

## **Attachment K**

# **Alternate Route Analysis for Gas Pipeline Relocations in Ridges Basin Final Report**

*Attachment K to the ALP Project Final Supplemental Environmental Impact Statement (FSEIS) contains the final report prepared by the Bureau of Reclamation, Western Colorado Area Office, Southern Division, of the gas pipeline relocation analysis for Ridges Basin.*

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION

ALTERNATE ROUTE ANALYSIS FOR  
GAS PIPELINE RELOCATIONS IN RIDGES BASIN  
FINAL REPORT

ANIMAS - LA PLATA PROJECT

APRIL 1999

WESTERN COLORADO AREA OFFICE  
SOUTHERN DIVISION

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**ALTERNATE ROUTE ANALYSIS  
TECHNICAL SCREENING  
FOR  
GAS PIPELINE RELOCATIONS IN RIDGES BASIN  
FINAL REPORT  
ANIMAS - LA PLATA PROJECT**

**EXECUTIVE SUMMARY**

The purpose of this report is to document the process, findings, and recommendations of the Alternate Route Analysis-Technical Screening Study for Gas Pipeline Relocations in Ridges Basin, Animas - La Plata Project.

The purpose of the Alternate Route Analysis-Technical Screening Study was to develop, investigate at an appraisal level, and comparatively rate alternate pipeline relocation routes for the present Northwest and MAPCO pipelines through the proposed Ridges Basin Damsite.

A previous relocation route analysis has been conducted and is documented in the FSFES and Ridges Basin Mainline Relocation Project - Environmental Report, 8/96, by Foster Wheeler Environmental Corp. for Northwest Pipeline Corp. The present proposed relocation route, the Carbon Mountain Route, is a result of this previous analysis. The present proposed relocation route is included in the routes analyzed in this study, and is referred to as Route A - Phoneline/West Carbon Mountain.

The disturbance of a golden eagle nesting area on Carbon Mountain during the construction of a portion of the present proposed relocation route would be an adverse impact of ALP on wildlife resources. Construction activities that would either directly or indirectly potentially effect nesting golden eagles or their nests would be requested to be permitted under the Bald Eagle Protection Act.

Some recently developed alternatives to ALP include a down-sized Ridges Basin Dam and Reservoir that would still require pipeline relocations but may allow for additional pipeline relocation routes.

A summary of the study process would be:

The study was requested in August, 1998, by Western Colorado Area Office - Southern Division (WCAO-SD) management as a result of new ALP proposals potentially allowing new alternate relocation routes and the preliminary findings concerning the feasibility of obtaining a golden eagle nest takings permit to proceed with the present proposed relocation route.

A working committee of three was established to head this study. The membership of the larger working group, 9 people, was also established with one member representing at least one evaluation criteria.

The working committee of three identified the relocation project needs and alternative routes to be evaluated based on prior analysis alternate route identification and conceptualization of new routes based on opportunities provided by more recent proposed projects. All alternate routes were investigated by all evaluators to identify potential impacts of each route.

The entire team met, shared and discussed all impacts identified for each alternate route, refined the rating system, developed relative weighting of criteria, and totaled the individual ratings to produce team route recommendations in the form of an arrayal table.

A total of 17 routes were evaluated, as represented on the Figure 1 as Routes A through Q. Many of these routes shared route segments in various combinations. The routes are shown individually on maps in Appendix A. Routes can be grouped in the following categories: Reservoir Routes, North of Reservoir Routes, and South of Reservoir Routes.

The routes on Figure 1 are listed in their order of preference, based on their summary ratings (Wt. Avg.) with the more preferred routes at the top. The following recommendations of the technical screening workgroup are based on these results.

- 1) Four of the routes are recommended to be excluded from further consideration due to protective restrictions of the Bald Eagle Protection Act of 1940, amended in 1962 to include golden eagles. These routes are the Powerline-West Carbon (D), Phoneline-West Carbon (A), Reservoir-High Abutment (J), and North Reservoir-West Carbon (G).
- 2) The top three routes on Figure 1 are reservoir routes and are the most recommended from the overall technical evaluation. These are Reservoir-Low Abutment, (K), 6800 foot North, (L), and 6800 foot South, (M).
- 3) Reclamation should pursue resolving the conflict between the high preference to use a reservoir route and Reclamation draft Directives and Standards that discourage installation of utilities on or near dams or other critical water storage, diversion, or conveyance structures.
- 4) Reclamation should consult with Northwest and MAPCO pipeline companies to insure that the degree of pipeline integrity assumed by this study can be obtained.
- 5) Reclamation should further evaluate the study assumptions on the toxicity and solubility of the products carried in the pipelines to be relocated.
- 6) The next three most recommended routes, not considering the excluded Powerline-West Carbon route (D) and North Carbon route (G), are south of the reservoir. These routes are Indian Creek Long, (Q), Indian Creek Short, (P), and Upper Southern, (O).
- 7) Since portions of all three of these routes south of the reservoir cross land owned by the Southern Ute Indian Tribe, Reclamation should consult with the Southern Ute Indian Tribe on the acceptability of using any of these routes.
- 8) The remaining 7 routes, although not as highly recommended as the above 6 routes, should be pursued if agreements cannot be reached to use a more recommended route.
- 9) The pipeline companies whose lines are to be relocated should be consulted with and included in the decision making.

## PURPOSE

The purpose of this report is to document the process, findings, and recommendations of the Alternate Route Analysis-Technical Screening Study for Gas Pipeline Relocations in Ridges Basin, Animas - La Plata Project.

The purpose of the Alternate Route Analysis-Technical Screening Study was to develop, investigate at an appraisal level, and comparatively rate alternate pipeline relocation routes for the present Northwest and MAPCO pipelines through the proposed Ridges Basin Damsite. All environmental, social, economic, engineering, construction, and operation and maintenance impacts were used to comparatively rate each identified alternate route. The products of this study are arrayal tables displaying identified alternate routes and their comparative impacts in all areas, recommended route(s), and this Final Report.

## BACKGROUND

The Animas-La Plata Project (ALP) as documented in the 1980 Final Environmental Statement (1980 FES), and the 1996 Final Supplement to the 1980 FES (FSFES) would divert flows of the Animas, La Plata, and San Juan Rivers for irrigation, municipal, and industrial uses. The Project would also satisfy the Project's portion of the Colorado Ute Indian water rights claims as specified by the 1988 Colorado Ute Indian Water Rights Settlement Act.

A major feature of this project would be Ridges Basin Dam and Reservoir. Currently three gas companies, Northwest Pipeline Corp. (Northwest), Greeley Gas Company, and Mid-American Pipeline Company (MAPCO), own and operate pipelines in Ridges Basin that would need to be relocated. The Northwest and MAPCO relocations must be completed prior to construction of Ridges Basin Dam because the pipelines lie within the proposed dam site.

A relocation route analysis was previously conducted and is documented in the FSFES and the Ridges Basin Mainline Relocation Project - Environmental Report, 8/96, by Foster Wheeler Environmental Corp. for Northwest Pipeline Corp. The present proposed relocation route, the Carbon Mountain Route, is a result of this previous analysis. The present proposed relocation route is included in the routes analyzed in this study, and is referred to as Route A - Phoneline/West Carbon Mountain. Refer to Appendix B for maps of all routes analyzed.

The disturbance of a golden eagle nesting area on Carbon Mountain during the construction of a portion of the Carbon Mountain gas pipeline relocation route would be an adverse impact of ALP on wildlife resources. Under the Fish and Wildlife Coordination Act, the U.S. Fish and Wildlife Service, working with Colorado Division of Wildlife, has recommended measures to protect this nesting area. Temporal and spatial restraints on construction activities in the vicinity of the nesting area would be required. Construction activities that would either directly or indirectly potentially effect nesting golden eagles or their nests would be requested to be permitted under the Bald Eagle Protection Act.

Some recently developed alternatives to ALP include a down-sized Ridges Basin Dam and Reservoir that would still require pipeline relocations but may allow for additional pipeline relocation routes.

This pipeline relocation route analysis was conducted to investigate if a relocation route can be identified that has less impacts than the present proposed route.

## SUMMARY OF THE STUDY PROCESS

- 1) The study was requested in August, 1998, by the Bureau of Reclamation (Reclamation) Western Colorado Area Office - Southern Division (WCAO-SD) management as a result of new ALP proposals potentially allowing new alternate relocation routes and the preliminary findings concerning the feasibility of obtaining a golden eagle nest takings permit to proceed with the present proposed relocation route.
- 2) A plan of study was developed.
- 3) Funding for this study was identified in the FY99 budget under Alternative Analysis Activities, Animas - La Plata Project.
- 4) A working committee of three was established to head this study and consisted of Jim Rottman, Bill Walsh, and Dave Kenney. Later, Warren Hurley and Kirk Lashmett were recruited to replace Dave Kenney upon his retirement.
- 5) Past relocation route studies were researched and a working summary was prepared.
- 6) A planning meeting was held with WCAO-SD group chiefs to introduce the study and request support in staffing a larger group of evaluators.
- 7) The membership of the larger working group was established with one member representing at least one tentative area of evaluation. Membership of the workgroup is listed later.
- 8) The working committee of three identified the relocation project needs. These are discussed later as working assumptions.
- 9) The working committee of three identified alternative routes to be evaluated based on prior analysis alternate route identification and conceptualization of new routes based on opportunities provided by more recent proposed projects. This list of routes to be evaluated was left open-ended through the entire process for contributions from the entire workgroup. The routes to be evaluated are shown on Figure 1.
- 10) Evaluation criteria and an array table were established. This is presented as Table 1.
- 11) Each alternate route was initially considered by each evaluator to establish what additional data/studies were needed to identify all impacts.
- 12) A summary of the results of the above consideration was present to project management for evaluation of additional studies to be pursued.
- 13) All alternate routes were investigated by all evaluators to identify potential impacts of each route.
- 14) The entire team met, shared and discussed all impacts identified for each alternate route, refined the rating system, developed relative weighting of criteria, and totaled the individual ratings to produce team route recommendations in the form of an array table.

- 15) The completed arrayal table and summary of recommended routes were presented to project management.
- 16) This final report was prepared to document the process.

WORKGROUP MEMBER

EVALUATION CRITERIA

Warren Hurley	Cultural Resources Indian Trust Assets Environmental Justice
Kirk Lashmett	Reservoir Aquatic Life Wildlife Habitat Golden Eagle Nesting Activity Riverine/Riparian
Bill Walsh Stan Powers	Geologic Hazards Water Quality Socio-economics
Mark Chiarito	Recreation Esthetics
Rob Waldman Judy Martin Rege Leach Jim Rottman	Hazardous Materials Lands Project Operation and Maintenance Gas Company issues Pipe Installation costs

GENERAL WORKING ASSUMPTIONS

The following general working assumptions were applied to the workgroup effort. For individual evaluator’s assumptions concerning their particular criteria refer to Appendix A which contains documentation of each evaluation.

- If a structural alternative to the Animas - La Plata Project were to be constructed, pipeline relocation would be needed.
- The minimum amount of pipeline needing to be relocated would be that amount that is located beneath the footprint of the damsite.
- The size of the reservoir that may be constructed may range between 90,000 to 240,000 acre feet.
- This study would be performed using only existing information/data.
- Number of pipelines to be accommodated in the relocation: Two MAPCO lines (one 10-inch and one 16-inch), one 26-inch Northwest line, and one future Northwest line.
- The right of way width for the relocation route would be 125 ft. permanent with additional temporary 50 ft. for construction. Where appropriate, sections of the alignment could be divided into two right of ways (one 50-foot and one 75-foot) with a wildlife habitat area between. It was

also assumed that the right of way width was somewhat flexible to accommodate narrower physical constraints and to split into two rights of way.

- The goal of this study was to choose the best engineered route with the minimum of resource impacts, leaving “political” concerns/aspects to another level of screening.

## DESCRIPTION OF ROUTES EVALUATED

A total of 17 routes were evaluated, as represented on the Figure 1 as Routes A through Q. Many of these routes shared route segments in various combinations. The routes are shown individually on maps in Appendix B. Routes can be grouped in the following categories.

### Reservoir Routes:

These are routes that would be totally or periodically inundated by the reservoir.

- J-Reservoir High Abutment.
- K-Reservoir Low Abutment.
- L-6800 Foot Elevation North.
- M-6800 Foot Elevation South.

### North of Reservoir Routes:

These are routes that would circumvent the reservoir to the north.

- A-Phoneline-West Carbon Mountain.
- B-Phoneline-East Carbon Mountain.
- C-Phoneline-East Animas.
- D-Powerline-West Carbon Mountain.
- E-Powerline-East Carbon Mountain.
- F-Powerline-East Animas.
- G-North Reservoir-West Carbon Mountain.
- H-North Reservoir-East Carbon Mountain.
- I-North Reservoir-East Animas.

### South of Reservoir Routes:

These are routes that would circumvent the reservoir to the south.

- N-Lower Southern.
- O-Upper Southern.
- P-Indian Creek Short.
- Q-Indian Creek Long.

Individual physical summary descriptions of each route follow.

### A) PHONELINE - WEST CARBON ROUTE:

This route begins at approximate existing Northwest Pipeline Mile Post 8, approx. 0.3 miles east of the proposed dam axis. This route would turn north from the existing pipeline and traverse the steep rocky south and west slopes of Carbon Mountain before entering the relatively level terrain near the crossing of county road 211. The first approx. 1.8 miles of this route, from the existing pipeline to the county road 211 crossing, is referred to as the Carbon Mountain Corridor and will require special procedures for its

construction. Extensive blasting, cut and fill, and a permanent crib type retaining wall will be needed to construct this corridor where the route traverses steep terrain including significant sideslope.

After crossing county road 211 this route heads west crossing approx. 1.5 miles of gently rolling terrain before connecting to an existing phoneline route which it follows for approx. 2 miles. This existing phoneline route follows relatively flat to rolling terrain. This route ends by leaving the existing phoneline route and traveling west, southwest for approx. 0.7 miles over relatively level terrain to the tie-in with the existing pipeline at approx. existing pipeline mile post 12.6. The total length of this route is approx. 6.0 miles.

#### B) PHONELINE - EAST CARBON ROUTE:

This route begins at approximate existing Northwest Pipeline Mile Post 7.8, approx. 0.5 miles east of the proposed dam axis. This route would turn north from the existing pipeline and travel approx. 0.9 miles climbing the steep rocky south slope of Carbon Mountain before turning northwest for approx. 0.9 miles descending the steep rocky north slope of Carbon Mountain. At this point the route crosses county road 211 and travels west along the gentle rolling to moderately rough terrain for approx. 0.5 miles while following an existing electric transmission route. This route then leaves the existing electric transmission line route and follows the phoneline segment which is shares with other routes. The phoneline segment heads west crossing approx. 1.5 miles gently rolling terrain before connecting to an existing phoneline route which it follows for approx. 2 miles. This existing phoneline route follows relatively flat to rolling terrain. This segment then ends by leaving the existing phoneline ROW and traveling west, southwest for approx. 0.7 miles over relatively level terrain to the tie-in with the existing pipeline at approx. existing pipeline mile post 12.6. The total length of this route is approx. 6.5 miles.

#### C) PHONELINE - EAST ANIMAS ROUTE:

This route begins in the Animas River valley at approximate existing Northwest Pipeline Mile Post 6.0, approx. 2.0 miles east of the proposed dam axis. This route would turn north, northeast from the existing pipeline and travel along the east side of county road 213 for approx. 1.8 miles to a point on the south side of the Animas River. The route would then cross the Animas River and roughly follow a railroad grade traveling northwest for approx. 0.8 miles through a mixed-use industrial area and adjacent to a middle school. From the railroad grade the route turns west and crosses the Animas River a second time. From the west side of the river, the route turns northwest then west, traveling adjacent to an existing electric transmission line for approx. 1.7 miles until intersecting county road 211. At this point the route crosses county road 211 and travels west along the gentle rolling to moderately rough terrain for approx. 0.5 miles while following an existing electric transmission line. This route then follows the phoneline segment which is shares with other routes. The phoneline segment heads west crossing approx. 1.5 miles gently rolling terrain before connecting to an existing phoneline route which it follows for approx. 2 miles. This existing phoneline route follows relatively flat to rolling terrain. This segment then ends by leaving the existing phoneline route and traveling west, southwest for approx. 0.7 miles over relatively level terrain to the tie-in with the existing pipeline at approx. existing pipeline mile post 12.6. The total length of this route is approx. 9.2 miles.

#### D) POWERLINE - WEST CARBON ROUTE:

This route begins at approximate existing Northwest Pipeline Mile Post 8, approx. 0.3 miles east of the proposed dam axis. This route would turn north from the existing pipeline and traverse the steep rocky south and west slopes of Carbon Mountain before entering the relatively level terrain near the crossing of county road 211. This approx. 1.8 mile segment of the route, shared with other routes, is referred to as the Carbon Mountain Corridor and will require special procedures for its construction. Extensive blasting, cut and fill, and a permanent crib type retaining wall will be needed to construct this corridor where the route traverses steep terrain including significant sideslope. After crossing county road 211 this route travels northwest approx. 0.3 miles over gently rolling terrain in the vicinity of county road 212 before reaching an existing electric transmission line. The route then follows the existing electric transmission line route for approx. 3.4 miles to the west, southwest, traversing relatively level to moderately rough terrain. This route ties-in with the existing pipeline at approx. existing pipeline mile post 12.2. The total length of this route is approx. 5.5 miles.

#### E) POWERLINE - EAST CARBON ROUTE:

This route begins at approximate existing Northwest Pipeline Mile Post 7.8, approx. 0.5 miles east of the proposed dam axis. This route first follows the East Carbon segment that it shares with other routes by turning north from the existing pipeline and traveling approx. 0.9 miles climbing the steep rocky south slope of Carbon Mountain before turning northwest and traveling approx. 0.9 miles descending the steep rocky north slope of Carbon Mountain. At this point the route crosses county road 211 turning west, northwest and follows an existing electrical transmission line route, skirting an electrical substation, for approx. 0.5 miles over gently rolling to moderately rough terrain. The route then follows the Powerline segment, that it shares with other routes, by following the existing electric transmission line route for approx. 3.4 miles to the west, southwest, traversing relatively level to moderately rough terrain. This route ties-in with the existing pipeline at approx. existing pipeline mile post 12.2. The total length of this route is approx. 5.9 miles.

#### F) POWERLINE - EAST ANIMAS ROUTE:

This route begins at approximate existing Northwest Pipeline Mile Post 6.0, approx. 2.0 miles east of the proposed dam axis, and follows a route segment shared with other routes. This route would turn north, northeast from the existing pipeline and travel along the east side of county road 213 for approx. 1.8 miles to a point on the south side of the Animas River. The route would then cross the Animas River and roughly follow a railroad grade traveling northwest for approx. 0.8 miles through a mixed-use industrial area and adjacent to a middle school. From the railroad grade the route turns west and crosses the Animas River a second time. From the west side of the river, the route turns northwest then west, traveling adjacent to an existing electric transmission line for approx. 1.7 miles until intersecting county road 211. At this point the route crosses county road 211 turning west, northwest and follows an existing electrical transmission line route, skirting an electrical substation, for approx. 0.5 miles over gently rolling to moderately rough terrain. The route then follows the Powerline segment, that it shares with other routes, by following the existing electric transmission line route for approx. 3.4 miles to the west, southwest, traversing relatively level to moderately rough terrain. This route ties-in with the existing pipeline at approx. existing pipeline mile post 12.2. The total length of this route is approx. 8.5 miles.

#### G) NORTH RES - WEST CARBON ROUTE:

This route begins at approximate existing Northwest Pipeline Mile Post 8, approx. 0.3 miles east of the proposed dam axis. This route would turn north from the existing pipeline and traverse the steep rocky south and west slopes of Carbon Mountain before entering the relatively level terrain near the crossing of county road 211. The first approx. 1.8 miles of this route, from the existing pipeline to the county road 211 crossing, is referred to as the Carbon Mountain Corridor and will require special procedures for its construction. Extensive blasting, cut and fill, and a permanent crib type retaining wall will be needed to construct this corridor where the route traverses steep terrain including significant sideslope.

After crossing county road 211 this route heads northwest traversing gently rolling terrain for approx. 0.25 miles before connecting with an existing electric transmission line route. The route continues south, southwest along the existing electric transmission line route for approx. 3 miles traversing relatively level to moderately rough terrain. This route ties-in with the existing pipeline at approx. existing pipeline mile post 12.2. This route is meant to represent a relocation route above the north shoreline of a smaller reservoir. The total length of this route is approx.( 5.0) miles.

#### H) NORTH RES - EAST CARBON ROUTE:

This route begins at approximate existing Northwest Pipeline Mile Post 7.8, approx. 0.5 miles east of the proposed dam axis. This route would turn north from the existing pipeline and travel approx. 0.9 miles climbing the steep rocky south slope of Carbon Mountain before turning northwest for approx. 0.9 miles descending the steep rocky north slope of Carbon Mountain. At this point the route crosses county road 211 and travels west along the gentle rolling to moderately rough terrain for approx. 0.5 miles while following an existing electric transmission route.

The route continues south, southwest along the existing electric transmission line route for approx. 3 miles traversing relatively level to moderately rough terrain. This route ties-in with the existing pipeline at approx. existing pipeline mile post 12.2. This route is meant to represent a relocation route above the north shoreline of a smaller reservoir. The total length of this route is approx.( 5.2) miles.

#### I) NORTH RES - EAST ANIMAS ROUTE:

This route begins at approximate existing Northwest Pipeline Mile Post 6.0, approx. 2.0 miles east of the proposed dam axis. This route would turn north, northeast from the existing pipeline and travel along the east side of county road 213 for approx. 1.8 miles to a point on the south side of the Animas River. The route would then cross the Animas River and roughly follow a railroad grade traveling northwest for approx. 0.8 miles through a mixed-use industrial area and adjacent to a middle school. From the railroad grade the route turns west and crosses the Animas River a second time. From the west side of the river, the route turns northwest then west, traveling adjacent to an existing electric transmission line for approx. 1.7 miles until intersecting county road 211. At this point the route crosses county road 211 and travels west along the gentle rolling to moderately rough terrain for approx. 0.5 miles while following an existing electric transmission route. The route continues south, southwest along the existing electric transmission line route for approx. 3 miles traversing relatively level to moderately rough terrain. This route ties-in with the existing pipeline at approx. existing pipeline mile post 12.2. This route is meant to represent a relocation route above the north shoreline of a smaller reservoir. The total length of this route is approx.( 7.8) miles.

#### J) RESERVOIR - HIGH ABUTMENT ROUTE:

This route begins at approximate existing Northwest Pipeline Mile Post 8, approx. 0.3 miles east of the proposed dam axis. This route would turn north from the existing pipeline and traverse the steep rocky south and west slopes of Carbon Mountain. The first approx. 0.8 miles of this route follows the most difficult portion of the Carbon Mountain Corridor segment and will require special procedures for its construction. Extensive blasting, cut and fill, and a permanent crib type retaining wall will be needed to construct this corridor where the route traverses steep terrain including significant sideslope. This route leaves the Carbon Mountain Corridor segment on the west slope of Carbon Mountain and traverses southwest over approx. 0.7 miles of moderately rough to steep terrain. From this point the route travels west, northwest for approx. 2.75 miles along the gentle, flat (except for Basin Creek crossings) right of way of the existing pipelines through Ridges Basin. This Below Reservoir Water Surface route would require installation of new pipe along a portion of the present right of way through Ridges Basin designed for reservoir inundation and would tie-in with the existing pipeline at approx. existing pipeline mile post 12.2. The total length of this route is approx.( 4.25) miles.

#### K) RESERVOIR - LOW ABUTMENT ROUTE:

This route begins at approx. existing Northwest Pipeline Mile Post 7.9, approx. 0.2 miles east of the proposed dam axis. This route would leave the existing pipeline and traverse northwest for approx. 0.15 miles, climbing the lower steep rocky terrain of the south slope of Carbon Mountain. (also the left abutment of the proposed damsite). At this point the route enters a tunnel, directionally drilled microtunnel, or near surface buried alternative, approx. 0.3 miles long to pass through the west face of Carbon Mountain (the left abutment of the proposed damsite). After exiting the tunnel the route drops down the lower moderately steep slopes of the Carbon Mountain. for approx. 0.3 miles before connecting back to the Northwest Pipeline right of way west through Ridges Basin. This route then follows the existing gentle, flat (except for Basin Creek crossings) Northwest Pipeline right of way west through Ridges Basin for approx. 2.6 miles. This Below Reservoir Water Surface route would require installation of new pipe along a portion of the present right of way through Ridges Basin designed for reservoir inundation and would tie-in with the existing pipeline at approx. existing pipeline mile post 12.2. The total length of this route is approx.( 3.2) miles.

#### L) 6800 FOOT NORTH ROUTE:

This route begins at approx. existing Northwest Pipeline Mile Post 7.9, approx. 0.2 miles east of the proposed dam axis. This route would leave the existing pipeline and traverse northwest for approx. 0.15 miles, climbing the lower steep terrain of the south slope of Carbon Mountain, (also the left abutment of the proposed damsite). At this point the route enters a tunnel, directionally drilled microtunnel, or near surface buried alternative, approx. 0.3 miles long to pass through the west face of Carbon Mountain and the left abutment of the proposed dam. After exiting the tunnel the route drops down the lower moderately steep slopes of the Carbon Mountain. for approx. 0.05 miles until reaching approx. elevation 6800. From this point the route contours around the northern portion of the proposed reservoir at the approx. 6800 foot elevation for approx. 4.3 miles. This Below Reservoir Water Surface route would require installation of pipe designed for reservoir inundation and would tie-in with the existing pipeline at approx. existing pipeline mile post 12.2. The total length of this route is approx.( 4.8) miles.

#### M) 6800 FOOT SOUTH ROUTE:

This route begins at approx. existing Northwest Pipeline Mile Post 7.9, approx. 0.2 miles east of the proposed dam axis. This route would leave the existing pipeline traveling southwest and climb the steep slope of the north face of Basin Mountain. for approx. 0.3 miles. Then the route would traverse the north face of Basin Mountain. for approx. 0.3 miles over steep terrain with significant sideslope until dropping back down to approx. elevation 6800 feet. From this point the route contours around the southern portion of the proposed reservoir at the approx. 6800 foot elevation for approx. 2.3 miles until encountering the existing gentle, flat (except for Basin Creek crossings) Northwest pipeline right of way west through Ridges Basin. The route would then follow this existing right of way for approx. 1.5 miles beneath the proposed reservoir until exiting the reservoir site and tying-in with the existing pipeline at approx. existing pipeline mile post 12.2. This Below Reservoir Water Surface route would require installation of pipe designed for reservoir inundation. The total length of this route is approx. 4.4 miles.

#### N) LOWER SOUTHERN ROUTE:

This route begins at approx. existing Northwest Pipeline Mile Post 7.9, approx. 0.2 miles east of the proposed dam axis. This route would leave the existing pipeline traveling southwest for approx. 0.5 miles up the steep north slope of Basin Mountain. It would then follow the rocky, extremely narrow at several locations, Basin Mountain ridge line west for approx. 1.2 miles. It would then turn to the north and travel down the steep north face of Basin Mountain. Once on the lower flanks of Basin Mountain the route would turn west and skirt the shoreline of the proposed reservoir for approx. 2.6 miles traversing moderately rough terrain. The final leg of this route would be approx. 0.4 miles long traveling north over moderately rough terrain from just south of county road 211 to the tie-in with the existing pipeline at approx. existing pipeline mile post 12.2. The total length of this route is approx. 5.1 miles.

#### O) UPPER SOUTHERN ROUTE:

The first 1.7 miles of this route are shared with the Lower Southern Route. It begins at approx. existing Northwest Pipeline Mile Post 7.9, approx. 0.2 miles east of the proposed dam axis. This route would leave the existing pipeline traveling southwest for approx. 0.5 miles up the steep north slope of Basin Mountain. It would then follow the rocky, extremely narrow at several locations, Basin Mountain ridge line west for approx. 1.2 miles. The Upper Southern Route continues approx. 2.4 miles further west along the Basin Mountain ridge line until it turns north for approx. 1.7 miles and travels down the steep north face of Basin Mountain and across moderately rough to rolling terrain. The tie-in with the existing pipeline is at approx. existing pipeline mile post 12.2. The total length of this route is approx. 5.8 miles.

#### P) INDIAN CREEK SHORT ROUTE:

This route begins in the Animas River valley at approximate existing Northwest Pipeline Mile Post 6.0, approx. 2.0 miles east of the proposed dam axis. This route takes off south, southwest from the existing pipeline traveling approx. 1.4 miles within the relatively flat Animas River valley crossing the river twice. The route then turns west and travels up the Indian Creek drainage for approx. 4.3 miles. Indian Creek drainage is relatively narrow with gently rolling to moderately rough terrain. A number of creek crossing may be needed. The route then turns northwest and for approx. 1.5 miles it climbs the moderately rough terrain of the south slope of Basin Mountain. Upon reaching the rocky ridge line of Basin Mountain the route continues northwest and north for approx. 1.7 miles traveling down the steep north slope of Basin Mountain and crossing moderately rough to rolling terrain before reaching the tie-in

with the existing pipeline at approx. existing pipeline mile post 12.2. The total length of this route is approx. 8.9 miles.

#### Q) INDIAN CREEK LONG ROUTE:

This route begins in the Animas River valley at approximate existing Northwest Pipeline Mile Post 5.4, approx. 2.5 miles east of the proposed dam axis. This route takes off southwest from the existing pipeline traveling approx. 1.4 miles within the relatively flat Animas River valley crossing the river once. The route then turns west for approx. 7.8 miles and travels up the entire length of Indian Creek, passes through West Gap, and enters the upper end of the Long Hollow Creek drainage. Indian Creek drainage is relatively narrow with gently rolling to moderately rough terrain. A number of creek crossing may be needed. Moderately rough to steep terrain may be encountered passing through West Gap and moderately rough to gentle terrain will be encountered in the Long Hollow drainage. Once in the Long Hollow drainage the route turns northeast for approx. 2.3 miles and immediately enters the upper Basin Creek drainage. The route follows an existing electrical transmission line route and parallels county road 141 for portions of this leg while crossing gently rolling terrain. The total length of this route is approx. 11.5 miles.

#### DISCUSSION OF EVALUATION RESULTS

This discussion of evaluation results is based on Table 1 which displays the individual evaluations of each route by each criteria, and the summary rating for each route based on the total evaluation.

Explanation of Table 1, Ridges Basin Gas Pipeline Relocation Analysis - Technical Screening:

- Each column represents an individual evaluation criteria and its numeric evaluation of each route, except for the first three columns and last column from the left.
- Each route has a row that displays the letter identification, name, length, numeric evaluation of each evaluation criteria, and a Wt. Avg. that represents the summary rating of each route.
- The rating scale used by each evaluator is a scale of 1 to 10 with a 1 rating representing the least amount of impact or most preferable route. A 10 rating was established as an “elimination” rating that eliminates the route from further consideration, based on the route being contrary to existing laws or policies. Routes that received a 10 rating in any criteria are bolded.
- Each evaluation criteria was assigned a weight relative to all other criteria. These relative weights are displayed in a row along the bottom of the figure and were used to calculate the weighted average (Wt. Avg.) column.
- Ratings are highlighted in purple to draw attention to ratings based on dam safety concerns.
- Ratings are highlighted in green to draw attention to ratings based on an assumption that pipeline products are not water soluble.
- The Wt. Avg. column is the summary rating for each route and is based on the sum of each route’s individually weighted ratings. As an example, the Wt. Avg. of Route K (Reservoir-Low Abutment), the first row, was calculated in the following manner. Cultural Resources, being the first criteria column, rated Route K as 1 and has a relative weight of 1, resulting in a final rating of 1. Reservoir Aquatic Life, second column, rated Route K as 1 and has a relative weight of 0.5, resulting in a final rating of 0.5 ( $1 \times 0.5 = 0.5$ ). Each criteria rating of Route K is individually multiplied by it’s relative weight in this same manner. All of the resultant individual criteria

ratings for Route K are then added together to produce the weighted average (Wt. Avg.) for Route K, 1.92, that is displayed in the last column to the right.

The routes in Table 1 are ordered from top to bottom in their order of preference, based on the Wt. Avg. results.

## Results Discussion

All routes that use the Carbon Mountain Corridor and High Abutment segments received ratings of 10 based on a February 19, 1999 Planning Aid Memorandum (PAM) from the US Fish and Wildlife Service. Use of these route segments would require receiving a "takings permit" from the US Fish and Wildlife Service to potentially disturb a golden eagle nesting area on Carbon Mountain. The PAM states that only inactive nests can be taken and that the Director of the Fish and Wildlife Service, when determining if a permit should be issued, must consider whether the applicant can reasonably conduct the resource development operation in a manner that avoids any golden eagle nest. Routes Powerline-West Carbon (D), Phoneline-West Carbon (A), Reservoir-High Abutment (J), and North Reservoir-West Carbon (G) are eliminated from further consideration due to Golden Eagle Nesting Activity criteria ratings.

The remaining reservoir routes, Reservoir-Low Abutment (K), 6800 foot North (L), and 6800 foot South (M), were rated preferably by the Cultural Resource, Lands Issues, and all biologic/wildlife criteria. Generally this is based on the philosophy that the reservoir area would be greatly impacted by reservoir inundation, therefore it would be preferable to have pipeline relocation impacts centered in that area on Project land.

These reservoir routes would not encounter any major geologic hazards and no water quality impacts were identified based on the assumption that pipeline integrity beneath the reservoir would be maximized.

Reclamation operation and maintenance, and gas company concerns are reflected in the Project O&M and Gas Co. Issues criteria with much less preferable ratings. Gas company concerns are based on operation and maintenance access and future pipeline installation impacts of reservoir routes. Reclamation operation and maintenance concerns are based on the conflicts with concurrent operation and maintenance of the pipelines and the reservoir/dam, and the potential hazards to the dam's safe operation and long term integrity. Three north of reservoir routes were eliminated from further consideration due to golden eagle nesting area impacts as stated above. The remaining north of reservoir routes are Phoneline-East Carbon Mountain (B), Phoneline-East Animas (C), Powerline-East Carbon Mountain (E), Powerline East Animas (F), North Reservoir-East Carbon Mountain (H), North Reservoir-East Animas (I). These routes were generally rated less preferable from the Cultural Resources perspective and major geologic hazards, a landslide on the north face of Carbon Mountain and a landslide/landfill complex on the northeast slope of Carbon Mountain, are encountered by all these north of reservoir routes. These north of reservoir routes were generally rated less preferable by biologic/wildlife criteria except that all these routes were rated most preferably relative to Reservoir Aquatic Life and Golden Eagle Nesting Activity. All of these routes were rated most preferable from the Indian Trust Assets perspective. Because all of these routes extend off of Reclamation land, especially routes using the East Animas segment, they are rated less preferable from the Lands Issues perspective. Both the Project O&M and Gas Co. Issues criteria rate these routes from the most to least preferable, with both agreeing that routes including the East Animas segment are most preferable.

The four south of reservoir routes are Indian Creek Long (Q), Indian Creek Short (P), Upper Southern (O), and Lower Southern (N). These routes are rated preferable from the Reservoir Aquatic Life and Golden Eagle Nesting Activity perspectives but less preferable from the Wildlife Habitat perspective. One of these routes, Lower Southern (N), encounters a major geologic hazard being a landslide complex on the north face of Basin Mountain.

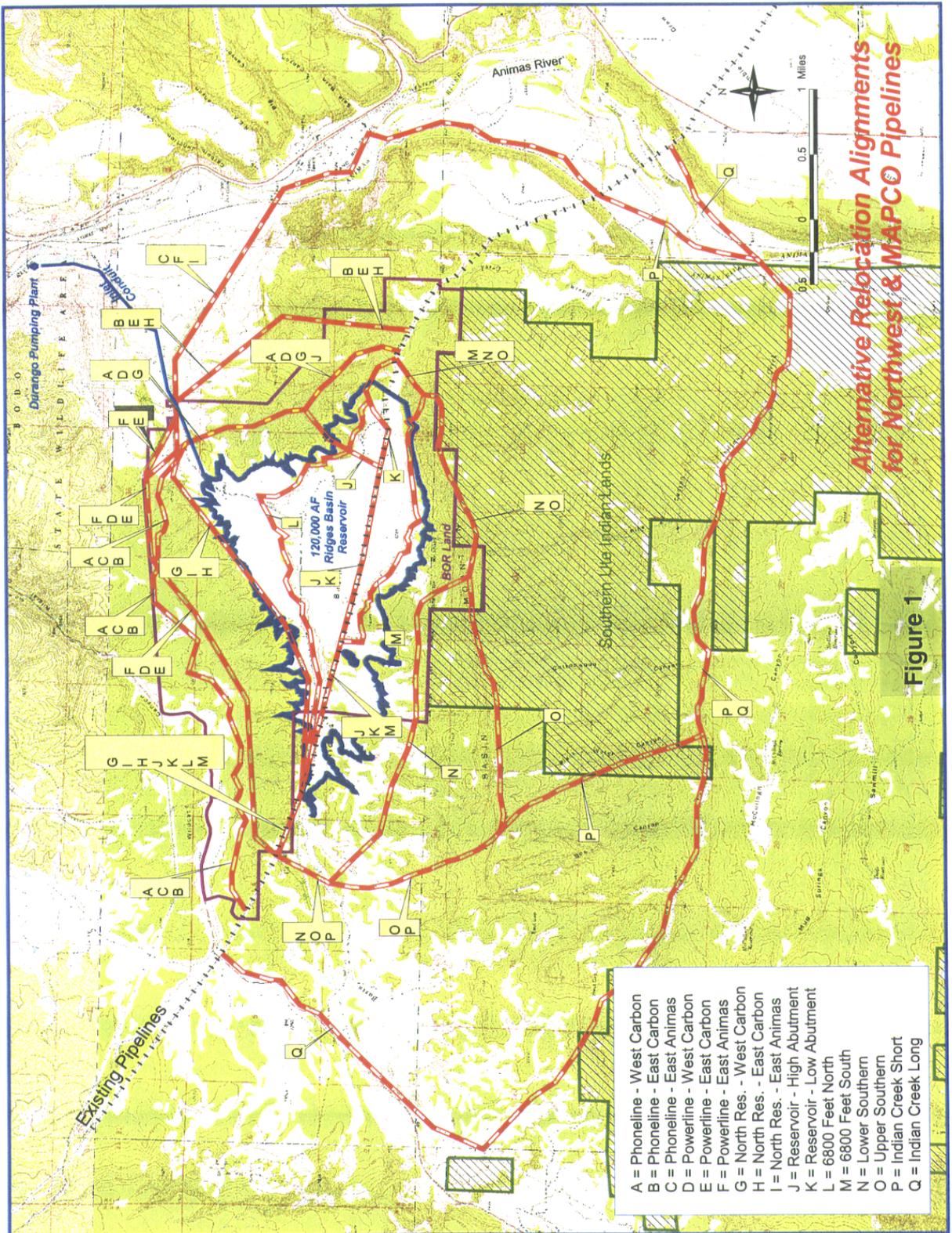
Except for the Lower Southern Route (N) all of these south of reservoir routes are rated less preferably from the Indian Trust Assets perspective because of the length of the routes on the Southern Ute Indian Reservation. Also, these routes are rated less preferable from the Lands Issues perspective because the routes fall not only outside of Reclamation lands but on Southern Ute Indian Reservation lands. These routes are preferable from the Reclamation operation and maintenance perspective because they are the least potentially impacting to the dam and reservoir.

## RECOMMENDATIONS

The routes in Table 1 are listed in their order of preference, based on their summary ratings (Wt. Avg.) with the more preferred routes at the top. The recommendations of the technical screening workgroup are based on these results.

- 1) Four of the routes are recommended to be excluded from further consideration due to protective restrictions of the Bald Eagle Protection Act of 1940, amended in 1962 to include golden eagles. These routes are the Powerline-West Carbon (D), Phoneline-West Carbon (A), Reservoir-High Abutment (J), and North Reservoir-West Carbon (G).
- 2) The top three routes on Figure 1 are reservoir routes and are the most recommended from the overall technical evaluation. These are Reservoir-Low Abutment, (K), 6800 foot North, (L), and 6800 foot South, (M).
- 3) Reclamation should pursue resolving the conflict between the high preference to use a reservoir route and Reclamation draft Directives and Standards that discourage installation of utilities on or near dams or other critical water storage, diversion, or conveyance structures.
- 4) Reclamation should consult with Northwest and MAPCO pipeline companies to insure that the degree of pipeline integrity assumed by this study can be obtained.
- 5) Reclamation should further evaluate the study assumptions on the toxicity and solubility of the products carried in the pipelines to be relocated.
- 6) The next three most recommended routes, not considering the excluded Powerline-West Carbon route (D) and North Carbon route (G), are south of the reservoir. These routes are Indian Creek Long, (Q), Indian Creek Short, (P), and Upper Southern, (O).
- 7) Since portions of all three of these routes south of the reservoir cross land owned by the Southern Ute Indian Tribe, Reclamation should consult with the Southern Ute Indian Tribe on the acceptability of using any of these routes.
- 8) The remaining 7 routes, although not as highly recommended as the above 6 routes, should be pursued if agreements cannot be reached to use a more preferable route.

- 9) The pipeline companies whose lines are to be relocated should be consulted with and included in the decision making. Northwest Pipeline Company has expressed serious concerns about any relocation route below the reservoir water surface. Their concern is that if maintenance is required on a section of the pipeline that lies below the reservoir water surface, their pipeline could be out of service for an extended period of time.



Alternative Relocation Alignments  
for Northwest & MAPCO Pipelines

**Figure 1**

- A = Phoneline - West Carbon
- B = Phoneline - East Carbon
- C = Phoneline - East Animas
- D = Powerline - West Carbon
- E = Powerline - East Carbon
- F = Powerline - East Animas
- G = North Res. - West Carbon
- H = North Res. - East Carbon
- I = North Res. - East Animas
- J = Reservoir - High Abutment
- K = Reservoir - Low Abutment
- L = 6800 Feet North
- M = 6800 Feet South
- N = Lower Southern
- O = Upper Southern
- P = Indian Creek Short
- Q = Indian Creek Long

**Table 1**  
**RIDGES BASIN GAS PIPELINE RELOCATION ANALYSIS**  
**Phase 1 - Technical Screening**  
**Animas-La Plata Project**

Route ID	Route Name	Length (miles)	Evaluation Criteria															Wt. Avg.	
			Cultural Resources	Reservoir Aquatic Life	Wildlife Habitat	Golden Eagle Nest Act.	Riverine/Riparian	Geologic Hazards	Water Quality	ITA/EJ	Recreation	Hazardous Materials	Aesthetic Issues	Socio-economics	Lands Issues	Project O & M	Gas Co. Issues		Pipe Installation Cost
K	Reservoir-Low Abutment	4.1	1	1	1	1	1	3	1	1	2	1	1	5	2	9	9	3	1.98
L	6800 foot North	4.8	3	1	2	2	1	4	1	1	2	1	2	5	3	9	8	4	2.28
M	6800 foot South	4.4	3	1	2	1	1	5	1	1	2	1	2	5	4	9	9	4	2.41
Q	Indian Creek Long	11.5	5	1	9	2	7	1	4	9	3	1	5	1	8	1	1	3	2.41
P	Indian Creek Short	8.9	4	1	8	2	6	1	4	8	4	1	5	4	8	1	3	4	2.54
<b>D</b>	<b>Powerline-West Carbon</b>	<b>5.5</b>	<b>7</b>	<b>1</b>	<b>6</b>	<b>10</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>5</b>	<b>5</b>	<b>2</b>	<b>4</b>	<b>5</b>	<b>4</b>	<b>2.58</b>
G	North Res-West Carbon	5.4	3	1	3	10	1	3	1	1	6	1	6	5	5	5	5	4	2.61
O	Upper Southern	5.8	4	1	8	3	1	3	2	6	1	1	4	4	7	4	5	8	2.62
A	Phoneline-West Carbon	6.0	8	1	3	10	1	2	1	1	5	1	7	5	3	4	4	4	2.63
J	Reservoir-High Abutment	4.8	2	1	1	10	1	3	1	1	4	1	4	5	4	7	9	5	2.64
H	North Res-East Carbon	5.9	4	1	1	2	1	9	2	1	5	1	6	5	6	5	7	6	2.88
B	Phoneline-East Carbon	6.5	8	1	6	1	1	9	2	1	4	1	5	5	4	4	7	6	2.89
N	Lower Southern	5.1	1	1	7	5	1	9	1	3	5	1	7	5	7	4	6	6	2.89
E	Powerline-East Carbon	5.9	7	1	5	2	1	9	2	1	4	1	5	5	5	4	7	6	2.90
F	Powerline-East Animas	8.5	8	1	7	1	8	9	4	1	8	1	6	8	9	1	3	1	3.05
I	North Res-East Animas	8.5	6	1	5	1	8	9	4	1	9	1	7	8	9	2	3	1	3.06
C	Phoneline-East Animas	9.2	9	1	7	1	8	9	4	1	8	1	8	8	9	1	2	1	3.15

Relative Weights 1/      1      0.5      0.3      0.4      0.3      0.5      0.5      0.5      1      1      0.8      0.1      1      1      1      0.8

 = could be a 10 depending on solubility of products

 = dam safety concerns

**Bold** = Alternatives with a 10 (elimination rating)

1/ Relative Weights = Each evaluation criteria was assigned a weight relative to all other criteria. This relative weight is used to calculate the weighted average (Wt. Avg.) column.

**NOTE:** The rating scale of 1 to 10 was used to rate each route for each evaluation criteria, where a rating of 1 indicates the least amount of impact or most preferable route.

4/27/99

**APPENDIX A**  
**ALTERNATIVE ALIGNMENT APPRAISAL**  
**FOR THE PROPOSED RELOCATION**  
**OF THE**  
**MAPCO AND NORTHWEST PIPELINES - RIDGES BASIN**

*Cultural Resources*  
*and*  
*Indian Trust Assets/Environmental Justice*

Proposed alignments A-Q, Analysis (Appraisal-level) completed by Warren F.X. Hurley. Parameters based on Plan of Study dated 9/21/98 and supplemental information. Appraisal-level analysis is an rating of various alternatives in regards to potential impacts, based largely on existing/internal information. In the absence of complete data, an expert's opinion is used. A value is assigned to each alternative (on a 1-10 scale) accompanied with a brief narrative.

Contacts/information sources: Existing survey data, Reclamation records, Colorado State Historic Preservation Office (SHPO) records, local archives, archaeological/anthropological/historical publications, demographic and community data.

Results: See figure 1 for assigned values in tabular format.

1) *Cultural Resources.*

Cultural resources are archaeological sites, historic properties, traditional cultural properties, and sacred sites. Alternatives which are within the pool limits of the proposed Ridges Basin Reservoir are assigned lower values since it is assumed that sites will need to be mitigated for Reservoir construction.

Least Impact. Alternatives of least impact (value of 1) were assigned to Routes K (Reservoir Low Abutment) and N (Lower Southern). Cultural resource surveys are 90% complete for these routes. Route K would leave much of the pipe in place and minimal additional impacts would occur. Route N is located where few sites are recorded.

Low Impact. Alternatives of low impact (value of 2 or 3) were assigned to Routes G (North Reservoir-West Carbon), J (Reservoir High Abutment), L (6800 ft North), and M (6800 ft South). Sites will be impacted, but will need to be mitigated anyway for Reservoir construction.

Moderate Impact. Alternatives of moderate impact (value of 4 thru 6) were assigned to Routes H (North Reservoir-East Carbon), I (North Reservoir-East Animas), O (Upper Southern), P (Indian Creek Short) ,

and Q (Indian Creek Long). Cultural resources surveys and (for portions unsurveyed) expert's opinion indicate that significant adverse impacts outside of Ridges Basin will occur. Additional survey and mitigation will be required.

High Impact. Alternatives of high impact (value of 7 thru 9) were assigned to Routes A (Phoneline-West Carbon), B (Phoneline-East Carbon), C (Phoneline-East Animas), D (Powerline-West Carbon), and F (Powerline-East Animas). Cultural resources surveys and (for portions unsurveyed) expert's opinion indicate that substantial adverse impacts outside of Ridges Basin will occur. Extensive additional survey and mitigation will be required.

## **2) *Indian Trust Assets/Environmental Justice***

Indian Trust Assets (ITAs) are any legal interests or resources held by an Indian Tribe, or held in trust by the U.S. Government for a tribe. Under the requirements for Environmental Justice any low-income or minority communities that may be affected by a proposed action must be identified. This appraisal-level analysis did not identify any low-income or minority communities in regards to any of the proposed alternatives. Therefore the ratings focus exclusively on ITAs.

No Impact. Alternatives of least impact (value of 1) were assigned to Routes A, B, C, D, E, F, G, H, I, J, K, L, & M. No ITAs were identified.

Low Impact. Route N (value of 3) is considered to have low impact on ITAs. Approximately 3/4 mile of this alternative occurs on Southern Ute tribal land. A pipeline would lessen the value and limit other uses of the land, but the short distance is not considered significant.

Moderate Impact. Route O (value of 6) is considered to have moderate impact on ITAs. Approximately 2 miles of this alternative occurs on Southern Ute tribal land. A pipeline would lessen the value and limit other uses of the land, and there is a possibility that tribal cultural resource sites could be impacted.

High Impact. Routes P (value of 8) and Q (value of 9) are considered to have a high impact on ITAs. Up to 5 miles of these alternative occur on Southern Ute tribal land. A pipeline would lessen the value and limit other uses of the land, and there are known tribal cultural resource sites could be impacted.

# **NORTHWEST AND MAPCO PIPELINES**

## **ANIMAS - LA PLATA PROJECT**

### **Ridges Basin Pipeline Relocation Analysis/Fish, Wildlife and Wetlands**

#### **PURPOSE:**

Ridges Basin is a proposed reservoir site for several Animas - La Plata Project (A-LP) alternatives. The purpose of the relocation analysis is to conduct an assessment of the potential effects of seventeen alternative relocation routes for existing and proposed natural gas pipelines within the proposed reservoir site. Pipeline relocation would be needed to be accomplished prior to dam construction.

The purpose of this evaluation is to assess impacts to fish, wildlife and wetlands associated with the varying proposed routes.

#### **METHOD OF STUDY:**

Assessing impacts associated with the various pipeline routes was accomplished by identifying significant fish, wildlife and wetland resources within the overall proposed area of impact and through consultation with other agency biologists. Input was solicited from the Fish and Wildlife Service, the Colorado Division of Wildlife and the Southern Ute Indian Tribe.

In late January, biologists with the Fish and Wildlife Service (Service) and the Colorado Division of Wildlife (CDOW) were provided the opportunity to view the proposed pipeline alternative routes through use of a helicopter. This aerial survey allowed all participants an opportunity to assess the relative value of the existing habitats associated with each alternative and to view some of the more significant resource areas that could be potentially impacted. Golden eagle nesting areas and big game (elk & deer) winter range were of greatest interest. In addition, we were able to view the extent of existing disturbances to wildlife habitats caused by previous human actions. Biologists with the Southern Ute Indian Tribe (SUIT) were familiar with tribal lands and their associated resources potentially impacted by proposed pipeline alternatives, therefore, they chose not to participate in the aerial surveys.

#### **Reference:**

Fish and Wildlife Service February 19, 1999 Planning Aid Memorandum (PAM).

#### **Assumptions:**

- \* Pipeline relocation is prerequisite to construction of Ridges Basin Reservoir.
- \* Existing pipelines can be left within the reservoir basin without creating significant concerns relative to potential rupture.
- \* The compressed methane gas (Northwest pipeline) and the compressed NGL's (MAPCO pipeline) are not overly toxic to fish and wildlife.
- \* The maximum depth of the reservoir would not exceed 190 feet (associated with a 130,000 AF reservoir).
- \* Any proposed route crossing Southern Ute Tribal lands would present significant resource problems thereby making it very difficult to obtain Tribal permission for relocating pipelines across their land.

- \* The only significant wetland vegetation was within the proposed Ridges Basin Reservoir site and would be lost through eventual inundation and would not be considered impacted by proposed pipeline routes
- \* None of the pipelines relocation proposals impact any threatened or endangered species.
- \* Four routes that came within close proximity of the Carbon Mountain golden eagle nests would require applying for a takings permit that the Service has formally stated would be very difficult to obtain unless it could be proven that all other alternatives are not feasible.

**RESULTS:**

There were no site specific investigations made of the area of potential impact. Subsequently, all participants in the surveys and a SUIT biologist met to discuss this issue in more detail. A general concurrence on what the significant fish and wildlife issues were and how the alternatives should be ranked was reached. It was agreed that the Service would provide a PAM documenting their position as well as CDOW's on recommended pipeline corridors.

The evaluation form includes a rating scale with numeric assignments ranging from 1-10 with 10 representing unacceptable effects and/or impacting an extremely valuable resource to identified resources and 1 representing no effect.

## IMPACT EVALUATION NORTHWEST AND MAPCO PIPELINES

**Instructions:** For the criteria listed in the columns below, numerically rate the impacts of each route as follows: No Effect = 1, and Major Effect/unacceptable =10. Add the ratings for each route and enter the sum total in the column provided. Rank each route in ascending order of impact, from no effect to major effect, in the column provided.

**Prepared By:** Kirk Lashmett

### Criteria to Assess Potential Effects on Fish, Wildlife and Wetlands

PIPELINE RELOCATION ROUTE	Wildlife Habitat	Reservoir's Aquatic Life	Golden Eagle Nesting Activity	Riverine/ Riparian Habitat
A	3	1	10	1
B	6	1	1	1
C	7	1	1	8
D	6	1	10	1
E	5	1	2	1
F	7	1	1	8
G	3	1	10	1
H	1	1*	2	1
I	5	1*	1	8
J	1	1*	10	1
K	1	1*	1	1
L	2	1*	2	1
M	2	1*	1	1
N	7	1	5	1
O	8	1	3	1
P	8	1	2	6
Q	9	1	2	7

\* Assumes the risk of contamination of reservoir from a pipeline break is assessed minimal. If this cannot be verified and the materials are deemed hazardous to aquatic life then the "1\*" revert to "10".

Rank   Route



1 K, L, M

2 H

3 B

4 E

5

6

7C,N,O,F

8 PQ

9 D

10A,G,J



## **GAS COMPANIES ISSUES**

### **ANIMAS-LA PLATA PROJECT Northwest and MAPCO Pipelines**

April 1999

#### **Assumptions:**

The relocated pipeline will require access for maintenance. The alternative alignments below the proposed Ridges Basin Reservoir would be designed with redundant lines and a safety system that would automatically shut down the lines in the event of leak or rupture.

Most of the previous work on selecting potential alignments was based on the fact that the pipelines requiring relocation were owned by two separate companies that had approximately parallel alignments. The Williams corporation now owns the Northwest and MAPCO pipelines. This shared ownership could influence the total required ROW requirements, it may allow for a smaller ROW in areas of environmental or engineering concerns.

#### **Methodology**

I visited the Northwest Pipeline (essentially Williams Corp.) office in Salt Lake City and discussed the company concerns on the various alternatives with their pipeline engineer familiar with this project (Dave Kendrick). He was provided with a package containing the 17 relocation alternatives.

During our discussion of the alignments I tried to make it clear that these alignments were selected using USGS 25K topography and were only approximately located. A preferred alignment would be refined for environmental and engineering concerns. Reclamation would be open to any suggested alignment refinements to address Northwest's concerns. I told Mr. Kendrick that Reclamation will keep them informed of the selection process and provide a process for their input.

#### **Northwest Pipeline Relocation Alternatives Concerns**

##### **◆ A-Phone line-West Carbon**

Stability of corridor-  
Retaining wall-  
100 foot total width-

Pipelines could get by with a 20 foot minimum offset. If there were concerns about close pipelines, one line could be installed at a deeper depth to reduce the risk of damage when installing a second line next to it. Perhaps a micro-tunnel instead of the corridor.

##### **◆ B-Phone line-East Carbon**

Steep terrain-  
Drainages parallel to alignments-  
The area east of Carbon Mountain is the most difficult terrain-

◆ C-Phone line-East Animas

No concerns if ROW and access to alignment (in developed areas) is taken care of.

+ Away from reservoir operation impacts-

+Easy to construct and maintain-

River crossings would be directionally drilled-

Would use higher class pipe through developed areas to meet safety requirements-

Hazard area (through landfill) could be directionally drilled-

◆ D-Power line-West Carbon

Same concerns as A-

Crossing Drainages-

Increased cathodic protection requirements-

◆ E-Power line-East Carbon

Same concerns as B and D-

◆ F-Power line-East Animas

Same concerns as D and C

◆ G-North Reservoir-West Carbon

Assume that this alignment is above high water line-

Side slope, land slide issues-

Same concerns as A-

◆ H-North Reservoir-East Carbon

Same concerns as G and B-

◆ I-North Reservoir-East Animas

Same concerns as G and C-

◆ J-Reservoir-High Abutment

No access to repair pipe-

Cost associated with pipeline being out of service

Require redundant line-

Restrict future expansion-

Still have corridor issues (unless micro-tunnel)-

Excavation and installation up steep slope-

Eventually will need to replace pipeline (drain reservoir?)-

*Note: Northwest is concerned with any alignment that would have restricted access because of the reservoir location. If their pipeline is out of service for any extended period of time their financial loss would be substantial. On their existing pipelines, they have emergency procedures to perform an emergency repair in a short period of time should a landslide or another event cause a disruption of service. A line below the reservoir would be inaccessible for repairs. Would Reclamation drain the reservoir for access to the pipeline? Some alignments designed to be located slightly below the reservoir surface (L and M) may be above the reservoir at certain times of the year or accessible through reservoir lowering, BUT repair access would be in saturated ground and very difficult at best. Northwest does not feel that redundant lines is a total solution to their concerns.*

◆ K-Reservoir-Low Abutment

Same concerns as J-  
Creative ways around dam abutment are possible - pipe needs to be accessible  
See note under J

◆ L- 6800 foot North

Needs to be accessible by reservoir operations  
A lot of the same issues as J and K  
Time pipe would be out of service before repairs could be made  
Maintenance issues in general (repairs in saturated ground, access across mud, etc.)  
Slope stability  
Redundant lines may be required  
Major repairs would require a lot of time (saturated ground, etc.)  
See note under J

◆ M-6800 foot South

Same as L  
More severe slope issues  
Steeper slopes around dam  
See note under J

◆ N-Lower Southern

SUIT ROW  
Ridge terrain  
Slope stability issues  
O&M and Construction access

◆ O-Upper Southern

Same as N  
Less slope stability issues

◆ P-Indian Creek Short

## SUIT ROW

Unknown area (geology, etc.)

O&M Related to length

River crossings

Creek crossings

Pipe would need to be out of the bottom of drainages (large drainage area)

Steep terrain coming up ridge (Indian Creek Short only)

+ Away from dam

+Good access - O&M and Construction

+Less development - easier ROW acquisition

### ◆ Q-Indian Creek Long

Same as P (except steep terrain up ridge)

Wetlands near La-Plata

## GENERAL

Pipelines away from project operations are better (away from dam releases)

All lines within reservoir could have a severe service and dollar loss. Getting access to pipelines for repair would be difficult even for the lines close to the water surface elevation (working in mud and trenches saturated).

Difficulty of getting ROW across SUIT lands is a concern to Northwest and MAPCO. In my rankings of alternatives based on Gas Company issues, I have stayed away from the political arena and made the assumption that an acceptable ROW across SUIT lands is possible.

It may be worth the effort to see if there are some benefits to the SUIT that could make granting a ROW more acceptable. There could be some benefits to SUIT's Red Willow ( i.e., Northwest providing gas transportation for fields near relocated line, some shared facilities).

## Ratings

The Indian Creek Long was given the highest rating ("one") in terms of gas company issues. This alignment is away from the project features and development in the Durango area. This rating assumes that an acceptable ROW can be negotiated with the Southern Ute Indian Tribe.

The Phoneline-East Animas alignment was give the second best rating of "two". The other two alignments utilizing East Animas and the Indian Creek Short alignment were given a rating of "three".

All alignments that utilized a below reservoir water surface configuration were given an "eight" or "nine". Northwest Pipeline is concerned about access to their pipeline should repairs or replacement be required. Even if Reclamation would draw down the reservoir for repairs, the ground would be saturated and require special equipment. The pipeline being out of service for an extensive time is a large concern for the pipeline company.

The alignments utilizing East Carbon Mountain were rated at "seven".

**PIPELINE RELOCATION ROUTE ANALYSIS  
ANIMAS - LA PLATA PROJECT  
GEOLOGIC HAZARDS EVALUATION  
APRIL 9, 1999**

**PURPOSE**

The purpose of the pipeline relocation route analysis is to evaluate relocation routes for existing pipelines within Ridges Basin. One criteria being used to evaluate and comparatively rate the 17 identified potential relocation routes is the presence of geologic hazards. A geologic hazard is a naturally occurring or man-made geologic condition or phenomenon that presents a risk or a potential danger to life and property, (Glossary of Geology, American Geologic Institute, 2nd edition, 1980). This Geologic Hazard Evaluation was performed by Bill Walsh, geologist.

**METHOD OF EVALUATION**

Evaluating geologic hazards associated with the relocation routes was accomplished by identifying geologic hazards in the relocation area. Existing geologic data, including geologic hazard mapping, was used to determine which hazards potentially exist in the pipeline relocation general area. This preliminary evaluation resulted in the following list of geologic hazards for further consideration:

**Geologic Hazards**

Floods.

    Dam failure inundation

    Storm event effects on reservoir and streams

Ground failures:

    Slope failures

        Landslides

        Debris flows

        Mud flows

        Rock falls

    Subsidence (collapse, consolidation, earth fissures due to withdrawal of fluids, and solutioning).

Surface erosion.

The above general geologic hazards were then related to geologic or man-made conditions in the relocation area that could pose the hazard to the relocated pipelines and pipeline personnel. Flooding as a result of dam failure was considered a hazard downstream of the Ridge Basin Damsite. Flooding as a result of a storm event was considered a potential hazard in the larger drainages such as the Animas River. Areas of potential landslide, debris flow, mud flow, and rockfall activity were delineated within the relocation area based on existing information. The potential for a subsidence hazard in the relocation area was associated with abandoned coal mines, a landfill, and to some degree the dam embankment. The potential of a surface erosion hazard in the relocation area was associated with the reservoir shoreline lying on an area with high erosion potential. Two unique hazards to this area were considered at this time. Coal bed fires and methane soil gas seepage are associated with the Fruitland Formation coal beds. Although all routes were considered to have potential for encountering methane soil gas and

or coal bed fires because all routes encounter or pass over the Fruitland Formation outcrop, these hazards will continue to be included in this evaluation for emphasis.

#### ANALYSIS ASSUMPTIONS

- Three landslides encountered by relocation routes, on the north faces of Carbon and Basin Mountains, are considered major landslides based on their size and location. These landslides could not be avoided with minor route adjustments. Avoidance of these hazards could be accomplished through taking another route. All other landslides encountered are considered minor landslides that could be addressed by minor route adjustments.
- The situation of routes encountering reservoir shorelines is not considered a serious slope stability hazard, proper pipeline design and construction should mitigate the hazard.
- Rockfall hazards are associated with 14 of the 17 routes, are common to the relocation area, and can be mitigated by design of rock support systems if needed. These are therefore considered minor hazards.
- Three routes, C, F, and I, encounter a landfill. Route adjustments would be difficult with developed Bodo Industrial Park immediately downslope and a landslide immediately upslope.
- Three routes, K, L, M, pass close to the dam embankment. Any potential hazard could be addressed as a route design issue, incorporating safe spacing between structures.
- Dam embankment hazards (differential settlement), coal mine hazards (subsidence), and reservoir shoreline hazards (landsliding, differential settlement), can be mitigated by minor route adjustments and/or proper design and construction consideration. These are therefore considered minor hazards.
- All routes are considered to have potential for encountering methane soil gas and/or coal bed fires because all routes encounter or pass over, the Fruitland Formation outcrop.
- No active faults are crossed by any routes, based on: Seismotectonic Study for Ridges Basin Damsite, ALP, Report No. 92-2, June 1992.
- The hazards of active faulting, methane soil gas, and coal bed fires are considered the same for all routes, therefore disregarded when comparatively rating the routes.
- The remaining minor hazards (reservoir shorelines, rockfalls, coal mines, dam embankment, and mud/debris flows) are considered to have equal weight.
- Significant costs for geologic hazard mitigation are not considered in this comparative rating. These are expected to be reflected in the cost of route criteria
- This geologic hazard comparative rating is based on all existing available data, and will be used in conjunction with other criteria comparative ratings to produce an overall summary rating for each route. It is assumed that the proposed relocation route, chosen by review of the route summary ratings, will be further investigated for geologic hazards and design data.

## CONTACTS:

Southern Ute Indian Tribe, Dick Baughman, geologist.  
BLM, Jeff Olson, geologist.  
Colorado Geologic Survey, Chris Carrol, geologist.  
Fort Lewis College Geology Dept., Rob Blair, geologist.  
La Plata County, Warren Holland.

## REFERENCES:

Seismotectonic Study for Ridges Basin Damsite, ALP, Report No. 92-2, June 1992.  
BOR Ridges Basin Reservoir Design Data Report, 1992.  
USGS Report, Generalized Surficial Geologic Map of Basin Mountain Quadrangle, Moore and Scott, 1981.  
Geologic Hazard Map of Basin Mtn. Quadrangle, 1976, by Allan E Miller, consulting geologist, Steamboat Springs, CO., for the Animas Regional Planning Commission, provided by La Plata County.  
Ridges Basin Reservoir Design Data Report, 1992, Appendix F, Coal mines near the proposed Ridges Basin Reservoir.  
The 1995 reconnaissance surveys along the Fruitland outcrop.  
Northwest's FERC application dated Aug. 1996.  
Alternate Route Comparison-Ridges Basin Relocation-Northwest Pipeline Corp.-Coop Agree. 1-FC-40-11100, memo dated 11/26/91.

## RESULTS

The following table relates the potential for each relocation route to encounter the geologic hazards potentially present in the area.

ROUTE ID	LAND-SLIDES MAJOR	LAND-SLIDES MINOR	RES. SHORE-LINE	ROCK-FALLS	COAL MINES	LAND-FILLS	DAM EMBANKMENT	CH4 SOIL GAS	COAL BED FIRES	MUD/DEBRIS FLOWS
A	-	3CM	-	WC	-	-	-	possible		1
B	1CM	-	-	NC	CC	-	-	possible		2
C	-	-	-	-	-	YES	-	possible		3+
D	-	3CM	-	WC	-	-	-	possible		1
E	1CM	-	-	NC	CC	-	-	possible		2
F	-	-	-	-	-	YES	-	possible		3+
G	-	3CM	YES	WC	-	-	-	possible		1
H	1CM	-	YES	NC	CC	-	-	possible		2
I	-	-	YES	-	-	YES	-	possible		3+
J	-	2CM	YES	WC	-	-	-	possible		1
K***	-	-	YES	WC	-	-	close	possible		1
L	-	1CM	YES	WC	-	-	close	possible		3
M	-	3BM	YES	BM	CG	-	close	possible		3
N	2BM	2BM	-	BM	CG	-	-	possible		3
O	-	2BM	-	BM	CG	-	-	possible		1
P	-	-	-	BM	-	-	-	possible		-
Q	-	-	-	BT	-	-	-	possible		-

Notes:

CM= Carbon Mtn., BM=Basin Mtn.

WC= west face of Carbon Mtn.; NC=north face of Carbon Mtn.; BM=north face of Basin Mtn.; BT= west face of Bridge Timber Mtn.

CC= Carbon Mtn. Coal mine and prospect; CG= Gates coal mine

### COMPARATIVE RATING OF RELOCATION ROUTES RELATIVE TO GEOLOGIC HAZARDS.

This comparative rating is based on all existing available data and the above assumptions. The rating scale used is a scale of 1 to 10 with 1 rating being the most desirable, least impacted, route. A 10 rating was established as an “elimination” rating that removes the route from further consideration, based on the route being contrary to existing laws or policies. No 10 ratings were given in the Geologic comparative ratings.

- Routes C, F, and I are rated at 9 due to encountering the landfill, a major geologic hazard.
- Routes B, E, H, and N, are rated at 9 due to encountering major landslides, major hazards, on the north faces of Carbon and Basin Mountains.
- Route M is rated at 5 because it encounters 6 minor geologic hazards.
- Route L is rated at 4 because it encounters 5 minor geologic hazards.
- Routes G, J, K, and O are rated 3 because they encounter 4 minor geologic hazards.
- Routes A and D are rated 2 because they encounter 3 minor geologic hazards.
- Routes P and Q are rated 1 because they encounter 1 minor geologic hazard.

**SUMMARY OF COMPARATIVE RATINGS**

RATING	ROUTES
1	P, Q
2	A, D
3	G, J, K, O
4	L
5	M
9	B, C, E, F, H, I, N

**ALTERNATE ROUTE ANALYSIS  
FOR GAS PIPELINE RELOCATION IN RIDGES BASIN**

**HAZARDOUS MATERIAL PERSPECTIVE**

Ridges basin is a proposed reservoir site for several Animas-La Plata Project (ALP) alternatives. The purpose of the relocation analysis is to conduct an assessment of the potential effects of seventeen alternative relocation routes for exiting and proposed natural gas pipelines within the proposed reservoir site. Pipeline relocation needs to be accomplished prior to construction of a dam if a structural alternative including Ridges Basin is selected in the NEPA EIS process.

This analysis pertains to hazardous materials and whether they will have an effect on the selection of an relocate route for the natural gas/gas product pipelines. Specifically, hazardous materials are evaluated in respect to construction, operation and maintenance (O&M), and the characteristics of the pipeline products.

**Assumptions:**

1. Seventeen alternative pipeline alignments are to be evaluated.
2. State and Federal regulatory programs are adequate for oversight of construction and O&M.
3. Facility/pipeline construction and O&M hazardous material management and safety standards are adequate for the location.
4. Engineering design and construction standards are state of the art.
5. Construction and installation of a alternate pipeline will only occur at a specific location if engineering can provide a design based on a high level of confidence that releases from the pipeline/facility are minimized and below normal occurrence rates.
6. Hazardous constituents of the gas product and their effect on aquatic and terrestrial life is not significant for this sub evaluation. This issue is evaluated under Fish, Wildlife and Wetland perspective.
7. Spill response programs including staff training, equipment, physical engineering controls and management engineering controls, program reporting and permitting requirements are in place.
8. Existing pipelines can be abandoned and left within the reservoir without creating significant concerns.

**Rating and Ranking:**

The analysis examines three subareas listed as separate columns: Construction, Operation & Maintenance, and Product Hazardous Constituents. The rating scale falls between: No Effect = 1 and Major Effects/unacceptable = 10. The columns for each alternative are added and divided by three to result in the final score.

**Evaluation Criteria For Hazardous Materials**

<b>Pipeline Relocation Routes</b>	<b>Construction</b>	<b>Operation and Maintenance</b>	<b>Product Hazardous Constituents</b>	<b>Overall Average For Three Subareas</b>
A	1	1	1	<b>1</b>
B	1	1	1	<b>1</b>
C	1	1	1	<b>1</b>
D	1	1	1	<b>1</b>
E	1	1	1	<b>1</b>
F	1	1	1	<b>1</b>
G	1	1	1	<b>1</b>
H	1	1	1	<b>1</b>
I	1	1	1	<b>1</b>
J	1	1	1	<b>1</b>
K	1	1	1	<b>1</b>
L	1	1	1	<b>1</b>
M	1	1	1	<b>1</b>
N	1	1	1	<b>1</b>
O	1	1	1	<b>1</b>
P	1	1	1	<b>1</b>
Q	1	1	1	<b>1</b>

**Findings:**

Based on the eight assumptions all seventeen relocation alternate route are rated as a **1**.

## LANDS PERSPECTIVE

ANIMAS-LA PLATA PROJECT  
Northwest and MAPCO Pipeline

### PIPELINE RELOCATION ANALYSIS

March 3, 1999

#### Methodology

Assessments made on lands issues are based solely on certain basic assumptions and considerations as identified below and listed as Criteria in the Rating Chart. The alternatives are then rated on a scale from 1 to 10 with 1 being Least Impact and 10 being a “show stopper”. There are no known show stoppers in the Lands analysis given the condemnation option. The pipeline integrity was never considered in this analysis. Pipeline failure scenario would increase a risk factor that would ultimately increase those rating for alternatives effecting more populated areas. **Emphasis is placed on land impacts directly related to the length of the route.**

Methodology in our assessment was derived from available inhouse information, inhouse expertise in local current realty environment ( Regional Appraiser), and other internal disciplines relative pipeline relocation obligations, Right-of-Way and Surface Disturbances issues.

#### Assumptions/Criteria

##### 1. Perpetual Easements (PE)

Easements will be acquired for multi-pipelines 75' to 100' wide and the length determined by alternate route selected. Included in the easements will be access for O&M of the pipeline. It was considered the ROW width would vary due to the terrain and conditions. Obtaining 75' to 100' width easements from private landowners will be more difficult. Alternatives confined within BOR's boundary are the most preferable in lands analysis.

##### 2. Temporary Use Area Right-of-Way (TUA)

Construction TUA will be an additional 25' ROW or more, whatever is needed for tree and spoils storage, staging areas, equipment, construction/assemblage, x-tra work areas required in rough terrain areas, road x-ings, washes, rivers, etc.

##### 3. Surface Disturbance

Ground disturbance considerations are moderate to rough terrain. Noxious weed species identification and mitigation, erosion and erosion potential, rock deposits, off-ROW work space, rough terrain, visual impacts, river crossings, rehabilitation and reclamation, reseeding, etc. The bigger the ROW/Easements, the bigger the impacts. Those alternatives within existing utility corridors will have less surface impacts and are preferred locations when considering disturbance. Along the County Road 211 re-route would have been another practical corridor for the pipeline had we been given that as an alternative.

**4. Negotiation/Appraisal/Acquisitions**

Alternatives outside of BOR property boundary involving a number of private property owners would involve some public hearings, county planning regulations, utilities and other land use conflicts. The more private property acquired, the greater the costs, increasing the risk for schedule delays. If more CDOW property is purchased, it will result in additional replacement land for them per agreement. Given BOR’s current limited staff and workload, ROW acquisitions could significantly impact schedules; particularly if 75' to 100' width is non-negotiable with the gas companies. Depending on the Tribal position regarding ROW crossing Indian Trust lands, those criteria evaluations could change significantly.

<b>ALT</b>	<b><u>PERPETUAL EASEMENT</u></b>	<b><u>TEMPORARY USE AREA</u></b>	<b><u>SURFACE DISTURBANCE</u></b>	<b><u>ACQUISITION COSTS</u></b>
A	2	2	6	1
B	4	4	6	2
C	9	9	9	9
D	1	1	6	1
E	4	4	6	4
F	9	9	9	9
G	4	4	6	4
H	4	4	6	5
I	9	9	9	9
J	4	2	4	4
K	2	1	3	2
L	4	2	3	2
M	2	4	5	2
N	8	6	8	8
O	8	6	8	8
P	8	8	8	8
Q	8	8	8	8

! Summary of comparative rating from most preferred to least preferred. (EQUALS)

(D, K), (A, L), (B, J, M), (E, G), H, (N, O), (P, Q), (C, F, I)

Animas LaPlata Project -- Pipeline Relocation Analysis

**Operation and Maintenance(O&M) Perspective 3-10-99 R. Leach**

**Assumptions:**

1. Seventeen alternative pipeline alignments are to be evaluated.
2. Ridges Basin Reservoir size is not fixed and may vary from 90,000 acre feet to its maximum capacity
3. There will be no emergency spillway. The original reservoir design had a spillway near county road 211.
4. Releases from the dams outlet works will be capable of releasing 1,000 cfs.
5. Pipelines to be located in the selected corridor are a 26 inch natural gas line and a 10 inch natural gas products line. The natural gas products line will carry products of a petroleum base which may or may not dissipate as a gas after discharging into the reservoir waters.
6. A 4 inch pipeline will be tapped into the 26 inch line at some point along its alignment.
7. No additional pumping or compression stations will be required with any of the alignments.
8. Supporting utilities such as electric and phone will not be required for any of the alignments.
9. Pipelines can be constructed and operated, well over 50 years, adjacent to either dam abutment without compromising the dams safety, future emergency operations, maintenance procedures and access, and increasing security risks.
10. A thorough review of the pipeline and dam design will be done and approved before a pipeline alternative route will be selected which is near the dam or within the reservoir. This pertains to all potential pipeline alignments which may interfere with any Reclamation facilities.
11. Pipelines can and will be operated constructed and operated for the life of the reservoir with minimal risk of rupturing.
12. All liability associated with incidents relating to the pipelines will be the responsibility of the pipelines owner no matter what route is selected.

Contacts Made:

Hank Sandhouse , Denver PAO

Darrel Krause, Denver PAO

Dal Holz, Env. And Planning, TSC

Ed Kramer, Lands, TSC

Larry Walkoviak, Resource Management Division, UC Regional Office

Chuck Madsen, Geosciences and Dams Group, UC Regional Office

O&M Considerations:

1. A major safety of dams concern is the integrity of the dam abutments and how it may be reduced with the various alignments. The alternatives which come within 1/4 of a mile of the dams abutments could impact the dam abutments seepage characteristics depending on the site and the pipeline and dam designs. Increased seepage induced by constructing the pipelines as well as possible pipeline blow-outs and unnoticed leaks are the most obvious concerns. Future emergency actions like grouting of abutments could be impacted. The possibility of heightening the dam may be limited. With access increased to the dam with pipeline alignments at the abutments, security concerns will be heightened.

2. Pipelines buried under the reservoirs water surface create a level of risk. The risks include:
  - a. Possible contamination of the reservoirs waters for the primary M&I use as well as associated uses as fish and wildlife and recreation.
  - b. Reservoir water drawdowns to allow for repair and replacement of the pipelines c. Erosion of the disturbed pipeline alignment if it is within the operating range of the reservoir water surface.
  - c. Explosive petroleum products leaking from the pipelines concentrate within the reservoir and near the dam creating a dangerous condition for the public and maintenance workers.
3. Access needed to operate and maintain the pipelines could impact O&M activities for the dam and reservoir.
4. Pipelines crossing Basin Creek where the reservoirs outlet works discharge must be constructed to withstand flows up to the outlet works capacity without rupturing.
5. Reclamation Manual Directives and Standards, 9\23\98 DRAFT is in review and anticipated to be adopted in the near future. It relates to the pipeline alternative route analysis through section 2. F. General Policy and Limitations, Blasting, Excavating Drilling, etc. Refer to the attached section of this draft document. To summarize, the document states activities near around, or within Reclamation owned facilities is discouraged because of the potential impacts on operation, maintenance, and structural safety of the facilities. Approval of the Area Manager, and Regional Director in consultation with the Chief, Dam Safety Office needs to be obtained prior to installing utilities on or near dams of other critical water storage, diversion, or conveyance structures.

#### Specific Alternative Analysis

##### A. Phone line/West Carbon Mountain

- Pipeline in Basin Creek requiring protection from washout at high flows.
- Pipeline O&M will require access common to the dam O&M access.

##### B. Phoneline/East Carbon Mountain

- Same as A

##### C. Phoneline/East Animas

- Minimal impacts

##### D. Powerline/West Carbon Mountain

- Same as A

##### E. Powerline/East Carbon Mountain

- Same as A

##### F. Powerline/East Animas

- Minimal impacts

##### G. North Reservoir/West Carbon Mountain

- Pipeline in Basin Creek requiring protection from washout at high flows.
- Pipeline O&M will require access common to the dam O&M access.
- North side of reservoir, pipeline under water within active water level.

H. North Reservoir/East Carbon Mountain

- Same as G.

I. North Reservoir/East Animas

- Pipeline underwater within active pool of reservoir.

J. Reservoir High Abutment (assuming pipeline is well away from abutment/dam interface and pipeline is bored into abutment above maximum water surface)

K. Reservoir Low Abutment - assume pipeline enters abutment below max water surface and is in close proximity to the dam abutment/embankment interface.

- Pipeline O&M will require access common to the dam o&m access.
- Pipeline in Basin Creek requiring protection from washout at high flows.
- Dam safety concern with pipeline construction and operation impact on integrity of abutment.
- Pipeline under reservoir within active water level impacting operation.

L. 6800feet Elevation North - this elevation is 10 to 15 feet below the top of active reservoir pool.

- Pipeline o&m access common to the dam O&M access.
- Pipeline in Basin Creek requiring protection from washout at high flows.
- Dam safety concern with pipeline construction and operation impact on integrity of abutment.

M. 6800 feet Elevation South - Same as L but on south side of abutment which is known to contain extensive coal seams in it.

- Same concerns as L with more concern for the integrity of the right abutment when it is disturbed.

N. Lower Southern

- O&M concern of pipeline in Basin Creek.

O. Upper Southern

- O&M concern of pipeline in Basin Creek.

P. Indian Creek Short

No impact

Q. Indian Creek Long

No impact

**Animas LaPlata Pipeline Relocation Analysis Rating Operations and Maintenance Perspective**

Alternative --	Reservoir -- Operation	Dam Safety -- Conflicts	Maintenance -- (1 to 10)	Total Criteria
A	2	1	2	5(4)
B	2	1	2	5(4)
C	1	1	1	3(1)
D	2	1	2	5(4)
E	2	1	2	5(4)
F	1	1	1	3(1)
G	3	1	2	6(5)
H	3	1	2	6(5)
I	2	1	1	4(2)
J	4	2	3	9(7)
K	4	4	3	11(9)
L	4	4	3	11(9)
M	4	5	3	12(9)
N	2	1	2	5(4)
O	2	1	2	5(4)
P	1	1	1	3(1)
Q	1	1	1	3(1)

Note: Rating Scale 1 to 5 with 1 being no impact and 5 being definite high impact. A rating criteria adopted to relate with other disciplines of 1 to 10 was established and this rating is shown within parenthesis in the last column.

## PIPE INSTALLATION COSTS

ANIMAS-LA PLATA PROJECT  
Northwest and MAPCO Pipelines

April 1999

### Assumptions:

Reclamation will be responsible for all costs associated with relocating the Northwest Pipeline, including acquisition of ROW. MAPCO will relocate their pipelines (one 10-inch and one 16-inch) at their sole expense to an alignment approximately parallel to the Northwest relocated line in a ROW acquired (or reimbursed) by Reclamation.

Pipe installation costs were based on the approximate alignments of the 17 alternatives. Costs include redundant lines beneath reservoir surface and corridor preparation costs in areas of extreme terrain.

At the start of this study, it was determined that “total relocation costs” were not possible with this level of study. Total relocation costs would include right-of-way acquisition, court costs for condemnation, environmental and cultural mitigation measures, and numerous other items that would require a very detailed alternative alignment evaluation.

### Methodology

This cost estimate’s purpose was to perform a relative cost evaluation of the various alternative alignments. The attached spread sheet is a summary of the items included in determining the pipe installation costs for the various alternatives. Some of the individual costs only apply to alignments with special requirements (corridor preparation, redundant lines, etc.). **This estimate provides for pipe installation costs only, no costs for ROW, or environmental and cultural mitigation are included.**

### Ratings

The alignments that received the best rating based on relocation costs were the three routes that use the East Animas alignment. They are the Phoneline-East Animas, Powerline-East Animas, and North Reservoir-East Animas routes. These alignments were given a “one” rating. It should be emphasized that this rating does not include the potential difficulty and cost of acquiring a ROW near industrial, commercial, and public areas (Bodo Park, Wall Mart, Escalante Middle School, etc.) along the alignment.

The Reservoir-Low Abutment and the Indian Creek Long alignments ranked next in costs and were given a rating of “three”.

The Upper Southern alignment installation cost rated the highest and was given a rating of “eight”. This alignment would require extensive corridor preparation to accommodate all of the pipelines. The Lower Southern and the alignments utilizing East Carbon were given a rating of “six”.



## **Pipeline Relocation Analysis Socio-Economics**

This analysis only addresses the potential effects the alternative alignments would have on social disturbance and jobs/income. Other socio-economic issues such as environmental justice, recreation, tourism and construction cost were evaluated under other categories.

### **Assumptions:**

To evaluate the socio-economic effect of the alternatives, the following assumptions were made:

1. The pipeline will not leak or have catastrophic failure.
2. Effects are associated with construction. There are no long term socio-economic effects associated with the pipeline location.

### **Methodology**

The proposed alignments were evaluated with respect to their potential socio-economic effects using the above assumptions and rated on a scale of 1 to 10 with 1 being the most desirable. Generally, longer alignments would create longer employment opportunities and alignments through more populated areas would create greater social disturbances. Alignment through Southern Ute Indian Tribal lands may provide Tribal members more employment opportunity if the Tribe requires special emphasis for hiring Native Americans. None of the alignment will have significant socio-economic effects to the area.

### **Results**

The following alignment would provide the longest job opportunities, may provide the best job opportunities for Southern Ute Indian Tribal members, and would not cause significant social disturbance during construction:

Alignment: Q

The following alignments would provide shorter job opportunities, less special opportunity for Southern Ute Indian Tribal members, but would not cause significant social disturbance during construction:

Alignments P, O

The following alignments would provide shorter job opportunities, no special opportunities for Native American, and little social disturbance during construction:

Alignments A, B, D, E, G, H, J, K, L, M, N,

The following alignments would provide better job opportunities than the previous alignments due to additional pipeline length, no special opportunities for Native Americans, but the increased social disturbance would more than offset the increased job related benefits:

Alignments C, I, F

**Ratings**

There are not likely to be significant socio-economic impacts associated with any of the alignments. One alignment would offer the most benefits by being the longest and being located primarily on Southern Ute Indian Tribal land. This alignment would also cause minor social disturbance. Two alignments would offer some benefits by crossing lesser portions of Southern Ute Indian Tribal land and also would cause minor social disturbance. Eleven alignments would offer no significant benefits over others nor would they cause significant social disturbance. The social disturbance associated with three of the alignments more than offset the increased job related benefits associated with their additional lengths. The alignments are rated on a scale of 1 to 10 with 1 being the most desirable, 10 being unacceptable, and 5 being neutral.

Rating	Alignment
1	Q
4	P, O
5	A, B, D, E, G, H, J, K, L, M, N
8	C, I, F

**ANIMAS - LA PLATA PROJECT  
NORTHWEST AND MAPCO PIPELINES  
Ridges Basin Relocation Route Analysis for Recreation and Aesthetics**

**PURPOSE:**

Ridges Basin is a proposed reservoir site for the Animas - La Plata Project (A-LP). The purpose of the relocation analysis is to conduct a cursory-level assessment of the potential effects of seventeen alternative relocation routes for existing and proposed natural gas pipelines at Ridges Basin. Pipeline relocation is prerequisite to construction of Ridges Basin Reservoir for A-LP. As part of the relocation analysis, the purpose of this assessment is to evaluate impacts to recreation and aesthetics. The results of these evaluations will be combined with the results of other concurrent evaluations for a cumulative matrix-type comparison and final analysis.

**METHOD OF STUDY:**

To identify impacts to recreation and aesthetics in a manner suitable for inclusion in the above mentioned matrix and final analysis, impact evaluation forms were developed to ensure consistent objective assessment of impacts for each relocation route, as shown on the following pages. The evaluation forms utilize a numeric rating scale which corresponds to an ascending order of impact, from no effect to major effect. By this method, impacts can be calculated and summarized for statistical comparison and ranking purposes. References and assumptions for this assessment are listed below.

**References:**

- (1) 1979 A-LP Definite Plan Report, Appendix F (DPR).
- (2) 1980 A-LP Final Environmental Statement (FES).
- (3) 1996 A-LP Final Supplement to Final Environmental Statement (FSFES).

**Assumptions:**

- (1) Pipeline relocation is prerequisite to construction of Ridges Basin Reservoir.
- (2) Seventeen routes are to be evaluated for the relocation analysis.
- (3) Ridges Basin Reservoir varies in size depending on the A-LP proposal.
- (4) Four relocation routes are located below the reservoir water surface.
- (5) Certain A-LP proposals include recreation and specific plans (FES, FSFES).
- (6) Certain A-LP proposals include recreation but exclude specific plans and, therefore, it is assumed these plans would be similar to existing plans (high impact development and natural setting on north side of reservoir; low impact development and natural setting on west, east and south sides of reservoir).

- (7) Certain A-LP proposals exclude recreation and, therefore, it is assumed only aesthetic impacts are applicable to these proposals.
- (8) Certain plans or proposals by the City of Durango and/or La Plata County address river recreation, river corridor aesthetics, fairground facilities, etc.
- (9) All impacts to recreation and aesthetics are assumed to be adverse based on prior analysis of pipeline relocation routes (DPR, FES, FSFES).

Other information such as land status and topography were reviewed to establish reasonable criteria and ensure objective evaluation. Lands on which the relocation routes are located include Bureau of Reclamation (Ridges Basin), Colorado Division of Wildlife (Bodo SWA), Southern Ute Indian Tribe (SUIT), and Animas River corridor. The Animas River corridor includes private property, City of Durango and/or La Plata County, in addition to portions of the above mentioned lands on which the routes are located. Other adjacent lands potentially affected by pipeline relocation include Trappers Crossing, Shenandoah and Rafter J Subdivisions.

The evaluation criteria for recreation includes potential effects to existing and/or proposed recreation development and use at Ridges Basin, Bodo State Wildlife Area, Southern Ute Indian Reservation, and/or Animas River corridor (DPR, FES, FSFES). The evaluation criteria for aesthetics includes modification of the landscape (disturbance) and corresponding effects to visual resources (scenery) at Ridges Basin, Bodo State Wildlife Area, Southern Ute Indian Reservation, Animas River corridor, and the above mentioned subdivisions.

As stated in the assumptions, certain routes correspond to A-LP proposals with and without recreation as a project purpose, and/or with and without specific recreation plans. A-LP is the subject of analysis in a current NEPA process and, therefore, information necessary for complete assessment of certain routes is not available at this time. Due to lack of information, the Bureau of Reclamation (BOR) requested assistance from the Colorado Division of Parks and Outdoor Recreation (CDPOR) to help complete this assessment. CDPOR is the current proposed recreation management agency for Ridges Basin Reservoir (FSFES).

BOR and CDPOR conducted an initial evaluation of impacts to recreation and aesthetics which identified the estimated cumulative effect of each route. Per peer review, the evaluation was modified to include separate estimates of the effects on each resource. Per team meeting, the evaluation was further modified to establish a common rating scale of 1 to 10 (no effect to major effect) and the criteria for recreation and aesthetics were expanded to address additional information per interdisciplinary comments. It was agreed a rating of "10" means impacts can't be avoided, reduced or mitigated, and each evaluation include at least one rating of "1" to identify or recommend a preferred route. To weight impacts on recreation and aesthetics as compared to impacts on other resources for the final analysis mentioned above, the team assigned weights of (1) and (0.8), respectively.

**RESULTS:**

As follows is a summary of potential effects to recreation and aesthetics based on the rating scale of 1 to 10 (see following pages) and a preferred route for each resource as mentioned above.

**Recreation**

<b><u>Impact</u></b>	<b><u>Route</u></b>
1	<b>O</b> (Preferred Route - see below)
2	K, L, M, O
3	Q
4	B, E, J, P
5	A, H, N
6	D, G
8	C, F
9	I

Routes K, L, M and O are equally rated and have the least effect on recreation at Ridges Basin and other adjacent areas, and no effect on river recreation. Logic to recommend a preferred route is based on proximity to the reservoir and protection of project purposes. Routes K, L and M are located under the reservoir, however, Route O is located outside of Ridges Basin. Therefore, the preferred route for recreation is Route O which corresponds to a higher level of avoidance of impacts and greater compatibility with project purposes.

**Aesthetic**

<b><u>Impact</u></b>	<b><u>Route</u></b>
1	<b>K</b> (Preferred Route - see below)
2	K, L, M
4	J, O
5	B, D, E, P, Q
6	F, G, H
7	A, I, N
8	C

Routes K, L and M are equally rated and have the least effect on aesthetics at Ridges Basin and other adjacent areas, and little or no effect on the Animas River corridor. Logic to recommend a preferred route is based on relative depth of the route under the reservoir, frequency of exposure due to drawdown, and protection of project purposes. Therefore, the preferred route for aesthetics is Route K which corresponds to a higher level of avoidance of impacts and greater compatibility with project purposes.

## RECREATION IMPACT EVALUATION

### Northwest and MAPCO Pipelines

To estimate impacts to recreation, rate each criteria on a scale of 1 to 10, from no effect to major effect. To estimate the cumulative impact of each route, add the ratings and divide the sum total by 4; enter the result. If the result includes a fraction, round down if less than ½, round up if greater than or equal to ½.

**Prepared By:** Mark Chiarito, BOR (WCAO-SD), and John Weiss, CDPOR (Navajo State Park)

#### EVALUATION CRITERIA FOR RECREATION

ROUTE	Ridges Basin	Animas River	Bodo SWA	SUIT	IMPACT
A	8	1	8	4	5 (5.25)
B	7	1	6	2	4
C	7	9	8	8	8
D	9	1	8	4	6 (5.50)
E	8	1	6	2	4 (4.25)
F	8	9	8	8	8 (8.25)
G	9	1	8	4	6 (5.50)
H	9	1	6	2	5 (4.50)
I	9	9	8	8	9 (8.50)
J	5	1	4	4	4 (3.50)
K	3	1	2	2	2
L	3	1	2	2	2
M	3	1	2	2	2
N	7	1	4	6	5 (4.50)
O	2	1	2	4	2 (2.25)
P	2	6	2	6	4
Q	2	3	2	6	3 (3.25)

## RECREATION IMPACT EVALUATION: SPECIFIC ROUTE ANALYSIS

### Route A - Phoneline, West Carbon Mountain

- \* Moderate impacts on reservoir recreation, hunting and nature observation due to cumulative effect of multiple utilities transecting high density recreation development and/or wildlife habitat on north side of reservoir; route located along ridgetop between Wildcat Canyon and Ridges Basin; greater impact on Bodo SWA compared to SUIT.
- \* Major impacts on reservoir recreation, hunting and nature observation due to single utility transecting low density recreation development and/or wildlife habitat on east side of reservoir; significant disturbance on west side of Carbon Mountain due to severe topography; greater impact on Bodo SWA compared to SUIT.

### Route B - Phoneline, East Carbon Mountain

- \* Moderate impacts on reservoir recreation, hunting and nature observation due to cumulative effect of multiple utilities transecting high density recreation development and/or wildlife habitat on north side of reservoir; same as Route A.
- \* Moderate impact on hunting and nature observation due to single utility transecting wildlife habitat on east side of Carbon Mountain; avoidance of severe topography compared to Route A; greater impact on Bodo SWA compared to SUIT.
- \* No impact on river recreation; route segment is at high elevation on west side of corridor.

### Route C - Phoneline, East Animas

- \* Moderate impacts on reservoir recreation, hunting and nature observation due to cumulative effect of multiple utilities transecting high density recreation development and/or wildlife habitat on north side of reservoir; same as Route A.
- \* Major impact on hunting and nature observation due to single utility transecting critical wildlife habitat (winter range/migration); route located across entire west side of river corridor; impact on Bodo SWA same as SUIT.
- \* Major impact on river recreation due to route segment length along river and two crossings.

### Route D - Powerline, West Carbon Mountain

- \* Same as Route A, except major impact to recreation on north side of reservoir; route located closer to reservoir and high density recreation development.

### Route E - Powerline, East Carbon Mountain

- \* Same as Route B, except major impact to recreation on north side of reservoir; route located closer to reservoir and high density recreation development.

### Route F - Powerline, East Animas

- \* Same as Route C, except major impact to recreation on north side of reservoir; route located closer to reservoir and high density recreation development.

**Route G - North Reservoir, West Carbon Mountain**

- \* Same as Route A, except major impact to recreation on north side of reservoir; route located along reservoir shoreline; greater impact compared to Route D.

**Route H - North Reservoir, East Carbon Mountain**

- \* Same as Route B, except major impact to recreation on north side of reservoir; route located along reservoir shoreline; greater impact compared to Route E.

**Route I - North Reservoir, East Animas**

- \* Same as Route C, except major impact to recreation on north side of reservoir; route located along reservoir shoreline; greater impact compared to Route F.

**Route J - Reservoir High Abutment**

- \* Minor impacts on reservoir recreation, hunting and nature observation due to single utility transecting low density recreation development and/or wildlife habitat on west side of reservoir; majority of route located below reservoir water surface.
- \* Moderate impacts on reservoir recreation, hunting and nature observation due to single utility transecting low density recreation development and/or wildlife habitat on east side of reservoir (west side of Carbon Mountain); significant disturbance due to severe topography; impact on Bodo SWA same as SUIT.

**Route K - Reservoir Low Abutment**

- \* Same as Route J, except minor impacts to recreation, hunting and nature observation on east side of reservoir due to route terminus at dam abutment; avoidance of severe topography on upper west side of Carbon Mountain.

**Route L - 6800' Elevation North**

- \* Same as Route K.

**Route M - 6800' Elevation South**

- \* Same as Route K.

**Route N - Lower Southern**

- \* Moderate impacts on reservoir recreation, hunting and nature observation due to single utility transecting low density recreation development and/or wildlife habitat on west and south sides of reservoir; majority of route in close proximity to shoreline; significant disturbance due to severe topography; greater impact on SUIT compared to Bodo SWA.

**Route O - Upper Southern**

- \* Same as Route N, except minor impacts to recreation, hunting and nature observation on west side of reservoir; majority of route outside of reservoir area.

**Route P - Indian Creek Short**

- \* Minor impact on reservoir recreation due to single utility transecting low density recreation development and/or wildlife habitat on west side of reservoir; remainder of route outside of reservoir area.
- \* Moderate impact on hunting and nature observation due to single utility transecting wildlife habitat on west side of reservoir; remainder of route outside of reservoir area; greater impact on SUIT compared Bodo SWA.
- \* Moderate impact on river recreation due to route segment length along river and two crossings.

**Route Q - Indian Creek Long**

- \* Same as Route P, except minor impact to river recreation due to route segment length along river and one crossing.

## AESTHETIC IMPACT EVALUATION

### Northwest and MAPCO Pipelines

To estimate impacts to aesthetics, rate each criteria on a scale of 1 to 10, from no effect to major effect. To estimate the cumulative impact of each route, add the ratings and divide the sum total by 5; enter the result. If the result includes a fraction, round down if less than ½, round up if greater than or equal to ½.

**Prepared By:** Mark Chiarito, BOR (WCAO-SD), and John Weiss, CDPOR (Navajo State Park)

#### EVALUATION CRITERIA FOR AESTHETICS

ROUTE	Ridges Basin	Animas River	Bodo SWA	SUIT	Rafter J Shenandoah Trappers Crossing	IMPACT
A	8	2	8	7	9	7 (6.8)
B	5	5	5	3	9	5 (5.4)
C	5	9	9	6	9	8 (7.6)
D	8	2	4	8	5	5 (5.4)
E	6	5	5	5	4	5
F	6	9	6	7	4	6 (6.4)
G	9	2	4	9	4	6 (5.6)
H	8	5	7	8	2	6
I	8	9	7	8	2	7 (6.8)
J	7	2	3	7	3	4 (4.4)
K	3	2	2	3	2	2 (2.4)
L	3	2	2	3	2	2 (2.4)
M	3	2	2	2	3	2 (2.4)
N	9	2	8	8	8	7
O	6	2	5	4	5	4 (4.4)
P	2	8	2	5	6	5 (4.6)
Q	2	7	3	7	6	5

## **AESTHETIC IMPACT EVALUATION: SPECIFIC ROUTE ANALYSIS**

### **Route A - Phoneline, West Carbon Mountain**

- \* Major impact on aesthetics due to cumulative effect of multiple utilities transecting north side of reservoir; route located along highly visible ridgetop between Wildcat Canyon and Ridges Basin; large utility corridor in natural setting will have significant effects on unobstructed views from Trappers Crossing, Shenandoah and Rafter J Subdivisions, and less significant effects on partial views from Bodo SWA, Ridges Basin and SUIT.
- \* Major impact on aesthetics due to single utility on east side of reservoir; route located on west side of Carbon Mountain; large utility corridor in natural setting and severe topography will have significant effects on unobstructed views from Ridges Basin and SUIT, and less significant effects on partial views from Bodo SWA, and Trappers Crossing, Shenandoah and Rafter J Subdivisions.
- \* Minor impact on aesthetics due to terminus below dam on west side of Animas River; route located on south side of Carbon Mountain which traverses to Basin Creek; short segment of large utility corridor in natural setting will have less significant effects on partial views from river corridor and SUIT.

### **Route B - Phoneline, East Carbon Mountain**

- \* Major impact to aesthetics on north side of reservoir; same as Route A.
- \* Moderate impact on aesthetics due to single utility on east side of Carbon Mountain; route located at upper elevation on west side of Animas River; avoidance of severe topography compared to Route A; large utility corridor in natural setting will have significant effects on unobstructed views from river corridor and partial views from Bodo SWA, and less significant effects on partial views from SUIT.
- \* Minor impact to aesthetics below dam on west side of Animas River; same as Route A.

### **Route C - Phoneline, East Animas**

- \* Major impact to aesthetics on north side of reservoir; same as Route A.
- \* Major impact on aesthetics due to single utility transecting river corridor; route traverses entire west side of valley and parallels Animas River with two crossings; large utility corridor in both natural and urban settings will have significant effects on unobstructed views from river corridor and Bodo SWA, and less significant effects on partial views from SUIT.

### **Route D - Powerline, West Carbon Mountain**

- \* Major impact on aesthetics due to cumulative effect of multiple utilities transecting north side of reservoir; route located closer to reservoir and mostly below ridgetop compared to Routes A, B, C; large utility corridor in natural setting will have significant effects on unobstructed views from Ridges Basin and SUIT, and less significant effects on partial views from Bodo SWA, and Trappers Crossing, Shenandoah and Rafter J Subdivisions.
- \* Major impact to aesthetics on east side of reservoir; same as Route A.
- \* Minor impact to aesthetics below dam on west side of Animas River; same as Route A.

### **Route E - Powerline, East Carbon Mountain**

- \* Major impact to aesthetics on north side of reservoir; same as Route D.
- \* Moderate impact to aesthetics on east side of Carbon Mountain; same as Route B.
- \* Minor impact to aesthetics below dam on west side of Animas River; same as Route A.

**Route F - Powerline, East Animas**

- \* Major impact to aesthetics on north side of reservoir; same as Route D.
- \* Major impact to aesthetics on west side of Animas River; same as Route C.

**Route G - North Reservoir, West Carbon Mountain**

- \* Major impact on aesthetics due to cumulative effect of multiple utilities transecting north side of reservoir; route located along entire shoreline and not integrated with existing utility; large utility corridor in natural setting will have significant effects on unobstructed views from Ridges Basin and SUIT, and less significant effects on partial views from Bodo SWA, and Trappers Crossing, Shenandoah and Rafter J Subdivisions.
- \* Major impact to aesthetics on east side of reservoir; same as Route A.
- \* Minor impact to aesthetics below dam on west side of Animas River; same as Route A.

**Route H - North Reservoir, East Carbon Mountain**

- \* Major impact to aesthetics on north side of reservoir; same as Route G.
- \* Moderate impact to aesthetics on east side of Carbon Mountain; same as Route B.
- \* Minor impact to aesthetics below dam on west side of Animas River; same as Route A.

**Route I - North Reservoir, East Animas**

- \* Major impact to aesthetics on north side of reservoir; same as Route G.
- \* Major impact to aesthetics on west side of Animas River; same as Route C.

**Route J - Reservoir High Abutment**

- \* Minor impact to aesthetics on north side of reservoir due to majority of route located below reservoir water surface; route terminus located at west end of reservoir; short segment of large utility corridor in natural setting will have less significant effects on unobstructed views from Ridges Basin and SUIT, and on partial views from Bodo SWA, and Trappers Crossing, Shenandoah and Rafter J Subdivisions.
- \* Major impact to aesthetics on east side of reservoir; same as Route A, except impact is slightly less due to shorter route segment on west side of Carbon Mountain.
- \* Minor impact to aesthetics below dam on west side of Animas River; same as Route A.

**Route K - Reservoir Low Abutment**

- \* Minor impact to aesthetics on north side of reservoir; same as Route J.
- \* Minor impact to aesthetics below dam on west side of Animas River; same as Route A.

**Route L - 6800' Elevation North**

- \* Same as Route K.

**Route M - 6800' Elevation South**

- \* Same as Route K, except for different location of terminus below dam on west side of Animas River; route located on north side of Basin Mountain which traverses to Basin Creek; short segment of large utility corridor in natural setting will have less significant effects on unobstructed views from Ridges Basin and SUIT, and less significant effects on partial views from Bodo SWA, river corridor, and Trappers Crossing, Shenandoah and Rafter J Subdivisions.

**Route N - Lower Southern**

- \* Major impact on aesthetics due to single utility transecting west and south sides of reservoir; majority of route located in close proximity to shoreline; severe topography on east half of segment on south side of reservoir (north side of Basin Mountain); large utility corridor in natural setting will have significant effects on unobstructed views from Ridges Basin and SUIT, and partial views from Bodo SWA, and Trappers Crossing, Shenandoah and Rafter J Subdivisions.
- \* Minor impact to aesthetics below dam on west side of Animas River; same as Route M.

**Route O - Upper Southern**

- \* Moderate impact on aesthetics due to single utility transecting west and south sides of reservoir; majority of route located south of reservoir area on SUIT; severe topography on east half of south segment on north side of Basin Mountain; large utility corridor in natural setting will have significant effects on unobstructed views from Ridges Basin and SUIT, and less significant effects on partial views from Bodo SWA, and Trappers Crossing Subdivision.
- \* Minor impact to aesthetics below dam on west side of Animas River; same as Route M.

**Route P - Indian Creek Short**

- \* Moderate impact on aesthetics due to single utility transecting west side of reservoir; majority of route located south of reservoir area on SUIT; route traverses moderate topography on west side of Basin Mountain east along lower section of Indian Creek to confluence with Animas River; large utility corridor in natural setting will have significant effects on unobstructed views from SUIT and Trappers Crossing Subdivision, and less significant effects on partial views from Ridges Basin and Bodo SWA.
- \* Major impact on aesthetics due to single utility transecting river corridor; route traverses entire west side of valley and parallels Animas River with two crossings; large utility corridor in both natural and urban settings will have significant effects on unobstructed views from river corridor, and less significant effects on partial views from SUIT.

**Route Q - Indian Creek Long**

- \* Same as Route P, except increased impact to SUIT and decreased impact to Animas River; route is longer, entirely out of reservoir area, and includes both upper and lower sections of Indian Creek; similar route segment along Animas River with one crossing.

## **Pipeline Relocation Analysis Water Quality**

### **Assumptions**

To evaluate the effects alternate pipeline alignments would likely have on water quality, the following assumptions were made:

1. The pipeline will not leak or have catastrophic failure.
2. The public perception of impacts to water quality is important.
3. Construction would be completed before Ridges Basin Dam is completed and the reservoir is filled.

### **Methodology**

The proposed alignments were evaluated with respect to their potential to affect water quality using the above assumptions and rated on a scale of 1 to 10 with 1 being the most desirable. All but one of the alignments are located entirely within the Animas River drainage basin. Seven of the alignments are located entirely within the Basin Creek drainage. Five of the alignments contain sections that are adjacent to the Animas River and include river crossings. The Animas River is the only perennial stream in the study area.

Any of the alignments are not likely to have a significant short or long term effect to water quality. The most likely effects associated with relocation of the pipelines would be construction related. The effects would include increased sediment load to the streams due to construction disturbance or material spills from an accident.

The soils in all the proposed alignments are very erosive and most areas have limited ground cover. A substantial sediment load enters the streams naturally as a result of heavy rains and snow melt. An increase in sediment would likely be negligible compared to the natural sediment load and would be very difficult or impossible to detect in the intermittent streams or the Animas River. Storage in Ridges Basin Reservoir will fluctuate widely, leaving large areas below the high water line exposed for long periods of time. A pipeline corridor in the basin would not contribute significant additional sediment loads to the Reservoir during snow melt or rainfall events.

At any construction site there is a chance for accidents that would spill fuel, oil, or other material that would be detrimental to water quality if they entered a stream. The most desirable scenario would be to have construction activities located far enough away from live streams so spills could be contained and cleaned up before the materials could enter the streams.

There is a lot of recreational use of the Animas River from Durango downstream to the Ute line. This section of river is also visible from U.S. Highway 160/550, Colorado Route 3, and La Posta Road. During rainfall events, muddy water enters this reach of river from the minor drainages and overland flow, and a significant sediment load enters the river at Basin Creek. If construction activities are located adjacent to the river or are visible in the basin above a source of muddy water entering the river, the

public could perceive that the muddy water in or entering the river is caused by the construction activities.

### **Results**

There are not likely to be significant effects to water quality resulting from any of the alignments. It would be desirable to limit disturbances to Basin Creek where disturbances would be insignificant as compared to disturbances related to dam construction. From this perspective the following alignments are preferred:

Alignments A, D, G, J, K, L, M, N

The following alignments are somewhat longer than the previous group and affect additional drainages. Construction in parts of all alignments but O would be visible from the highways but all are well away from the Animas River.

Alignments B, E, H, O

Parts of the following alignments are adjacent to the Animas River and both cross the Animas River at least once.

Alignments P, Q

Parts of the following alignment are adjacent to the high recreational use area of the Animas River, contain multiple river crossings, and are highly visible from the highways.

Alignments C, F, I

### **Ratings**

There are not likely to be significant effect to water quality resulting from any of the alignments. Some alignments may have greater perceived effects by the public and some alignments would be more venerable to accidents that may occur during construction. The alignments are rated on a scale of 1 to 10 with 1 being the most desirable and 10 being unacceptable.

Rating	Alignments
1	A, D, G, J, K, L, M, N
2	B, E, H, O
4	C, F, I, P, Q