5.0 TRANSMISSION STRUCTURES AND MATERIALS

5.1 Alternative Structure Designs Considered

A comparison of proposed and alternative 500-kV structure types is contained in Table 5-1 and shown in Figure 5-1. A lattice self-supporting structure was selected as the base structure and the steel pole H-frame will be used in select areas.

Table 5-1. Alternative 500-kV Transmission Line Structures Considered

	Single-Circuit Structures			
Structure Features	**Lattice Steel**	**Lattice Steel**	**Tubular Steel**	**Tubular Steel**
Tower Finish	Dulled Galvanized	Dulled Galvanized	Weathering Steel	Weathering Steel
Tower Type – Tangent	Guyed Delta	Four-legged	H-Frame	Single Pole
Conductor Configuration	Delta	Delta	Horizontal	Delta
Average Tower Height – Feet	170	170	140	120-130
Proposed ROW Width – Feet	250	250	250	250
Average Span – Feet	1,000 – 1,200	1,200 – 1,300	900 – 1,300	800 – 1,000
Approximate Tangent Tower Weight – Pounds	20,000	25,000	50,000	40,000
Foundation Type	Bearing Pad and Screw Anchors for Guys	Drilled Pier	Drilled Pier	Drilled Pier
Typical Foundation Diameter – Feet	3	4	6	8
Typical Foundation Depth – Feet	4 ft for Pad 10-20 ft for Guy Anchors	15	25	30
Number of Foundations	1 for Mast and 4 for Guy Anchors	4	2 or 3	1
Construction Methods	Crane Helicopter	Crane Helicopter	Crane Helicopter	Crane
Cost	Lower	Lower	High	Highest
Comments	Guyed “V” structure will be 25 ft lower and approximately 4,600 lb lighter	Smaller foundations can be installed with smaller drill rig	Large foundation sizes require larger drilling rig	Large foundation sizes require larger drilling rig
Conclusions	**Not carried forward for detailed analysis**	**Proposed single-circuit structure**	**Proposed where low structure heights required**	**Carried forward as mitigation only**

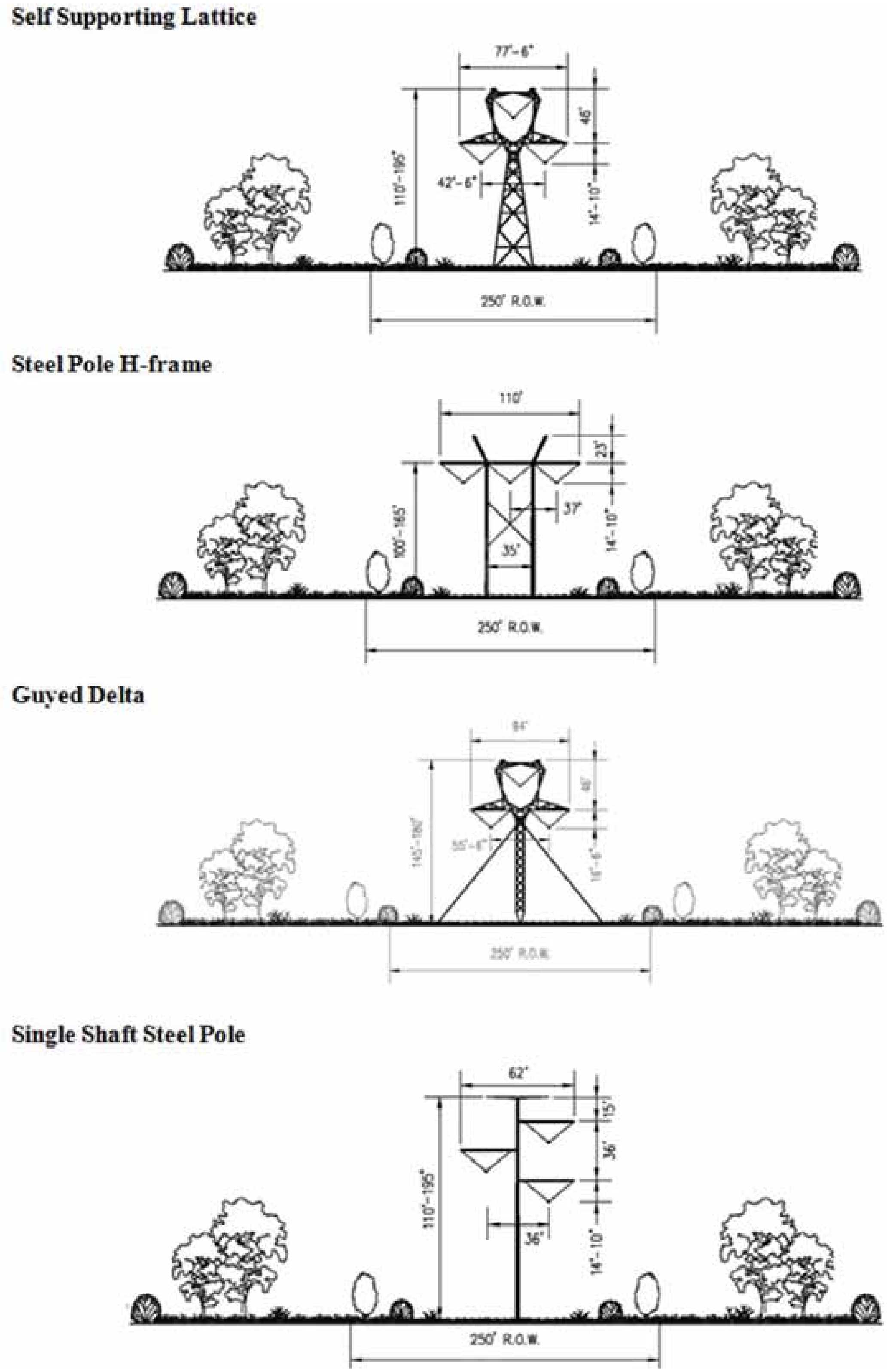

Figure 5-1. Alternative 500-kV Transmission Line Structures Considered

5.1.1 Self-Supporting Lattice

The predominant structure type to be utilized is the delta latticed steel tower. This is the most economical structure type for the 500-kV voltage and is considered the industry standard. The large conductor size, tensions, and clearances required at this voltage make the lattice tower the most efficient structure for long span construction. The long spans not only minimize the number of structures required per mile and their associated material and installation costs but also minimize overall land use impact by reducing the number of structures on any one property.

The delta configuration of the conductor phasing is preferred for long single-circuit transmission lines because it tends to reduce the need for phase transpositions along the line since all phases are equally spaced relative to each other. The delta configuration, although somewhat taller than a flat or horizontal configuration, can reduce the width of ROW required because the outboard conductor phase is closer to the centerline of the ROW.

All structure coatings and conductor will be specified to be “de-glared” or “non-specular” to minimize the visual impact of the new transmission line.

5.1.2 Tubular H-Frame

The single-circuit 500-kV tubular steel pole H-frame structure is more expensive than the lattice tower alternative. IPC does not wish to propose this alternative as a Project-wide option, but proposes that, where needed for mitigation of sensitive visual resources or where lower structure heights are required, the H-frame tangent configuration for single-circuit 500-kV is feasible. Therefore, this alternative is carried forward for consideration as a mitigation measure where the use of lattice towers presents a significant adverse impact to the environment or where land uses require shorter structure heights.

5.1.3 Tubular Single-Pole

Tubular single-pole structures must be self-supporting or are guyed at angles and corners. While H-frames can achieve lateral stability against the weight of the conductor and ice and wind conditions by virtue of the braced H-frame design, single-pole structures require deeper foundations and heavier steel poles to provide the same lateral stability, since each pole must be designed to independently withstand operational and ice and wind loads. Single-pole structures are more expensive to purchase and install and offer no technical or operational advantage over the proposed H-frame structure. However, in special circumstances where minimizing the structure footprint is critical they could be employed.

5.1.4 Guyed

Guyed 500-kV single-circuit transmission towers will have a single foundation in the center to support the mast(s) and four down guys to support the tower. The delta-type tower has a single mast and the V-type tower has two masts that meet at the single foundation in the center of the tower. The single foundation will be either pre-cast or poured in place reinforced concrete bearing pad, approximately 6 feet by 6 feet square and 1 to 2 feet in depth. Resting on the top of the bearing pad will typically be a 3-foot by 2-foot pedestal that supports the bottom of the mast(s). The bearing pad will be set in an excavation 2 to 4 feet deep depending on the soil at the site. Guyed towers are not suitable in mountainous terrain or in agricultural or residential areas. Soil conditions must also be favorable for guying and the presence of shallow rock significantly increases guying costs. IPC will only consider them suitable as tangent structures. Because of the agricultural disadvantages and significant amount of mountainous terrain along the Project route, they were not carried forward for detailed analysis.

5.2 Structure Finish and Surface Treatment Alternatives

The proposed surface finish for the single-circuit lattice steel towers is a galvanized finish, treated after the initial galvanizing process to produce a dulled finish to reduce surface reflectivity. This process results in an installed tower with more visual absorption and thus allows the towers to blend in better with the terrain, while at the same time preserving the corrosion resistant properties of the galvanized coating on the steel. The 500-kV transmission line lattice steel towers will be specified to have a dull galvanized finish. There are two other steel finishes that are used in the industry on transmission line structures, including painting and the use of weathering steel as a material for tower fabrication.

5.2.1 Painting

Painting of the lattice tower structures is not proposed and is considered operationally and economically infeasible by IPC for several reasons:

- Unlike a galvanized surface, which will provide corrosion protection and preserve the surface appearance of the steel for decades, a painted surface will require repainting several times during the life of the Project to maintain the painted surface and the desired appearance. The need to keep up with the painting of the structures will create a significant added expense during operation and maintenance of the transmission lines.
- The 500-kV transmission line circuit will have to be de-energized in order to repaint each of the structures. Given the importance of the Project 500-kV transmission line to the reliable operation of the western U.S. transmission grid, taking the circuits out of service for painting will not be feasible from either a transmission operations or economic perspective.
- While the need to paint the structures will add cost, the need to de-energize the circuits during painting will result in much greater added costs for replacement transmission or energy if a circuit were taken out of service. Operational experience over the last several decades has shown that because of the importance of 500-kV bulk power lines to the system, an outage of a circuit is very difficult to schedule, and even then there are only very short windows (days) in the spring and fall when an outage is possible.

5.2.2 Weathering Steel

Weathering steel, proposed for all H-frame structures, is a group of steel alloys that were developed to eliminate the need for painting. This type of steel alloy forms a stable rust-like appearance if exposed to the weather for several years. This is because during the wetting and drying cycles due to weather, it rusts and forms a protective layer on its surface. This layer protects the surface of the steel, prevents further rusting, and the layer develops and regenerates continuously when subjected to the influence of the weather. Weathering steel is commonly used by IPC, and throughout the industry, when tubular steel structures are specified for transmission lines.

The use of weathering steel for lattice towers is neither practical nor recommended. Lattice towers are composed of many members of various sizes of steel angles, bolted together in a latticework to form the tower. The bolts holding the members together are torqued to a specific tightness during construction. The tightness of each of the bolted connections on the tower is essential to maintain the rigidity and strength of the tower. With a galvanized steel surface, the surface does not degrade and so the bolts stay tight and the integrity of the tower is maintained. On the other hand, attempts to use weathering steel on lattice towers have demonstrated a phenomenon now known as “pack-out.” Pack-out occurs when the weathering steel under the bolt head or washer rusts and expands to form the protective layer during the weather cycles. Pack-out has the effect of loosening or breaking the bolted connections on the tower, thus compromising the tower’s rigidity and structural integrity.

6.1 Underground Technologies

For 500-kV AC underground lines, a number of cable technologies exist. While some have long running track records of high reliability, others are relatively new and untested. At the 500-kV voltage level, only a number of underground installations exist, namely in Japan and China. Within the U.S., 500-kV underground installations are limited to test sections. Alberta Electric Systems Operations is conducting a Feasibility Study to place approximately 12 miles underground on the Heartland Transmission Project (AESO 2010).

There are four basic technologies to consider for 500-kV AC underground circuits:

1. Solid Dielectric (Cross-Linked Polyethylene [XLPE]);
2. Gas Insulated transmission Line (GIL);
3. Pipe-type (High Pressure Fluid-Filled [HPFF]); and
4. Self-Contained Fluid Filled (SCFF); and
5. Superconducting Cables.

Solid Dielectric Cable—Considered only for distances of up to a few miles at the 500-kV voltage level, solid dielectric insulation or XLPE cable construction has been used only in special situations. While the technology is progressively emerging, lack of practical experience results in major reliability concerns for operating larger scale 500-kV underground systems.

Gas Insulated Transmission Line—GIL technology at the 500-kV voltage level has been implemented primarily within substations and not for longer transmission lines. GIL has been incorporated into substation designs with the length typically limited to distances less than 1,000 feet. However, the high cost and lack of experience with longer underground transmission lines, as well as questions of reliability, are more of a concern than with the other more prominent cable technologies.

High Pressure Fluid-Filled Cable—HPFF cable systems are a pipe-type system in which three single-phase cables are located within a single steel pipe (Figure 6-1). HPFF cables use Kraft paper insulation or a laminated polypropylene paper insulation that is impregnated with dielectric fluid to minimize the insulation breakdown under electrical stress. Since the system requires a continuous high pressure, pumping plants are required every 7 to 10 miles along the route, assuming relatively flat topography. The pumping plants are responsible for maintaining a constant pressure on the system, but must have large reserve tanks to facilitate the expansion and contraction of the dielectric fluid as the system undergoes thermal cycling. To maintain an operable pipe-type system, cathodic protection must be applied to the cable pipes to mitigate corrosion. This in turn helps prevent fluid leaks, which pose both an operational and an environmental concern. Using an HPFF system does provide high reliability but it also requires additional equipment, resulting in additional opportunity for component failure, while specially trained personnel are required to maintain these systems. Industry sponsored testing has proven that this technology can operate at the 500-kV voltage level; however, there are no 500-kV HPFF pipe-type systems currently installed within the U.S. and few installations can be found throughout the world. That being said, of the available cable technologies, an HPFF cable system may be considered the most logical for a 500-kV system.

Figure 6-1. Typical HPFF Pipe Installation

Self-Contained Fluid Filled Cable—SCFF cable systems are similar to the HPFF systems. The cable is typically constructed around a hollow tube, used for fluid circulation, and uses the same Kraft paper or laminated polypropylene paper insulation materials. Because the fluid system is “self-contained,” the volume of fluid required is less; however, the same distribution of pumping plants would be required. While SCFF cable systems have the longest running history at the extra high voltage levels, their use is typically restrained to long submarine cable installations. This technology has been implemented on inland applications with high reliability at 500-kV voltage levels.

Superconducting Cables—Research is currently underway in the advancement of high-temperature superconductors. Utilizing a unique cable design where all three phases are centered concentrically on a single core (Figure 6-2), the cables are capable of displaying low electric losses with the same power transfer capabilities as a standard non-superconducting cable. The core, filled with a cryogenic fluid, supercools the conducting material resulting in extremely low losses and high electrical power transfer capacities. Most high temperature superconductor systems are located adjacent to large metropolitan areas, where they are capable of transferring large quantities of power a few thousand feet, at the distribution level. However, technological advances in the last few years have seen the first 138-kV AC system installed in Long Island, New York, in early 2008. Because high-temperature superconductor systems have neither been established at the 500-kV voltage levels nor over long distances, superconducting cable will not be a technology option to consider for the Project.

Figure 6-2. High Temperature Superconductor AC Cable Design

6.1.1 Design of Cable Systems

The following are key considerations for underground transmission line design for 500-kV cable systems:

- A 500-kV cable system would consist of multiple cables per phase to achieve the target power transfer requirements and to provide redundancy in the case of a cable failure.
- Concrete encased duct banks would be installed at a minimum cover depth of 3-feet, or as required by routing design, and would be backfilled with specially engineered thermally favorable backfill to assist in heat dissipation.
- To obtain further redundancy, multiple duct banks per circuit can be utilized to minimize common mode failures of the cable installation.
- Depending upon installation location, a permanent access road approximately 14-feet wide may be required to perform operation and maintenance procedures.
- The total construction surface impact of the underground cable system is at a minimum approximately 30 feet, and includes any permanent access roads.
- Splicing of the cable would be required approximately every 1,500 to 2,000 feet. Splicing would be performed inside large underground vault structures. Vault dimensions would be approximately 12 feet wide by 28 to 40 feet long by 8 to 9-feet deep depending upon the cable manufacturer splice and cable racking requirements.
- Depending on the terrain characteristics, burial depths may need to be increased to avoid heating the soil and changing the conditions of the vegetation and wildlife habitat above the duct bank or pipe type cables.
- Underground to overhead transition stations would be required at each end of the underground transmission line, and at each intermediate reactive compensation and pumping stations. Requiring 2 to 4 acres, each site would consist of pedestal-type termination structures, reactors (similar to a large power transformer in appearance), and pumping plants, dependent upon cable system. In addition to these structures, A-frame dead-end structures, approximately 80 feet tall, would be required at each end of the system.
- Underground to overhead transitions at the 230-kV level can be accomplished with a single steel structure design if a solid dielectric cable system is implemented.
- Pumping plants would be required every 7 to 10 miles along the route, for either HPFF or SCFF cable systems.
- Reactive compensation would be required every 7 to 20 miles along the route to offset the capacitive reactance of the cable system, depending on the cable technology employed and electrical system requirements.

6.1.2 Reliability and Maintenance

Long-term reliability of underground cable systems is a major concern. Underground 500-kV lines are largely an unproven technology, as they have been implemented in a limited number of circumstances. In conjunction with their limited use, all installations to date have been relatively short compared to the Project, raising concern about the reliability of an extensive cross-country cable system. A catastrophic failure of any portion of the system—underground cable, splices, terminations, or fluid systems—could result in the cable system being inoperable and out of service.

Basic maintenance of the aforementioned cable systems consists of a thorough yearly inspection, while any fluid systems must be inspected and tested monthly. Inspections include all terminations and splices, all bonding systems, as well as all valves, gauges, switches, and alarms within the pumping plant. Cathodic protection systems are monitored as an ongoing process.

6.2 Construction Process

Large open trench installation or the more costly trenchless technologies are utilized to place the cables underground. Construction includes, but may not be limited to clearing of the ROW, trenching, installation of duct banks or pipe networks, installation of vaults, cable splicing and terminating, and termination structure construction.

Trenching—Generally the most common technique for placing underground lines, open cut trenching utilizes a large surface excavation to place the required infrastructure. The typical trench dimensions vary by cable type, voltage level, and required power transfer, but in all cases require a minimum cover depth of 3 feet (see Figure 6-3). While a number of cable arrangements can be achieved, soil characteristics and existing infrastructure often play the largest role of how the installations are designed. Trenching operations are typically staged

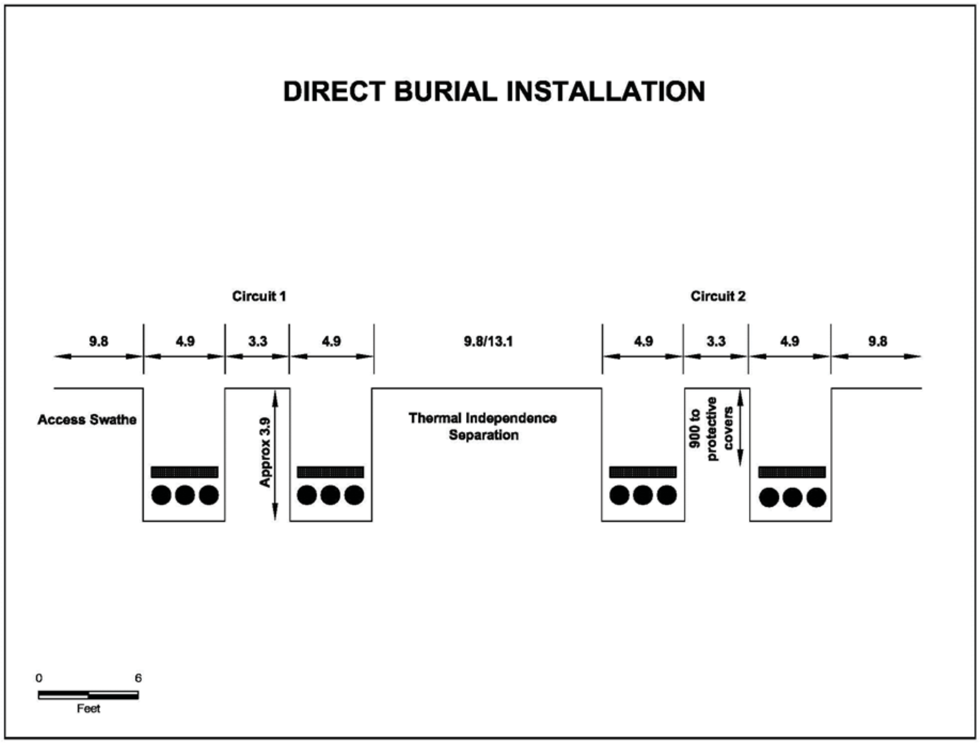

Figure 6-3. Typical Direct Burial Installation

such that a maximum of 300 to 500 feet of trench is open at any one time. Steel plating may be positioned over the open trench to minimize surface disruptions, while traffic controls alleviate congestion through the project area. Emergency vehicle and local access must be coordinated with local jurisdictions as necessary.

Installation—Single- and double-circuit solid dielectric cable systems are often installed in duct bank configurations. Another method is duct burial. Figure 6-3 illustrates the space requirements. Figure 6-4 also shows a cable construction ROW.

Figure 6-4. Typical Cable Construction ROW with Single Cable Trench Open

Pipe-type cable systems use steel pipes to encase each set of cables. Pipe-type cable systems can be utilized at the 500-kV level.

Vault Installation—In a vault installation (Figure 6-5), preformed concrete splice vaults are placed at approximately 1,500- to 2,000-foot intervals depending on the maximum cable per reel length. The vaults, initially used to install the cables into the conduits, are primarily used to house the splice assemblies, and to provide access for yearly inspections of the system. The vaults are used to sectionalize segments of cable in the event of a failure to locate the faulted cable and repair the required section. The typical installation time frame of each vault is approximately one week beginning with excavation, placement, compaction, and finally resurfacing of the excavated area.

Figure 6-5. Typical XLPE Vault Installation

Cable Pulling, Splicing, and Termination—Upon completion of the civil construction, cables are installed within the duct banks or steel pipes. Each cable segment is installed, spliced at each of the vaults along the route, and terminated at the transition sites where the cable connects to overhead conductors. To install the cable, a reel of cable is positioned at one end of a cable section, while a pulling rig is located at the other end. Using wire rope, each section of cable is installed into its respective conduit/steel pipe, while workers apply either water-based lubricant for solid dielectric cable or dielectric fluid for pipe type cable, to the cable jacket to minimize the frictional forces placed on the cables. Before termination or splicing operations begin, the cables are trained into the correct position using heat blankets. This process removes the curvature of the cable from being on the reel while also relieving any longitudinal strain exerted on the cable during pulling operations.

Termination Structure Construction—Because of the large size of cable equipment required for 500-kV lines, large transition sites are the only option.

Figure **6-6** shows a typical transition station.

Figure 6-6. Typical Overhead to Underground Transition Station

Special Construction Methods—In locations where open trench construction is not feasible, such as water crossings, airports, railway crossings, large roadway interchanges, etc., methods of trenchless installation must be utilized. Three main types of trenchless technologies exist. These are:

- Jack and Bore Tunneling
- Horizontal Directional Drilling
- Microtunneling

Jack and Bore Tunneling – Jack and bore tunneling is an auguring operation that simultaneously jacks or pushes a steel casing into the excavated cavity (Figure 6-7). As the equipment progresses forward, subsequent casing segments are added, while the spoils are removed through the center of the casing. Upon completing the crossing, the duct system is positioned inside of the steel casing using specially designed spacers, and the entire casing is then backfilled with thermally designed grout. The grout not only solidifies the installation from any movement, but also helps dissipate heat away from the cable system. For pipe type cable systems, the jacked casing can double as the cable pipe and may be welded to the trenched cable pipe.

Figure 6-7. Typical Jack and Bore Casing Installation

Horizontal Directional Drilling—The horizontal directional drilling method uses a steerable cutting head to create a pilot hole along a predetermined route. Using progressively larger reamers, the hole is enlarged to the intended diameter. A product casing is then pulled through the hole and duct work, using specially designed spacers, is positioned within the casing. Grout is pumped into the voids within the casing to secure the installation and assist with the thermal transfer of heat away from the cable system. As with the jack and bore method, the casing can be used as the cable pipe in a pipe type cable system.

Microtunneling—Microtunneling resembles the jack and bore method; however, the casing diameters and distances can typically be increased. Microtunneling uses a remotely operated tunneling machine to create the desired diameter hole. A casing is then placed into the excavated hole and duct work is positioned within the casing. As before, the casing is filled with grout, or the casing can be used as the product pipe in a pipe-type cable system.

6.3 Construction Time

Installing large segments of underground transmission lines can require as much as twice the construction time of overhead lines, if not more, due to the extensive excavation required to complete the trenching and installation of the cable system infrastructure, cable splicing, and construction of transition stations.

6.4 Conclusion

Underground cable system installation has historically been justifiable in terms of cost and reliability only in urban or metropolitan areas, and for limited distances. Because of the high cost of an underground line compared to overhead 500-kV lines, unproven technology over long distances for 500-kV, reliability and reactive compensation issues for long installations, and increased land disturbance, the alternative of placing the 500-kV line underground was not considered feasible for the Project.

7.0 PERMITS, APPROVALS, CONSULTATIONS, AND CONSISTENCY WITH PLANS

7.1 Permits Approvals and Consultations

Table 7-1 through Table 7-3 present summaries of federal, state, and local environmental permitting requirements that are considered likely to exist for the proposed Project facilities in Idaho and Oregon, respectively, including the various environmental permits and authorizations required for construction and operation of the transmission line and substation facilities. For completeness, Oregon and local permits that will be substantively addressed within the EFSC process have been listed. These tables exclude permit applications that have no significant environmental component.

Table 7-1. Major Federal Permits, Approvals, and Consultations

Regulatory Agency	Required Permit or Approval	Agency Action
Advisory Council on Historic Preservation	Section 106 Consultation, National Historic Preservation Act	Has the opportunity to comment if the Project may affect cultural resources that are either listed on or eligible for listing on the National Register of Historic Places.
U.S. Department of Agriculture, Forest Service	Temporary Use Permit	Consider issuance of a Temporary Use Permit for temporary activities in a construction right-of-way (ROW) on National Forest lands.
	Special Use Permit (SUP)	Consider issuance of a SUP for use of National Forest lands for construction and operation of electric transmission lines and associated facilities.
	Operation and Maintenance Plan	Consider approval of detailed Operation and Maintenance Plan.
	Notice to Proceed	Following issuance of the SUP and approval of the Construction, Operations, and Maintenance (COM) Plan on National Forest lands, consider issuance of a Notice to Proceed with Project development and mitigation activities.
U.S. Department of Defense, Army Corps of Engineers	Section 404, Clean Water Act (CWA) Permit	Consider issuance of a Section 404 permit for the placement of dredge or fill material into all waters of the U.S., including jurisdictional wetlands.
U.S. Department of Defense (DoD), Navy	Easement to cross DoD lands	Consider easement across Boardman Bombing Range.
U.S. Department of the Interior, Bureau of Land Management (BLM)	Antiquities and Cultural Resource Use Permit	Consider issuance of antiquities and cultural resources use permit to conduct surveys and to excavate or remove cultural resources on federal lands.
	Various Resource Management Plans	Consider amending the plans.

Table 7-1. Major Federal Permits, Approvals, and Consultations (continued)

Regulatory Agency	Required Permit or Approval	Agency Action
BLM (continued)	ROW Grant	Consider issuing long-term ROW grant for operations and maintenance of those portions of the Project that will occupy BLM-managed land, including easements across federally owned waterways.
	Short-Term ROW Grant	Consider issuance of a short-term ROW grant for temporary activities in the construction ROW, on lands leading the ROW and associated areas such as staging areas that are within BLM-managed lands.
	Plan of Development (POD)	Consider approval of detailed POD.
	Notice to Proceed	Following issuance of the ROW grant and approval of the POD, consider issuance of a Notice to Proceed with Project development and mitigation activities.
U.S. Environmental Protection Agency, Region 10	Section 401, Clean Water Act (CWA), Water Quality Certification	In conjunction with states, consider issuance of water use and crossing permits.
	Section 402, CWA, National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction Activity for Idaho	Review and issue NPDES permit for discharge of Stormwater in Idaho. In Oregon, NPDES permitting is delegated to the Oregon Department of Environmental Quality.
U.S. Environmental Protection Agency, Regions 8 and 10	Section 404, CWA	Review CWA, Section 404 applications for wetland dredge-and-fill applications for the U.S. Army Corps of Engineers (USACE) with 404(c) veto power for wetland permits issued by the USACE.
U.S. Fish and Wildlife Service, Region 1	Section 7 Consultation, Biological Opinion (Endangered Species Act)	Consider lead agency finding of impact on federally listed or proposed species. Provide Biological Opinion if the Project is likely to adversely affect federally listed or candidate species or their habitats.
	Fish and Wildlife Coordination Act	Provide comments to prevent loss of and damage to wildlife resources.

Table 7-2. Summary of Environmental Permitting Requirements — Idaho

Agency/Permit	Action Requiring Permit, Approval, Or Review	Description
Idaho Department of Environmental Quality (IDEQ)		
Fugitive Dust Control Plan (IDAPA 58.01.01.220)	• Construction and on-going maintenance, including: • Paved public roadways • Unpaved haul roads • Transfer points, screening operations, and stacks and vents • Crushers and grinding mills • Stockpiles	Fugitive dust emissions must be reasonably controlled at each site of construction or operations, based upon best management practices (BMPs) outlined in the Rules for the Control of Air Pollution in Idaho.
NPDES General Permit for Stormwater Drainages Associated with Construction Activity The U.S. Environmental Protection Agency (EPA) has jurisdiction over the NPDES permit program in Idaho.	Potential for stormwater discharges associated with construction of the proposed project.	IDEQ provides technical assistance and support for controlling stormwater in Idaho. IDEQ's Catalog of Stormwater Best Management Practices includes site design techniques for controlling stormwater runoff associated with land development activities. IDEQ also provides plan and specification review for facilities that control, treat, or dispose of stormwater if requested by the developer or design engineer.
Section 401 Certification	Potential for discharge to waters of the state associated with construction of the proposed project.	Section 401 of the federal CWA requires that any applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the state, must provide the licensing or permitting agency a certification from IDEQ that the activity complies with water quality requirements and standards. The Section 404 and Section 10 permits each trigger the 401 certification requirement. The Project may be required to incorporate protective measures into its construction and operational plans, such as bank stabilization, treatment of stormwater runoff, spill protection, and fish and wildlife protection. The IDEQ certification process requires a land use compatibility statement signed by the local government land use authority
Idaho Transportation Department		
Oversized or Overweight Loads	Variance Permit for Oversized/Overweight Loads	In addition to other requirements for operating in Idaho, such as registration requirements, motor carriers transporting oversize or overweight loads that originate in Idaho must obtain a variance permit and the driver must have possession of that permit prior to transport.

Table 7-2. Summary of Environmental Permitting Requirements — Idaho (continued)

Agency/Permit	Action Requiring Permit, Approval, Or Review	Description
ROW over federally funded highway	ROW Use Permit	Consider issuance of permit for transmission line crossing of federally funded highways (typically delegated to the state department of transportation).
Idaho Department of State Lands (IDL)		
Easement Across State Lands or Rivers (IC Title 58 Chapter 6)	Encroachment on, through, or over state lands, including rivers, reservoirs, and lakes.	The State Board of Land Commissioners may grant rights-of-way for roads and electric lines, and for other purposes. Transmission lines and tower structures will be granted a 30-year ROW on state land. Substations sited on state land will require a lease agreement with Idaho Dept. of Lands.
Idaho Department of Water Resources (IDWR)		
Stream Channel Alteration Permit and Wetland Removal Fill Permit (IC Title 42 Chapter 38)	Crossing rivers or streams, or filling or removing material from wetlands.	This permit will be needed if any roads or other Project features will require the alternation of any stream channel or wetland.
Fish and Wildlife Coordination Act of 1934, as amended 1946, 1958, 1977 (U.S.C. 661-667e)		
Fish and Wildlife Coordination Act of 1934, as amended 1946, 1958, 1977 (U.S.C. 661-667e)	Potential Project impacts to fish and wildlife species and their habitat	Idaho Department of Fish and Game will coordinate with BLM and USFWS on wildlife issues/impacts associated with the Project.
Owyhee County		
Conditional Use Permit (CUP)	Construction of transmission Line	The county is considering requiring a CUP for transmission facilities.

Table 7-3. Summary of Environmental Permitting Requirements — Oregon

Agency/Permit	Action Requiring Permit, Approval, or Review	Description
Oregon Department of Environmental Quality		
NPDES Individual Permit for Stormwater Drainages Associated with Construction Activity	Potential for stormwater discharges associated with construction of the proposed Project.	This permit will be needed for stormwater management associated with construction. A permit requires a land use compatibility statement signed by the local land use authority and an Oregon Department of Environmental Quality (ODEQ)-approved Erosion and Sediment Control Plan prior to beginning any on-site activities. The permit provides for a public review process for those projects that disturb five acres or more of land. If the application is approved, ODEQ assigns the source to the appropriate storm water discharge general permit. Substantive review will occur as part of the EFSC process

Table 7-3. Summary of Environmental Permitting Requirements — Oregon (continued)

Agency/Permit	Action Requiring Permit, Approval, or Review	Description
Section 401 Certification	Potential for discharge to waters of the state associated with construction of the proposed project.	Section 401 of the federal CWA requires that any applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the state, must provide the licensing or permitting agency a certification from ODEQ that the activity complies with water quality requirements and standards. The Section 404 and Section 10 permits each trigger the 401 certification requirement. The Project may be required to incorporate protective measures into its construction and operational plans, such as bank stabilization, treatment of stormwater runoff, spill protection, and fish and wildlife protection. The ODEQ certification process requires a land use compatibility statement signed by the local government land use authority.
Water Resources Department- Surface Water Permit		This permit would be applicable if an existing water use permit for the site will be used.
Land Use Compatibility Determination		The land use compatibility determination will be addressed as part of the EFSC Application for Site Certificate. This determination is required for issuance of ODEQ permits.
Oregon Department of Environmental Quality		
Water Quality Division-On-site Sewage Disposal System Permit		This permit will be required for portable toilets during construction. This permit will also be required if a new septic system is to be installed to accommodate new sewage disposal.
Oregon Department of State Lands		
Department of State Lands (DSL)	Removal/Fill Permit	This permit is required when 50 cubic yards or more of material is removed, filled, or altered within natural wetlands and waterways. This permit is also required for the removal or fill of any material regardless of the number of cubic yards affected in a stream designated as essential salmon habitat or designated as a scenic waterway. A joint application to the Oregon DSL and the USACE must be submitted for the Project. After a comment period that includes resource agencies, interest groups, local government, and neighbors, the DSL and USACE determine whether the proposed Project will meet permit standards. If there is a question, the permits will likely be approved with required mitigation conditions.
Easement for State-Owned Lands	Encroachment on, through or over state lands.	The Oregon DSL may grant leases for roads and electric lines, and for other purposes.

Table 7-3. Summary of Environmental Permitting Requirements — Oregon (continued)

Agency/Permit	Action Requiring Permit, Approval, or Review	Description
Oregon Department of Parks and Recreation		
Historic Preservation Office Archaeological Artifacts Excavation Permit		This permit is required to conduct archaeological investigations.
Historic Preservation Section 106 Consultation—Oregon Office		Under Section 106 of the National Historic Preservation Act of 1966 and under federal regulations governing the protection of historic and cultural resources, federal and other governmental agencies to whom federal authority has been delegated must avoid undertakings that adversely affect properties included in or eligible for the National Register of Historic Places. Prework surveying and reporting will be site dependent and will be required prior to consultation if consultation is determined to be required.
Oregon Department of Transportation		
Oversized or Overweight Loads	Variance Permit for Oversized/Overweight Loads	In addition to other requirements for operating in Oregon, such as registration requirements, motor carriers transporting oversize or overweight loads that originate in Oregon must obtain a variance permit and the driver must have possession of that permit prior to transport.
ROW over federally funded highway	ROW Use Permit	Consider issuance of permit for transmission line crossing of federally funded highways (typically delegated to the state department of transportation).
Office of State Fire Marshal		
Application to Install Flammable/Combustible Liquid Tanks		Prior to installation of above ground tanks over 1,000 gallons for the storage of flammable or combustible liquids, applicant must prepare plans showing compliance with the Uniform Fire Code and submit the plans for review by the State Fire Marshal.
Hazardous Materials Survey		Businesses that use or store hazardous substances are required to report such substances annually to the Fire Marshal and pay hazardous substance possession fees. If construction period is less than 2 years, no construction reporting is necessary.
Emergency Response Notification & Reporting		Emergency planning notification and reporting may be required under the Emergency Planning and Community Right-to-Know Act depending on quantities of "extremely hazardous substances" present at the energy facility site. If any listed substance is present at the site in an amount over the threshold quantities, initial notification (to local emergency/fire agency) is required within 60 days of handling threshold quantities.

Table 7-3. Summary of Environmental Permitting Requirements — Oregon (continued)

Agency/Permit	Action Requiring Permit, Approval, or Review	Description
Department of Forestry		
Notification to the State Forester – Types of Operations		The operator, landowner, or timber owner is required to comply with the practices described in the forest practice statutes and rules unless approval has been obtained from the State Forester for a plan for an alternate practice which is designed to result in the same effect or to meet the same purpose or provide equal or better results as those practices described in statute or administrative rule.
Counties		
Land Development Services – Conditional Use Permit		A conditional use permit will be required for any facilities located outside of lands zoned for industrial or commercial uses. This permit will actually be covered in the EFSC review under the Path B option.
Building Codes Division – Building Permit		Building permits will be required for plumbing, structural/mechanical/energy, elevator, and electrical.
Land Development Services – Utility Permit		Crossing of county roadways by transmission line facilities requires a utility permit. ORS 758.010 authorizes, outside cities, the construction, maintenance, and operation of “water, gas, electric or communications service lines, fixtures and other facilities along the public roads in this state,” subject to reasonable requirements for location, construction, operation, and maintenance.

7.2 Relationship to Resource Management Plans and Forest Plans

Land use plans, in various forms, are written by agencies to guide the management of resources and uses within their jurisdiction. The BLM has Resource Management Plans (RMPs) in place for all lands affected by this Project. The USFS has a Land and Resource Management Plan (Forest Plan) in place for the Wallowa-Whitman National Forest.

Ultimately, any route approved by the BLM and USFS needs to be in conformance with the direction provided in the applicable agency plans. In these cases, the BLM and the USFS can deny the Project, require modifications to the proposal so that it is in conformance, or amend the applicable land use plan. Where possible, the proposed Project has already been modified to comply with the plans through the constraint and opportunity analysis described in Section 5.2. A key decision variable in selecting the proposed route was crossing of the near-continuous band of National Forest in the middle portion of the study area. The proposed route crosses the Wallowa-Whitman National Forest in a designated utility corridor and is consistent with Forest Plan direction (USFS 1990). The Energy Resources and Power Transmission Facilities, Standards and Guidelines section of the plan provides for:

> “6. Utility Corridors. When applications for rights-of-way for utilities are received, the Forest’s first priority will be to utilize residual capacity in existing rights-of-way.”

Final conformance with plans will be evaluated as part of the NEPA analysis. Table 7-4 lists the various federal land use plans that provide direction and management standards for activities within their jurisdiction and their year of publication. The Baker RMP and Wallowa-Whitman Land and Resource Management plan are currently under revision, but because no decision has been made, the current plan (and not the proposed or draft plan) is listed.

Table 7-4. BLM and USFS Land Use Plan Status along Boardman to Hemingway Route

Administrative Unit	Applicable Plan Name	Plan Year
Idaho		
Owyhee Field Office	Owyhee RMP	1999
Oregon		
Vale District – Malheur-Jordan Resource Area – Baker Resource Area	 Southeastern Oregon RMP Baker RMP	 2002 1989
Wallowa-Whitman National Forest	Land and Resource Management Plan, Wallowa-Whitman National Forest	1990

8.0 PRELIMINARY ENVIRONMENTAL ASSESSMENT

This section describes IPC's proposed approach to data collection and a preliminary assessment of the impact of construction, operations, and maintenance of the Project transmission line along its proposed route.

8.1 Phased Study Approach

IPC proposes to collect necessary data to support the analysis of resource impacts in phases. This data collection approach will provide an appropriate level of detail for decision making while allowing the EFSC Site Certificate, NEPA, BLM ROW grant, and USFS SUP processes to proceed concurrently. The specific phasing of data described below takes into account the unique nature of a long high voltage transmission line, multiple regulatory processes, public interest and input in line routes and the inherent ability of transmission line components to be micro-sited in many cases to minimize or avoid impact. When the three phases are taken together, the data collected and analyzed meet NEPA requirements, typical BLM and USFS survey requirements, and the substantive requirements of EFSC regulations.

The phases of the study plan are:

- Phase 1, largely based on collection and utilization of existing data, will provide the basis for ODOE to deem the Application for Site Certificate (ASC) complete and issue the Draft Proposed Order, and for the BLM to issue a Draft EIS.
- Phase 2 will provide protocol level information about IPC's proposed route as described in the ASC and allow the BLM to issue a Final EIS; and
- Phase 3 will provide site specific data for resources along the approved route that could be affected at the time of construction as well as information on conditions that have changed due to route or project description changes.

Appendix A describes how data collection will be accomplished during each phase.

8.2 Environmental Assessment

The following environmental assessment is based on a preliminary analysis of the proposed route; a detailed assessment of potential impacts and their level of significance will be conducted as part of the NEPA analysis. Table 8-1 shows environmental resources crossed by the proposed route.

Air Quality: During construction, operation of gasoline and diesel fuel engines in land-clearing/grading equipment, cranes, bulldozers, and various types of trucks and cars could result in minor air quality impacts in the vicinity of project. Dust can be created directly from the activities involved in construction, such as vegetation removal, grading, and vehicles and equipment moving on unsurfaced roads. Impacts from vehicle operation and fugitive dust will be controlled by applying the appropriate control measures (e.g., watering unpaved roads, covering piles, etc.). The project will emit no pollutants during operation and does not require permits from the Oregon Department of Environmental Quality or Idaho Department of Environmental Quality. Maintenance activities will be infrequent, particularly in the early years of operation. Where maintenance is required, there will be operation of gasoline and diesel fuel engines in cranes, personnel hoists, or various types of trucks and cars. There could be a very minor amount of dust generated. The level of emissions during maintenance will be well below any need for permits, as for operations above.

Table 8-1. Environmental Resources Crossed by the Proposed Route

Resource Group	Resource Name	Miles
Cultural Resources	Intact Oregon Trail Segment (OR BLM)	0.5
	Within 1200 ft Historic Trail Buffer	8.3
Fish and Wildlife	Bighorn Sheep Habitat (Boise District, ID)	3.5
	IDFG Focal Area	10.8
	Field Survey 2011 Washington Ground Squirrel 785ft Buffer	1.1
	Field Survey 2011 Sage-grouse Lek 2-mile buffer: Occupied	2.9
	ODFW 2011 Sage-grouse Lek 2-mile buffer: Occupied	7.6
	ODFW 2011 Sage-grouse Lek 2-mile buffer: Unoccupied	13.0
	ODFW Big Game Deer Winter Range	121.4
	ODFW Big Game Elk Winter Range	83.8
	ODFW Conservation Opportunity Area	50.4
	ODFW wildlife linkage priority total rank - 0	1.1
	ODFW wildlife linkage priority total rank - 1	1.0
	ODFW wildlife linkage priority total rank - 3	1.0
	ODFW wildlife linkage priority total rank - 4	1.9
	ODFW wildlife linkage priority total rank - 5	10.6
	ODFW wildlife linkage priority total rank - 6	3.1
	ODFW wildlife linkage priority total rank - 7	5.3
	ODFW wildlife linkage priority total rank - 8	1.5
	ODFW wildlife linkage range - Whitetailed Jackrabbit	10.6
	ODFW wildlife linkage range buffers - Black Bear	5.4
	ODFW wildlife linkage range buffers - Elk	8.5
	ODFW wildlife linkage range buffers - Mule Deer	22.4
	ODFW wildlife linkage range buffers - Pronghorn Antelope	3.6
	ODFW wildlife linkage range buffers - White-tailed Jackrabbit	1.6
	Pronghorn Antelope Habitat (Boise District, ID)	23.8
	Sage-grouse Core Area High Density (Oregon)	50.6
	Sage-grouse Core Area Low Density (Oregon)	41.0
	USFS Elk Crucial Winter Range Habitat	18.9
	USFS Elk Migration Habitat	8.9
	USFS Elk Summer Range Habitat	40.7
	USFS Elk Winter Range Habitat	35.8
Geological Resources	Erosion Hazard: High (NRCS Soil Data)	60.1
	Erosion Hazard: Moderate (NRCS Soil Data)	82.2
	Erosion Hazard: Low (NRCS Soil Data)	63.1
	Idaho Landslide Susceptibility: Low	23.8
	Oregon Landslide Feature: Fan	4.7
	Oregon Landslide Feature: Landslide	2.6
	Oregon Landslide Feature: Talus-Colluvium	1.3
	Prime Farmland/Arable Land: Soils Class 1-4	153.5
	U.S. Geological Survey Active Mining Area	0.2

Table 8-1 Environmental Resources Crossed by the Proposed Route (continued)

Resource Group	Resource Name	Miles
Land Use	Exclusive Farm Use Zone/Multiple Use Range Zone	166.7
	Fire Management Unit (ID)	23.8
	Fire Management Unit (OR)	281.2
	Fire Management Zone (OR)	281.2
	Fire Management Zone (USFS)	5.5
	Forested Land: Private	17.2
	Forested Land: Public	4.9
	Grazing Allotment (ID)	22.1
	Grazing Allotment (OR)	121.7
	Military Training Route	63.9
	Oregon State Park	0.2
	Proposed Wilderness Study Area (ONDA)	2.4
	The Nature Conservancy: Portfolio	88.0
	USDA Cropland	51.7
	USFS Power Transportation Facility Retention	5.5
	USFS ROS Roaded Natural Modified	5.7
	Vale District Off-Highway Vehicle: Limited to Designated Routes	0.9
	Vale District Off-Highway Vehicle: Limited to Existing Routes	13.2
	Virtue Flat OHV Park	0.1
	Wildland Urban Interface (ID)	25.0
	Wildland Urban Interface (OR)	107.4
	Wind Farm Boundary (including Proposed)	9.0
	Within 500ft Turbine (including Proposed)	2.5
Linear Corridors	USFS Utility Corridor	5.5
	Vale District Utility Corridor	15.4
	West-wide Energy Corridor	13.9
Ownership	Bureau of Land Management	88.3
	Bureau of Reclamation	1.1
	Private Land	204.0
	State Land	5.8
	U.S. Forest Service	5.9
Visual Resources	BLM Visual Resource Management Class 2	7.3
	BLM Visual Resource Management Class 3	19.9
	BLM Visual Resource Management Class 4	63.4
	National Forest Visual Quality Objective: Modification	0.4
	National Forest Visual Quality Objective: Partial Retention	4.2
	National Forest Visual Quality Objective: Retention	1.1
	Viewshed Area (Baker County)	5.1
	Within 1200ft Nationally Designated Scenic Byway	3.7
Water and Wetlands	Floodplain: Area Not Mapped	43.2
	Floodplain: Not in Flood Zone	90.2
	Floodplain: Zone A	1.3
	National Wetland Inventory	0.0
	NHD Stream/River	0.1
	Oregon Watershed Restoration Inventory Project Area	2.7
	Oregon Wetland	1.5
	Oregon Wetland Soils	10.2
	Wild and Scenic River - Suitable	0.9

Table 8-1 Environmental Resources Crossed by the Proposed Route (continued)

Resource Group	Resource Name	Miles
Zoning	Oregon Statewide Zoning: Agriculture	172.0
	Oregon Statewide Zoning: Agriculture (Range)	70.3
	Oregon Statewide Zoning: Forest	39.0
	Oregon Statewide Zoning: Rural Industrial	0.0
	Morrow County: Exclusive Farm Use	45.5
	Union County: Agriculture Grazing A-2	5.3
	Union County: Exclusive Farm Use A-1	3.9
	Union County: Timber Grazing A-4	30.0
	Baker County: Exclusive Farm Use	74.6
	Baker County: Mining Extraction	0.4
	Owyhee County: Agricultural	23.8

Geology and Soils: IPC and its Contractors will perform field reconnaissance to evaluate any geological hazards that may cross the proposed route. Impacts to soils during construction could result from vegetation clearing and construction and would include erosion and compaction. IPC utilizes construction techniques and best management practices (BMPs) that avoid or minimize most erosion and will mitigate compaction where appropriate after construction. Soils impacts during operations and maintenance will be minimal.

Surface and Groundwater Quality: The proposed route will cross approximately 400 permanent, intermittent, and ephemeral waterbodies. Construction stormwater will be managed as required by National Pollutant Discharge Elimination System 1200-C permit issued by the Oregon Department of Environmental Quality and by EPA in Idaho. Transmission lines and associated substations will not discharge pollutants to surface water or groundwater during maintenance and operation.

Surface and Groundwater Availability: Major water uses are for preparation and installation of concrete transmission line structure and substation equipment foundations, and dust control during ROW, staging, fly yard, access road, and substation grading and site work. As the preliminary design advances, the total amount of water needed will be identified. The required water will be procured from municipal sources and/or from landowners. No new water rights will be required but if needed, limited licenses will be procured from the Oregon Water Resources Division and Idaho Department of Water Resources. During maintenance and operations, the Project will not require any new use of surface or groundwater.

Wildlife and Wildlife Habitat: The proposed route will cross 205.2 miles of big game winter range in Oregon, 23.8 miles of pronghorn antelope habitat, and 3.5 miles of bighorn sheep habitat in Idaho. Wildlife could be affected primarily during the construction phases but may also be affected during maintenance activities. IPC utilizes construction techniques and BMPs that avoid, minimize, and mitigate potential wildlife impacts.

Terrestrial Habitat – Wildlife and habitat impacts potentially resulting from constructing the Project and associated facilities (e.g., access roads and substations) are related to habitat disturbance, introduction of invasive species, injury or mortality, erosion, dust, noise, contaminant exposure, and interference with behavior. Potential impacts resulting from operations and maintenance include electrocution and exposure to electromagnetic fields, noise, collisions, maintenance activities (including herbicide use), contaminants (including oil spills), disturbance (including habitat disturbance and interference with animal behavior), and fire effects (e.g., an indirect effect of the project could be an increase in the potential for fires). Specific mitigation measures will be developed to avoid or minimize potential impacts to wildlife species from the Project.

Riparian and Aquatic Habitat – Potential impacts could include changes in water surface flow patterns, deposition of sediment in surface water bodies, changes in water quality or temperature regimes, loss of riparian vegetation, introduction of toxic materials, and changes in human access to water bodies. During maintenance of the ROW, aquatic systems could be adversely affected by maintenance activities, including vegetation management.

Threatened and Endangered and Plant and Animal Species: There are 12 federal wildlife, fish, and plant threatened, endangered, or candidate species and a variety of special status species that may occur in the vicinity of the proposed route. These species are listed in Table 8-2 and Table 8-3. Siting of the proposed ROW avoids, to the extent practicable, known critical habitat. Potential habitat and the location of threatened, endangered, and special status species will be identified through site-specific field surveys. Micrositing and adoption of BMPs will avoid or reduce the potential for significant impacts.

Historic, Cultural, and Archaeological Resources: Human use of the Project area extends over 12,000 years. Of special interest in the Project area are the NHTs, including the Oregon NHT. The proposed route will be within a 1,200-foot buffer of historic trails for 8.3 miles and cross 0.5 mile of intact trail buffer. For trails, both the physical integrity and the integrity of the setting are important. A survey of historic, cultural, and archaeological resources will be conducted in accordance with a Programmatic Agreement agreed to among the responsible agencies, IPC, and others, prior to construction. Based on the results of these surveys, the Project could be realigned or mitigation proposed to reduce impact.

Scenic and Aesthetic Areas: The Project will cross some mountainous areas and extensive rangeland with panoramic views. The Project will also cross areas managed for scenic qualities including 7.3 miles of BLM Visual Resource Management Class II, 1.1 miles of USFS Retention, and 4.2 miles of Partial Retention. The transmission line has the potential to impact visual resources. The ongoing siting and routing for this Project have included efforts to minimize impact on scenic and aesthetic resources.

Designated Uses: The Project will be near or cross several designated uses such as the Boardman Bombing Range, National Historic Oregon Trail Interpretive Center, and the ACEC associated with the Owyhee River. The proposed route avoids protected areas as identified by EFSC. Potential visual effects or physical effects on designated uses have for the most part been avoided. Micrositing will be used to further reduce impacts.

Land Use including Agriculture: Approximately 204 miles of the 305-mile route is proposed to be on private land, with the balance mostly BLM-managed. The Project will follow 34.8 miles of designated utility corridor, which partially overlaps 101 miles of existing transmission line that is paralleled. The predominant land covers crossed by the proposed route are agriculture and forest. Of these, 51.7 miles is cropland/irrigated farmland. The proposed route crosses 166.2 miles of Exclusive Farm Use Zone/Multiple Use Range Zone, which could not be avoided. Corridor siting and micrositing during the design phase will minimize impacts to these land use zones and uses.

Table 8-2. Special Status Fish and Wildlife Species with the Potential to Occur in the Vicinity of the Project

Species	USFWS[1]	BLM Boise District[2]	BLM Oregon District[2]	USFS R6 [3]	ODFW[4]	Potential Habitat within Route	Potential Field Survey Requirement
MAMMALS							
Gray Wolf (*Canis lupus*)	E Delisted 4/2/2009 in Idaho and Eastern Oregon. This decision re-confirmed on 5/5/2011.	FRFO	VALE (E in OR)	UMA(E); WAW(E)	LE	Y	N
Canada Lynx (*Lynx canadensis*)	T	FRFO;	VALE; PRIN	UMA; WAW (MIS)		N	N
Washington Ground Squirrel (*Spermophilus washingtoni*)	C				LE	Y	Y
Pygmy Rabbit *(Brachylagus idahoensis)*		FRFO	VALE; PRIN		SV	Y	Y
White-tailed Jack Rabbit (*Lepus townsendii*)					SU	Y	N
Wolverine (*Gulo gulo*)	C	FRFO (North American sub-species)	PRIN	UMA; WAW (MIS) (California subsp)	LT	Y	N
Fisher (*Martes pennanti*)		FRFO	PRIN	WAW	SC	Y	N
American Marten (*Martes martes*)				UMA (MIS); WAW (MIS)	SV	Y	N
Kit Fox *(Vulpes velox)*			VALE			N	N
Rocky Mountain Elk (*Cervus canadensis*)				WAW (MIS)		Y	N
Fringed Myotis (*Myotis thysanodes*)		FRFO	VALE; PRIN		SV	Y	N
Spotted Bat *(Euderma aculatum)*		FRFO	VALE; PRIN		SC	Y	N
Townsend's Big-eared Bat (*Corynorhinus townsendii*)		FRFO	VALE; PRIN	UMA	SC	Y	N
Pallid Bat (*Antrozous pallidus*)			PRIN		SV	Y	N

Table 8-2. Special Status Fish and Wildlife Species with the Potential to Occur in the Vicinity of the Project (continued)

Species	USFWS[1]	BLM Boise District[2]	BLM Oregon District[2]	USFS R6[3]	ODFW[4]	Potential Habitat within Route	Potential Field Survey Requirement
AVIAN							
Bald Eagle *(Haliaeetus leucocephalus)*	Delisted 8/8/2007	FRFO	VALE	UMA; WAW (MIS)	LT	Y	N
Yellow-billed Cuckoo *(Coccyzus americanus)*	C	FRFO	VALE		SC	N	N
Flammulated Owl (*Otus flammeoulus*)		FRFO			SC	Y	N
Great Gray Owl (*Strix nebulosa*)					SV	Y	N
Burrowing Owl (*Athene cunicularia*)					SC	Y	Y
Greater Sage-grouse *(Centrocercus urophasianus)*	C	FRFO	VALE	WAW	SV	Y	Y
Columbian Sharp-tailed Grouse *(Tympanuchus phasianellus columbianus)*		FRFO	VALE	WAW		Y	Y
Mountain Quail *(Oreotyx pictus)*		FRFO				Y	N
Peregrine Falcon *(Falco peregrinus anatum)*		FRFO	VALE	UMA; WAW (MIS)	LE	Y	N
Prairie Falcon *(Falco mexicanus)*		FRFO				Y	N
Northern Goshawk *(Accipiter gentilis)*		FRFO		WAW (MIS)	SC	Y	Y
Ferruginous Hawk *(Buteo regalis)*		FRFO			SC	Y	Y
Swainson's hawk (*Buteo swainsoni*)					SV	Y	Y
Common nighthawk (*Chordeiles minor*)					SC	Y	N
Three-toed Woodpecker *(Picoides tridactylus)*				UMA; WAW (MIS)	SC	Y	Y
Lewis' Woodpecker *(Melanerpes lewis)*		FRFO	VALE	UMA (MIS); WAW (MIS)	SV	Y	N
White-headed Woodpecker *(Picoides albolarvatus)*		FRFO	VALE	UMA (MIS); WAW (MIS)	SC	Y	N

Table 8-2. Special Status Fish and Wildlife Species with the Potential to Occur in the Vicinity of the Project (continued)

Species	USFWS[1]	BLM Boise District[2]	BLM Oregon District[2]	USFS R6[3]	ODFW[4]	Potential Habitat within Route	Potential Field Survey Requirement
Williamson's Sapsucker (*Sphyrapicus throideus*)		FRFO		UMA (MIS); WAW (MIS)		Y	N
Pileated Woodpecker (*Dryocopus pileatus*)				UMA (MIS); WAW (MIS)		Y	N
Yellow-bellied Sapsucker (*Sphyrapicus varius*)				UMA (MIS); WAW (MIS)		Y	N
Black-backed Woodpecker (*Picoides arcticus*)				UMA (MIS); WAW (MIS)	SC	Y	N
Hairy Woodpecker (*Picoides villosus*)				UMA (MIS); WAW (MIS)		Y	N
Northern Flicker (*Colaptes auratus*)				UMA (MIS); WAW (MIS)		Y	N
Downy Woodpecker (*Picoides pubescens*)				UMA (MIS); WAW (MIS)		Y	N
Mountain Chickadee (*Poecile gambeli*)				UMA (MIS); WAW (MIS)		Y	N
Black-capped Chickadee (*Poecile atricapilla*)				UMA (MIS); WAW (MIS)		Y	N
White-breasted Nuthatch (*Sitta carolinensis*)				UMA (MIS); WAW (MIS)		Y	N
Red-breasted Nuthatch (*Sitta canadensis*)				UMA (MIS); WAW (MIS)		Y	N
Pygmy Nuthatch (*Sitta pygmaea*)				UMA (MIS); WAW (MIS)		Y	N
American White Pelican (*Pelecanus erythrorhynchos*)		FRFO	VALE			N	N
Trumpeter Swan (*Cygnus buccinator*)			VALE			N	N
Horned Grebe (*Podiceps auritus*)			VALE			N	N
Calliope Hummingbird (*Stellula calliope*)		FRFO				Y	N
Willow Flycatcher *(Empidonax trailii)*		FRFO				Y	N
Hammond's Flycatcher *(Empidonax hammondii)*		FRFO				Y	N

Table 8-2. Special Status Fish and Wildlife Species with the Potential to Occur in the Vicinity of the Project (continued)

Species	USFWS[1]	BLM Boise District[2]	BLM Oregon District[2]	USFS R6[3]	ODFW[4]	Potential Habitat within Route	Potential Field Survey Requirement
Olive-sided Flycatcher (*Contopus borealis*)		FRFO			SV	Y	N
Loggerhead Shrike *(Lanius ludovicianus)*		FRFO			SV	Y	N
Sage Sparrow *(Amphispiza belli)*		FRFO			SC	Y	N
Black-throated Sparrow *(Amphispiza bilineata)*		FRFO			SP	Y	N
Grasshopper Sparrow (*Ammodramus savannarum*)			VALE		SV/SP	Y	N
Yellow Breasted Chat (*Icteria virens*)						N	N
Bobolink (*Dolichonyx oryzivorus*)			VALE		SV	N	N
Tricolored blackbird (*Agelaius tricolor*)					SP	Y	N
Western Bluebird (*Sialia Mexicana*)					SV	Y	N
Frankllin's Gull (*Larus pipixcan*)			VALE			N	N
Upland Sandpiper (*Bartramia longicaula*)		FRFO		UMA; WAW	SC	Y	N
Long-billed Curlew (*Numenius americanus*)					SV	Y	N
Bufflehead (*Bucephala albeola*)				WAW		N	N
REPTILES AND AMPHIBIANS							
Columbia Spotted Frog *(Rana luteiventris)*	C		VALE	UMA; WAW		Y	N
Oregon Spotted Frog (*Rana pretiosa*)					SC	N	N
Northern Leopard Frog *(Rana pipiens)*		FRFO	VALE	UMA		Y	N
Western Toad *(Bufo boreas)* Northern Rocky Mountain Population		FRFO			SV	Y	N

Table 8-2. Special Status Fish and Wildlife Species with the Potential to Occur in the Vicinity of the Project (continued)

Species	USFWS[1]	BLM Boise District[2]	BLM Oregon District[2]	USFS R6[3]	ODFW[4]	Potential Habitat within Route	Potential Field Survey Requirement
Woodhouse Toad *(Bufo woodhousii)*		FRFO	VALE		SP	Y	N
Inland Tailed Frog (*Ascaphus montanus*)			VALE	UMA; WAW	SV	Y	N
Mojave Black-collared Lizard *(Crotaphytus bicinctores)*		FRFO				N	N
Longnose Snake *(Rhinocheilus lecontei)*		FRFO				Y	N
Western Ground Snake *(Sonora semiannulata)*		FRFO				Y	N
Common Garter Snake *(Thamnophis sirtalis)*		FRFO				Y	N
Sagebrush Lizard (*Sceloporus graciosus*)					SV	Y	N
Painted Turtle (*Chrtsemys picta*)			VALE	UMA	SC	N	N
FISH							
Bull Trout (*Salvelinus confluentus*)	T, CH	FRFO	VALE	UMA; WAW	SC	Y	N
Inland Redband Trout (*Oncorhynchus mykiss gibbsi)*		FRFO	VALE	UMA; WAW	SV	Y	N
Oregon Great Basin Redband Trout (*Oncorhynchus myskiss*)					SV	Y	N
Middle Columbia River Steelhead (*Oncorhynchus mykiss* ssp.)	T			UMA; WAW	SV	N (downstream influence)	N
Snake River Basin steelhead (*Oncorhynchus mykiss* ssp.)	T			UMA; WAW	SV	Y	N
Snake River Chinook (Spring/Summer/Fall Runs) (*Oncorhynchus tshwatscha* ssp.)	T		VALE	UMA; WAW	LT	Y	N

Table 8-2. Special Status Fish and Wildlife Species with the Potential to Occur in the Vicinity of the Project (continued)

Species	USFWS[1]	BLM Boise District[2]	BLM Oregon District[2]	USFS R6[3]	ODFW[4]	Potential Habitat within Route	Potential Field Survey Requirement
Snake River Sockeye Salmon *(Oncorhynchus nerka)*	E		VALE	WAW		Y	N
Westslope Cutthroat Trout (*Oncorhynchus mykiss* ssp.)				UMA; WAW	SV	Y	N
Malheur Mottled Sculpin (*Cottus bendirei*)					SC	N	N
Margined Sculpin (*Cottus marginatus*)					SV	N	N
Pacific Lamprey (*Lampetra tridentata*)					SV	Y	N
INVERTEBRATES							
None							

[1] Federally Listed Species: E = Endangered; T = Threatened; C = Candidate; XN = Experimental Non-essential Population; CH = Critical Habitat.
[2] BLM Sensitive Species: FOU = Four Rivers Field Office; VALE = Vale Oregon.
[3] Region 6 USFS Sensitive Species: UMA = Umatilla National Forest; WAW =Wallowa-Whitman National Forest; MIS = Management Indicator Species.
[4] Oregon Department of Fish and Wildlife: LE = Listed Endangered; LT = Listed Threatened; SC = Critical Sensitive Species; SV = Vulnerable Sensitive Species; SP = Peripheral Species

Table 8-3. Special Status Plant Species with the Potential to Occur in the Vicinity of the Project

Species	USFWS[1]	BLM Idaho FO[2]	BLM Oregon FO[2]	USFS R6[3]	Potential Habitat within Route	Potential Field Survey Requirement
VASCULAR PLANTS						
Howell's Spectacular Thelypody (*Thelypodium howellii* ssp. *spectabilis*)	T		VALE		Y	Y
Spalding's Catchfly (*Silene spaldingii*)	T		VALE	UMA; WAW	N	N
Slickspot Peppergrass (*Lepidium papilliferum*)	–	FOU	VALE		Yes	Yes
Macfarlane's Four O'Clock (*Mirabilis macfarlanei*)	T		VALE	WAW	N	N

[1] Federally Listed Species: E = Endangered; T = Threatened; C = Candidate; XN = Experimental Non-essential Population; CH = Critical Habitat.
[2] BLM Sensitive Species: FOU = Four Rivers Field Office;; VALE = Vale Oregon.
[3] Region 6 USFS Sensitive Species: UMA = Umatilla National Forest; WAW =Wallowa-Whitman National Forest; MIS = Management Indicator Species.

Solid Waste Management: Substation and ROW construction will generate a variety of solid wastes, including concrete, hardware, and wood debris. Components will be trucked to the Project during construction and operations. Excess materials generated during construction will be spread on-site (mostly excess material from foundation excavations) or be hauled off-site to be disposed of in accordance with applicable state or federal laws and regulations.

Socioeconomics: Projected economic benefits to the counties that will be crossed by the Project include spending on local goods and services, direct monthly employment, additional indirect employment, Project-related expenditures on materials and supplies, and generation of additional property tax payments.

Demands on local economies will include:

Housing: The Project is not anticipated to have an adverse impact or create a major demand for housing. Many of the workers will come from outside of the project area and will require temporary housing over a 2-year construction period. Construction workers hired from outside the area will require motels or other rental units. The proposed and alternate corridors generally follow or are near the I-84 corridor, which contains sufficient temporary housing supplies. In addition, construction of the transmission line will proceed in a linear manner with construction dispersed over many miles. The transient workers will benefit the local communities by renting housing for the construction duration.

Traffic Safety: The construction of the transmission line will result in a temporary increase in local traffic, including large trucks and construction equipment. A traffic management plan will be developed to minimize impacts.

Police and Fire Protection: Project plans developed as part of preparing the ASC will provide a framework for construction phase management of personnel, rules of behavior, identification of local police and fire protection resources, and emergency response procedures to be used or followed throughout the six counties crossed.

Health Care: The proposed and alternative corridors follow the I-84 corridor, which contains sufficient health care facilities to support the Project. The size of the construction workforce is not expected to make significant demands on health care resources. The construction phase of the Project will be covered by a comprehensive health and safety plan.

Schools: The vast majority of construction phase workers typically do not relocate family to the job location. The number of operations phase personnel will be minimal. Impacts to school systems will be minimal for either phase.

9.0 RESOURCE REPORTS AND ENVIRONMENTAL PROTECTION PLANS / ENVIRONMENTAL PROTECTION MEASURES

9.1 Resource Reports

IPC will prepare 13 resource reports based on the work plans completed in the earlier phase of the Project. The reports will include a description of the affected environment including analysis area, regulatory framework, and analysis methods; effects common to all alternatives; and disturbance calculations. These reports are as follows:

- Resource Report 1 – Visual Resources
- Resource Report 2 – Cultural Resources
- Resource Report 3 – Socioeconomics
- Resource Report 4 – Vegetation
- Resource Report 5 – Wildlife
- Resource Report 6 – Water and Fishery
- Resource Report 7 – Wetlands and Waters of the United States
- Resource Report 8 – Geologic Hazards/Soils/Minerals/Paleontology
- Resource Report 9 – Land Use, Recreation, and Agricultural
- Resource Report 10 – Transportation
- Resource Report 11 – Air Quality
- Resource Report 12 – Noise
- Resource Report 13 – Electrical Environment

9.2 Environmental Protection Plans and Measures

This section describes the framework plans included as appendices to this POD that IPC will use to ensure environmental protection during construction, operations, and maintenance. Each plan will include environmental protection measures (EPMs). These measures have been developed by IPC to maintain environmental quality and meet requirements of various agencies. For the purposes of initial review the measures are included in Appendix E. Once finalized, they will be incorporated into the individual plans. IPC will be responsible to ensure their contractors and employees will implement these measures. Table 9-1 describes the framework plans.

Table 9-1. Environmental Protection Plan Description and Status

Framework Plan	Preliminary Plan or Environmental Protection Measures	Final Plan
The **Framework Blasting Plan** will include types of explosives as well as storage and security, and general use of explosives including the procedures and safety measures for blasting activities.	Included in POD as Appendix F. Environmental Protection Measures included in Appendix E.	Construction POD and COM Plan

Table 9-1. Environmental Protection Plan Description and Status (continued)

Framework Plan	Preliminary Plan or Environmental Protection Measures	Final Plan
The **Framework Reclamation Plan** will include site-specific construction mitigation, reclamation, and revegetation measures for each land management area crossed by the ROW within BLM-managed and National Forest lands. It will combine IPC's BMPs with site-specific mitigation developed in consultation with agencies. Some measures will apply Project-wide, while others will be designed for specific areas.	Included in POD as Appendix G. Environmental Protection Measures included in Appendix E.	Construction POD and COM Plan
The **Framework Plant and Wildlife Conservation Measures Plan** will present the measures proposed by IPC for avoidance and minimization of impacts to special status plant and wildlife species as related to construction activities for the Project and outlines specific conservation measures to be implemented in the event that state or Federally listed species, BLM sensitive species, or USFS special status species or their habitats are identified within or adjacent to the Project right-of-way.	Included in POD as Appendix H. Environmental Protection Measures included in Appendix E.	Construction POD and COM Plan
The **Framework Agricultural Protection Plan** will include measures intended to mitigate or provide compensation for agricultural impacts that may occur due to construction of the Project. The measures will be intended to be implemented on partially or wholly owned private agricultural land unless directed otherwise by the landowner. Agricultural land will be defined to include that which is annually cultivated or rotated cropland; land in perennial field crops, orchards, or vineyards; land used for small fruit, nursery crops, greenhouses, or Christmas trees; improved pasture; hayfields; and land in the Conservation Reserve Program.	Included in POD as Appendix I. Environmental Protection Measures included in Appendix E.	Construction POD and COM Plan
The **Framework Fire Prevention and Suppression Plan** will include measures to be taken by IPC and its contractors to ensure that fire prevention and suppression measures are carried out in accordance with federal, state, and local regulations. The plan will address the specific requirements of the USFS and BLM handbooks and provide BMPs for fire management on privately owned lands. Measures will be identified in this plan that apply to work within the Project area defined as the ROW, access roads, all work and storage areas (whether temporary or permanent), and other areas used during construction and operation of the Project.	Included in POD as Appendix J. Environmental Protection Measures included in Appendix E.	Construction POD and COM Plan
The **Framework Operations, Maintenance, and Emergency Response Plan** will include measures to be employed while conducting routine, corrective, and emergency operations and maintenance activities. Measures identified will be in compliance with applicable state and federal laws and policies; ensure consistency across and within federal jurisdictions; and allow for IPC to access the transmission line and ancillary facilities in a timely, cost effective, and safe manner. At the end of the useful life of the Project, if the facility is no longer required, the transmission line will be removed from service. Prior to removal, a decommissioning and restoration plan covering planned activities will be prepared for review and approval.	Included in POD as Appendix K. Environmental Protection Measures included in Appendix E.	Construction POD and COM Plan

Table 9-1. Environmental Protection Plan Description and Status (continued)

Framework Plan	Preliminary Plan or Environmental Protection Measures	Final Plan
The **Framework Traffic and Transportation Management Plan** will include measures that require compliance with federal policies and standards relative to planning, siting, improvement, maintenance, and operation of roads for the Project.	Included in POD as Appendix L. Environmental Protection Measures included in Appendix E.	Construction POD and COM Plan
The **Framework Stormwater Pollution Prevention Plan** will include measures for temporary and permanent erosion and sediment control that will be used during construction, operation, and maintenance of the transmission line and ancillary facilities.	Included in POD as Appendix M Environmental Protection Measures included in Appendix E.	Construction POD and COM Plan
The **Framework Spill Prevention, Containment, and Countermeasures Plan** will include measures for spill prevention practices, requirements for refueling and equipment operation near waterbodies, procedures for emergency response and incident reporting, and training requirements.	Included in POD as Appendix N. Environmental Protection Measures included in Appendix E.	Construction POD and COM Plan
The **Cultural Resources Protection and Management Measures will** include the procedures undertaken to inventory, evaluate, and protect cultural resources. It describes the treatment of any eligible or listed resource that cannot be avoided, and procedures for handling inadvertent discoveries during construction, operation, and maintenance.	Environmental Protection Measures included in Appendix E. Final measures will be based on the Programmatic Agreement and the Historic Properties Treatment Plan.	Construction POD and COM Plan
The **Aesthetic Resource Protection Plan** will include measures for minimizing visual impacts.	Plan to be prepared following field surveys	Construction POD and COM Plan
The **Biological Resources Habitat Protection and Monitoring Plan** includes specific conservation measures to be implemented in the event state or federally listed species, BLM sensitive species, or USFS sensitive species are identified along the Project route during surveys. Measures identified in the plan will be specific to the protection of these species and take priority over measures identified in other plans.	Plan to be prepared following field surveys and development of compensation plan	Construction POD and COM Plan
The **Waters and Wetlands Protection Plan** includes measures to protect wetlands and other waters (streams, ponds, lakes, etc.) within the Project boundaries and meet U.S. Army Corps of Engineers and Oregon Department of State Lands requirements for compensatory mitigation.	Plan to be prepared following field surveys and development of compensation plan	Construction POD and COM Plan

10.0 REFERENCES

BLM (Bureau of Land Management). 1989. Baker Resource Management Plan Record of Decision. Rangeland Program Summary (RPS). Vale District Office and Baker Resource Area. July.

BLM. 1999. Owyhee Resource Management Plan. BLM Owyhee Field Office, U.S. Department of Interior.

BLM. 2002. Southeastern Oregon Resource Management Plan and Record of Decision. Vale Field Office. September. Available online at: http://www.blm.gov/or/districts/vale/plans/seormp.php

Columbia Grid. 2010. 2010 Update to 2009 Biennial Transmission Expansion Plan.

DOE (U.S. Department of Energy). 2006. National Electric Transmission Congestion Study. Available online at http://www.oe.energy.gov/DocumentsandMedia/Congestion_Study_2006-10.3.pdf

DOE (United States Department of Energy) and BLM. 2008. West-wide Energy Corridor Programmatic Environmental Impact Statement (Energy Corridor PEIS). Available online at http://corridoreis.anl.gov/index.cfm

FAA (U.S. Department of Transportation Federal Aviation Administration). 2007. Advisory Circular AC 70/7460-1k Obstruction Marking and Lighting.

FERC (Federal Energy Regulatory Commission). 2008. Order-890. Pro Forma Open Access Transmission Tariff.

IPC (Idaho Power Company). 2006. Treasure Valley Electrical Plan.

IPC. 2008. Open Access Transmission Tariff. Available on Open Access Same Time Information System (OASIS) website at: http://www.oatioasis.com/IPCO/IPCOdocs/IPC_OATT_Vol_6_Issued_2007-12-14.pdf

IPC. 2009. Integrated Resource Plan Update. Available online at: http://www.idahopower.com/energycenter/irp/2009IRPFinal.htm

IEEE (Institute of Electrical and Electronics Engineers). 2007. National Electrical Safety Code. New York, NY.

NACE International. 2003. Grounding Systems. Houston, TX. Available online at: http://www.nace.org/content.cfm?parentid=1001&currentID=1001

NERC (North American Electricity Reliability Corporation). 2010. About NERC and Reliability Standards. Pamphlet. Available online at: http://www.nerc.com/files/About-NERC.pdf

NTTG (Northern Tier Transmission Group). 2007. Fast Track Study. Available online at: http://nttg.biz/site/index.php?option=com_frontpage&Itemid=1

NTTG. 2009. 2008-2009 Biennial Transmission Plan-Final Report. Available online at http://www.oatioasis.com/PGE/PGEdocs/NTTG_2008-09_Biennial_Transmission_Plan_Final_Report.APPROVED_12.08.pdf

ORS (Oregon Revised Statutes), Title 57 – Utility Regulation §§ 756-042. 2009. Available online at: http://landru.leg.state.or.us/ors/756.html

PacifiCorp. 2009. 2008 Integrated Resource Plan. Portland, Oregon. Available online at: http://www.pacificorp.com/es/irp.html

PGE (Portland General Electric). 2009. Integrated Resource Plan. Available online at: http://www.portlandgeneral.com/our_company/news_issues/current_issues/energy_strategy/docs/2009_irp.pdf

USFS (U.S. Forest Service). 1990. Wallowa-Whitman National Forest Land and Resource Management Plan. Available online at: http://www.fs.fed.us/r6/uma/blue_mtn_planrevision/documents.shtml

WECC (Western Electricity Coordinating Council). 1996. Disturbances Report for the Power System Outages that occurred on the Western Interconnection. Available online at: http://www.nerc.com/docs/docs/pubs/AUG10FIN.pdf

WECC. 2008. TPL–(001 through 004)–WECC–1–CR–System Performance Criteria. Available online at: http://www.wecc.biz/Standards/WECC%20Criteria/TPL%20–%20(001%20thru%20004)%20–%20WECC%20–%201%20–%20CR%20-%20System%20Performance%20Criteria.pdf

WECC. 2010. Western Electricity Coordinating Council Website. Accessed May 18, 2010. Available at http://www.wecc.biz/About/Pages/default.aspx