife management areas crossed by the project. Consequently, no population-level changes to any wildlife species are expected. Habitat reductions would be long-term for shrub and woodland habitats because of long recovery times. Ninety-three miles of new pipeline extensions would add to regional habitat fragmentation. | 1,668 acres of general wildlife habitat over a distance of 504 miles, 50 acres of pronghorn fawning habitat, and 65 acres within wildlife management areas representing less than 1 percent of the major vegetation communities or wildlife management areas crossed by the project. Consequently, no population-level changes to any wildlife species are expected. Habitat reductions would be long term for shrub and woodland habitats because of long recovery times. Ninety-three miles of new pipeline extensions would add to regional habitat fragmentation. |
| Spill risk (any spill volume) for fisheries. | Pecos River: once in 4,900 years Rio Grande: once in 4,000 years Jemez River tributaries: once in 2,900 years. The conditions for acute toxicity to fisheries would be from large spills at low river flows; the greatest chance for chronic toxicity would be from large spills at low river flows, and from leaks that release product over a relatively long time (1 week or more). | Pecos River: once in 4,900 years Rio Grande: once in 4,000 years Jemez River tributaries: once in 2,900 years. The conditions for acute toxicity to fisheries would be from large spills at low river flows; the greatest chance for chronic toxicity would be from large spills at low river flows, and from leaks that release product over a relatively long time (1 week or more). | Pecos River: once in 4,900 years Rio Grande: once in 4,000 years Jemez River tributaries: once in 2,900 years. The conditions for acute toxicity to fisheries would be from large spills at low river flows; the greatest chance for chronic toxicity would be from large spills at low river flows, and from leaks that release product over a relatively long time (1 week or more). |
| Sensitive Species | | | |
| Habitat reductions for sensitive terrestrial species. | Aztec gilia, Brack's fishhook cactus – Surface disturbance activities would result in the incremental long-term disturbance of 236 acres of badlands habitat along the northern pipeline extension. | Aztec gilia, Brack's fishhook cactus – Surface disturbance activities would result in the incremental long-term disturbance of 236 acres of badlands habitat along the northern pipeline extension. | Aztec gilia, Brack's fishhook cactus – Surface disturbance activities would result in the incremental long-term disturbance of 236 acres of badlands habitat along the northern pipeline extension. |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|----------------------------|--|---|---|
| | <p>Preconstruction surveys for the Aztec gilia and Brack's fishhook cactus would occur prior to surface disturbance activities within potentially suitable habitat. If applicable, appropriate protection measures would be implemented in order to minimize potential impacts to these species.</p> | <p>Preconstruction surveys for the Aztec gilia and Brack's fishhook cactus would occur prior to surface disturbance activities within potentially suitable habitat. If applicable, appropriate protection measures would be implemented in order to minimize potential impacts to these species.</p> | <p>Preconstruction surveys for the Aztec gilia and Brack's fishhook cactus would occur prior to surface disturbance activities within potentially suitable habitat. If applicable, appropriate protection measures would be implemented in order to minimize potential impacts to these species.</p> |
| | <p>Bat roosting habitat - Surface disturbance activities at 64 work sites would result in the incremental long-term disturbance of approximately 45 acres of karst terrain that may provide suitable cave features for roosting bat species.</p> <p>Preconstruction monitoring would occur prior to surface disturbance activities within karst terrain that may provide suitable roosting habitat for bat species. If applicable, appropriate protection measures would be implemented in order to minimize potential impacts to roost sites or winter hibernacula. Because the probability of encountering a bat roost or hibernaculum is estimated to be low due to the small area of surface disturbance and based on the protection measures that have been developed for bats, overall impacts to bat species are expected to be low.</p> | <p>Bat roosting habitat - Surface disturbance activities would result in the incremental long-term disturbance of approximately 87 acres of karst terrain from pipeline construction activities. Surface disturbance at 44 work sites would result in the incremental long-term disturbance of approximately 31 acres of karst terrain.</p> <p>Preconstruction monitoring would occur prior to surface disturbance activities within karst terrain that may provide suitable roosting habitat for bat species. If applicable, appropriate protection measures would be implemented in order to minimize potential impacts to roost sites or winter hibernacula. Because the probability of encountering a bat roost or hibernaculum is estimated to be low due to the small area of surface disturbance and based on the protection measures that have been developed for bats, overall impacts to bat species are expected to be low.</p> | <p>Bat roosting habitat - Surface disturbance activities would result in the incremental long-term disturbance of approximately 12 acres of karst terrain from pipeline construction activities. Surface disturbance at 44 work sites would result in the incremental long-term disturbance of approximately 31 acres of karst terrain.</p> <p>Preconstruction monitoring would occur prior to surface disturbance activities within karst terrain that may provide suitable roosting habitat for bat species. If applicable, appropriate protection measures would be implemented in order to minimize potential impacts to roost sites or winter hibernacula. Because the probability of encountering a bat roost or hibernaculum is estimated to be low due to the small area of surface disturbance and based on the protection measures that have been developed for bats, overall impacts to bat species are expected to be low.</p> |
| | <p>Black-tailed prairie dog – Surface disturbance activities would result in the incremental short-term disturbance of 8 acres along the new southern pipeline extension.</p> | <p>Black-tailed prairie dog – Surface disturbance activities would result in the incremental short-term disturbance of 8 acres along the new southern pipeline extension.</p> | <p>Black-tailed prairie dog - Surface disturbance activities would result in the incremental short-term disturbance of 8 acres along the new southern pipeline extension.</p> |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|----------------------------|---|--|--|
| | <p>Direct impacts to individuals would occur as a result of crushing from construction activities, vehicles, and equipment. However, it would not be anticipated that construction activities would permanently alter prairie dog colonies that would be crossed by the project ROW. Furthermore, installation of the pipeline would not restrict the colonization of the ROW by prairie dogs.</p> <p>Although it is possible that some prairie dogs could be lost from the population as a result of construction activities, no significant population-level effects would be anticipated.</p> | <p>Direct impacts to individuals would occur as a result of crushing from construction activities, vehicles, and equipment. However, it would not be anticipated that construction activities would permanently alter prairie dog colonies that would be crossed by the project ROW. Furthermore, installation of the pipeline would not restrict the colonization of the ROW by prairie dogs.</p> <p>Although it is possible that some prairie dogs could be lost from the population as a result of construction activities, no significant population-level effects would be anticipated.</p> | <p>Direct impacts to individuals would occur as a result of crushing from construction activities, vehicles, and equipment. However, it would not be anticipated that construction activities would permanently alter prairie dog colonies that would be crossed by the project ROW. Furthermore, installation of the pipeline would not restrict the colonization of the ROW by prairie dogs.</p> <p>Although it is possible that some prairie dogs could be lost from the population as a result of construction activities, no significant population-level effects would be anticipated.</p> |
| | <p>Lesser prairie chicken – Surface disturbance activities at 105 work sites and at 1 pump station would result in the incremental long-term disturbance of 77 acres in designated prairie chicken habitat along the existing pipeline in southeastern New Mexico.</p> <p>Preconstruction surveys for breeding prairie chickens would occur prior to surface disturbance activities within potentially suitable habitat, depending on the time of construction activities. If applicable, appropriate protection measures would be implemented in order to minimize potential impacts to breeding prairie chickens.</p> <p>The expected surface disturbance represents a very small fraction (less than 1 percent) of the estimated 80 square miles of lesser prairie chicken habitat surrounding the pipeline ROW in southeastern New Mexico. As a result, potential disturbance to</p> | <p>Lesser prairie chicken – Surface disturbance activities at 105 work sites and at 1 pump station would result in the incremental long-term disturbance of 77 acres in designated prairie chicken habitat along the existing pipeline in southeastern New Mexico.</p> <p>Preconstruction surveys for breeding prairie chickens would occur prior to surface disturbance activities within potentially suitable habitat, depending on the time of construction activities. If applicable, appropriate protection measures would be implemented in order to minimize potential impacts to breeding prairie chickens.</p> <p>The expected surface disturbance represents a very small fraction (less than 1 percent) of the estimated 80 square miles of lesser prairie chicken habitat surrounding the pipeline ROW in southeastern New Mexico. As a result potential disturbance to</p> | <p>Lesser prairie chicken – Surface disturbance activities at 105 work sites and at 1 pump station would result in the incremental long-term disturbance of 77 acres in designated prairie chicken habitat along the existing pipeline in southeastern New Mexico.</p> <p>Preconstruction surveys for breeding prairie chickens would occur prior to surface disturbance activities within potentially suitable habitat, depending on the time of construction activities. If applicable, appropriate protection measures would be implemented in order to minimize potential impacts to breeding prairie chickens.</p> <p>The expected surface disturbance represents a very small fraction (less than 1 percent) of the estimated 80 square miles of lesser prairie chicken habitat surrounding the pipeline ROW in southeastern New Mexico. As a result potential disturbance to</p> |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|----------------------------|--|---|---|
| | <p>prairie chickens during the breeding and nesting season is expected to be low, based on the level of surface disturbance activities within breeding habitat and the low density of prairie chicken populations that currently occur within the project area. Consequently, the proposed surface disturbance on private and state land is not likely to reduce the population viability within this 80-square-mile local habitat area.</p> | <p>Prairie chickens during the breeding and nesting season is expected to be low, based on the level of surface disturbance activities within breeding habitat and the low density of prairie chicken populations that currently occur within the project area. Consequently, the proposed surface disturbance on private and state land is not likely to reduce the population viability within this 80-square-mile local habitat area.</p> | <p>prairie chickens during the breeding and nesting season is expected to be low, based on the level of surface disturbance activities within breeding habitat and the low density of prairie chicken populations that currently occur within the project area. Consequently, the proposed surface disturbance on private and state land is not likely to reduce the population viability within this 80-square-mile local habitat area.</p> |
| | <p>Sand dune lizard – Surface disturbance activities at 94 work sites would result in the incremental long-term disturbance of 67 acres along the existing pipeline in southeastern New Mexico.</p> <p>Special construction techniques have been developed to minimize potential impacts to the sand dune lizard and its habitat.</p> <p>The estimated surface disturbance represents a very small fraction (less than 1 percent) of the estimated 80 square miles of sand dune lizard habitat surrounding the pipeline ROW. Although some individuals could be injured or killed as a result of surface disturbance activities, the proposed surface disturbance is not likely to reduce the population viability of this species within this 80-square-mile local habitat area.</p> | <p>Sand dune lizard – Surface disturbance activities at 94 work sites would result in the incremental long-term disturbance of 67 acres along the existing pipeline in southeastern New Mexico.</p> <p>Special construction techniques have been developed to minimize potential impacts to the sand dune lizard and its habitat.</p> <p>The estimated surface disturbance represents a very small fraction (less than 1 percent) of the estimated 80 square miles of sand dune lizard habitat surrounding the pipeline ROW. Although some individuals could be injured or killed as a result of surface disturbance activities, the proposed surface disturbance is not likely to reduce the population viability of this species within this 80-square-mile local habitat area</p> | <p>Sand dune lizard - Surface disturbance activities at 94 work sites would result in the incremental long-term disturbance of 67 acres along the existing pipeline in southeastern New Mexico.</p> <p>Special construction techniques have been developed to minimize potential impacts to the sand dune lizard and its habitat.</p> <p>The estimated surface disturbance represents a very small fraction (less than 1 percent) of the estimated 80 square miles of sand dune lizard habitat surrounding the pipeline ROW. Although some individuals could be injured or killed as a result of surface disturbance activities, the proposed surface disturbance is not likely to reduce the population viability of this species within this 80-square-mile local habitat area</p> |
| | <p>Southwestern willow flycatcher, yellow-billed cuckoo – Surface disturbance activities at two work sites would result in the incremental long-term disturbance of 1 acre of potential habitat at the Rio Grande and Rio Puerco.</p> | <p>Southwestern willow flycatcher, yellow-billed cuckoo – Surface disturbance activities at two work sites would result in the incremental long-term disturbance of 1 acre of potential habitat at the Rio Grande and Rio Puerco.</p> | <p>Southwestern willow flycatcher, yellow-billed cuckoo – Surface disturbance activities at two work sites would result in the Incremental long-term disturbance of 1 acre of potential habitat at the Rio Grande and Rio Puerco.</p> |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|--|--|--|--|
| | <p>Preconstruction surveys for the southwestern willow flycatcher and the yellow-billed cuckoo would occur prior to surface disturbance activities within 0.5 mile of potentially suitable habitat, depending on the time of construction activities. If applicable, appropriate protection measures would be implemented to minimize potential impacts to these species.</p> | <p>Preconstruction surveys for the southwestern willow flycatcher and the yellow-billed cuckoo would occur prior to surface disturbance activities within 0.5 mile of potentially suitable habitat, depending on the time of construction activities. If applicable, appropriate protection measures would be implemented to minimize potential impacts to these species.</p> | <p>Preconstruction surveys for the southwestern willow flycatcher and the yellow-billed cuckoo would occur prior to surface disturbance activities within 0.5 mile of potentially suitable habitat, depending on the time of construction activities. If applicable, appropriate protection measures would be implemented to minimize potential impacts to these species.</p> |
| <p>Protection Measures to be implemented and effectiveness.</p> | <p>Protection measures for plants (pipeline rerouting, directional drilling, replanting) would be applied to avoid or reduce the loss of individual plants on federal lands.</p> <p>Protection measures for sensitive animal species would include spatial and temporal work restrictions, habitat restoration measures, and noise reduction measures.</p> <p>Projected habitat reductions are very small relative to remaining habitat, but would be long term because of the long recovery times for shrubs, and desert vegetation. Population-level reductions are not anticipated with application of protection measures for critical times and habitat components.</p> | <p>Protection measures for plants (pipeline rerouting, directional drilling, replanting) would be applied to avoid or reduce the loss of individual plants on federal lands.</p> <p>Protection measures for sensitive animal species would include spatial and temporal work restrictions, habitat restoration measures, and noise reduction measures.</p> <p>Projected habitat reductions are very small relative to remaining habitat, but would be long term because of the long recovery times for shrubs, and desert vegetation. Population-level reductions are not anticipated with application of protection measures for critical times and habitat components.</p> | <p>Protection measures for plants (pipeline rerouting, directional drilling, replanting) would be applied to avoid or reduce the loss of individual plants on federal lands.</p> <p>Protection measures for sensitive animal species would include spatial and temporal work restrictions, habitat restoration measures, and noise reduction measures.</p> <p>Projected habitat reductions are very small relative to remaining habitat, but would be long term because of the long recovery times for shrubs, and desert vegetation. Population-level reductions are not anticipated with application of protection measures for critical times and habitat components.</p> |
| <p>Spill effects on sensitive fish and aquatic invertebrate species.</p> | <p>The probability of a spill in the rivers supporting sensitive fish (Rio Grande, Pecos River) is very low (see fisheries above). In the event of a spill, some individuals of sensitive fish species could be injured or killed. It is unlikely that a spill would cause a long-term population-level reduction because of the populations remaining upstream of the pipeline crossing, mobility of river-inhabiting species, and frequent reproduction.</p> | <p>The probability of a spill in the rivers supporting sensitive fish (Rio Grande, Pecos River) is very low (see fisheries above). In the event of a spill, some individuals of sensitive fish species could be injured or killed. It is unlikely that a spill would cause a long-term population-level reduction because of the populations remaining upstream of the pipeline crossing, mobility of river-inhabiting species, and frequent reproduction.</p> | <p>The probability of a spill in the rivers supporting sensitive fish (Rio Grande, Pecos River) is very low (see fisheries above). In the event of a spill, some individuals of sensitive fish species could be injured or killed. It is unlikely that a spill would cause a long-term population-level reduction because of the populations remaining upstream of the pipeline crossing, mobility of river-inhabiting species, and frequent reproduction.</p> |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|--|---|---|---|
| | Aquatic invertebrate species inhabiting springs in the Bitter Lake Wildlife Refuge are not expected to be affected by pipeline spills because of the movement of contaminants in groundwater feeding these springs is very slow (hundreds of years), allowing adequate time for a spill response. | Aquatic invertebrate species inhabiting springs in the Bitter Lake Wildlife Refuge are not expected to be affected by pipeline spills because of the movement of contaminants in groundwater feeding these springs is very slow (hundreds of years), allowing adequate time for a spill response. | Aquatic invertebrate species inhabiting springs in the Bitter Lake Wildlife Refuge are not expected to be affected by pipeline spills because of the movement of contaminants in groundwater feeding these springs is very slow (hundreds of years), allowing adequate time for a spill response. |
| Land Use and Aesthetics | | | |
| Number of residences experiencing increases in noise and fugitive dust from pipeline and pump station construction equipment over a period of 5-10 days (pipeline) to 30-60 days (pump station). | 81 residences. See air quality above. | 326 residences. See air quality above | 131 residences. See air quality above |
| Surface disturbance in BLM Special Management Areas. | Construction of the northern pipeline extension and maintenance work sites along the existing pipeline would result in small (generally 10 acres or less) surface disturbance within existing utility corridors in 5 existing and 2 proposed BLM special management areas. These proposed surface disturbances would be consistent with current BLM visual resource management designations, and would either be located adjacent to existing roadways (e.g., Highway 550), or would not be seen from public roads. | Construction of the northern pipeline extension and maintenance work sites along the existing pipeline would result in small (generally 10 acres or less) surface disturbance within existing utility corridors in 5 existing and 2 proposed BLM special management areas. These proposed surface disturbances would be consistent with current BLM visual resource management designations, and would either be located adjacent to existing roadways (e.g., Highway 550), or would not be seen from public roads. | Construction of the northern pipeline extension and maintenance work sites along the existing pipeline would result in small (generally 10 acres or less) surface disturbance within existing utility corridors in 5 existing and 2 proposed BLM special management areas. These proposed surface disturbances would be consistent with current BLM visual resource management designations, and would either be located adjacent to existing roadways (e.g., Highway 550), or would not be seen from public roads. |
| Conversion of private land to long-term utility uses. | In mixed industrial and residential areas on the outskirts of Odessa, Texas, it is estimated that a maximum of 60 acres of this mixed-use area would be converted to utility uses by construction of the southern pipeline extension, and would not be available for residential or commercial uses during the pipeline operating life. This conversion represents a small fraction of the land available for development in the Midland-Odessa area. | In mixed industrial and residential areas on the outskirts of Odessa, Texas, it is estimated that a maximum of 60 acres of this mixed-use area would be converted to utility uses by construction of the southern pipeline extension, and would not be available for residential or commercial uses during the pipeline operating life. This conversion represents a small fraction of the land available for development in the Midland-Odessa area. | In mixed industrial and residential areas on the outskirts of Odessa, Texas, it is estimated that a maximum of 60 acres of this mixed-use area would be converted to utility uses by construction of the southern pipeline extension, and would not be available for residential or commercial uses during the pipeline operating life. This conversion represents a small fraction of the land available for development in the Midland-Odessa area. |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|--|--|--|--|
| Noise from pump station operations. | Shell has committed to mitigate noise from new pump stations to a level below 55 dBA at the nearest residence. At San Ysidro, the nearest residence would be located 0.06 mile from the new pump station, which would be co-located with an existing natural gas liquids station. The San Luis pump station would be collocated with an existing natural gas liquids pump station in the San Luis Cliff Window SMA, where noise from these units could be briefly heard by hikers traversing the Continental Divide Trail. | Shell has committed to mitigate noise from new pump stations to a level below 55 dBA at the nearest residence. At San Ysidro, the nearest residence would be located 0.06 mile from the new pump station, which would be co-located with an existing natural gas liquids station. The San Luis pump station would be collocated with an existing natural gas liquids pump station in the San Luis Cliff Window SMA, where noise from these units could be briefly heard by hikers traversing the Continental Divide Trail. | Shell has committed to mitigate noise from new pump stations to a level below 55 dBA at the nearest residence. At San Ysidro, the nearest residence would be located 0.06 mile from the new pump station, which would be co-located with an existing natural gas liquids station. The San Luis pump station would be collocated with an existing natural gas liquids pump station in the San Luis Cliff Window SMA, where noise from these units could be briefly heard by hikers traversing the Continental Divide Trail. |
| Transportation | | | |
| Road crossings during construction. | 172 secondary public roads that would be crossed by the pipeline extensions would be trenched to install pipe. Shell would provide at least one traffic lane, or detours to maintain traffic flow. Shell would notify private owners 14 days in advance of crossing private roads to ensure continued access. | 219 secondary public roads that would be crossed by the pipeline extensions and pipeline replacement segment would be trenched to install pipe. Shell would provide at least one traffic lane, or detours to maintain traffic flow. Shell would notify private owners 14 days in advance of crossing private roads to ensure continued access. | 190 secondary public roads that would be crossed by the pipeline extensions and rerouted pipeline segment would be trenched to install pipe. Shell would provide at least one traffic lane, or detours to maintain traffic flow. Shell would notify private owners 14 days in advance of crossing private roads to ensure continued access. |
| Increases in truck traffic at Moriarty and Bloomfield terminals. | Approximately 83 single tanker trucks per day (based on 15,000 barrels delivered to the terminal per day) would be used to transport petroleum products from the Moriarty terminal via an existing I-40 interchange north of the terminal. A comparable number of trucks would visit the Bloomfield terminal, and would turn either east or west onto New Mexico Highway 64 at Bloomfield. The number of tanker trucks would increase over time as product deliveries to the terminal increased. | Approximately 83 single tanker trucks per day (based on 15,000 barrels delivered to the terminal per day) would be used to transport petroleum products from the Moriarty terminal via an existing I-40 interchange north of the terminal. A comparable number of trucks would visit the Bloomfield terminal, and would turn either east or west onto New Mexico Highway 64 at Bloomfield. The number of tanker trucks would increase over time as product deliveries to the terminal increased. | Approximately 83 single tanker trucks per day (based on 15,000 barrels delivered to the terminal per day) would be used to transport petroleum products from the Moriarty terminal via an existing I-40 interchange north of the terminal. A comparable number of trucks would visit the Bloomfield terminal, and would turn either east or west onto New Mexico Highway 64 at Bloomfield. The number of tanker trucks would increase over time as product deliveries to the terminal increased. |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|---|--|--|--|
| Cultural Resources | | | |
| Number of National Register of Historic Places (NRHP) sites potentially affected by construction; Potential effects to these sites. | The cultural resource inventory is not complete for the existing pipeline. Twenty-four NRHP-eligible sites were located during cultural resource pedestrian surveys for the pipeline extensions. | The cultural resource inventory is not complete for the existing pipeline. Twenty-four NRHP-eligible sites were located during cultural resource surveys for the pipeline extensions. | The cultural resource inventory is not complete for the existing pipeline and the 43-mile reroute segment. Twenty-four NRHP-eligible sites were located during cultural resource surveys for the pipeline extensions. |
| | Cultural resource sites could be modified by construction surface disturbance, and unanticipated discovery of buried cultural resources, including human remains. Adverse effects to NRHP-eligible archaeological and historic sites would be reduced by site avoidance or implementation of proposed data recovery procedures outlined in Shell's Cultural Resources Management Plan. | Cultural resource sites could be modified by construction surface disturbance, and unanticipated discovery of buried cultural resources, including human remains. Adverse effects to NRHP-eligible archaeological and historic sites would be reduced by site avoidance or implementation of proposed data recovery procedures outlined in Shell's Cultural Resources Management Plan. | Cultural resource sites could be modified by construction surface disturbance, and unanticipated discovery of buried cultural resources, including human remains. Adverse effects to NRHP-eligible archaeological and historic sites would be reduced by site avoidance or implementation of proposed data recovery procedures outlined in Shell's Cultural Resources Management Plan. |
| Native American Concerns | | | |
| Status of tribal consultation. | Tribal consultation has been initiated by BLM with those tribes recognized as having a past or present affiliation with NMPP project area. Efforts will continue to identify places of traditional cultural significance to Native American tribes through government-to-government consultation. At this time, none of the tribes asked to participate in the consultation process have identified any traditional properties that may be affected by the NMPP project. | Tribal consultation has been initiated by BLM with those tribes recognized as having a past or present affiliation with NMPP project area. Efforts will continue to identify places of traditional cultural significance to Native American tribes through government-to-government consultation. At this time, none of the tribes asked to participate in the consultation process have identified any traditional properties that may be affected by the NMPP project. | Tribal consultation has been initiated by BLM with those tribes recognized as having a past or present affiliation with NMPP project area. Efforts will continue to identify places of traditional cultural significance to Native American tribes through government-to-government consultation. At this time, none of the tribes asked to participate in the consultation process have identified any traditional properties that may be affected by the NMPP project. |
| Social and Economic Conditions | | | |
| Infrastructure and fiscal effects. | Construction work forces for the pipeline extensions, pump stations, and terminal would be relatively small (50 to 200 workers) and dispersed across the states of Texas and New Mexico. Demands on local services would be temporary and local goods and services purchased by the project are estimated to be \$1 million in Texas, and \$2 million in | Construction work forces for the pipeline extensions, pump stations, and terminal would be relatively small (50 to 200 workers) and dispersed across the states of Texas and New Mexico. Demands on local services would be temporary and local goods and services purchased by the project are estimated to be \$1 million in Texas, and \$2 million in | Construction work forces for the pipeline extensions, pump stations, and terminal would be relatively small (50 to 200 workers) and dispersed across the states of Texas and New Mexico. Demands on local services would be temporary and local goods and services purchased by the project are estimated to be \$1 million in Texas, and \$2 million in |

Table ES-8 (Continued)

| Resource/Impact Indicators | Proposed Action | Pipeline Replacement Alternative | Pipeline Reroute Alternative |
|---|---|---|---|
| | New Mexico. It is estimated that a maximum amount of \$614,000 and \$708,000 in property taxes would be paid by Shell in Texas and New Mexico, respectively. | New Mexico. It is estimated that a maximum amount of \$614,000 and \$708,000 in property taxes would be paid by Shell in Texas and New Mexico, respectively. Property taxes could be slightly greater because the valuation of replacement pipe may be greater than existing pipe. This potential valuation difference would apply to Sandoval, Bernalillo, Santa Fe, and Tarrant counties, New Mexico. | New Mexico. It is estimated that a maximum amount of \$614,000 and \$708,000 in property taxes would be paid by Shell in Texas and New Mexico, respectively. Property taxes could be slightly greater because the valuation of replacement pipe may be greater than existing pipe. This potential valuation difference would apply to Sandoval, Bernalillo, Santa Fe, and Tarrant counties, New Mexico. |
| Environmental Justice (Disproportional project effects on minority and low income communities). | Proposed project facilities would not be located in or near communities or residential areas with a high fraction of minority and low income people. | Proposed project facilities would not be located in or near communities or residential areas with a high fraction of minority and low income people. | Proposed project facilities would not be located in or near communities or residential areas with a high fraction of minority and low income people. |
| Hazardous Materials and Waste | | | |
| Spills of hazardous materials during construction. | There is a risk that fuel and other hazardous materials could be spill during construction activities. Shell's Hazardous Material and Refuse Disposal Plan identifies types of hazardous materials to be handled, spill reporting, storage, and responses to spills. Implementation of this plan would reduce the potential for spills in sensitive areas, but would not entirely prevent spills or ensure proper waste disposal. | There is a risk that fuel and other hazardous materials could be spill during construction activities. Shell's Hazardous Material and Refuse Disposal Plan identifies types of hazardous materials to be handled, spill reporting, storage, and responses to spills. Implementation of this plan would reduce the potential for spills in sensitive areas, but would not entirely prevent spills or ensure proper waste disposal. | There is a risk that fuel and other hazardous materials could be spill during construction activities. Shell's Hazardous Material and Refuse Disposal Plan identifies types of hazardous materials to be handled, spill reporting, storage, and responses to spills. Implementation of this plan would reduce the potential for spills in sensitive areas, but would not entirely prevent spills or ensure proper waste disposal. |
| Facility construction on areas of known soil and water contamination. | Construction, operation, and maintenance of the proposed pipeline and ancillary facilities would not be located over any known areas of soil or groundwater contamination, based on review of USEPA Superfund Site Status Summaries. | Construction, operation, and maintenance of the proposed pipeline and ancillary facilities would not be located over any known areas of soil or groundwater contamination, based on review of USEPA Superfund Site Status Summaries. | Construction, operation, and maintenance of the proposed pipeline and ancillary facilities would not be located over any known areas of soil or groundwater contamination, based on review of USEPA Superfund Site Status Summaries. |

**Table ES-9
Impact Summary for the Proposed NMPP Powerlines**

| Project Description | |
|--|---|
| Facilities/Location/ Size/ Length | Facilities / Number of Poles/ Surface Disturbance / Land Ownership |
| <u>Transmission Line</u> (100-foot-wide construction ROW) <ul style="list-style-type: none"> Willard-to-Mesa – Torrance, Chaves, Lincoln, Guadalupe counties (115 kV, 108 miles) | <u>Transmission Line</u> <ul style="list-style-type: none"> Willard-to-Mesa (760 poles, 87 acres) Ownership: BLM – 22 miles; State – 7 miles; Private – 79 miles |
| <u>Distribution Lines</u> (50-foot-wide construction ROW) <ul style="list-style-type: none"> Maljamar – Lea Co., NM (12.5 kV, 5 miles, 4 acres) | <u>Distribution Lines</u> <ul style="list-style-type: none"> Maljamar (59 poles; 4 acres) Ownership: BLM – 5 miles |
| <ul style="list-style-type: none"> Pecos River – Chaves Co., NM (7.2 kV, 2 miles) | <ul style="list-style-type: none"> Pecos River (32 poles, 2 acres) Ownership: Private – 1 mile, State – 0.4 mile |
| <ul style="list-style-type: none"> Moriarty Densitometer – Torrance Co., NM (7.2 kV, 2 miles) | <ul style="list-style-type: none"> Moriarty Densitometer (42 poles, 2 acres) Ownership: Private – 1 mile; State – 1 mile |
| <ul style="list-style-type: none"> San Luis Pump Station – Sandoval Co., NM (24.9 kV, 0.5 mile) | <ul style="list-style-type: none"> San Luis Pump Station (13 poles, 0.6 acre) Ownership: BLM – 0.5 mile |
| Bloomfield Meter Station – San Juan Co., NM (0.48 kV, 0.2 mile) | <ul style="list-style-type: none"> Bloomfield Meter Station (5 poles, 0.2 acre) Ownership: Private – 0.2 mile |
| <u>Service Drops</u> – 50-foot-wide construction ROW Ector Co., TX; Lea, Chaves, Torrance, Bernalillo, Sandoval, McKinley, and San Juan counties, NM | |
| 16 drops (range in service from 0.48 kV to 115 kV; 0.1 mile total length for all drops; total of 32 poles; surface disturbance of 0.1 acre) | |
| | |
| Resource/Impact Indicators | Impact Summary |
| Public Health and Safety | |
| Electrocution hazards to residential/commercial areas. | No residences or commercial facilities would be located under or near (300 feet) of any of the proposed transmission line, distribution powerlines, or service drops. |
| Potential damage to powerline facilities from natural hazards that could cause interruptions in service. | Surface subsidence or surface collapses above subsurface voids could affect the Willard-to-Mesa transmission line pole stability in karst terrain over a distance of approximately 61 miles. Pre-construction surveys and pole-relocations would avoid this hazard. |

Table ES-9 (Continued)

| Resource/Impact Indicators | Impact Summary |
|--|---|
| Climate and Air Quality | |
| Number of miles of new transmission and powerline construction requiring large equipment (trucks, backhoes, drilling equipment, small cranes). | Larger equipment needed for construction of the 108 miles of the Willard-to-Mesa transmission line, and of the 9 miles of power distribution lines and services drops would emit CO, NO _x , unburned hydrocarbons, and generate fugitive dust over a period of 1 to 5 days at any particular location. |
| Mineral Resources | |
| Estimated area of economically recoverable mineral resources underlying the transmission line, distribution powerlines, and service drops. | No known economically recoverable mineral resources underlie the proposed facilities. |
| Paleontological Resources | |
| Miles of BLM Condition 1 and 2 fossil formations crossed by the new transmission line, distribution powerlines, and service drops. | Approximately 0.6 mile of the San Luis pump station distribution line and 0.3 mile of the Bloomfield distribution line would be located on Condition 1 fossil formations. Approximately 57 miles of Condition 2 fossil formations would be crossed by the Willard-to-Mesa transmission line. Paleontological monitoring could be required on BLM lands at pole excavations along 0.5 mile (about 0.6 acre) of the San Luis distribution line, and 22 miles (about 27 acres) of the Willard-to-Mesa transmission line. Paleontological monitoring on approximately 50 miles of private and state lands would not be required, and any excavated fossils may be destroyed. |
| Soils | |
| Area of sensitive soils (difficult to stabilize or reclaim) that would be disturbed by project construction. | The Maljamar distribution line would cross 5 miles of sandy soils; the Willard-to-Mesa transmission line and Pecos River distribution line would cross 62 miles of calcareous soils. Of this total, 27 miles would be located on federal land subject to standard revegetation measures; the remaining 50 miles would be revegetated in accordance with private land easements and state land leases, where revegetation measures may or may not be comparable to those on federal lands. Total surface disturbance is estimated to be 97 acres, with an average pole surface disturbance about 0.1 acre, which represents a very small new disturbance relative to adjacent undisturbed rangeland. |
| Water Resources | |
| Surface disturbance within perennial streams. | The proposed electrical transmission facilities would not be located in or near any perennial streams. |

Table ES-9 (Continued)

| Resource/Impact Indicators | Impact Summary |
|---|---|
| Vegetation, Livestock Grazing, Noxious and Invasive Weeds, Wetlands | |
| Acres of native vegetation disturbed / vegetation recovery rates / livestock forage reductions / noxious weed invasion/ wetlands disturbed. | About 97 acres of native vegetation would be removed to install transmission line, distribution lines, and service drops. Construction equipment would drive along 117 miles of construction ROW, but would not require new access roads. The majority of this acreage would be in plains mesa grassland (70 percent), low shrublands (28 percent), and juniper woodland (2 percent). It is estimated that with the application of standard BLM revegetation measures the herbaceous component can recover in 3 to 5 years, the shrub component in 5 to 15 years; and trees within woodlands in 25 to 50 years. Assuming that each acre of these rangelands can support about 15 animals per unit month (AUM), the short-term forage loss would be 6 AUMs per year for about 5 years. Noxious weed populations may be present along the construction alignments, but would not be spread into new areas by implementing equipment cleaning measures. No poles would be placed in wetlands; it is likely that construction equipment would be driven across intermittently wet areas such as playas and intermittently flowing drainages. No filling activities subject to Corps of Engineers permits would be undertaken. |
| Wildlife and Fisheries | |
| Wildlife habitat reductions | About 97 acres of general wildlife habitat would be removed over a distance of 117 miles. Construction equipment would drive along 117 miles of construction ROW, but would not require new access roads. There would be short-term (several day) displacement of mobile species; and potential losses of individuals of less mobile species from equipment passage along the construction ROW. The small, isolated surface disturbances and short duration of construction activities would not cause short- or long-term changes in the overall population viability of any wildlife species. |
| Risks of raptor electrocution and raptor collisions | Conductor separation measures and perching prevention would be applied to electrical distribution lines to prevent electrocutions; added conductor visibility measures would be applied in areas of high potential for raptor collisions. |

Table ES-9 (Continued)

| Resource/Impact Indicators | Impact Summary |
|-----------------------------------|---|
| Sensitive Species | |
| Habitat reductions or disturbance | <p>Bat roosting habitat – 61 miles of karst terrain in southeastern New Mexico crossed by the Willard-Mesa transmission line. Preconstruction monitoring would occur prior to surface disturbance activities within karst terrain that may provide suitable roosting habitat for bat species. If applicable, appropriate protection measures, including spatial and temporal measures, would be implemented in order to minimize potential impacts to roost sites or winter hibernacula. Because the probability of encountering a bat roost or hibernacula is estimated to be low due to the small area of surface disturbance, and based on the protection measures that have been developed for bats, overall impacted to bat species are expected to be low.</p> |
| | <p>Lesser prairie chicken – The Maljamar powerline would cross 5 miles of lesser prairie chicken habitats in southeastern New Mexico. Preconstruction surveys for breeding prairie chickens would occur prior to surface disturbance activities within potentially suitable habitat, depending on the time of construction activities. If appropriate, applicable protection measures, including spatial and temporal measures, would be implemented in order to minimize potential impacts to breeding prairie chickens.</p> <p>The expected surface disturbance represents a small fraction (less than 1 percent) of the estimated 80 square miles of prairie chicken habitat in proximity to the project area. Nevertheless, the Maljamar electrical powerline would result in an incremental long-term increase in habitat fragmentation within lesser prairie chicken habitat. In order to minimize potential habitat fragmentation from the construction and operation of powerline, applicable protection measures, including placement of the Maljamar powerline and the development of adequate raptor proofing devices on powerlines, would be implemented to minimize potential impacts to prairie chicken habitat. Protection measures also have been developed to minimize potential collision impacts to prairie chickens along the Maljamar powerline.</p> |
| | <p>Sand dune lizard - The Maljamar powerline would cross 5 miles of sand dune lizard habitat in southeastern New Mexico.</p> |

Table ES-9 (Continued)

| Resource/Impact Indicators | Impact Summary |
|---|---|
| | The estimated surface disturbance represents a very small fraction (less than 1 percent) of the estimated 80 square miles of sand dune lizard habitat in proximity to the project area. Nevertheless special construction techniques have been developed to minimize potential impacts to the sand dune lizard and its habitat along powerline corridor. Although some individuals could be injured or killed as a result of construction activities, the proposed surface disturbance is not likely to reduce the population viability within the 80-square-mile local habitat area. |
| Land Use | |
| Surface disturbance/Visual resource changes in BLM Special Management Areas | The San Luis pump station powerline would be visible to recreational users of the Continental Divide Trail for a short interval along the trail (1 to 2 miles). All proposed powerlines on BLM lands would be located within Visual Resource Management Class III or IV, which allows the visual contrast modifications caused by these facilities. |
| Land use conversion to utility uses on private lands | The proposed transmission line and powerlines would require a permanent ROW on 82 miles of private lands. None of the existing uses (rangeland) would be changed by installation of these facilities. |
| Transportation | |
| Access road requirements | Existing access roads will be used for construction, operation, and maintenance of the proposed electrical powerline facilities. While maintenance equipment may periodically drive along the ROW, no permanent new roads would be required. |
| Cultural Resources | |
| Number of National Register Historic Places (NRHP) sites potentially affected by construction; potential effects to these sites | Thirteen archaeological sites were located along the Willard-to-Mesa transmission line during field surveys. Ten of these sites were evaluated as potentially NRHP-eligible, and avoidance was recommended. |

Table ES-9 (Continued)

| Resource/Impact Indicators | Impact Summary |
|--|--|
| | Cultural resource sites could be modified by construction surface disturbance, and unanticipated discovery of buried cultural resources, including human remains. Adverse effects to NRHP-eligible archaeological and historic sites would be reduced by site avoidance or implementation of approved data recovery procedures outlined in a Cultural Resources Management Plan approved by the BLM and appropriate consulting parties. |
| Native American Consultation | |
| Status of tribal consultation | Tribal consultation has been initiated by the BLM with those tribes recognized as having a past or present affiliation with the NMPP project area, including transmissions lines and powerlines. Efforts will continue to identify places of traditional cultural significance to Native American tribes through government-to-government consultation. At this time, none of the tribes asked to participate in the consultation process have identified any traditional properties that may be affected by the NMPP project. |
| Social and Economic Conditions. | |
| Fiscal and infrastructure effects; Environmental Justice | Construction of these facilities would increase the tax base of the counties in which they would be built. The increased assessed value of these facilities is not known, but would represent a minor (less than one percent) tax base increase in the counties crossed. It is estimated that a crew of 40 workers would construct the Willard-to-Mesa powerline in about 15 months. Workers would spend a portion of their income in nearby communities, but overall fiscal impacts would be minor. One community (Willard) with a large fraction of minority residents would be avoided by project facilities. |
| Hazardous Materials and Waste | |
| Spills of hazardous materials during construction | There is a risk that fuel and other hazardous materials could be spilled during construction activities. A Hazardous Material and Refuse Disposal Plan that identifies types of hazardous materials to be handled, spill reporting, and responses to spills would be prepared and approved by BLM prior to construction. Implementation of this plan would reduce the potential for spills in sensitive areas, but would not entirely prevent spills or ensure proper waste disposal. |

Table ES-9 (Continued)

| Resource/Impact Indicators | Impact Summary |
|--|---|
| Facility construction on areas of known soil and water contamination. | Construction, operation, and maintenance of the proposed transmission line and powerlines would not be located over any known areas of soil or groundwater contamination, based on review of USEPA Superfund Site Status Summaries. |
| Alternatives Comparison | |
| <p>Willard-to-Mesa Alternative Transmission Line Alignment (110 miles) This alternative was developed to minimize disturbance within large and unique playas near Willard.</p> <p>The major differences between the proposed alignment and the alternative include:</p> <ul style="list-style-type: none"> • The alternative alignment is approximately 2 miles longer, resulting in slightly greater surface disturbance from pole placement, and cross-country travel by construction equipment. The alternative would cross the same soils and vegetation communities as the proposed alignment, except where the alternative would be located adjacent to a railroad utility corridor rather than creating a new 8-mile ROW across an undisturbed playa. • Co-location of the alternative transmission line with an existing utility is expected to reduce the migratory bird collision hazard over flyways across playas. These collision hazards would primarily occur when the playas are filled with water after wet seasons. | |

TABLE OF CONTENTS
VOLUME I

EXECUTIVE SUMMARY ES-1

1.0 INTRODUCTION 1-1

1.1 Introduction..... 1-1

1.2 Purpose and Need for the Project..... 1-4

1.3 Decisions Needed..... 1-5

1.3.1 Bureau of Land Management..... 1-6

1.3.2 Bureau of Indian Affairs 1-6

1.4 Federal Approval Process and Authorizing Actions 1-6

1.4.1 Bureau of Land Management..... 1-6

1.4.2 Bureau of Indian Affairs 1-7

1.4.3 U.S. Forest Service..... 1-7

1.4.4 Advisory Council on Historic Preservation..... 1-8

1.4.5 U.S. Fish and Wildlife Service 1-8

1.4.6 U.S. Army Corps of Engineers Section 404 Nationwide Permits Under the
Clean Water Act..... 1-9

1.4.7 Office of Pipeline Safety 1-9

1.5 Permits and Relationship to Non-Federal Policies, Plans, and Programs..... 1-9

1.6 ROW Easement Acquisition Process..... 1-9

1.7 Scoping and Issues..... 1-13

1.7.1 Public Participation and Scoping Meetings 1-13

1.7.2 Issues and Document Organization..... 1-13

2.0 ALTERNATIVES 2-1

2.1 Management Common to All Alternatives 2-1

2.2 Proposed Action..... 2-2

2.2.1 Construction and Pre-Operational Maintenance 2-10

2.2.1.1 Existing Pipeline..... 2-12

2.2.1.2 New Pipeline and Ancillary Facilities 2-12

2.2.1.3 Pre-Operational Testing and Valve Installation 2-33

2.2.1.4 Reclamation 2-38

2.2.2 Normal System Operation and Routine Maintenance..... 2-40

2.2.2.1 Pipeline System 2-41

2.2.2.2 Terminal and Metering Facilities 2-48

2.2.2.3 Pump Stations and Pressure Control Stations 2-49

2.2.3 Abnormal Operations, Leak Detection, and Emergency Procedures..... 2-49

2.2.3.1 Abnormal Operations and Leak Detection..... 2-49

2.2.3.2 Spill Response and Remediation 2-54

2.3 Alternative Formulation and Screening Process 2-60

2.4 No Action Alternative 2-62

2.5 Pipeline Alternatives 2-64

2.5.1 Pipeline Replacement In Sensitive Resource Areas..... 2-64

TABLE OF CONTENTS

| | | |
|------------|---|------------|
| 2.5.2 | Pipeline Reroute in Sensitive Resource Areas..... | 2-65 |
| 2.5.3 | Proposed Action with Enhanced Safety Mitigation Measures | 2-65 |
| 2.6 | Electrical Transmission Powerline Alternatives | 2-71 |
| 2.7 | Alternatives Considered but Eliminated | 2-71 |
| 2.8 | Comparison of Environmental Consequences | 2-73 |
| 3.0 | AFFECTED ENVIRONMENT | 3-1 |
| 3.1 | Introduction..... | 3-1 |
| 3.2 | Public Health and Safety | 3-2 |
| 3.2.1 | Factors Affecting Public Health and Safety Risk from Petroleum Products Pipelines..... | 3-2 |
| 3.2.1.1 | Evolution of Pipe Materials, Fabrication Methods, and Industry Regulations | 3-2 |
| 3.2.2 | Causes of Accidents..... | 3-9 |
| 3.2.3 | Baseline Transportation Accident Rates..... | 3-9 |
| 3.2.4 | Petroleum Product Pipeline Accident Rates..... | 3-11 |
| 3.2.4.1 | Accident Rates Estimated from Incident Databases | 3-12 |
| 3.2.4.2 | Texas-New Mexico Pipeline Operating History | 3-15 |
| 3.2.4.3 | Recent NMPP Pipeline Integrity Tests..... | 3-17 |
| 3.2.5 | Petroleum Product Pipeline Spill Volumes | 3-20 |
| 3.2.6 | Petroleum Product Pipeline Fires and Explosions | 3-20 |
| 3.2.7 | Petroleum Product Terminals and Pump Station Accidents | 3-20 |
| 3.2.8 | Petroleum Product Trucking Accidents..... | 3-22 |
| 3.2.9 | Natural Hazards..... | 3-22 |
| 3.2.9.1 | Seismicity and Faults..... | 3-23 |
| 3.2.9.2 | Landslides..... | 3-24 |
| 3.2.9.3 | Karst..... | 3-24 |
| 3.2.9.4 | Flooding and Incised Channels..... | 3-27 |
| 3.2.10 | Environmentally Sensitive Resources Along the NMPP Route | 3-28 |
| 3.3 | Climate and Air Quality | 3-30 |
| 3.4 | Mineral Resources | 3-32 |
| 3.4.1 | Leasable Minerals..... | 3-32 |
| 3.4.1.1 | Oil and Natural Gas | 3-32 |
| 3.4.1.2 | Coal | 3-32 |
| 3.4.1.3 | Non-Energy Leasable Minerals..... | 3-33 |
| 3.4.2 | Locatable Minerals..... | 3-33 |
| 3.4.3 | Saleable Minerals | 3-33 |
| 3.5 | Paleontological Resources | 3-35 |
| 3.6 | Soils..... | 3-40 |
| 3.7 | Water Resources, Quality and Quantity..... | 3-44 |
| 3.7.1 | Surface Water | 3-44 |
| 3.7.2 | Groundwater | 3-45 |
| 3.7.2.1 | Aquifers | 3-45 |
| 3.7.3 | Depth of Water in Groundwater Wells | 3-52 |
| 3.7.4 | Wetlands, Floodplains and Riparian Zones..... | 3-53 |

TABLE OF CONTENTS

| | | |
|------------|---|------------|
| 3.8 | Vegetation, Livestock Grazing, Noxious and Invasive Weeds | 3-55 |
| 3.9 | Wildlife and Fisheries | 3-59 |
| 3.9.1 | Terrestrial Wildlife | 3-59 |
| 3.9.1.1 | Big Game | 3-59 |
| 3.9.1.2 | Small Game Species | 3-60 |
| 3.9.1.3 | Nongame Species | 3-60 |
| 3.9.2 | Aquatic Resources | 3-61 |
| 3.9.3 | Sensitive Species | 3-62 |
| 3.9.3.1 | Plant Species | 3-62 |
| 3.9.3.2 | Terrestrial and Aquatic Species | 3-62 |
| 3.10 | Land Use and Aesthetics | 3-73 |
| 3.10.1 | Land Ownership and Use | 3-73 |
| 3.10.2 | Rangeland/Agriculture | 3-73 |
| 3.10.3 | Residential/Commercial Areas | 3-73 |
| 3.10.4 | Special Designations, Recreation, and Visual Resources | 3-74 |
| 3.10.5 | Noise | 3-76 |
| 3.11 | Transportation | 3-79 |
| 3.12 | Cultural Resources | 3-80 |
| 3.12.1 | Protection of Cultural Resources | 3-80 |
| 3.12.2 | Cultural Overview | 3-80 |
| 3.12.2.1 | Paleoindian Period (12,000 to 7,500 years ago) | 3-80 |
| 3.12.2.2 | Archaic Period (7,500 to 1,600 years ago) | 3-81 |
| 3.12.2.3 | Late Prehistoric Period (1,600 to 450 years ago) | 3-81 |
| 3.12.2.4 | Historic Period (450 years ago to the present) | 3-82 |
| 3.12.3 | Archaeological and Historic Resources | 3-83 |
| 3.13 | Native American Consultation | 3-85 |
| 3.14 | Social and Economic Conditions | 3-86 |
| 3.14.1 | Population, Employment and Income | 3-86 |
| 3.14.2 | Public Finance and Revenue | 3-86 |
| 3.14.3 | Environmental Justice | 3-89 |
| 3.15 | Hazardous Waste and Materials | 3-92 |
| 4.0 | ENVIRONMENTAL CONSEQUENCES | 4-1 |
| 4.1 | Introduction | 4-1 |
| 4.1.1 | Analysis Assumptions and Guidelines | 4-1 |
| 4.1.2 | Chapter Structure | 4-2 |
| 4.2 | Proposed Action and Pipeline Alternatives | 4-2 |
| 4.2.1 | Public Health and Safety | 4-2 |
| 4.2.1.1 | Proposed Action | 4-3 |
| 4.2.1.2 | Pipeline Replacement Alternative | 4-15 |
| 4.2.1.3 | Pipeline Reroute Alternative | 4-21 |
| 4.2.2 | Climate and Air Quality | 4-24 |
| 4.2.2.1 | Proposed Action | 4-24 |
| 4.2.2.2 | Pipeline Replacement Alternative | 4-25 |
| 4.2.2.3 | Pipeline Reroute Alternative | 4-26 |

TABLE OF CONTENTS

| | | |
|----------|--|------|
| 4.2.3 | Mineral Resources..... | 4-26 |
| 4.2.3.1 | Proposed Action | 4-26 |
| 4.2.3.2 | Pipeline Replacement Alternative | 4-27 |
| 4.2.3.3 | Pipeline Reroute Alternative..... | 4-28 |
| 4.2.4 | Paleontological Resources..... | 4-28 |
| 4.2.4.1 | Proposed Action | 4-28 |
| 4.2.4.2 | Pipeline Replacement Alternative | 4-30 |
| 4.2.4.3 | Pipeline Reroute Alternative..... | 4-30 |
| 4.2.5 | Soils..... | 4-31 |
| 4.2.5.1 | Proposed Action | 4-31 |
| 4.2.5.2 | Pipeline Replacement Alternative | 4-34 |
| 4.2.5.3 | Pipeline Reroute Alternative..... | 4-36 |
| 4.2.6 | Water Resources, Quantity and Quality | 4-36 |
| 4.2.6.1 | Proposed Action | 4-36 |
| 4.2.6.2 | Pipeline Replacement Alternative | 4-46 |
| 4.2.6.3 | Pipeline Reroute Alternative..... | 4-47 |
| 4.2.7 | Vegetation, Livestock Grazing, Noxious and Invasive Weeds..... | 4-47 |
| 4.2.7.1 | Proposed Action | 4-47 |
| 4.2.7.2 | Pipeline Replacement Alternative | 4-50 |
| 4.2.7.3 | Pipeline Reroute Alternative..... | 4-50 |
| 4.2.8 | Wildlife and Fisheries | 4-51 |
| 4.2.8.1 | Terrestrial Wildlife | 4-51 |
| 4.2.8.2 | Aquatic Resources..... | 4-53 |
| 4.2.8.3 | Sensitive Species | 4-61 |
| 4.2.9 | Land Use and Aesthetics | 4-78 |
| 4.2.9.1 | Proposed Action | 4-78 |
| 4.2.9.2 | Pipeline Replacement Alternative | 4-83 |
| 4.2.9.3 | Pipeline Reroute Alternative..... | 4-83 |
| 4.2.10 | Transportation..... | 4-84 |
| 4.2.10.1 | Proposed Action | 4-84 |
| 4.2.10.2 | Pipeline Replacement Alternative | 4-84 |
| 4.2.10.3 | Pipeline Reroute Alternative..... | 4-85 |
| 4.2.11 | Cultural Resources | 4-85 |
| 4.2.11.1 | Proposed Action | 4-85 |
| 4.2.11.2 | Pipeline Replacement Alternative | 4-88 |
| 4.2.11.3 | Pipeline Reroute Alternative..... | 4-88 |
| 4.2.12 | Native American Concerns | 4-88 |
| 4.2.12.1 | Proposed Action | 4-88 |
| 4.2.12.2 | Pipeline Replacement Alternative | 4-89 |
| 4.2.12.3 | Pipeline Reroute Alternative..... | 4-89 |
| 4.2.13 | Social and Economic Conditions | 4-89 |
| 4.2.13.1 | Proposed Action | 4-89 |
| 4.2.13.2 | Pipeline Replacement Alternative | 4-91 |
| 4.2.13.3 | Pipeline Reroute Alternative..... | 4-91 |

TABLE OF CONTENTS

| | |
|--|------------|
| 4.2.14 Hazardous Materials and Waste | 4-91 |
| 4.2.14.1 Proposed Action | 4-91 |
| 4.2.14.2 Pipeline Replacement Alternative | 4-92 |
| 4.2.14.3 Pipeline Reroute Alternative | 4-92 |
| 4.3 Proposed Action with Enhanced Safety Mitigation Measures | 4-92 |
| 4.4 No Action Alternative | 4-93 |
| 4.4.1 Current and Future Risk in Central New Mexico | 4-93 |
| 4.4.2 Current and Future Risk in the Four Corners Region | 4-101 |
| 4.4.3 Overall Risk | 4-103 |
| 4.4.4 Environmental Consequences | 4-103 |
| 5.0 CUMULATIVE IMPACTS | 5-1 |
| 5.1 Co-located Pipelines | 5-1 |
| 5.2 Transportation Risks Beyond the Four Corners Area | 5-3 |
| 6.0 UNAVOIDABLE ADVERSE IMPACTS | 6-1 |
| 7.0 IRREVERSIBLE/IRRETRIEVABLE COMMITMENT OF RESOURCES | 7-1 |
| 8.0 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY | 8-1 |
| 9.0 ELECTRICAL POWERLINES | 9-1 |
| 9.1 Electrical Powerline Land Requirements | 9-1 |
| 9.1.1 Maljamar Electrical Distribution Powerline | 9-1 |
| 9.1.2 Pecos River Motor Operated Valve Electrical Distribution Powerline | 9-1 |
| 9.1.3 Willard-to-Mesa Electrical Transmission Powerline | 9-1 |
| 9.1.4 Moriarty Densitometer Electrical Distribution Powerline | 9-4 |
| 9.1.5 San Luis Electrical Transmission and Distribution Powerlines | 9-4 |
| 9.1.6 Bloomfield Electrical Distribution Powerline | 9-4 |
| 9.1.7 Service Drops (Electrical Service Voltage Reductions) | 9-4 |
| 9.1.8 Other Power Requirements | 9-5 |
| 9.2 Electrical Powerline Construction | 9-5 |
| 9.2.1 ROW Acquisition and Clearing | 9-5 |
| 9.2.2 Access Roads | 9-5 |
| 9.2.3 Electrical Powerline Structure Construction and Installation | 9-6 |
| 9.2.4 Conductor Installation | 9-8 |
| 9.2.5 Restoration and Cleanup | 9-8 |
| 9.3 Electrical Powerline Alternatives | 9-8 |
| 9.4 Affected Environment and Environmental Consequences | 9-11 |
| 9.4.1 Public Health and Safety | 9-11 |
| 9.4.1.1 Public Safety Risk Associated with Electrical Powerlines | 9-11 |
| 9.4.1.2 Natural Hazards | 9-11 |
| 9.4.2 Climate and Air Quality | 9-13 |
| 9.4.3 Mineral Resources | 9-13 |

TABLE OF CONTENTS

| | | |
|--|---|-------------|
| 9.4.4 | Paleontological Resources..... | 9-13 |
| 9.4.5 | Soils..... | 9-14 |
| 9.4.6 | Water Resources, Quality, and Quantity | 9-15 |
| 9.4.7 | Vegetation, Livestock Grazing, Noxious and Invasive Weeds..... | 9-15 |
| 9.4.8 | Wildlife and Fisheries | 9-17 |
| 9.4.8.1 | Terrestrial Species..... | 9-17 |
| 9.4.8.2 | Sensitive Species | 9-19 |
| 9.4.9 | Land Use, Aesthetics, Special Use Areas, and Noise | 9-27 |
| 9.4.9.1 | Special Designations, Recreation and Aesthetics..... | 9-28 |
| 9.4.9.2 | Noise | 9-28 |
| 9.4.10 | Transportation..... | 9-28 |
| 9.4.11 | Cultural Resources | 9-29 |
| 9.4.12 | Native American Consultation..... | 9-29 |
| 9.4.13 | Social and Economic Conditions | 9-29 |
| 9.4.14 | Hazardous Materials Contamination..... | 9-30 |
| 9.5 | Comparison of Alternatives | 9-30 |
| 9.6 | Cumulative Impacts | 9-33 |
| 9.7 | Unavoidable Adverse Impacts..... | 9-34 |
| 9.8 | Irreversible/Irretrievable Commitment of Resources | 9-34 |
| 9.9 | Relationship Between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity..... | 9-34 |
| 9.10 | Consultation and Coordination | 9-34 |
| 9.11 | References | 9-34 |
| 10.0 | CONSULTATION AND COORDINATION..... | 10-1 |
| 11.0 | REFERENCES | 11-1 |
| LIST OF PREPARERS AND REVIEWERS | | |
| GLOSSARY | | |
| ACRONYMS AND ABBREVIATIONS | | |
| INDEX | | |

**TABLE OF CONTENTS
VOLUME II**

APPENDIX A – SHELL’S PLAN OF DEVELOPMENT

APPENDIX B – WORK SITE MATRIX

APPENDIX C – PUMP STATION AND PRESSURE CONTROL STATION MAPS

APPENDIX D – SUMMARY REPORT ON NEW MEXICO PRODUCTS PIPELINE ERW LONGITUDINAL SEAM INTEGRITY

APPENDIX E – SHELL’S NEW MEXICO PRODUCTS PIPELINE SYSTEM SAFETY PLAN

APPENDIX F – ENVIRONMENTAL FATE AND EFFECTS OF PETROLEUM PRODUCT SPILLS

APPENDIX G – SURGE ANALYSIS CONCURRENCE LETTER

APPENDIX H – SPECIAL STATUS SPECIES AND SPECIES OF SPECIAL CONCERN

APPENDIX I - WATER QUALITY ANALYSIS

LIST OF TABLES

| | | |
|-------------|---|------|
| 1-1 | Ownership of Land Crossed by the NMPP Project..... | 1-2 |
| 1-2 | Federal and State Permits, Licenses, Approval, and Consultation Requirements..... | 1-10 |
| 2-1 | Summary of Proposed Activities..... | 2-11 |
| 2-2 | Description of Pre-Operational Maintenance Activities | 2-13 |
| 2-3 | Proposed Pump Stations for the NMPP Project | 2-28 |
| 2-4 | Operating Pressures | 2-29 |
| 2-5 | Shell's Committed Integrity Mitigation Measures | 2-42 |
| 2-6 | Reasonable Maximum Volume of Product Released Following a Complete Rupture | 2-51 |
| 2-7 | Reasonable Maximum Volume of Product Released Following a Leak at 1% of the Detection Limit..... | 2-52 |
| 2-8 | Reasonable Maximum Volume of Product Released Prior to Detection by Volumetric Balancing..... | 2-53 |
| 2-9 | Reasonable Maximum Volume of Product Released Prior to Detection by Aerial Surveillance | 2-53 |
| 2-10 | Sensitive Areas Retained for Further Analysis – Pipeline Replacement Alternative..... | 2-64 |
| 2-11 | Pipe Rerouting Retained for Further Consideration..... | 2-70 |
| 3-1 | Relative Risk of Petroleum Transportation Methods as Compared to Pipelines..... | 3-11 |
| 3-2 | Summary of Risk Probabilities for Petroleum Product Pipeline Incidents..... | 3-12 |
| 3-3 | Fire and Explosion Probabilities for Petroleum Product Transmission Pipelines | 3-22 |
| 3-4 | Proportion of Incidents Occurring Along Pipeline and Ancillary Facilities..... | 3-22 |
| 3-5 | Risk Probabilities for Trucking of Hazardous Materials | 3-23 |
| 3-6 | Sensitive Areas Along the Proposed NMPP Route and Reroute Alternative | 3-29 |
| 3-7 | Number of Residences and Public Assembly Places in Proximity to NMPP Facilities for the Proposed Action and Reroute Alternative..... | 3-29 |
| 3-8 | Coal-Bearing Geologic Units Along the NMPP Route | 3-33 |
| 3-9 | Condition 1 Fossil Formations Crossed by the Proposed NMPP Project..... | 3-35 |
| 3-10 | Soils Constraints Along the NMPP Project | 3-42 |
| 3-11 | Summary of Discharges in Perennial Streams Crossed or Paralleled by the NMPP..... | 3-44 |
| 3-12 | Major Aquifers Crossed by the NMPP Project..... | 3-47 |
| 3-13 | Depth to Groundwater Along the NMPP Route | 3-53 |
| 3-14 | Miles of Vegetation Crossed by the NMPP Project | 3-55 |
| 3-15 | Dominant Species Within Vegetation Communities Crossed by the NMPP Project..... | 3-57 |
| 3-16 | Special Status Wildlife and Plant Species Potentially Occurring Within the Project Area..... | 3-64 |
| 3-17 | Species of Special Concern Potentially Occurring Within the Project Area..... | 3-70 |
| 3-18 | Surface Ownership and Land Use Along the NMPP Project | 3-73 |
| 3-19 | Typical Values of Yearly Day-Night Average Sound Levels..... | 3-77 |
| 3-20 | Noise-Sensitive Areas Nearest to Proposed Pump Station | 3-78 |
| 3-22 | Socioeconomic Conditions in Affected Counties | 3-87 |
| 3-23 | Environmental Justice Statistics for Affected Communities | 3-88 |
| 3-24 | Environmental Justice Statistics in Affected Areas | 3-91 |
| 4-1 | Occurrence Intervals for Fires and Explosions Caused by Pipeline Incidents | 4-7 |
| 4-2 | Number of Incidents Predicted to Occur Along the Pipeline, Terminals, and Pump Stations in 30 Years | 4-8 |

LIST OF TABLES

| | | |
|-------------|---|-------|
| 4-3 | Summary of Trucking Risks Associated with the NMPP System..... | 4-10 |
| 4-4 | Estimated Number of Releases and Spill Volumes Associated with the Proposed Action | 4-12 |
| 4-5 | Comparison of Risk of Accidental Deaths in the United States | 4-13 |
| 4-6 | Comparison of the Estimated Number of Events for the Proposed Action and Pipeline Alternatives | 4-16 |
| 4-7 | Predicted Number of Fires and Explosions Caused by Pipeline Incidents | 4-16 |
| 4-8 | Number of Incidents Predicted to Occur Along the Pipeline, Terminals and Pump Stations | 4-17 |
| 4-9 | Comparison of the Estimated Number of Spills and Proximity to Sensitive Receptors..... | 4-19 |
| 4-10 | Predicted Spills (in 30 years) on Agricultural Lands, Erosive, or Poor Revegetation Potential Soils Along the Proposed Action Route | 4-32 |
| 4-11 | Crude Oil and Petroleum Product Spill Case Histories | 4-35 |
| 4-12 | Summary of Valves Protecting Waterbodies Crossed by the NMPP Route..... | 4-37 |
| 4-13 | Predicted Number of Spills Associated with Surface Water Resources Crossed by the Proposed Action | 4-38 |
| 4-14 | Volume of Product Released in Three Potential Scenarios | 4-39 |
| 4-15 | Predicted Number of Spills Associated with Surface Water Resources Crossed by the Proposed Action | 4-43 |
| 4-16 | Potential Impact Locations for Special Status Species Within the Project Area..... | 4-62 |
| 4-17 | Potential Impact Locations for Species of Special Concern Within the Project Area | 4-65 |
| 4-18 | Noise-Sensitive Areas Nearest to Proposed Pump Stations and Estimated Noise Level Increases | 4-82 |
| 4-19 | Enhanced Safety Mitigation Table..... | 4-94 |
| 4-20 | Comparison of Risk Associated with the Proposed Action and No Action Alternative | 4-101 |
| 4-21 | Environmental Consequences of the No Action Alternative..... | 4-107 |
| 5-1 | Comparative Safety Risks Associated with Transporting Petroleum Products by Trucks Only and Pipeline and Trucks Beyond the Four Corners Area | 5-5 |
| 6-1 | Summary of Unavoidable Adverse Impacts..... | 6-1 |
| 7-1 | Irreversible, Irretrievable, Short-term, Long-term Commitment of Resources..... | 7-1 |
| 9-1 | Land Required for the Proposed Electrical Powerlines | 9-2 |
| 9-2 | Summary of Electrical Transmission Powerline Alternatives for the Willard-to-Mesa Route | 9-9 |
| 9-3 | Condition 1 and 2 Fossil Formations Crossed by the Proposed Electrical Powerlines..... | 9-14 |
| 9-4 | Soil Constraints Along the Proposed Electrical Powerlines | 9-15 |
| 9-5 | Miles and Acres of Vegetation Crossed by the Proposed Electrical Powerlines | 9-16 |
| 9-6 | Special Status Wildlife and Plant Species Potentially Occurring Within the Electrical Powerlines Project Areas..... | 9-20 |
| 9-7 | Wildlife and Plant Species of Special Concern Potentially Occurring Within the Electrical Powerlines Project Areas..... | 9-23 |
| 9-8 | Ownership for Proposed Electrical Powerlines | 9-27 |
| 9-9 | Land Use for Proposed Electrical Powerlines | 9-27 |

LIST OF FIGURES

| | | |
|-------------|--|------|
| 1-1 | NMPP System Overview | 1-3 |
| 2-1 | NMPP Overview Map Index..... | 2-3 |
| 2-2 | NMPP Overview Map 1..... | 2-4 |
| 2-3 | NMPP Overview Map 2..... | 2-5 |
| 2-4 | NMPP Overview Map 3..... | 2-6 |
| 2-5 | NMPP Overview Map 4..... | 2-7 |
| 2-6 | NMPP Overview Map 5..... | 2-8 |
| 2-7 | Shell's Interstate Petroleum Products Pipeline System..... | 2-9 |
| 2-8 | Typical Pipeline Construction Sequence..... | 2-16 |
| 2-9 | Moriarty Terminal | 2-22 |
| 2-10 | Moriarty Terminal Plot Plan..... | 2-23 |
| 2-11 | Typical Pump Station Plot Plan (Merritt) | 2-26 |
| 2-12 | Typical Pump Station Plot Plan with Surge Relief Tank (Mesa) | 2-27 |
| 2-13 | Typical Pressure Control Station Plot Plan (Placitas)..... | 2-31 |
| 2-14 | Typical Densitometer Site Details..... | 2-32 |
| 2-15 | Typical Block Valve with a Sonic Flow Meter..... | 2-37 |
| 2-16 | Shell's Proposed Maximum Operating Pressures (SOP) Relative to Hydrostatic Test Pressures and Maximum Operating Pressures (MOP) | 2-44 |
| 2-17 | Flow Chart Showing the Decision Process for Identifying and Evaluating Pipeline Alternatives..... | 2-61 |
| 2-18 | Transportation Routes, Refineries, and Terminals | 2-63 |
| 2-19 | Pipeline Alternative Overview | 2-66 |
| 2-20 | Pecos River Pipeline Alternative | 2-67 |
| 2-21 | Moriarty to Placitas Pipeline Alternative | 2-68 |
| 2-22 | Torreón Mission Pipeline Alternative..... | 2-69 |
| 3-1 | Pipeline Age | 3-4 |
| 3-2 | Risk Probabilities Associated with the Decade of Pipeline Construction | 3-8 |
| 3-3 | Causes of Pipeline Incidents | 3-10 |
| 3-4 | Spill Volumes Released from Petroleum Project Transmission Pipelines | 3-21 |
| 3-5 | Potential Karst Geologic Formations..... | 3-25 |
| 3-6 | Condition 1 Fossil Formations | 3-36 |
| 3-7 | Sensitive Soil Types Crossed..... | 3-43 |
| 3-8 | Primary Groundwater Aquifer Systems..... | 3-46 |
| 3-9 | Water Wells Depth to Water | 3-54 |
| 3-10 | Vegetation Types Crossed | 3-56 |
| 3-11 | Special Use Areas..... | 3-75 |
| 4-1 | Predicted Number of Spills Along the Entire Proposed NMPP Route Over a 30-year Period Based on Various Risk Probabilities..... | 4-4 |
| 4-2 | Estimated Size of Spills Associated with the Proposed Action in a 30-year Period | 4-5 |
| 4-3 | Projected Number of Spills in Central New Mexico Over a 30-year Period Under the Proposed Action and No Action Alternative | 4-97 |
| 4-4 | Projected Number of Injuries in Central New Mexico Over a 30-year Period Under the Proposed Action and No Action Alternative | 4-98 |

LIST OF FIGURES

4-5 Projected Number of Fatalities in Central New Mexico Over a 30-year Period Under the Proposed Action and No Action Alternative 4-99

4-6 Projected Number of Spills in the Four Corners Area Over a 30-year Period Under the Proposed Action and No Action Alternative 4-104

4-7 Projected Number of Injuries in the Four Corners Area Over a 30-year Period Under the Proposed Action and No Action Alternative 4-105

4-8 Projected Number of Fatalities in the Four Corners Area Over a 30-year Period Under the Proposed Action and No Action Alternative 4-106

5-1 Cumulative Risk for the Proposed Action..... 5-2

5-2 Cumulative Risk for the Pipeline Reroute Alternative 5-4

9-1 Electrical Powerlines Overview..... 9-3

9-2 Transmission and Distribution Powerline Structures 9-7

9-3 Willard-to-Mesa Proposed Powerline and Alternative Routes 9-10