

**DRAFT REPORT
ANALYSIS OF ALTERNATIVES
CROSS CASCADE PIPELINE PROJECT**

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CROSS CASCADE PIPELINE

PROPOSED ACTION

Olympic Pipe Line Company (OPL) is proposing to construct and operate a 227-mile long refined petroleum products pipeline across the state of Washington. The proposed pipeline will be an extension of an existing 400-mile long OPL pipeline system which generally runs north-south parallel to Interstate 5 in western Washington. The proposed pipeline will begin near Woodinville in western Washington and terminate at an existing storage and distribution facility at Pasco in eastern Washington. A storage and distribution facility will be constructed at Kittitas which is near the midpoint of the proposed pipeline in central Washington.

Refined petroleum products from the refineries in northwestern Washington that are destined for central and eastern Washington are currently transported by one of three methods: via OPL's existing pipeline to Portland, Oregon where they are transferred to river barges for transport up the Columbia River to Pasco; via sea-going barges through the Strait of Juan de Fuca and south along the Pacific Ocean coast of Washington to the Columbia River, then east along the Columbia River to Portland, Oregon where they are transferred to river barges for transport up the Columbia River to Pasco; and transported via OPL's existing pipeline to the south Puget Sound area where they are transferred to tanker trucks for transport to central and eastern Washington using highways across the Cascade Mountains.

OPL states that the existing pipeline is being utilized at capacity and that the demand for pipeline-transport of refined petroleum products currently exceeds the capacity of the existing pipeline. This line serves the western Washington/Oregon markets and SEA-TAC International Airport, as well as providing the first leg in the current system for transporting petroleum products to central and eastern Washington.

According to OPL, the demand from shippers for use of the existing pipeline exceeds its capacity by twenty (20) percent. As a common carrier, OPL is required to serve all qualified shippers and must therefore equitably prorate the desired shipments to fit the capacity of the pipeline. Shippers must use sea-going barges or tanker trucks to transport the amounts that OPL cannot transport. With expected population and commerce growth in western, central and eastern Washington, OPL believes that the demand for the transport of products to central and eastern Washington from western Washington refineries will continue to grow.

PURPOSE OF AND NEED FOR THE PROJECT

The purpose of the proposed action is to provide a cost-effective, efficient, environmentally sound means to transport refined petroleum products from western Washington refineries to central and eastern Washington to meet the long range needs for product transportation.

DEVELOPMENT OF ALTERNATIVES

Alternatives to the proposed project have been developed using a three-tier approach:

- The first tier includes alternatives to a pipeline for transporting petroleum products.
- The second tier includes alternative routes for the proposed pipeline.
- The third tier includes alternative locations for the individual sections of the pipeline at wetland and water crossings along the proposed route, and alternative locations for pump stations.

For each tier, the criteria for evaluating feasible alternatives is identified.

1. TIER 1 - ALTERNATIVES TO A PIPELINE FOR TRANSPORTING PETROLEUM

PRODUCTS

1.A CRITERIA FOR EVALUATING ALTERNATIVES

As noted above, the purpose of the proposed project to provide a cost-effective, efficient, environmentally sound means to transport refined petroleum products from western Washington refineries to central and eastern Washington to meet the long range needs for product transportation. Alternatives to be considered would be:

- Transportation methods or modes that exist between western Washington and central and eastern Washington;
- Transportation methods or modes that are planned for construction between western Washington and central and eastern Washington;
- Transportation modes that exist between western and central and eastern Washington, or exist elsewhere that could be utilized to transport petroleum products between western Washington and central and eastern Washington; and
- Other transportation methods or modes that are capable of transporting refined petroleum product.

Alternative transportation methods or modes that are found to meet one of the four criteria above must then be evaluated for cost-effectiveness, efficiency, and environmental soundness.

1.B. DEVELOPMENT OF ALTERNATIVES

The following alternatives have been proposed for consideration:

- No-Action (continued use of existing pipeline plus river barges or tanker trucks, or the use of sea-going barges plus river barges)
- Proposed Cross Cascade Pipeline
- Railroad
- Air Transport
- Yellowstone Pipeline between Billings, Montana and Spokane and Moses Lake, Washington
- Chevron Pipeline between Salt Lake City, Utah and Pasco, Washington and Spokane, Washington

The alternatives have been evaluated against the criteria listed in I.A above as shown on the following table:

Alternatives	Evaluation Criteria			
	Existing Petroleum Product Transportation Mode between western and eastern Washington	Planned Washington Transportation Projects	Existing Transportation Modes between western and eastern Washington that could transport Refined Petroleum Products	Other Transportation Modes that could be utilized
No Action (existing pipeline plus tanker	Yes			

trucks)				
No Action (sea-going barges plus river barges)	Yes			
Proposed Cross Cascade Pipeline		Yes		
Railroad			Yes	
Air Transport			No; No commercially available air transport	
Yellowstone Pipeline				No; would not meet purpose and need of project
Chevron Pipeline				No; would not meet purpose and need of project

Based on the above evaluation, three of the identified alternatives have been found to not meet at least one of the criteria:

- Air transport;
- The use of the Yellowstone Pipeline; and
- The use of the Chevron Pipeline.

Currently, the military is the only known transporter by air of petroleum products. No commercial transporters have been identified and air transport is therefore not considered as a feasible alternative.

Both the Yellowstone Pipeline and the Chevron Pipeline have been suggested as alternatives to the proposed Cross Cascade Pipeline Project. Both pipelines enter eastern Washington from the east or southeast, and would not provide a means of transporting product from western Washington refineries to central and eastern Washington. Because neither pipeline meets the stated purpose and need of this project, neither pipeline is considered as feasible alternatives.

1.C. PRELIMINARY EVALUATION OF REASONABLE ALTERNATIVES FOR COST-EFFECTIVENESS, EFFICIENCY AND ENVIRONMENTAL SOUNDNESS

The next step in the Tier 1 evaluation is to perform a preliminary review of the alternative transportation methods or modes that have been found to meet one of the four criteria above for cost-effectiveness, efficiency, and environmental soundness. The four alternatives considered as reasonable alternatives to meeting the purpose and need of the project are:

- No-Action (continued use of existing pipeline plus river barges or tanker trucks)
- No-Action (continued use of existing pipeline plus sea-going barges plus river barges)
- Proposed Cross Cascade Pipeline
- Railroad

1.C.1 Cost-Effectiveness

In terms of cost-effectiveness, the No-Action Alternatives are considered to be cost effective based on their existing use by petroleum product shippers. OPL states that their proposed Cross Cascade Pipeline would be as cost-effective or better than existing transportation modes based on the following assumptions on the cost of transporting products:

Alternative	No Action - Pipe plus River Barge	No Action - Sea-going Barge plus River Barge	Proposed Pipeline
Pipe Transport	\$0.40/barrel	N.A.	\$1.25/barrel
Sea-Barge Transport	N.A.	\$1.25/barrel	N.A.
River Barge Transport	\$1.15/barrel	\$1.15/barrel	N.A.
Rail Transport	N.A.	N.A.	N.A.
Handling (\$0.25 at each transfer)	\$0.50 (2 transfers)	\$0.50 (2 transfers)	\$0.25 (1 transfer)
Total Cost Per Barrel	\$2.05	\$2.90	\$1.50

Rail transport is not believed to be cost-effective. There are existing rail lines between northwestern Washington and central and eastern Washington. It is believed that if rail transport was cost effective as a routine means of transporting refined petroleum products, that shippers would be using the existing rail lines as opposed to using the existing pipeline plus river barges. There is no evidence that this is occurring. Because it is not being used as a routine transportation mode, it is not possible to obtain a cost per barrel shipping charge for use in a cost comparison. Based on the assumption that rail transport is not cost-effective, use of rail is not considered a practicable alternative.

1.C.2 Efficiency

A preliminary review of the remaining alternatives finds that both the No-Action Alternatives (use of the existing pipeline plus river barges) and the proposed Cross Cascade Pipeline would be efficient means of transporting product. The use of sea-going barges plus river-barges is not considered as efficient due to the time required for the sea barges to go from the northwest Washington refineries to the mouth of the Columbia, although some product is being transported in this means today to handle those volumes which exceed the capacity of the existing pipeline.

1.C.3 Environmental Soundness

The No-Action Alternatives, or existing transportation system, utilizes a combination of a 400-mile long pipeline which has been in operation for over 30 years, sea-going and river barges, and tanker trucks. While there have been some spills from all four of these means during that time period, no environmental disasters have occurred. Pipelines in general are considered as an environmentally sound means of transporting petroleum or natural gas products. Both the No-Action Alternatives and the proposed Cross Cascade Pipeline would meet the test of being "environmentally sound" although the site specific environmental

impacts of each alternative must be analyzed in detail in the Environmental Impact Statement before a full comparison can be made.

ID SUMMARY OF ALTERNATIVES ADVANCED FOR ENVIRONMENTAL REVIEW

Only three alternatives have been found to meet the purpose and need statement for the project, and to be cost-effective, efficient, and environmentally sound: the No-Action Alternatives and the proposed Cross Cascade Pipeline. These alternatives are to be advanced for detailed environmental comparison in the EIS.

Three alternatives were considered and eliminated as not meeting the purpose and need: air transport, the Yellowstone Pipeline from Montana, and the Chevron Pipeline from Utah. Air transport was eliminated because there are no existing commercial air transporters for refined petroleum products. Both the Yellowstone and Chevron Pipelines were eliminated because they would not meet the stated purpose of the project, to transport products from western Washington refineries to central and eastern Washington.

Rail transport has been eliminated from further study based on it not being cost-effective.

2. TIER 2 - ALTERNATIVE ROUTES FOR THE PROPOSED PIPELINE

2.A SITING CRITERIA

The purpose of the project is to transport refined petroleum products from western Washington refineries to central and eastern Washington to meet the long range needs for product transportation. A number of alternative routes for a pipeline have been considered. This consideration included evaluation of alternative origin points, alternative destination points, and alternative routes that would connect the desired origin and destination points.

There are no federal, state, or industry criteria to be used in route selection for a petroleum product pipeline, but there are accepted practices within the pipeline industry. The following six criteria were used in evaluating route alternatives:

- Length of pipeline as a cost factor for both construction and operation;
- Elevation profile;
- Constructability;
- Pipeline access;
- Environmental impacts; and
- Ownership/Land Use.

2.A.1 Pipeline Length

The cost of construction and operation of a pipeline is dependent upon its length. Increasing the length of a pipeline route directly increases the amount of materials and labor that must be utilized. There may also be a need to add more pump stations or to increase the diameter of the pipe in order to compensate for the additional frictional losses. Each of these items adds to the pipeline's construction cost. If the size of the pipe is not enlarged, the increase length will result in the consumption of larger amounts of electric energy as the result of additional frictional losses. This adds to the pipeline's operation costs. The estimated effects of these elements are as follows:

- The estimated construction cost for a mile of pipeline is approximately \$460,000.
- The estimated construction cost of each pump station is approximately \$2 million.
- Enlarging the pipeline by one standard diameter costs approximately \$32,000 per mile.

- Increasing the length while holding the diameter constant costs approximately \$36,000 per mile-year.

2.A.2 Elevation Profile

The cost of construction and operation is also dependent upon the elevation profile of the route. Increasing the total elevation gain of a route or increasing the number of elevation gains and losses both result in an increase in the length of a pipeline's route and often causes an increase in the number of pump stations that are required. This increases the construction cost. High points and sudden elevation losses near the end of pipeline segments create the need to maintain higher than normal back pressures. This results in the consumption of larger amounts of electric energy and higher operating costs.

2.A.3 Constructability

Constructability refers to the engineering difficulty and construction costs relative to the topography and geology (soils) of a route. Steep and rugged terrain is more difficult to work with when engineering a pipeline, and costs of construction are significantly higher than constructing on more level terrain. The routes are also reviewed to identify any significant obstacles to construction. Large rock outcroppings, narrow right-of-way, water bodies, and steep slopes are among the construction obstacles that can add significant costs and present impassable or difficult barriers.

2.A.4 Pipeline Access

Petroleum pipelines are designed to be in use for decades. Prime consideration is given to pipeline access for maintenance activities when choosing right-of way. The pipeline corridor is chosen so that access to the line is very easy at valve and pump station locations and easy at all other points.

2.A.5 Environmental Impacts

Alternative routes are reviewed on a preliminary basis for significant environmental impacts. Consideration is given to wetlands, stream crossings, sensitive plant and animal species, and important habitats. To minimize the disturbance of existing habitats and land uses, routes that would use existing cleared or disturbed rights-of-way are preferred.

2.A.6 Ownership/Land Use

The overall cost and time to acquire rights-of-way for a proposed pipeline is a significant consideration. Constructing a pipeline through highly developed areas is expensive and there are often significant landowner issues that have to be considered. Although these areas often cannot be avoided, construction through highly developed areas can be minimized by careful selection of a route. Minimizing the total number of land owners that are affected reduces the number of easements that have to be negotiated and the overall cost of the project. Selecting a route that traverses grazing and/or unproductive land and the utilization of existing corridors is a major factor in evaluating potential routes.

2.B. ALTERNATIVES TO BE CONSIDERED

The purpose of the project is to transport refined petroleum products from western Washington refineries to central and eastern Washington to meet the long range needs for product transportation. A number of alternatives have been considered for the route, beginning with the alternatives for the origin point, the alternatives for the destination point, and the alternative routes that would connect the desired origin and destination points.

2.B.1 Alternatives for Origin of the Proposed Pipeline

OPL currently operates a 16" pipeline which extends south from the refineries in Whatcom County and is joined by a 16" pipeline that extends easterly from the refineries near Anacortes in Skagit County. These two pipelines come together (Allen Station) west of Burlington, Washington, near the intersection of Allen Road and State Route 20. From this point to Renton, Washington (Renton Station), a 16" and 20" pipeline parallel each other. At Renton, these pipelines are connected to a 12" pipeline which serves the Seattle-Tacoma International Airport, a 12" line which serves the petroleum product terminals on Harbor Island (Seattle), and a 14" pipeline that extends to Portland, Oregon.

Five alternative locations between the Allen Station and the Renton Station were identified as possible points for the new pipeline to central and eastern Washington to tie into the existing two parallel pipelines:

- Allen Station - existing OPL Pump Station
- Snohomish - intersection of the existing pipeline with the BNRR right-of-way south of Everett
- Thrashers Corner - north of OPL's existing Woodinville Station
- Hollywood - Sammamish River Valley
- Renton Station - existing OPL pump station

OPL determined that there was adequate capacity in the existing pipelines from the refineries to the Woodinville Station to serve both the existing and proposed pipelines. Origin locations south of Woodinville would require the addition of pump stations on the existing lines beyond those planned for the proposed project.

These alternative origin points are reviewed below as part of an overall route alternative.

2.B.2 Alternatives for Terminus or Destination of the Proposed Pipeline

One of the primary considerations in selecting a Cross Cascade route was determining how to integrate the services to be provided by the new pipeline with those of existing operational petroleum pipelines in Eastern Washington. Currently, there are two petroleum product pipeline systems serving eastern Washington. One pipeline (Chevron) comes from Salt Lake City, Utah through Boise, Idaho to the Northwest Terminalling facility in Pasco, Washington. A continuation of this pipeline extends from the Northwest Terminalling distribution facility northeast to Spokane, Washington. The second existing pipeline (Yellowstone) originates at refineries near Billings, Montana and comes to Spokane, Washington, and then continues via a smaller 6 inch pipeline to Moses Lake, Washington. In evaluating the viability of a new pipeline to eastern Washington, two operational scenarios were considered:

- Moses Lake Terminus Alternative - One scenario would be to build a new product line to Moses Lake, Washington (Moses Lake Terminus Alternative), and then to move product to and from Spokane and Pasco via the existing pipelines by reversing or bi-directing their flow.
- Pasco Terminus Alternative - The second operating scenario would be to construct a new pipeline directly to Pasco. Product would then be moved to Spokane and Moses Lake via the existing pipelines.

Moses Lake Terminus Alternative

The Moses Lake Terminus Alternative would require the least amount of new pipeline right-of-way. At a minimum, the existing pipelines from Moses Lake and Spokane would have to be modified and new pump

stations and a distribution terminal at Moses Lake (at an approximate construction cost of \$10 million) would have to be built. The pipelines from Moses Lake to Spokane are believed to be too small (6") to economically carry the estimated flows to meet market conditions. It was anticipated that this pipeline would either have to be replaced or new parallel lines constructed. The practicability of this alternative would hinge on being able to convince the owners of these existing pipelines to modify their pipeline. This was viewed as being highly improbable for competitive reasons. For these reasons, this scenario was dropped from further consideration.

Pasco Terminus Alternative

The Pasco Terminus Alternative would provide an option to the current system which entails a 300-mile pipeline movement to Portland, a transfer from a Portland terminal to a barge, then a 200-mile barge trip through four locks to Pasco. It would replace this circuitous route with a single 300-mile pipeline movement to Pasco. Based on existing and future market needs, Northwest Terminalling's Pasco Terminal was chosen as the most appropriate destination.

2.B.3 Alternative Routes for Proposed Pipeline

Based on an operating scenario of constructing a new product pipeline to Pasco, Washington, a number of alternative pipeline routes were identified following the three central mountain passes in Washington:

- Stevens Pass;
- Snoqualmie Pass; and
- Stampede Pass.

Maps of these mountain passes were reviewed to identify any existing road or utility corridors that could potentially be used for a pipeline. The alternative mountain pass routes which have been considered based on the Pasco Terminus Alternative are:

- Allen Station via Stevens Pass to Pasco
- Snohomish via Stevens Pass to Pasco
- Thrashers Corner via Snoqualmie Pass to Pasco
- Thrashers Corner via abandoned railroad route (Centennial Trail) and Snoqualmie Pass to Pasco
- Hollywood via the Tolt Pipeline Corridor and Snoqualmie Pass to Pasco
- Renton Station via Stampede Pass to Pasco

In addition, there is one variation through the Yakima Valley to Pasco that could use any of the three mountain pass routes.

An evaluation of each of these routes is provided in the next section.

2.C PRELIMINARY EVALUATION OF ENGINEERING AND ENVIRONMENTAL FEASIBILITY

Each of the identified route alternatives have been evaluated following the six criteria for line placement:

- Length of pipeline as a cost factor for both construction and operation;
- Elevation profile;
- Constructability;
- Pipeline Access;
- Environmental Impacts; and

- Ownership/land use.

A preliminary review of environmental impacts and pipeline access was determined based on an aerial review by helicopter. If a route alternative was eliminated based on one of the first four criteria, it was considered as either not buildable or not operable from a cost viewpoint. In those cases a review of environmental impacts and ownership/land use impacts was not performed.

2.C.1 Allen Station Alternative Via Stevens Pass

The Allen Station Alternative route would take advantage of the point where the two existing product lines first come together at the Allen Pump station approximately 2.5 miles west of Burlington, Washington. From this point a new pipeline would be constructed in the existing right-of-way (ROW) to a point approximately 4 miles south of Everett where the existing pipelines cross the Burlington Northern Railroad (BNRR) tracks. At this point, a new pump station would be constructed and the route would turn east and parallel the BNRR right-of-way through the communities of Monroe, Sultan, and Gold Bar. Because the BNRR right-of-way narrows near the community of Index, the pipeline route would enter the BPA powerline right-of-way which also parallels Highway 2 to a point approximately 5 miles east of the Stevens Pass summit. At this location, the route would follow the old BNRR right-of-way to the abandoned Old Cascade Tunnel under Stevens Pass.

The route, after exiting the east portal of the Old Cascade Tunnel, would generally follow State Route 2 and BPA powerlines easterly approximately 24 miles to Chumstick Creek in the Wenatchee National Forest. The route turns south and parallels Chumstick Creek and a county road for approximately 8 miles to Leavenworth. At Leavenworth, the route would again generally follow existing BPA powerlines southeasterly for approximately 39 miles passing north of Cashmere, crossing the Wenatchee River east of Monitor and going west of Wenatchee.

South of Wenatchee the route would follow BPA powerlines that parallel the Columbia River. The route would cross the Columbia River south of Rock Island Dam where a BPA powerline crosses the Columbia River west of Moses Coulee. After crossing the Columbia River, the route would traverse southeasterly through the Columbia Basin irrigation Project and intersect SR 26 east of the community of Royal City. This alternative would parallel SR 26 to a point approximately 4 miles west of Othello, then turn south following county roads to Pasco along the same route as the Thrasher to Pasco route.

- Pipeline Length: The approximate length of the pipeline would be 285 miles.
- Elevation profile: Eight (8) pump stations would be required.
- Constructability: Routes using Stevens Pass were considered more rugged with more steep slopes and rock outcroppings, and therefore less "constructable" than routes using Snoqualmie Pass.
- Pipeline Access: The terrain was considered more "remote" than routes using Snoqualmie Pass, and therefore less accessible.
- Environmental Impacts: There would be four major river crossings: Columbia, Snohomish, Skykomish and Wenatchee rivers, with at least six crossings of the Skykomish between Monroe and Index.
- Ownership/Land use: Seven cities would be impacted, Monroe, Sultan, Gold Bar, Index, Leavenworth, Cashmere and Wenatchee.

2.C.2 Snohomish Alternative via Stevens Pass

An alternative to the Allen Station route is to tie into the two existing pipelines at the crossing of the BNRR right of way south of Everett. From this location, the route would be the same as the Allen Station alternative.

- Pipeline Length: The approximate length of the pipeline would be 240 miles.
- Elevation profile: Seven (7) pump stations would be required.
- Constructability: Routes using Stevens Pass were considered more rugged with more steep slopes and rock outcroppings, and therefore less "constructable" than routes using Snoqualmie Pass.
- Pipeline Access: The terrain was considered more "remote" than routes using Snoqualmie Pass, and therefore less accessible.
- Environmental Impacts: There would be four major river crossings: Columbia, Snohomish, Skykomish and Wenatchee rivers, with at least six crossings of the Skykomish between Monroe and Index.
- Ownership/Land use: Seven cities would be impacted, Monroe, Sultan, Gold Bar, Index, Leavenworth, Cashmere and Wenatchee.

2.C.3 Thrashers Corner Alternative via Snoqualmie Pass to Pasco

The proposed pipeline would begin with the construction of a pump station at Thrashers Corner north of Woodinville. With the exception of the descent down to the Snoqualmie River, this segment lies within existing Bonneville Power Administration (BPA) transmission line right-of-way. Near the Snoqualmie River, the proposed right-of-way deviates from the BPA corridor and traverses northeasterly to the Snoqualmie River, and across the river in a utility box located on a newly constructed county bridge. The route rejoins the BPA corridor east of the Snoqualmie River. For the most part, the route would be within existing the BPA corridor for the first 27 miles of the route. After a short segment utilizing a private forest road and following forest land to the south, the pipeline route would follow a county road before joining the Cedar Falls Trail. The pipeline is proposed to be within the trail right-of-way through the cities of Snoqualmie and North Bend.

At approximately MP 40, the route would leave the Cedar Falls Trail and follow Edgewick Road before traversing a short segment of new right of way and entering the John Wayne Trail. From this point to Snoqualmie Pass, the route would be within the John Wayne Trail right-of-way for short distances with the majority of the route utilizing USFS roadways. The route would cross Snoqualmie Pass in the abandoned Chicago, Milwaukee, and St. Paul railroad tunnel.

East of Snoqualmie Pass, the proposed route would be inside the JWT to an area of recently harvested forest land, and then runs parallel to the Puget Power transmission line corridor which joins a 4-line BPA transmission corridor. The route drops south of the BPA right-of-way at MP 81.8 for approximately 1.5 miles, and then returns to the northern limit of the BPA right-of-way at MP 83.2. Forest land predominates south of the pipeline route and farmland predominates to the north. The proposed pipeline route crosses I-90 approximately 1.5 miles east of the Indian John Rest Area.

After crossing under I-90, the route begins the descent into the Upper Yakima River Valley. The proposed route crosses the JWT on the west bank of the Yakima River and State Highway 10 on the east side of the river. All of this segment is within existing transmission line corridor. To avoid very steep terrain and sensitive oak forest habitat, this segment deviates from the BPA right-of-way by turning south to descend the steep western slope into Swauk Creek Canyon. The route crosses Swauk Creek at MP 97.8 and then ascends the eastern side of the Swauk Creek Canyon.

The proposed route rejoins the east/west BPA right-of-way and passes to the northeast of the town of Thorpe. The route crosses Highway 97 near MP 100.5, crosses Green Canyon Road, and then parallels Robinson Road on the north side. After leaving the BPA corridor, the route traverses southeasterly through alternating grazing land and irrigated farmland. The proposed route passes approximately 2 miles northeast of the City of Ellensburg. North of the intersection of Lyons Road and Naneum Road, the proposed pipeline route turns south and parallels the east side of Naneum Road. The route briefly intersects the JWT at the junction with Kittitas Highway, approximately .75 mile west of the town of Kittitas. The route continues parallel to the JWT through a portion of the City of Kittitas and then turns south to the site of the proposed storage and distribution facility.

At the northeast corner of the intersection of I-90 (Exit 115) and Badger Packet Road, a storage and distribution facility and pump station (Kittitas Terminal) will be constructed on 26 acres that are currently used for irrigated agriculture. Upon exiting this site, the pipeline will be reduced to a 12" diameter.

The proposed route will continue east from the Kittitas Terminal through grazing land, then either cross the Highline Canal and I-90 into the Yakima Training Center (YTC), or continue north of I-90 through the Ginko State Park. The proposed route descends to the Columbia River to cross the river in one of four locations (I-90 bridge, Beverly railroad bridge, south of Wanapum Dam, or north of the I-90 bridge).

On the east side of the Columbia River, the route ascends the slopes to the east of Wanapum Village in new right-of-way. The pipeline route joins and runs adjacent to the north side of Beverly Burke Road to approximately MP 147.9, where it crosses to the south side of Beverly Burke Road. A pump station is planned for future construction at approximately MP 148.8 (Beverly-Burke Station). At MP 153.2, Beverly Burke Road turns to the north, but the proposed pipeline route continues easterly for approximately 3 miles.

The route then turns northeasterly, crossing agricultural land, and easterly again to cross under the Royal Branch Canal at MP 156.2. The route crosses the canal again at MP 157.1 and runs parallel to 14 SW Road to the east through rangeland. At MP 163, the proposed pipeline route crosses Smyrna Road and enters an industrial area southeast of Royal City. The proposed route then turns to the southeast and runs adjacent to State Highway 26 to MP 176. The route turns south and follows farm fence lines, crosses Lower Crab Creek Road and turns easterly along the base of the Saddle Mountains. It crosses the Grant/Adams County line at MP 176.9 and continues southeast and parallel to Kuhn Road from MP 179 to MP 181.5.

The proposed route runs adjacent to local farm roads to approximately MP 183.1 where it turns south. Here, the proposed route is adjacent to and parallel with an existing powerline corridor through irrigated agricultural land, and again runs adjacent to farm roads. A pump station will be constructed in the future at MP 182.2, in agricultural land approximately 2,200' north of Highway 24. The proposed pipeline crosses Highway 24 at MP 184.5; this point is also near the boundary between Adams and Franklin counties.

At MP 186.6, the proposed route turns southeast, continuing through range and agricultural land. The route crosses the Wahluke Branch Canal and parallels the Burlington Northern Railroad tracks. The proposed route will be constructed adjacent to Hendrikson Road from MP 189.3 to MP 190.9, then parallels the railroad in a southerly direction to MP 193.4.

From MP 193.4, the route turns southeast and at MP 194.4 crosses the Hendricks extension, agricultural lands and a wetland area associated with Eagle Lakes. The proposed route continues southeast to MP 198, where it enters a small industrial area, crosses Road 170 just east of Basin City, and turns south adjacent to Glade North Road. The route crosses the Potholes Canal at MP 200.6 and the Eltopia Canal at MP 203.6.

At MP 205.2, the proposed route departs from Glade North Road to avoid an agricultural/industrial area and goes south through agricultural fields; it intersects Glade North Road (MP 207.1) and runs parallel to it to MP 216. Most of the pipeline construction in this segment will be in new right-of-way adjacent and parallel to existing corridors.

South of Esquatzel Coulee, the route joins a BPA transmission line right-of-way. The proposed route crosses Highway 395 at MP 217.6 leaving the BPA right-of-way at MP 221.9. The corridor traverses agricultural and industrial land within the city limits of Pasco to the route termination at the Northwest Terminalling bulk storage facility west of Highway 12 and adjacent to the Snake River.

- Pipeline Length: The approximate length of the pipeline would be 226 miles.
- Pipeline Hydraulics: Six (6) pump stations would be required.
- Constructability: Routes using Snoqualmie Pass were considered less rugged than Stevens Pass routes with fewer steep slopes and rock outcroppings, and therefore more "constructable" than routes using Stevens Pass.
- Pipeline Access: The majority of the route follows existing roads, trails, and transmission line corridors. Where new right-of-way corridors are needed, they are located near existing roads or utility corridors. Due to the proximity of I-90, the use of the Cedar Falls Trail and the John Wayne Trail, and many existing county and private roads, the route is considered very accessible.
- Environmental Impacts: Approximately 115 miles of the route would be in existing cleared rights-of-ways. These will limit the need to disturb uncleared land and limit impacts on wetland and vegetation habitats. The route would cross 285 rivers, streams, or culverts, however 8 or 9 of these crossings would be on existing bridges, and many of these crossings would be located above or below an existing culvert, or below an existing irrigation canal.
- Ownership/Land use: Federal agencies own 33 miles of the route; state agencies own or control 33 miles; local agencies own or control 7 miles; and there are 154 miles in private ownership with many ownerships in large tracts. The pipeline would cross through three cities or towns (North Bend, Snoqualmie, and Kittitas), although the route through North Bend and Snoqualmie would be on the existing Cedar Falls Trail and would not require new right-of-way to be developed.

2.C.4 Thrashers Corner via abandoned railroad route (Centennial Trail) and Snoqualmie Pass to Pasco

This alternative would use the abandoned railroad right-of-way that follows the Snoqualmie River valley. This alternative would begin at Thrashers Corner and head east along the existing BPA powerline corridor. However, after crossing the Snoqualmie River, the alternative route would utilize the railroad right-of-way that generally parallels SR 203 on the east side of the Snoqualmie River valley. The route would have stayed on old railroad right-of-way over Snoqualmie Pass, the Columbia River, and to a point just east of Royal City where it would turn south to Pasco following the same route as described above for the Thrashers Corner to Pasco route.

- Pipeline Length: The approximate length of the pipeline would be 245 miles.
- Elevation profile: Six (6) pump stations would be required.
- Constructability: The existing right-of-way in the Snoqualmie Valley is very narrow, and would cause a considerable increase in the construction time due to the difficulties of moving labor and equipment in a confined space.
- Pipeline Access: The majority of the route would follow an abandoned railroad line. In some places, this route parallels existing highways or roads. However in the vicinity of Snoqualmie Pass, the route would be farther from I-90 and other existing roads than the Thrashers Corner to Pasco Route. It was therefore considered less accessible.

- Environmental Impacts: Approximately 115 miles of the route would be in existing cleared rights-of-ways. While this would generally limit the need to disturb uncleared land and limit impacts on wetland and vegetation habitats, there are a number of wetlands which are directly adjacent to the Centennial Trail. Due to the narrowness of the trail, it would be very difficult if not impossible to avoid temporary construction impacts to the wetlands. In addition, the trail bed would require widening to allow space for the pipeline in addition to the existing cable, and this widening would require filling of wetlands on one or both sides of the trail.
- Ownership/Land use: Federal agencies own 10 miles of the route; state agencies own or control 33 miles; local agencies own or control 7 miles; and there are 87 miles in private ownership. The pipeline would cross through seven cities or towns (Duvall, Carnation, North Bend, Snoqualmie, Kittitas, Ellensburg, and Beverly), although the route through would be on the existing Centennial Trail and would not require new right-of-way to be developed.

2.C.5 Hollywood via the Tolt Pipeline Corridor and Snoqualmie Pass to Pasco

The Hollywood - Tolt Pipeline Alternative would originate near Hollywood in the Sammamish River valley, and would head directly east following the right-of-way of the City of Seattle's Tolt River Waterline. This route would cross the Snoqualmie River south of Duvall and connect with the BPA powerline corridor north of Stillwater. At this point the route would follow the Thrasher-Pasco corridor over Snoqualmie Pass to Pasco.

Although this route is a cleared pipeline route and would have fewer direct landowner and environmental impacts, the City of Seattle has plans to develop an additional water pipeline within their corridor, and concerns have been expressed by the City of Seattle over placing a petroleum products pipeline in the same right-of-way as the water pipeline that supplies potable water to the City of Seattle.

- Pipeline Length: The approximate length of the pipeline would be 225 miles.
- Elevation profile: Eight (8) pump stations would be required.
- Constructability: Routes using Snoqualmie Pass were considered less rugged than Stevens Pass routes with fewer steep slopes and rock outcroppings, and therefore more "constructable" than routes using Stevens Pass.
- Pipeline Access: The majority of the route follows existing utility corridors, roads, trails, and transmission line corridors. Where new right-of-way corridors are needed, they are located near existing roads or utility corridors. Due to the proximity of I-90, the use of the Cedar Falls Trail and the John Wayne Trail, and many existing county and private roads, the route is considered very accessible.
- Environmental Impacts: Four rivers would be crossed, Snoqualmie, Tolt, Columbia and Yakima.
- Ownership/Land use: The Tolt River Pipeline corridor owned by the City of Seattle who has plans to place a second water pipeline in the corridor, eliminating space for a petroleum products pipeline.

2.C.6 Renton Station via Stampede Pass to Pasco

One route was considered over Stampede Pass, starting near I-405 and SR 167 at the existing OPL Renton Station. The Renton Station, in addition to being a pump station, is also the main office and monitoring station for OPL. The route would go northeasterly out of the Renton Station to SR 169 (Maple Valley Road). The route would use the existing powerline and railroad right-of-way and traverse southeasterly paralleling SR 169. Near 192nd Street the route would turn east crossing SR 18 just north of Hobart and connect with the BPA powerline corridor. The route would then generally follow the existing powerline right-of-way southeasterly past Howard Hanson Reservoir, then northeasterly ascending Stampede Pass. The route would then turn to the southeast and connect with the John Wayne Trail and follow the same route as the Thrasher-Pasco corridor.

- Pipeline Length: The approximate length of the pipeline would be 210 miles.
- Elevation profile: Eight (8) pump stations would be required.
- Constructability: Routes using Stampede Pass were considered more rugged than Snoqualmie Pass routes with more steep slopes and rock outcroppings, and therefore less "constructable" than routes using Snoqualmie Pass.
- Pipeline Access: Because Stampede Pass is more remote in places, the access to the pipeline in mountainous areas was considered less accessible than routes over Snoqualmie Pass.
- Environmental Impacts: The route would pass through both the Cedar River and Green River watersheds. There are strict prohibitions on construction within watershed areas.
- Ownership/Land use: The route would pass through more densely populated areas in south King County and was viewed to have greater ownership and land use impacts than routes using Snoqualmie Pass.

2.C.7 Route Using Yakima Valley

An alternative route to Pasco was considered that would turn south near Ellensburg and go through the Yakima Valley. The Yakima Alternative would have used any of the three alternative routes over Snoqualmie Pass, or the route over Stampede Pass. East of Snoqualmie Pass, all of the considered routes would follow the existing BPA powerlines going south and east of Cle Elum. East of Cle Elum, where the powerline corridor crosses the Yakima River, the routes would also cross the John Wayne Trail. The Yakima alternative would follow the trail and cross over the Yakima River several times on existing railroad bridges. West of Ellensburg, the route would turn south, crossing the Yakima River several times, and would generally parallel the west side of the Yakima River.

Approximately 5 miles south of Ellensburg, the route would cross to the east side of the Yakima River and follow the railroad right-of-way. The corridor through the canyon would cross the Yakima River a minimum of five times. North of Yakima, the route would turn southeasterly and follow an existing BPA powerline right-of-way that is north of the Roza Canal. Near the Yakima/Benton County line and SR 241, the route would turn south along an existing powerline corridor. Approximately 6 miles north of Grandview, the route would turn east and southeast crossing the Columbia on the I-182 bridge and going north of Pasco before turning south to the Northwest Terminalling facility.

- Pipeline Length: The approximate length of the pipeline would be 240 miles.
- Pipeline Hydraulics: Eight (8) pump stations would be required.
- Constructability: The Yakima Sub-route could use any of the three mountain pass routes. It was considered "less constructable" because it would have crossed the Yakima River a minimum of six times (at approximately \$3/4 - 1 million for each crossing) and would have crossed irrigation canals 43 times, including 2 crossings each of the Sunnyside and Rosa Canals.

- Pipeline Access: With the Snoqualmie Pass crossing, this route would be as accessible as the Thrasher to Pasco route.
- Environmental Impacts: The route would cross the Yakima River a minimum of six times. The route would cross a number of vineyards, croplands and orchards. The route would cross the Sunnyside and Rosa Irrigation Canals twice. The route would cross irrigation canals 43 times.
- Ownership/Land use: The route would pass through the densely populated areas of Ellensburg, Yakima, Selah and Richland. Construction impacts to vineyards, orchards and croplands such as used for growing asparagus would be significant.

2.D SUMMARY AND COMPARISON OF ROUTE ALTERNATIVES

A comparison of the six route alternatives and one sub-alternative is shown on the following table.

The routes were compared first of all for pipeline length as the length adds significantly to both the construction and operation costs. The construction costs for the pipeline through generally level terrain is approximately \$460,000 per mile. The Allen Station via Stevens Pass to Pasco Route Alternative would be 45 to 60 miles longer than other routes and would therefore cost a minimum of between \$20 and \$28 million more to build than other routes. This route and the Snohomish Alternative would both go over Stevens Pass. Stevens Pass is much more rugged, with more steep slopes and more rock outcroppings than Snoqualmie Pass. These factors add to the construction difficulty, and will significantly increase construction costs and the time required for construction in mountainous areas. Both routes would also require going through 7 cities with construction impacts to both residents and motorists on Highway 2. For these reasons, both the Allen Station and Snohomish Alternatives have been eliminated from further consideration.

The Renton Station Alternative would use Stampede Pass, and would go through the City of Seattle's Cedar River watershed and the Green River watershed. Stampede Pass was judged to be less constructable than Snoqualmie Pass Alternatives, the pipeline access would be more remote than Snoqualmie Pass alternatives, and it was viewed as unlikely that permission would be granted by the City of Seattle to construct within the Cedar River watershed. For these reasons, this alternative has been eliminated from further consideration.

Three alternatives using Snoqualmie Pass have been considered. One route, using the Centennial Trail would be approximately 20 miles longer than the other two at an approximate increase of \$10 million in construction costs. The Hollywood Alternative would require two additional pump stations, at a construction cost of approximately \$4 million over the Thrashers Corner Alternative. Pipeline access would range from easy to moderate for all three alternatives. All three would have the same number of river crossings. A preliminary review of wetland impacts for the three alternatives has shown that the alternative using the abandoned railroad line along the Centennial Trail would create the unavoidable impact of filling high quality wetlands. High quality wetlands can be avoided on the other two Snoqualmie Pass alternatives. The railroad alternative also would impact a greater number of cities than the other two Snoqualmie Pass Alternatives. Due to the need to add fill to widen the Centennial Trail route, the resulting unavoidable impacts to wetlands, and the greater number of cities that would be affected during construction, the railroad alternative has been eliminated from further consideration.

Of the two remaining Snoqualmie Pass alternatives, the Hollywood Alternative would place the proposed pipeline in the City of Seattle Tolt River Water Pipeline corridor. The City has initiated plans to add a second water pipeline within this corridor, and there would not be room for two water pipelines plus the refined petroleum products pipeline. Because this route would now require the clearing of new right-of-way it has been eliminated from further consideration.

The Yakima Valley subroute could be used with any of the three mountain pass crossings. The

environmental impacts have been judged to be greater than the Thrashers Corner alternative because it would require crossing the Yakima River a minimum of six times as compared to one crossing for the Thrashers Corner alternative. The increase in crossings would increase construction costs by approximately \$5 million (river crossing costs are estimated at \$1 million per crossing). The route would also cross through vineyards, orchards and crops such as asparagus. The Thrashers Corner alternative would cross through primarily grazing land and would skirt around irrigated fields. The Yakima Valley subroute was judged to have a greater impact on land uses for this reason. The purchase of right-of-way easements from property owners was also estimated to be greater due to the impacts to vineyards, crop lands, and orchards. The construction impacts to these areas would take longer to recover as compared to brief impacts to open grazing land. For these reasons, the Yakima Valley subroute has been eliminated from further consideration.

The remaining alternative, Thrashers Corner via Snoqualmie Pass to Pasco, has been found to be constructable and accessible. The alternative makes extensive use of existing utility or road corridors to minimize the need to clear new right-of-way. The route avoids crossing through major populated areas, and crosses through two cities within an existing trail. This route is being advanced for further consideration in the Environmental Impact Statement.

	Pipeline Length	# of Pump Stations	Constructability	Pipeline Access	Environmental Impacts	Ownership/Land Use
Allen Station via Stevens Pass to Pasco	285 miles	8	less constructable than Snoqualmie Pass routes	difficult	River crossings: Columbia, Snohomish, Skykomish (6 crossings), Wenatchee	7 cities: Monroe, Sultan, Gold Bar, Index, Leavenworth, Cashmere, Wenatchee
Snohomish via Stevens Pass to Pasco	240 miles	7	less constructable than Snoqualmie Pass routes	difficult	River crossings: Columbia, Snohomish, Skykomish (6 times), Wenatchee	7 cities: Monroe, Sultan, Gold Bar, Index, Leavenworth, Cashmere, Wenatchee
Thrashers Corner via Snoqualmie Pass to Pasco	227 miles	6	more constructable than Stevens Pass routes	easy	River crossings: Snoqualmie, Tolt, Columbia, Yakima	3 cities: North Bend, Snoqualmie, Kittitas (North Bend and Snoqualmie on trail)
Thrashers Corner via abandoned railroad route (Centennial Trail) and Snoqualmie Pass to Pasco	245 miles	6	more constructable than Stevens Pass routes	moderate	River crossings: Snoqualmie, Tolt, Columbia, Yakima Significant wetland impacts along Centennial Trail	7 cities: Duvall, Carnation, North Bend, Snoqualmie, Kittitas, Ellensburg, Beverly
Hollywood via the Tolt Pipeline Corridor and Snoqualmie Pass to Pasco	225 miles	8	more constructable than Stevens Pass routes	easy	River crossings: Snoqualmie, Tolt, Columbia, Yakima	Conflict with City of Seattle Tolt River Pipeline corridor
Renton Station via Stampede Pass to Pasco	210 miles	8	less constructable than Snoqualmie Pass routes	moderate	River crossings: Cedar, Green Columbia, Yakima	Conflict with City of Seattle Cedar River watershed
Yakima Valley Sub-route Alternative	240 miles	8	constructable assuming paired with Snoqualmie Pass route	easy	River crossings: Snoqualmie, Tolt Columbia, Yakima (4 times) Construction impacts to vineyards, orchards, crops	Land use conflicts due to construction impacts to vineyards, orchards, crops, Ellensburg, Yakima, Selah, Richland

3. TIER 3 - ALTERNATIVE LOCATIONS FOR INDIVIDUAL SECTIONS OF THE PIPELINE AT WETLANDS AND WATER CROSSINGS

3.A. CRITERIA FOR EVALUATING ALTERNATIVES WITHIN THE PREFERRED ROUTE

Within the preferred corridor between Thrashers Corner and Pasco, alternative locations have been considered for:

- Pump Stations
- Kittitas Terminal
- Line locations, including wetland and water crossing locations

The criteria used for evaluating alternative pump station locations are:

- Adequate land area for pump station
- Adequate existing electrical power supply, or proximity of existing electrical supply
- Year-round access to site

The criteria used for evaluating alternative sites for the Kittitas Terminal area:

- Site must be located near the middle of central Washington to serve as an efficient distribution point for central Washington.
- Site must be located in close proximity to major east-west and north-south highways to provide efficient distribution to central Washington.
- In order to avoid maintaining excessive amounts of back pressure on the pipeline, the site needs to be located in an area of gradual elevation change and far enough east or west of areas such as Elk Height where there is a rapid elevation gain.
- Adequate site size.
- Availability of electric power at the site.
- Compatible land uses adjacent to the site and along connecting corridors between the site and major highways.
- Availability of existing adequate transportation infrastructure from major highways to the site for tanker truck traffic.
- Ability to purchase site for the facility and to secure proper zoning.

The criteria used for evaluating alternative centerline locations include:

- Preference for use of existing cleared rights-of-way, including transmission line corridors, trails, and roadways.
- Avoidance of high quality wetlands or wildlife habitat.
- Minimizing impacts at stream crossings by the use of existing bridges.
- Minimizing impacts at stream or river crossings by using the narrowest feasible crossing points.
- Avoidance of land use impacts, such as existing structures, irrigated crop lands, gardens, orchards, and golf course fairways.
- Land owner preferences as to line location.

3.B DESCRIPTION OF ALTERNATIVE PUMP STATION LOCATIONS

The proposed project will have six pump stations, including one at the Kittitas Terminal. The siting of the Kittitas Terminal is discussed separately in Section 3.C. Pump stations are generally located based on the needed hydraulics for efficient operation of the pipeline. The criteria for evaluating alternative pump station

locations is:

- Appropriate hydraulic location
- Adequate land area for pump station
- Adequate existing electrical power supply, or proximity of existing electrical supply
- Year-round access to site
- Avoidance of wetlands and other environmentally sensitive areas.

3.B.1 Thrasher Pump Station

The Thrasher Pump Station is the origin of the pipeline. Two alternative sites, one at OPL's existing Woodinville Pump Station, and a second site on 46th Avenue North, north of 212th Street NE in Woodinville (Thrashers Corner) were considered. The Thrashers Corner site is located directly adjacent to a BPA transmission line corridor, a corridor desired for routing of the pipeline.

The Woodinville Pump Station site is surrounded by residential development and cannot be enlarged. The site was found to be not large enough to accommodate both the existing and proposed pump stations. The site is approximately 2 to 3 miles from the BPA transmission line corridor. This additional mileage would have added approximately \$1 - 1.5 million in construction costs for the additional line length.

The Thrasher Pump Station site was selected as the preferred pump station location based on site size and immediate proximity to the proposed pipeline corridor. This site also satisfied the criteria of avoiding environmentally sensitive areas.

3.B.2 North Bend Pump Station

Six alternative sites were considered for the location of the North Bend Pump Station. The pipeline in this area is proposed to be located on the Cedar Falls Trail. Three sites along the trail were evaluated in or near North Bend, one on the north side of the trail at SE 120th, one directly to the south on the south side of the trail, and a third location near I-90. A fourth location was reviewed further to the east near Edgewick Road. The sites near I-90 and Edgewick Road were eliminated due to the lack of electrical power. Two additional sites approximately two miles further to the east were considered. Neither site had an adequate power supply, and one site would not be accessible during the winter months.

The two sites near SE 120th were viewed to be equal in terms of power supply, access, and site size. Neither site has wetlands nor significant wildlife habitat. The northern site was selected based on the landowner's willingness to sell the property.

3.B.3 Stampede Pass Pump Station

The Stampede Pass Pump Station is located at the intersection of Stampede Pass Road and the John Wayne Trail. The proposed pipeline alignment for this segment is within the trail. There were no alternative sites in this vicinity that were found to have power, access, or adequate land area.

3.B.4 Beverly Burke Pump Station

After crossing the Columbia River near Vantage, the proposed pipeline corridor heads east along Beverly Burke Road. There was only one site identified in this area that was of suitable size, with adequate power and access and available for sale. The site is directly adjacent to Beverly Burke Road approximately 4 miles east of the Columbia River.

3.B.5 Othello Pump Station

The Othello Pump Station site is located on Mound Road just to the north of Highway 246 near the boundary between Adams and Franklin County. The site is on the proposed pipeline corridor. No alternative sites were found in this area with adequate land size, access, and power, and available for sale.

3.C DESCRIPTION OF ALTERNATE SITES FOR THE KITTTITAS TERMINAL

As noted above, the criteria used for evaluating alternative sites for the Kittitas Terminal area:

- Site must be located near the middle of central Washington to serve as an efficient distribution point for central Washington.
- Site must be located in close proximity to major east-west and north-south highways to provide efficient distribution to central Washington.
- In order to avoid maintaining excessive amounts of back pressure on the pipeline, the site needs to be located in an area of gradual elevation change and far enough east or west of areas such as Elk Height where there is a rapid elevation gain.
- Adequate site size.
- Availability of electric power at the site.
- Compatible land uses adjacent to the site and along connecting corridors between the site and major highways.
- Availability of existing adequate transportation infrasture from major highways to the site for tanker truck traffic.
- Ability to purchase site for the facility and to secure proper zoning.

A search was made for sites generally near Ellensburg in the I-90 corridor. Three sites were identified by right-of-way personnel and a third site at the Ellensburg Airport was identified by Kittitas County commissioners. The four sites evaluated are:

- A 27-acre tract adjacent to the Kittitas exit on I-90.
- A tract near the intersection of SR 10 and SR 97.
- A site near Elk Heights.
- County-owned industrially-zoned property at the Ellensburg Airport.

A comparison of the four sites is shown on the following table:

	Kittitas	SR 10/SR 97	Ellensburg Airport	Elk Heights
System Hydraulic Impact	none	high back pressure	high back pressure	none
Electric Power Availability	3/4 mile to suitable substation need to build feeder two viable suppliers	3/4mile to suitable substation need substation and feeder upgrades one viable supplier	2-3 miles to suitable substation need substation and feeder upgrades two viable suppliers	7 miles to suitable substation need to build feeder and substation one viable supplier
Land Uses at Site and Along Transportation	interstate highway	state highway	residential	rural residential

Corridor	highway commercial and agricultural uses	agricultural uses	residential and agricultural uses	residential and agricultural uses
Transportation Infrastructure	adjacent to interstate highway very easy access to regional system may need minor revision of ramps good all-weather access moderate volume use for residential and agricultural access	adjacent to state highway easy access to regional system need to build signals or acceleration lane good all-weather access moderate volume use for residential and agricultural access	adjacent to county road difficult access to regional system need to build road section and upgrade intersection dangerous grade for winter driving high volume use for residential and agricultural access	adjacent to interstate highway very easy access to regional system need major revision of ramps good all-weather access low volume use for residential and agricultural access
Property Ownership	Purchase from private landowner	Purchase from private landowner	Lease from public landowner	Purchase from private landowner
Wetlands or sensitive areas on site	None	None	Yes	Not evaluated

The Ellensburg Airport site was eliminated from consideration based on the difficult truck access to the regional system, the need to build new roads, safety considerations related to winter driving conditions, the high back pressure in the system that would be caused by the location, and the presence of wetlands on the site.

The Elk Heights site was eliminated based on construction costs due to the need to construct 7 miles of new electrical supply lines, the need to build an electrical substation, and the need to construct major revisions to existing ramps to the interstate system.

The Kittitas site and the SR 10/SR 97 site are comparable in terms of access to the regional transportation system, and access to power. The SR 10/SR 97 site was viewed as less desirable due to the high back pressure that would be created in the system based on its location, and the construction costs of needed to build an electrical substation.

The Kittitas Terminal site was selected as the preferred site.

3.D DESCRIPTION OF LINE ALTERNATIVES

The criteria used for evaluating alternative centerline locations include:

- Preference for use of existing cleared rights-of-way, including transmission line corridors, trails, and roadways.
- Avoidance of high quality wetlands or wildlife habitat.
- Minimizing impacts at stream crossings by the use of existing serviceable bridges.
- Minimizing impacts at stream or river crossings by using the narrowest feasible crossing points.

- Avoidance of land use impacts, such as existing structures, irrigated crop lands, gardens, orchards, and golf course fairways.
- Land owner preferences as to line location.

The map atlas that was prepared in February 1996 presented a proposed centerline based on known issues at that time. Since that time, a number of route improvements within the proposed corridor have been made. The improvements and alternatives that were considered for the placement of the centerline are described below by mile post increments.

MP 0 - 3.3

West of Maltby Road, there is an existing wetland. The alternatives to avoiding this wetland would have caused impacts to residential structures in Halo Estates. A route selection was made to both avoid the residential area and to trench through slightly less of the wetland area.

The wetland at Little Bear Creek will be crossed by the pipeline. There were no alternatives to route placement due to topography and the desire to stay within the existing BPA transmission line corridor. A decision was made to cross the wetland using a horizontal directional drill to avoid direct impacts to the wetland.

East of Highway 9, the proposed centerline has been moved from the south side of the BPA right-of-way to the north side to minimize wetland impacts.

Between Station 137.5 and 147.5, the route has been moved to the north side of the powerline to accommodate the landowner's development.

MP 3.03 - 5.97

Between station 230 and 237, the centerline has been moved to the north side of the corridor to minimize wetland impacts.

Echo Lake Road Wetlands (MP 4.5): The preferred corridor is within the BPA right-of-way. The initial route crossed from the south side of the BPA right-of-way to the north side to avoid residences adjacent to the south side of the right-of-way. While the route avoided the homes, the route would have crossed an open-water portion of a wetland. After a more thorough investigation, it was decided to maintain the proposed corridor on the south side of the BPA right-of-way within a dirt access road, and to then cross to the north side of the right-of-way to avoid the homes. The proposed corridor avoids the more sensitive open water portion of the wetlands although it is anticipated that there will still be some impacts to less sensitive portions of the wetland from construction of the pipeline.

The route then crosses the Echo Lake Golf Course. The centerline has been rerouted to follow the existing golf cart path to minimize impacts to the golf course and to avoid wetlands.

MP 5.97 - 8.90

Near Welch Road between approximately Station 320 and 327, the centerline has been slightly moved to accommodate the landowner's desires.

At approximately Station 410, the route crosses the Snoqualmie River. There are three alternatives: to use the new Snohomish County Snoqualmie River Bridge, or to dredge or drill across the river. The preferred crossing method is to use the bridge, provided that there is still room in the utilidor under the bridge at the

time this project is permitted. The revised route would cross two small low value wetlands on the west side. The bridge crossing would avoid drilling or dredging through the river, and avoid construction staging in flood plains.

MP 8.90 - 11.74

At station 557 near Peoples Creek, the centerline has been rerouted from the north side of the corridor to the south side to minimize impacts to the creek. At station 596, the centerline has been rerouted outside of the BPA corridor to use an existing road and to cross the creek at a location where it is already in a culvert.

MP 8.90 - 11.74

Between Station 683 and 694, the centerline has been rerouted onto an existing road to avoid a wetland. At the King County line, at station 725, the centerline has been rerouted to the west to accommodate the landowner. There are no wetland impacts caused by the reroute.

North Road Wetlands (MP 12.8 to 13.0): The initially-considered corridor and the preferred pipeline corridor are within the BPA corridor. The initial route would have crossed through a large wetland and open water area extending across the right-of-way. The first alternative to crossing this wetland/open water area was to go around it on the west side through private roads. Further investigation of this route concluded that there would still be potential impacts to wetlands and numerous residential yards. It was determined that a route around the east side of the wetland/open water area was more feasible with less impacts to the wetland and residential properties.

MP 11.58 - 20.64

Between station 822 and 837, the centerline has been moved from the east side of the BPA corridor to minimize impacts to wetlands. Between station 873 and 877, the centerline has been rerouted to the east to decrease wetland impacts.

MP 20.64 - 25.19

At the Tolt River, the centerline has been moved farther to the west to cross the main stem through the riprap along the northern, or right bank, in an area that has been previously disturbed. The route has also been revised to avoid a newly constructed house.

MP 25.19 - 30.40

At Griffin Creek, the centerline has been moved 10 feet to the east to avoid a mature Spruce tree,

MP 30.40 - 39.02

At Tokul Creek, the line has been moved to the west to decrease impacts to the creek and to avoid a tributary to the creek. The route will use an existing railroad corridor. At station 1730, the centerline has been moved to the north to use the abandoned railroad bed and to avoid mature trees.

Tokul Creek (MP 30.6 to MP 32.9): Crossing of Tokul Creek created significant engineering difficulties due to the extremely steep slopes. The original route selected crossed the Tokul farther to the east, and would have required clearing a construction corridor through approximately .5 miles of forested area. The initial route would have also impacted some wetland areas, and would have required a significant drop and rise in elevation. Two other potential routes were investigated, but both had the same constraints. Through

discussions with the commercial property owner, it was found that a more westerly route following Falls Station Road would be more suitable.

MP 39.02 - 41.38

There are two alternative routings in this area, one using Edgewick Road. Edgewick Road is a heavily travelled 2-lane paved road. During construction the road would have to be closed to through traffic. A route has been selected to avoid the roadway impacts and to avoid the adjacent Category 1 forested wetland. The route at station 2115 has been moved to the south to avoid Boxley Creek. At Station 2155, the centerline has been moved to accommodate the landowner and moved onto Twin Falls State Park land.

Edgewick Road Wetlands (MP 38.6 To MP 41.2): This area has numerous wetlands, small ponds, and residences. Many alternative routes were investigated to cross this area to reach the John Wayne Trail. The selected corridor has the least impacts of the routes investigated.

MP 41.38 - 47.44

At stations 2303 and 2314, the route has been moved to the south side of the streams for constructability.

MP 47.44 - 53.50

In the vicinity of Alice Creek and Tinkham Road, the route has been located to maximum the use of the road and previously disturbed areas, and to avoid impacts to the recreational trail. The centerline has also been moved to avoid potential spotted owl habitat.

MP 53.50 - 66.57

At station 2860 - 2900, the centerline has been moved from the John Wayne Trail to an abandoned railroad siding to minimize recreational impacts to trail users and to use previously disturbed lands. The centerline was also moved to use the narrowest crossing points for Humpback and Olallie Creeks to minimize impacts to the creek.

MP 66.57 - 69.60

At approximately Mile Post 68, the centerline has been rerouted around the existing tunnel due to limited construction space within the tunnel.

MP 69.60 - 72.54

At Cabin Creek (Station 3820), consideration was given to using the existing bridge. The bridge has been found to be unusable for the pipeline, and the centerline has been rerouted to use a Puget Power maintenance road. The road is elevated away from most of the wetlands. This route will minimize wetland impacts and avoid mature trees.

MP 72.54 - 75.47

At station 3845, the centerline has been routed onto Monahan Road as a means of access to the Puget Power transmission line corridor. At station 3935, the centerline has been rerouted around the wetland that was found in the powerline corridor.

MP 75.47 - 78.41

At station 4057-4077, the centerline has been realigned to cross the concrete-lined canal at a 90 degree angle. From station 4113 - 4120, the centerline has been moved onto an existing road to avoid a wetland.

MP 78.41 - 81.25

At Big Bear Creek (MP 79), the centerline has been moved to the west to accommodate a landowner. At Little Creek (Station 4250-4058), the centerline has been moved to the east to minimize impacts to the creek.

MP 81.25 - 82.95

At MP 82 there are two alternative alignments. One alignment would be in a spotted owl circle. An agreement has been reached with a nearby landowner to cross onto the landowner's property to avoid the spotted owl circle.

MP 82.95 - 91.87

Between station 4382 and 4417, the centerline has been moved to the north onto the power line corridor to avoid a spotted owl circle, and then to the south edge of the BPA corridor to avoid wetlands. At station 4435-4445, the centerline has been moved to the north onto an existing road to avoid a wetland. At station 4467-4478, the centerline has been moved to the south to use an existing road and culvert crossing to avoid wetlands and Spex Art Creek.

MP 91.87 - 94.79

At Station 5000, the route will cross the Yakima River. The centerline has been moved to the north at the river crossing to avoid the cottonwood trees. There is consideration being given to building a bridge to cross the river in this location to extend the John Wayne Trail and to provide access to the Wallace Ranch. The alternative is under discussion with both State Parks and the landowner.

MP 94.79 - 106.91

At station 5097-5210, the centerline has been moved off of the powerline to avoid wetlands, oak woodlands, and talus slope areas.

Swauk Creek (MP 97.5): The preferred route follows the BPA corridor. Several important habitat features have been identified in this area, and the routes are further constrained by the Swauk Creek Canyon which has very steep slopes with rock outcroppings. Field investigations have determined that a more southerly route down the canyon slopes and then northerly back up the eastern side of the canyon is the most feasible and would avoid impacts to the oak woodland habitat features. Although the preferred corridor passes through small areas of oak woodland, no oak trees will be removed.

MP 106.91 - 108.90

From station 5675-5742, the centerline has been moved to the north and east to minimize impacts to wetlands and Currier Creek.

Ellensburg (MP 105.5 to MP 119): The initial route would have brought the pipeline closer to Ellensburg

with a terminal and pump station constructed on the northeast side of the Ellensburg Airport. Further investigation of this route and site for the terminal identified a number of issues: a significant number of wetlands would have been impacted; traffic patterns to the proposed terminal were difficult, and the pipeline would have been constructed on the John Wayne Trail through the City of Ellensburg. To avoid these constraints, the preferred corridor was significantly rerouted to traverse farther north of Ellensburg, and the proposed terminal site moved near Kittitas. The preferred corridor minimizes the wetland impacts and has improved truck access to the terminal.

MP 108.90 - 115.91

From approximately MP 109 - 115, the centerline has been relocated to the property lines to accommodate the landowners and to accommodate future development of the land.

MP 115.91 - 121.88

From station 6245, where the pipeline crosses under the Kittitas Highway, to station 6320, the centerline has been moved to the west and south to accommodate the landowner. At station 6350 - 6410, the line has been moved to the north to parallel the John Wayne Trail to avoid the existing sewage lagoon. The route then follows an existing road to the south to the Kittitas Terminal.

MP 121.88 - 124.91

From station 6444 - 6565, the centerline has been moved off of the John Wayne Trail to parallel I-90 to accommodate the landowner concerns. The realignment decreases impacts to private irrigation canals and lessens impacts on farming.

MP 124.91 - 127.94

From station 6572 to 6610, the centerline has been moved to the north to avoid a gravel pit. Use of the existing railroad right-of-way was considered as an alternative route, but it was found to be too narrow to accommodate construction. From station 6727 - 6755, the centerline has been moved to the north to improve constructability.

MP 127.94 - 146.02

The original route would cross the Yakima Training Center, owned by the U.S. Army. To accommodate concerns of the Army over potential future conflicts between the pipeline and training exercises, a second alternative has been developed to move the centerline north to the Army's fence line. A third alternative would move the centerline to remain on the north side of I-90 on land owned by the Ginko State Park. A comparison of the environmental impacts of these alternatives will be provided in the EIS.

At Johnson Creek, the original route has been moved further to the west to minimize the wetland impacts.

MP 146.02 - 156.53

At MP 147.3, the pipeline will cross the Columbia River. Nine (9) alternative crossing methods or locations have been considered:

Location	Geotechnical Feasibility	Environmental Impacts	Estimated Cost
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Drilling north of I-90 bridge	unknown	need large cleared area for drilling base	\$1.2 million
Dredging north of I-90 bridge	gravel - feasible	need to minimize impacts to fish habitat and shorelines	\$3.6 million
Crossing on I-90 bridge	structurally feasible	none	\$800,000
Drilling south of I-90 bridge	unknown	no place for drilling base	\$1.2 million
Dredging south of I-90 bridge	gravel - feasible	need to minimize impacts to fish habitat and shorelines	\$3.6 million
Crossing on Wanapum Dam	may conflict with dam operation	none	\$800,000
Drilling south of Wanapum Dam	gravel - feasible	need large cleared area for drilling base	\$1.9 million
Dredging south of Wanapum Dam	gravel - feasible	need to minimize impacts to fish habitat and shorelines	\$1.0 million
Crossing on Beverly Railroad Bridge	structurally feasible	none	\$1.2 million

Four of the alternatives were selected for further studies based on constructability and cost, and ranked in order of preference based on cost, and environmental impacts. The four alternatives under consideration are:

- Crossing on the I-90 Bridge
- Crossing on the Beverly Railroad Bridge
- Drilling south of Wanapum Dam
- Dredging north of I-90 Bridge

An environmental comparison of the four alternatives, and the land routes that would connect with those alternatives, will be provided in the EIS. The preferred alternative is to cross on the I-90 bridge. Selection of this route will be based on whether it would be permissible by both the state of Washington and the Federal Highway Administration. There is a Washington State statute that says that placement of hazardous liquid pipelines on interstate bridges should be avoided, but it does not appear to be, at the time of this writing, prohibited outright.

Should it not be permissible to cross on the I-90 bridge, the next option would be to use the Beverly Railroad Bridge. The bridge is currently being reviewed for structural stability and to determine the condition of its coating. Use of the trestle would eliminate the need to trench or directionally drill across the Columbia River. However, crossing on the trestle would increase the total distance of the pipeline route, and the pipeline would be exposed for a significant distance. Discussions with Burlington Northern and Washington State Parks have identified a potential reactivation of the bridge by the railroad which would reduce the desirability of using it for the pipeline.

If neither the I-90 bridge or the railroad bridge are found to be suitable for hanging a pipeline, the next alternative would be to do a horizontal directional drill under the Columbia River south of Wanapum Dam. This location was selected because it would be a narrow crossing of the river, and the slopes on either side of the river would provide better constructability for the pipeline than steeper slopes to the north.

MP 156.53 - 161.46

Between station 8270 and 8365, there were two alternative routes considered. The shortest route would traverse the land diagonally. The alternative route requires that the pipeline go due north for one mile before turning east. The longer route was selected because there would be fewer wetland impacts.

MP 161.46 - 170.45

Between station 8605-8657, the centerline has been moved farther to the north to avoid wetlands and at the landowner's request (Quack, Inc.) to avoid duck hunting areas. Between station 8700 - 8810, the centerline has been rerouted to follow the section line, and moved to the north paralleling the railroad line, to avoid the wetlands that are important to waterfowl.

MP 170.45 - 173.30

At station 9147, the centerline has been moved to the north side of Highway 26 to avoid the Columbia National Wildlife Refuge and wetlands.

MP 173.30 - 188.92

The original route crosses the toe and eastern portion of the Corfu Landslide area. An alternative has been developed to parallel Highway 26 to Danielson Road. This alternative route would avoid the Corfu Landslide area, be shorter in length, and decrease wetland impacts by approximately 1.5 acres. At MP 182, the route would be located within the existing county road right-of-way.

Saddle Mountain (MP 177.7 to MP 184): The initial corridor followed a transmission line that is approximately midslope on the Saddle Mountains (elevation approximately 1,300'). The geologic review indicated that this route traversed geologic formations similar to what has been identified as the Corfu Landslide (MP 175 to MP 178). Although the Corfu Landslide is very historic, it was decided to relocate the pipeline corridor to the toe of the slope along Kuhn Road to avoid crossing the potential landslide area.

MP 188.92 - 196.88

The proposed route in this location will go through a wetland. Alternatives were explored to avoid the wetland, but the route is constrained on the east by an existing irrigation circle. The irrigation pivot has electrical lines throughout the field and drainage tiles.

MP 196.88 - 202.94

At station 10455 - 10500, the centerline has been zigzagged to minimize impacts to the Eagle Lakes wetlands. At station 10635-10645, the centerline has been moved further east of Glade North Road to avoid a wetland, and to cross the railroad at a 90 degree angle.

MP 202.94 - 205.97

At station 10735-10822, the centerline has been moved to the east side of the to improve constructability, and to accommodate the landowner.

MP 205.97 - 208.99

At station 10945, the centerline has been moved to the east side of Glade North Road to avoid an asparagus field and landowner concerns.

MP 208.99 - 217.99

At station 11095, the centerline has been moved to the edge of an irrigation sprinkler circle which was not there at the time the route was originally planned. The relocated centerline then follows the property line.

MP 217.99 - 227.27

At stations 11614 - 11627, the centerline has been moved to the south at Esquatzel Coulee to cross the coulee at a right angle, and to avoid conflicts with the power line.

MP 227.27 - 230.09

At station 12130, the centerline has been rerouted to the north to follow an existing road into Northwest Terminalling's facility.

4. SUMMARY OF ALTERNATIVE ANALYSIS

This section summarizes the results of each of the Tier 1 - 3 alternative evaluations.

4.A TIER 1 - AITERNATIVES TO A PIPELINE FOR TRANSPORTING PETROLEUM

The purpose of the proposed action is to provide a cost-effective, efficient, environmentally sound means to transport refined petroleum products from western Washington refineries to central and eastern Washington to meet the long range needs for product transportation. Seven alternative transportation methods have been identified and considered to meet the project's purpose:

- No-Action (continued use of existing pipeline plus river barges or tanker trucks, or the use of sea-going barges plus river barges)
- Proposed Cross Cascade Pipeline
- Railroad
- Air Transport
- Yellowstone Pipeline between Billings, Montana and Spokane and Moses Lake, Washington
- Chevron Pipeline between Salt Lake City, Utah and Pasco, Washington and Spokane, Washington

Three alternatives have been found to meet the purpose and need statement for the project, and to be cost-effective, efficient, and environmentally sound: the two No-Action Alternatives and the proposed Cross Cascade Pipeline. These alternatives are to be advanced for detailed environmental comparison in the EIS.

4.B TIER 2 - ALTERNATIVE ROUTES FOR THE PROPOSED PIPELINE

Five alternative origin points, two alternative destination points, and seven routes were considered for the pipeline.

4.B.1 Alternative Origin Points

The alternative origin points are:

- Allen Station - existing OPL Pump Station
- Snohomish - intersection of the existing pipeline with the BNRR right-of-way south of Everett
- Thrashers Corner - north of OPL's existing Woodinville Station
- Hollywood - Sammamish River Valley
- Renton Station - existing OPL pump station

OPL determined that there was adequate capacity in the existing pipelines from the refineries to the Woodinville Station to serve both the existing and proposed pipelines. Origin locations south of Woodinville would require the addition of pump stations on the existing lines beyond those planned for the proposed project.

4.B.2 Alternative Destination Points

The two alternative destination points are:

- Moses Lake Terminus Alternative - One scenario would be to build a new product line to Moses Lake, Washington (Moses Lake Terminus Alternative), and then to move product to and from Spokane and Pasco via the existing pipelines by reversing or bi-directing their flow.
- Pasco Terminus Alternative - The second operating scenario would be to construct a new pipeline directly to Pasco. Product would then be moved to Spokane and Moses Lake via the existing pipelines.

The Moses Lake Terminus Alternative would require the least amount of new pipeline right-of-way. At a minimum, the existing pipelines from Moses Lake and Spokane would have to be modified and new pump stations and a distribution terminal at Moses Lake (at an approximate construction cost of \$10 million) would have to be built. The pipelines from Moses Lake to Spokane are believed to be too small (6") to economically carry the estimated flows to meet market conditions. It was anticipated that this pipeline would either have to be replaced or new parallel lines constructed. The practicability of this alternative would hinge on being able to convince the owners of these existing pipelines to modify their pipeline. This was viewed as being highly improbable for competitive reasons. For these reasons, this scenario was dropped from further consideration and the Pasco Terminal Alternative became the preferred alternative for the destination point.

4.B.3 Alternatives Routes Between the Origin and Destination Points

Routes between the origin and destination points were considered using following the three central mountain passes in Washington: Stevens Pass; Snoqualmie Pass; and Stampede Pass. The alternative mountain pass routes which have been considered based on the Pasco Terminus Alternative are shown below. In addition, there is one variation through the Yakima Valley to Pasco that could use any of the three mountain pass routes.

- Allen Station via Stevens Pass to Pasco
- Snohomish via Stevens Pass to Pasco
- Thrashers Corner via Snoqualmie Pass to Pasco
- Thrashers Corner via abandoned railroad route (Centennial Trail) and Snoqualmie Pass to Pasco
- Hollywood via the Tolt Pipeline Corridor and Snoqualmie Pass to Pasco

- Renton Station via Stampede Pass to Pasco

The Allen Station via Stevens Pass to Pasco Route Alternative would be 45 to 60 miles longer than other routes and would therefore cost a minimum of between \$20 and \$28 million more to build than other routes.

This route and the Snohomish Alternative would both go over Stevens Pass, which is viewed as more difficult to construct over than Snoqualmie Pass. This would significantly increase construction costs and the time required for construction in mountainous areas. Both routes would also require going through 7 cities with construction impacts to both residents and motorists on Highway 2. For these reasons, both the Allen Station and Snohomish Alternatives have been eliminated from further consideration.

The Renton Station Alternative would use Stampede Pass, and would go through the City of Seattle's Cedar River watershed and the Green River watershed. Stampede Pass was judged to be less constructable than Snoqualmie Pass Alternatives, the pipeline access would be more remote than Snoqualmie Pass alternatives, and it was viewed as unlikely that permission would be granted by the City of Seattle to construct within the Cedar River watershed. For these reasons, this alternative has been eliminated from further consideration.

Three alternatives using Snoqualmie Pass have been considered. One route, using the Centennial Trail would be approximately 20 miles longer than the other two at an approximate increase of \$10 million in construction costs. The Hollywood Alternative would require two additional pump stations, at a construction cost of approximately \$4 million over the Thrashers Corner Alternative. A preliminary review of wetland impacts for the three alternatives has shown that the alternative using the abandoned railroad line along the Centennial Trail would create the unavoidable impact of filling high quality wetlands. High quality wetlands can be avoided on the other two Snoqualmie Pass alternatives. The railroad alternative also would impact a greater number of cities than the other two Snoqualmie Pass Alternatives. Due to the need to add fill to widen the Centennial Trail route, the resulting unavoidable impacts to wetlands, and the greater number of cities that would be affected during construction, the railroad alternative has been eliminated from further consideration.

Of the two remaining Snoqualmie Pass alternatives, the Hollywood Alternative would place the proposed pipeline in the City of Seattle Tolt River Water Pipeline corridor. The City has initiated plans to add a second water pipeline within this corridor, and there would not be room for two water pipelines plus the refined petroleum products pipeline. Because this route would now require the clearing of new right-of-way it has been eliminated from further consideration.

The Yakima Valley subroute could be used with any of the three mountain pass crossings. The environmental impacts have been judged to be greater than the Thrashers Corner alternative because it would require crossing the Yakima River a minimum of six times as compared to one crossing for the Thrashers Corner alternative. The increase in crossings would increase construction costs by approximately \$5 million (river crossing costs are estimated at \$1 million per crossing). The route would also cross through vineyards, orchards and crops such as asparagus. The Thrashers Corner alternative would cross through primarily grazing land and would skirt around irrigated fields. The Yakima Valley subroute was judged to have a greater impact on land uses for this reason. The purchase of right-of-way easements from property owners was also estimated to be greater due to the impacts to vineyards, crop lands, and orchards. The construction impacts to these areas would take longer to recover as compared to brief impacts to open grazing land. For these reasons, the Yakima Valley subroute has been eliminated from further consideration.

The remaining alternative, Thrashers Corner via Snoqualmie Pass to Pasco, has been found to be constructable and accessible. The alternative makes extensive use of existing utility or road corridors to minimize the need to clear new right-of-way. The route avoids crossing through major populated areas, and crosses through two cities within an existing trail. This route is being advanced for further consideration in

the Environmental Impact Statement.

TIER 3 - 4.C ALTERNATIVE LOCATIONS FOR INDIVIDUAL SECTIONS OF THE PIPELINE

4.C.1 Alternative Pump Station Sites

The proposed project includes 5 pump stations, and one storage and distribution facility which includes a pump station. The locations are:

- Thrashers Corner (origin of the route)
- North Bend
- Stampede Pass
- Kittitas Terminal and Pump Station
- Beverly Burke
- Othello

The approximate location of each pump station is controlled by the elevation profile of the pipeline and the hydraulics needed for efficient operation. There are five criteria for evaluating the alternative sites:

- Appropriate hydraulic location
- Adequate land area for pump station
- Adequate existing electrical power supply, or proximity of existing electrical supply
- Year-round access to site
- Avoidance of wetlands and other environmentally sensitive areas.

Alternative to the Thrashers Corner pump station were considered as part of the alternatives for the origin point (see discussion above under 4.B.) There were six alternative sites identified for the North Bend Pump Station. Four sites were eliminated due to lack of an adequate power supply. The preferred alternative was selected based on the landowner's willingness to sell.

No alternative sites were identified for the Stampede Pass Pump Station, the Beverly Burke Pump Station or the Othello. All three areas have limited power opportunities and access roads which in turns limited the number of site alternatives.

4.C.2 Alternative Sites for the Kittitas Terminal

The location of the Kittitas Terminal has additional criteria:

- Site must be located near the middle of central Washington to serve as an efficient distribution point for central Washington.
- Site must be located in close proximity to major east-west and north-south highways to provide efficient distribution to central Washington.
- In order to avoid maintaining excessive amounts of back pressure on the pipeline, the site needs to be located in an area of gradual elevation change and far enough east or west of areas such as Elk Height where there is a rapid elevation gain.
- Adequate site size.
- Availability of electric power at the site.
- Compatible land uses adjacent to the site and along connecting corridors between the site and major highways.
- Availability of existing adequate transportation infrastructure from major highways to the site for tanker truck traffic.

- Ability to purchase site for the facility and to secure proper zoning.

Four sites were identified and evaluated using the above criteria:

- A 27-acre tract adjacent to the Kittitas exit on I-90.
- A tract near the intersection of SR 10 and SR 97.
- A site near Elk Heights.
- County-owned industrially-zoned property at the Ellensburg Airport.

The Ellensburg Airport site was eliminated from consideration based on the difficult truck access to the regional system, the need to build new roads, safety considerations related to winter driving conditions, the high back pressure in the system that would be caused by the location, and the presence of wetlands on the site.

The Elk Heights site was eliminated based on construction costs due to the need to construct 7 miles of new electrical supply lines, the need to build an electrical substation, and the need to construct major revisions to existing ramps to the interstate system.

The Kittitas site and the SR 10/SR 97 site are comparable in terms of access to the regional transportation system, and access to power. The SR 10/SR 97 site was viewed as less desirable due to the high back pressure that would be created in the system based on its location, and the construction costs of needed to build an electrical substation. The Kittitas Terminal site was selected as the preferred site.

4.C.3 Alternative Alignments for the Route

As described in Section 3.D, there have been a number of revisions made to the original route to avoid wetlands or other wildlife habitat, to accommodate landowner preferences, and to improve constructability. Key alternatives include:

- Crossing of the Snoqualmie River
- Use of land within the Ginko State Park as an alternative to crossing the Yakima Training Center
- Crossing of the Columbia River
- Realignment along Highway 26 to avoid the Corfu Landslide area

Snoqualmie River: There are three alternatives for crossing the Snoqualmie River: placing the pipeline within the utilidor under the newly constructed county-owned bridge, dredging through the river, or horizontally drilling under the river. The preferred alternative is to use the bridge, and Snohomish County staff have verbally indicated their agreement and preference for this alternative. Use of the bridge will depend upon the timing of obtaining EFSEC approval for the project and whether there is still space available within the utilidor.

Yakima Training Center: The original route crossed the Yakima Training Center. A second alternative was developed to move the centerline to the north along the Army's property line to eliminate conflicts between the pipeline and the Army's training exercises. OPL is currently in discussions with State Parks concerning alternative routes that would move the centerline to the north side of I-90 onto Ginko State Park Land. We anticipate that the outcome of these discussions will be the identification of one route across the Ginko State Park that will be evaluated environmentally against the Yakima Training Center route alternatives.

Columbia River: Nine alternative crossing methods were considered for the Columbia River:

- Drilling north of the I-90 bridge
- Dredging north of the I-90 bridge
- Crossing on the I-90 bridge
- Drilling south of the I-90 bridge
- Dredging south of the I-90 bridge
- Crossing on Wanapum Dam
- Drilling south of Wanapum Dam
- Dredging south of Wanapum Dam
- Crossing on the Beverly Railroad Bridge

Four of the alternatives were selected for further studies based on constructability, cost, and environmental impacts. The four alternatives, in order of preference are:

- Crossing on the I-90 Bridge
- Crossing on the Beverly Railroad Bridge
- Drilling south of Wanapum Dam
- Dredging north of I-90 Bridge

Use of the I-90 Bridge will be based on whether it would be permissible by both the state of Washington and the Federal Highway Administration. There is a Washington State statute that says that placement of hazardous liquid pipelines on interstate bridges should be avoided, but it does not appear to be, at the time of this writing, prohibited outright.

Should it not be permissible to cross on the I-90 bridge, the next option would be to use the Beverly Railroad Bridge. The bridge is currently being reviewed for structural stability and to determine the condition of its coating. Use of the trestle would eliminate the need to trench or directionally drill across the Columbia River. However, crossing on the trestle would increase the total distance of the pipeline route, and the pipeline would be exposed for a significant distance. Discussions with Burlington Northern and Washington State Parks have identified a potential reactivation of the bridge by the railroad which would reduce the desirability of using it for the pipeline.

If neither the I-90 bridge or the railroad bridge are found to be suitable for hanging a pipeline, the next alternative would be to do a horizontal directional drill under the Columbia River south of Wanapum Dam. This location was selected because it would be a narrow crossing of the river, and the slopes on either side of the river would provide better constructability for the pipeline than steeper slopes to the north.

Corfu Landslide Area: The original route crosses the toe and eastern portion of the Corfu Landslide area. An alternative route has been identified which would parallel Highway 26 to Danielson Road. This alternative route would avoid the landslide area, be shorter in length, and avoid impacting approximately 1.5 acres of wetlands which would be crossed on the Corfu Landslide route.