

5.0 CONCLUSIONS AND RECOMENDATIONS

5.1 SUMMARY OF THE STAFF'S ENVIRONMENTAL ANALYSIS

The conclusions presented are those of the environmental staff of the FERC working in cooperation with the Coast Guard, EPA, COE, BLM, BOR, USFS, DOT, and Douglas County. The Coast Guard LOR will address the suitability of the Coos Bay navigation channel for LNG marine traffic, and the Coast Guard's LNG Operations Plan will address issues related to the public impact of safety and security zones for LNG vessels. Likewise, the COE will present its own conclusions and recommendations in the dredging, dredged material placement, and wetland permits it may issue pursuant to section 10 of the RHA and section 404 of the CWA. The EPA has the authority to review and veto the COE decisions on the section 404 permit. The BLM, BOR, and USFS are federal agencies that administer lands that would be crossed by portions of the Pacific Connector pipeline, and the BLM has authority under the MLA to grant the right-of-way across all federal lands with the concurrence of the surface managing agencies. All actions on the federal lands, including those proposed under the application for a Right-of-Way Grant, must comply with the respective LRMPs or Forest Plans of the affected BLM districts and USFS National Forest crossed. In implementing the NEPA process to assess the proposed action on federal lands, this EIS is tiered by reference to these management plans, as amended by the Northwest Forest Plan

We (the Commission's staff) have determined that construction and operation of the JCE & PCGP Project would result in limited adverse environmental impacts. We developed measures that would appropriately and reasonably avoid, minimize, or mitigate environmental impacts resulting from construction and operation of the proposed Project. If the proposed Project is found to be in the public interest and is constructed and operated in accordance with recommended mitigation measures, it would be an environmentally acceptable action. Our conclusions are based on information provided by Jordan Cove and Pacific Connector; analyses and field investigations by Commission staff; review of comments from federal, state, and local agencies; and input from public groups and individual citizens. We recommend that our mitigation measures be attached as conditions to any authorization issued by the Commission.

If the Coast Guard issues an LOR finding the waterway suitable for LNG marine traffic, the arrival, transit, cargo transfer, and departure of LNG carriers would be required to adhere to the procedures of an LNG Vessel Transit Management Plan required by the Coast Guard Sector Portland. In addition, Jordan Cove would develop Operations and Emergency Manuals in consultation with the Coast Guard. These procedures would be developed to ensure the safety and security of all operations associated with LNG marine transits and unloading.

If an accidental or intentional breach of an LNG carrier resulting in a release of LNG were to occur during transit of the waterway, impacts on the various environmental resources within the Zones of Concern could result. LNG would not contaminate water, because it is not soluble, it floats, and the LNG would vaporize shortly after being spilled. The primary hazard from an LNG spill would be a pool fire if the vapors are ignited. A pool fire could have adverse effects on vegetation, wildlife, structures, and people. In general, the area of effect of an LNG release and any resulting fire would be fairly limited in area and short-lived. The severity and duration of the impacts would vary depending on the resource and its distance from the source, as

resources in Zone 1 would be more severely impacted than resources in Zone 3. However, with implementation of the mitigation measures described in the Coast Guard's WSR, a release would be highly unlikely and the potential impact on resources would be less than significant.

5.1.1 Geology

The geology of the Pacific Northwest is dominated by the CSZ. The Jordan Cove LNG facilities would be located at the eastern edge of the CSZ, on a site mantled by thick (over 100 feet) dune sheets. The Pacific Connector pipeline would cross the Coast Range, Klamath Mountains, Western and High Cascades, and Basin and Range physiographic regions and would pass through varying soil and lithologic units ranging from soft sediments to hard granite.

No faults are reported at the LNG terminal site, and the Coos Bay area is located in a region with historically moderate to low seismic activity within the active CSZ. The risk of lateral spreading is low at the terminal site. Jordan Cove would densify the upper 15 feet of fill, and conduct additional studies of the potential for liquefaction-induced settlement from the deeper isolated layers between 25 and 45 feet. Jordan Cove believes that subsidence from a megathrust earthquake would not damage its proposed facilities. However, a tsunami generated by a megathrust earthquake on the CSZ would present the greatest tsunami inundation risk at the site. Jordan Cove has proposed construction of a protective barrier with a minimum crest elevation of + 45 feet. It would also provide a protective covering for the barrier that satisfies the recommendations of DOGAMI for such barriers. We are recommending site-specific tsunami analysis be provided prior to the final EIS that would ensure that final site improvement designs would satisfy both the FERC Seismic Guidelines and the 2007 Oregon Structural Safety Specialty Code. We are also recommending that Jordan Cove retain a Board of Consultants to review the final LNG terminal design and perform construction and quality inspections.

Pacific Connector selected the proposed pipeline route through an iterative process to avoid areas with high risk of geological hazards. During construction, Pacific Connector would implement site-specific construction techniques and BMPs to mitigate local geological hazards that could not be completely avoided.

Where the pipeline would be in the Klamath Falls area it would be in an area that has experienced numerous earthquakes. Empirical reviews of historical earthquakes demonstrate that welded steel pipelines are not prone to failure due to earthquakes. The pipeline would cross two moderate-risk rapidly moving landslide sites (MPs 18.14 to 18.20 on private land, and MP 36.92 on BLM land). Implementation of Pacific Connector's ECRP would minimize or avoid the potential for construction to adversely affect slope stability. Previously unidentified landslides or new landslides could affect the pipeline after installation. Pacific Connector would conduct monitoring of potential landslide areas to prevent damage to the pipeline. If movement were detected, immediate action would be taken to reduce the risk to the pipeline to minimize the potential impacts.

We are recommending that Pacific Connector characterize potential landslide hazards through other means in areas where LiDAR and aerial photograph coverage is not available. We also recommend that Pacific Connector conduct supplemental site-specific seismic hazard analyses that determine the potential liquefaction and lateral spreading hazards at locations currently listed as "unknown" in table 4.1.3.2-1, at locations where active fault crossings would be completed, and at locations characterized as having moderate to high landslide potential. In addition, we are

recommending that Pacific Connector prepare a Landslide Emergency Response Plan in coordination with affected agencies. The plan should address repair and mitigation, to the extent practicable, for damages sustained by off-site infrastructure and natural resources.

Fluvial erosion may represent a hazard to the proposed pipeline where streams have the potential to expose the pipe as a result of significant channel migration or scour of the streambed. Pacific Connector relocated most of the pipeline in high scour potential areas to avoid these hazards and has proposed design changes to mitigate remaining crossings. The pipeline project may cause minor scour in some locations. Impacts from erosion and scour in the Coos Bay are not anticipated.

Potential effects associated with blasting include temporary and localized impacts to wells and springs and to water quality in wetlands. Blasting could potentially redirect surface water and groundwater flows to and from wetlands. We believe that use of Pacific Connector's proposed monitoring and mitigation would avoid or reduce the likelihood of local failures of unstable rock and soil, and damage to structures or utilities from blasting vibrations.

Effects on Federal Lands

Construction and operation of the Jordan Cove LNG terminal would not affect geologic or mineral resources on federal lands. The potential exists for surface rupture from faulting near MP 174 of the Pacific Connector pipeline within the Fremont-Winema National Forest. Pacific Connector would follow published guidance and implement mitigation measures. The potential exists on federal lands along portions of the proposed pipeline route for seismically induced ground shaking to induce rockfalls, landslides, or soil slumps. A moderate-risk rapidly moving landslide site could not be avoided at MP 36.92 on BLM Coos District land. Pacific Connector would conduct regular monitoring of the pipeline right-of-way across rugged terrain within BLM and NFS lands, including in this area, for previously unidentified landslides or new landslides.

The pipeline would cross Middle Creek, which has a moderate risk for scour, at MP 27.04 on BLM lands. Pacific Connector would design this crossing to withstand estimated potential scour that could occur during 50-year maximum scour events, which would adequately protect the pipeline at this crossing location.

5.1.2 Soils and Sediments

The proposed LNG marine traffic is not expected to have a significant impact on soils along the waterway or sediments within the waterway. The site of the proposed LNG terminal is dominated by sandy soils. Soils along the proposed pipeline route are variable. About 31 percent of the soils that would be crossed by the proposed pipeline are classified as prime farmland or farmland of statewide importance, about 4 percent are hydric soils, and 83 percent are soils prone to compaction.

About 51.3 acres are likely to become compacted during construction of on the LNG terminal facilities. Jordan Cove's Environmental Site Assessments identified existing areas of contaminated soil and sediments. With the design features and SPCC plan, the Jordan Cove Project is not anticipated to spread existing contamination or cause additional soil contamination.

Construction of the pipeline would not convert prime farmland to other uses, because it could still be used for agricultural purposes after the pipeline is installed and the right-of-way restored.

Several contaminated sites were identified within 0.25 mile of the proposed pipeline route. Long-term commitments of soil resources would occur at aboveground facilities where soils would be graded and graveled or where permanent facilities would be constructed. Six mainline valve sites, and one meter station would be located on prime farmland soils and would permanently remove the soils from potential for agricultural use. Increased wind erosion potential would be monitored but may occur. Long-term impacts to soils are not anticipated in the TARs but would occur in the PARs.

Potential impacts on soils would be minimized through measures specified in Jordan Cove's Plan and Procedures (for the LNG terminal) and Pacific Connector's ECRP (for the pipeline). These plans were based on the FERC staff's Plan and Procedures. Pacific Connector's ECRP was modified based on input from BLM and USFS, as well as revegetation recommendations from BLM, USFS, NRCS, and County Soil and Water Conservation Districts.

Construction of the LNG terminal would require the dredging of about 5.6 mcy of material for the slip and access channel. Dredged material from the slip and access channel would be stockpiled in the Jordan Cove Placement site, two locations on the former Weyerhaeuser Linerboard site, and at the Port site. The dredged material placed on the Port site would be stored temporarily until it is sold for commercial uses and removed by barge from the site, estimated to take up to seven years. No permanent facilities would be constructed at the Port's temporary stockpile site.

Jordan Cove proposes to use hydraulic cutterhead dredging to excavate the proposed access channel. Dredging activities would resuspend sediments and result in increases in TSS and turbidity. However, through proper operational controls and potentially the use of physical barriers, this source can be controlled. Based on modeling results it is anticipated that turbidity generation at the dredging site would not present a significant environmental concern to the aquatic species located in the vicinity of the proposed dredge prism.

Effects on Federal Lands

Construction and operation of the Jordan Cove LNG terminal would not affect federal lands. The proposed Pacific Connector Pipeline would cross the Umpqua, Rogue River-Siskiyou and Fremont-Winema National Forests; through the checkerboard landownership pattern of the BLM-administered lands within the Coos Bay, Roseburg, Medford, and Lakeview BLM Districts; and BOR-administered lands in the Klamath Valley.

Pacific Connector has incorporated USFS and BLM comments into a revised ECRP to avoid impacts to soils. The USFS and BLM have requested topsoil segregation where the Pacific Connector pipeline would cross forested lands under their management. Pacific Connector states that where the pipeline would traverse steep forested landscapes, it would be impractical and unreasonable to salvage topsoil based on topographic and vegetation conditions. With implementation of Pacific Connector's ECRP, impacts to soil productivity from the requested topsoiling variance would not be expected to contribute to cumulative impacts. However, to ensure resolution of the acceptability of the proposed topsoiling plan for forested lands, we recommend that Pacific Connector come to an agreement with the USFS and BLM regarding whether additional acreage should be restored to offset the topsoil segregation on USFS and BLM forested lands.

5.1.3 Water Resources and Wetlands

No surface or groundwater resources underlying and in the vicinity of the LNG terminal site would be used for either construction or operation of the slip or LNG terminal. All water would be supplied by the Coos Bay North Bend Water Board (CBNBWB). The nearest registered well maintained by the CBNBWB is located approximately 0.5 mile from the site.

While there are no groundwater wells that supply public drinking water systems within 400 feet of the proposed pipeline construction right-of-way or work space, there are 6 wellhead protection areas that would be crossed by the proposed pipeline. Pacific Connector identified 5 private wells within 200 feet of the proposed pipeline, but none of these are used for drinking water. Additionally, there are several types of groundwater wells in Oregon that are exempt from obtaining any kind of permit, and are therefore not registered or identified in a state database. Pacific Connector would attempt to identify any unregistered wells in the vicinity of its proposed pipeline through field investigations and contacts with landowners within and adjacent to the proposed pipeline right-of-way prior to construction.

Because pipeline construction activity is generally limited to surface disturbance and shallow trenching, is temporary, and is contained within the approved construction work areas, groundwater wells (both public and private) beyond 200 feet of the construction work areas are not expected to be adversely affected by the pipeline. Pacific Connector would conduct pre-construction surveys to confirm the presence and locations of groundwater wells (both public and private). Pacific Connector would follow the measures outlined in its ERCP and SPCC plan to avoid or minimize impacts on groundwater resources. Additionally, Pacific Connector developed a Groundwater Supply Monitoring and Mitigation Plan in order to identify monitoring and mitigation measures to prevent and/or minimize impacts to groundwater.

Several potentially contaminated groundwater sites have been identified near the proposed pipeline, however they are distant enough from the pipeline that it is not anticipated that contaminated groundwater would be encountered. However, because the potential exists for unanticipated discovery of contaminated soils or groundwater during construction, we are recommending that Pacific Connector should prepare a plan to address the unanticipated discovery of contaminated soils or groundwater during construction.

Dredging the slip and access channel would have limited temporary impacts on water quality in Coos Bay. Approximately 41 acres of the 72 acres required for construction of the slip and access channel would be excavated or dredged in isolation from the waters of Coos Bay resulting in no turbidity being released to the waters of Coos Bay. The remaining area to be dredged would result in temporary siltation and sedimentation impacts similar to those that currently occur during channel maintenance dredging activities. Because the duration of the dredging in the bay would be 4 to 6 months, the turbidity created would be relatively short term and localized.

No ballast water from LNG carriers would be discharged into Coos Bay during their transit to the terminal. However, once at dock each LNG carrier would take in water from Coos Bay for ballast and engine cooling during offloading operations. A typical 145,000-m³ capacity LNG carrier would require approximately 13.2 million gallons of ballast water, which also would support routine operational needs. Ballast water intake per ship would be approximately 1.5 percent of the total terminal slip volume. Jordan Cove has indicated that carriers at dock would

use approximately 2.5 to 4.6 million gallons for cooling (less than 1 percent of the slip volume), depending on carrier size.

Jordan Cove's estimate for cooling water use by LNG carriers is less than the volumes estimated by some other LNG projects, and since submittal of its application to the FERC, Jordan Cove has committed that LNG carriers serving the terminal would be cold-ironed (electrical power from shore would be utilized rather than ship board engines), which would reduce the volume of cooling water. Therefore, we are recommending that Jordan Cove provide additional information on cooling water intake needs before the final EIS.

Jordan Cove has developed an external screening system that complies with the NMFS fish screening criteria. Intake for ballast and cooling water would constitute a minor but recurring impact to the water resources of Coos Bay. LNG carrier operations and any resulting impacts on water quality would be comparable to typical shipping traffic.

During the operation of the LNG terminal, each SCV would produce approximately 20 gpm of water from the combustion process. With five vaporizers operating, approximately 100 gpm, or 144,000 gpd would be generated. This water would be slightly acidic and would be neutralized before being conveyed to the fire water pond where it would be used to recharge the pond and the overflow discharged to the industrial wastewater pipeline, which ultimately discharges to the ocean. Jordan Cove would apply for a new NPDES permit for this discharge.

Water used for hydrostatic testing of the LNG storage tanks would be potable water obtained from the existing CBNBWB line. Ultimately, 10 of the 28.25 million gallons used to hydrotest the LNG storage tanks would be retained in the fire water pond, effectively using that quantity of water a second time and reducing the amount of water required from the CBNBWB. The remaining 18.25 million gallons would be discharged into the industrial wastewater pipeline, which connects to a previously existing permitted ocean discharge point. All water would be sampled and tested for suitability prior to discharge. If treatment is found to be required, treatment procedures would be developed prior to discharge.

During construction of the LNG storage tanks and other LNG terminal facilities, disturbed soils would be exposed to potential erosion. To minimize the impacts of erosion and sedimentation on surface waters, land-disturbing and construction activities would be conducted in compliance with the NPDES permit (1200-C) for stormwater discharges during construction activities. Stormwater runoff from the disturbed portions of the site would be managed in accordance with a site-specific ECRP which incorporates stormwater pollution prevention. Jordan Cove and the Port would install all necessary erosion and sedimentation control structures in compliance with the ECRP. Following appropriate treatment, all construction stormwater from the proposed LNG terminal site would be directed towards the slip. Following construction of the LNG terminal facilities, approximately 16 acres of the site would consist of impervious surface area. The stormwater management system is designed and constructed to accommodate this increase in runoff volume and to direct any flow that does not come into contact with any equipment containing potential contaminants to the slip. During operations stormwater flows that could come into contact with equipment containing potential contaminants would be directed to a holding area in the fire water pond where they would be tested before being released to the fire water pond and ultimately discharged through the NPDES permitted discharge.

The Pacific Connector pipeline would cross or run adjacent to 379 waterbodies, of which 100 are perennial, 124 are intermittent, 141 are ditches, 8 are stock ponds, and 6 are estuaries (within Coos Bay and Cooston Channel). The proposed Pacific Connector pipeline would cross six subbasins including the Coos, Coquille, South Umpqua, Upper Rogue, Upper Klamath, and Lost River subbasins.

The proposed pipeline would cross two rivers listed on the Nationwide Rivers Inventory; the North Fork of the Coquille and the South Umpqua Rivers. Considering the crossing methods proposed, the timing (during seasonal low flows) and the measures contained in their SPCC and ECRP plans, impacts to these waterbodies should be temporary and of small magnitude. The Pacific Connector pipeline would cross 34 waterbodies that have been determined to be water quality limited according to the ODEQ Integrated Report.

The proposed pipeline route would cross or be adjacent to 11 public drinking water source areas. In some locations, the pipeline route is within a particular source area for several miles, but in other locations the route travels along ridgelines meandering in and out of source areas. Four public water systems that have surface water intakes within 3 miles downstream of waterbodies would be crossed by the proposed pipeline. Pacific Connector would provide written notification to the authorities of the surface water supply intakes at least one week before beginning in-water work or as otherwise specified by the appropriate authorities. We are recommending that Pacific Connector develop additional plans for coordination with surface water intakes within three miles downstream of pipeline crossings.

Construction of the pipeline and related surface facilities may result in minor, short-term impacts to waterbodies. These impacts could occur because of instream construction activities or construction on slopes and riparian areas adjacent to stream channels. Clearing and grading of streambanks, removal of riparian vegetation, instream trenching, trench dewatering, and backfilling could result in streambank modification; increased sedimentation; turbidity; increase in temperature, decreased dissolved oxygen concentrations; releases of chemical and nutrient pollutants from sediments; and introduction of chemical contaminants, such as fuel and lubricants. An increase in soil compaction and vegetation clearing could potentially increase runoff and subsequent streamflow or peak flows. To minimize potential adverse impacts along the construction right-of-way and at waterbody crossings, Pacific Connector would implement measures from its ECRP during the construction, restoration, and operation of the pipeline.

Construction activities at waterbody crossings would be conducted in accordance with all federal and state regulations and permit requirements. Depending on the overall construction schedule, pipeline construction at waterbody crossings would be conducted during low-flow periods whenever possible and within ODFW recommended in-water construction windows. Construction during low flows would minimize sedimentation and turbidity, minimize streambank and bed disturbances, and limit the time it takes to complete instream construction.

The wet open cut method would be used for construction of the pipeline within Coos Bay. The wet open cut method involves trench excavation, pipeline installation, and backfilling through a waterbody without controlling or creating a dry zone to work in. Construction of the pipeline across the Coos Bay estuary would span 6.90 miles and disturb approximately 243 acres. Turbidity impacts would be similar to those related to the dredging of the slip. Pacific Connector would comply with applicable permit conditions as well as the measures in its Procedures.

Pacific Connector proposes to use diverted open cut crossings for both of the South Umpqua River crossings because the river is too wide to utilize other dry crossing methods (flume or dam-and-pump), and other crossing methods (conventional boring or HDD) are not feasible due to topographic and subsurface constraints.

Pacific Connector proposes to use conventional bores to cross underneath Catching Slough and the Medford Aqueduct. A bore would involve excavation of pits on either side of the waterbody and boring horizontally underneath the waterbody. A successful bore would result in no direct impact to the waterbody. The use of conventional bore crossings would eliminate the need for in-water construction activities that could result in sedimentation and turbidity as well as impacts on waterbody banks and beds.

Pacific Connector proposes to use the HDD method for the crossing of the Coos River, the Rogue River, and the Klamath River. Pacific Connector has prepared an HDD Contingency Plan and Failure Procedure that describes the procedures that would be followed if an inadvertent release of drilling mud occurred during the HDD process and the methods that would be used to contain the drilling fluid. The use of HDD crossings would eliminate the need for in-water construction activities that could result in sedimentation and turbidity as well as impacts on waterbody banks and beds.

Pacific Connector would use standard dry open-cut crossing methods at the remaining crossings, including dam-and-pump and fluming. To minimize impacts on surface waters, Pacific Connector would implement its ECRP and SWPPP. With the implementation of the proposed measures and our recommendations, impacts on open-trenched waterbodies would be temporary, and suspended sediment and turbidity levels would return to preconstruction levels soon after the stream crossings are completed.

After backfilling, the pipeline would be hydrostatically tested in accordance with DOT regulations to ensure that the system is capable of operating at the maximum operating pressure. Pacific Connector estimates that approximately 59 million gallons of water would be required to test the pipeline. Water for hydrostatic testing would be obtained from commercial or municipal sources or from surface water right owners. If water for hydrostatic testing would be acquired from surface water sources, Pacific Connector would obtain all necessary appropriations and withdrawal permits prior to use. Pacific Connector does not anticipate that chemicals would be added to the hydrostatic test water. If chlorinated municipal water is used, the discharge of this water would be treated, if necessary, to minimize potential impacts to sensitive areas. When discharged, the test water would be released adjacent to the construction right-of-way through an energy dissipating device and a straw bale filter or sediment bag. Test water would not be discharged directly into surface waters. Where possible, test water would be released within the same basin from which it was withdrawn. However, cascading water from one test section to another to minimize water withdrawal requirements may make it impractical to release water within the same basin where the water was withdrawn in all cases.

Pacific Connector would apply for permission to discharge the hydrostatic test water concurrently with its request for coverage under the ODEQ General Stormwater Discharge Permit and permitted through a separate letter of approval. State withdrawal permits require review by the ODWR, ODEQ, and ODFW to ensure potential impacts from the withdrawal do not occur. All hydrostatic test water would be discharged to upland areas at a rate to prevent

scour, erosion, and sediment migration to sensitive resources such as wetlands and waterbodies as detailed in Pacific Connector's ECRP and all permit conditions would be implemented.

Construction and operation of the Jordan Cove LNG terminal facilities would not directly affect wetlands. During construction, Jordan Cove would implement erosion and sediment control measures from its Plan and Procedures which would prevent impact to wetlands not directly affected by facility construction. Construction and operation of the slip and access channel would result in the permanent loss of approximately 7.1 acres of shallow subtidal habitat including approximately 6.8 acres of submerged aquatic vegetation. The Port has proposed mitigation to offset the permanent impact to submerged aquatic vegetation (eelgrass) that would result from construction of the slip and access channel. To mitigate for loss of intertidal unvegetated sand-mud flats and algal flat, the Port proposes to restore and enhance approximately 30.7 acres of low and/or high marsh along a tidal flood bench adjacent to the Isthmus Slough, near river mile 6.0. To mitigate for the impact to eelgrass, the Port proposes to create 1.1 acres of new eelgrass habitat. The final mitigation plan would be determined through the Port's ongoing coordination with the COE and NMFS. We are recommending that Jordan Cove continue to consult with these agencies to develop a final mitigation plan.

The Pacific Connector pipeline would cross approximately 14.9 miles of wetlands within 554 wetland systems. The construction right-of-way and TEWAs would impact 405.5 acres of wetlands, including 237.9 acres of estuary wetlands, 111.5 acres of palustrine emergent wetlands, 47.6 acres of riverine wetlands, 3.8 acres of palustrine forested wetlands, 0.7 acre of palustrine scrub-shrub wetlands, and 3.2 acres of palustrine unconsolidated bottom wetlands. Construction and operation of the pipeline would result in the permanent filling of 0.14 acre of wetlands at one aboveground facility. Following construction, vegetation maintenance within the permanent operational right-of-way for the pipeline would convert forested or scrub-shrub wetlands to a scrub or herbaceous wetland type. Permanent wetland vegetation conversion would occur in approximately 1.1 acre of palustrine forested wetlands and 0.1 acre of palustrine scrub-shrub wetlands. The total permanent wetland vegetation type conversion would be approximately 1.2 acres. In order to minimize impacts to wetlands Pacific Connector would implement the wetland construction and restoration measures contained in its ECRP.

Effects on Federal Lands

Construction and operation of the Pacific Connector pipeline on federal lands would result in the loss of 37.4 acres of forested habitat within Riparian Reserves (associated with 7 wetlands; 11 perennial fish-bearing streams; 1 perennial stream; 4 intermittent fish-bearing streams; and 14 intermittent streams). This loss of forest habitat would be a long-term impact. Pacific Connector has attempted to minimize loss of forested habitat in Riparian Reserves by siting the pipeline and TEWAs to minimize clearing within Riparian Reserves as much as practical.

Pacific Connector would implement measures from its ECRP during construction and restoration to minimize long term impact on riparian habitat. Pacific Connector also proposes to donate large woody debris to agencies or conservation groups to perform instream restoration projects; and/or donate large boulders greater than 24 inches in diameter for use as fish habitat structures. Final mitigation measures would be evaluated and approved by the appropriate agencies to ensure adequate materials, designs, and placements of instream structures. Pacific Connector also proposes to establish a mitigation fund to compensate for temporary and

permanent riparian vegetation and aquatic impacts from construction and operation of the pipeline.

For any temporary crossings on any stream channel (whether intermittent or perennial, wet or dry) on NFS lands, it is the USFS policy that equipment crossings must be accomplished using 1) a bridge 2) a temporary culvert with temporary road fill to be removed after work is completed or 3) a low water ford with a rock mat. Pacific Connector has agreed that waterbody crossings at MP 110.56, 166.21 and 172.45 would be accomplished by 1) a bridge 2) a temporary culvert with temporary road fill to be removed after work is completed or 3) a low water ford with a rock mat.

The USFS has expressed concern that details for hydrostatic test water withdrawal and discharge are not adequately defined to ensure erosion is prevented, stream flows and aquatic organisms would not be affected, and that inter-basin transfer of undesirable organisms would not occur. Pacific Connector is proposing methods for hydrostatic test water withdrawal and discharge that we believe are consistent with industry practices, and that have been shown, through use on many similar pipeline projects to adequately minimize impacts on waterbodies. However, to ensure that USFS concerns for impacts to watersheds within its jurisdiction are addressed, we are recommending that Pacific Connector continue to consult with the USFS and BLM regarding specific plans for hydrostatic test water withdrawal and discharge on USFS and BLM lands, and include additional detail for mitigating potential impacts from hydrostatic testing as requested by the USFS.

The USFS has also raised a number of concerns regarding the proposed crossing of the East Fork Cow Creek (MP 109). Pacific Connector and the USFS have met a number of times to evaluate potential crossing locations, methods, and impacts, and as a result Pacific Connector has incorporated special design measures into the proposed East Fork Cow Creek crossing. We are recommending that Pacific Connector provide additional information on measures it would implement during crossing of East Fork Cow Creek to prevent potential resuspension of existing mercury contamination.

The BLM has identified that French drains were installed to stabilize Elk Creek Road near the proposed pipeline route at MPs 33.8 and 35.9. Pacific Connector would identify the presence and exact locations of drains on affected properties during right-of-way easement acquisition, expected to begin early 2009.

5.1.4 Vegetation and Timber

Vegetative communities located nearer to waterway for LNG traffic have some potential to be affected by vessel transit as a result of wave action from LNG carriers. This is not expected to be measurably above baseline conditions because vessels would transit the bay at slow speed, thereby minimizing wave actions, bank erosion, and sedimentation. Impacts from LNG carriers on shoreline vegetation would be similar to conditions resulting from existing ship traffic within Coos Bay.

During transit to the LNG terminal, the potential exists for an accidental or intentional breach of an LNG carrier resulting in a release of LNG and impacts on vegetation within the Zones of Concern. However, the risk of an accidental or intentional release of LNG during transit of the

LNG carriers is extremely low and can be managed by implementing the recommendations in the Coast Guard's WSR.

Construction of the proposed LNG terminal would impact approximately 117.2 acres of vegetation, of which about 114.2 acres would be permanently impacted. Of these 114.2 acres approximately 61.5 acres would be dune forest, 16.7 acres herbaceous vegetation, and 36.0 acres disturbed habitat. In addition, dredged material disposal at the Port Commercial Sand Stockpile site would impact an additional 7.2 acres of dune forest and 60.7 acres of herbaceous vegetation. Mitigation for the permanent loss of vegetation habitat at the LNG terminal site would be accomplished through out-of-kind, off proximity habitat enhancement or protection to achieve the habitat replacement ratios acceptable to ODFW in terms of quantity and quality. Jordan Cove's proposed mitigation strategy would involve the restoration/enhancement of approximately 54 additional acres in the Port's planned mitigation area (Lyon's Property) in Isthmus Slough.

Construction of the LNG terminal has the potential to increase the risk of aquatic and terrestrial invasive plant species at the project site due to the amount of ground disturbance, heavy equipment use, and potential off-site vectors (i.e., equipment used in other locations). To avoid introducing or spreading invasive species, Jordan Cove would follow the recommendations outlined in Oregon Aquatic Species Management Plan, the Oregon Noxious Weed Strategic Plan, and BLM's multi state environmental impacts statement, Northwest Area Noxious Weed Control Program, and its supplements. These documents focus on detection, containment, and/or reduction of invasive plant infestations with an integrated pest management approach (e.g., chemical, mechanical, manual and/or biological) as well as implementation of measures to avoid the introduction and spread of noxious weeds.

Concerns were raised by several commenters regarding the potential spreading of Port-Orford-cedar root disease. Surveys for Port-Orford-cedar root disease were not conducted; however, it is likely present within the Coos Bay area due to the presence of its host. Jordan Cove would follow all federal, state, and local management plans in order to prevent the spread of Port-Orford-cedar root disease. Preconstruction surveys would be conducted to determine if Port-Orford-cedar root disease is present within the LNG terminal site. If it is found, the precise locations would be mapped and all contractors and site construction workers would be informed of its location. All earth-moving equipment would be decontaminated before entering and after leaving a site infected with Port-Orford-cedar root disease in order to prevent cross contamination, which should avoid or minimize the chance of spreading of this disease off-site.

Construction of the Pacific Connector pipeline would require cutting, clearing, and/or removal of existing vegetation within the construction right-of-way and temporary work areas. All areas except the UCSAs sites and portions of the hydrostatic test discharge sites would be cleared of vegetation. Construction of the pipeline would have short-term impacts (generally 1-3, or 1-5 years) to vegetation within approximately 598.7 acres of agricultural lands, 444.4 acres of grasslands-shrub land, 311.7 acres of recent clearcuts, 135.3 acres of riparian shrub area, 7.5 acres of ditches and canals, and 1.1 acres of coastal dunes. Short-term impacts would also occur to vegetation within UCSAs (768.0 acres).

Construction of the pipeline would have long-term impacts on vegetation within approximately 2,669.4 acres of forest, including 1,559.0 acres of mature forest-woodland and 1,106.2 acres of

regenerating young forests. The pipeline facilities would also have long term impact on approximately 4.2 acres of riparian forest. Impacts to forest vegetation would be considered long-term because it would take at least 20-30 years for trees within areas disturbed by construction to return to pre construction age.

Of the total construction impact of 4,920.4 acres, 4061.9 acres (82.6 percent) would be revegetated or allowed to revegetate following construction. During operation the permanent pipeline easement, aboveground facilities, and new permanent access roads would impact approximately 1,800.6 acres. Pacific Connector proposes to limit vegetation maintenance within its permanent pipeline easement to a 30-foot-wide maintenance corridor, which would reduce the impact of vegetation maintenance from 1,776.5 acres (the area within the full operational right-of-way) to 834.5 acres (a reduction of 942 acres).

Multiple noxious weeds were documented along the pipeline route during botanical surveys. The presence of these species increases the potential for new or expanded growth of noxious weeds as a direct consequence of ground disturbance and equipment movement during pipeline construction. Pacific Connector has proposed a number of mitigation measures and a monitoring program to reduce the likelihood of the proposed pipeline increasing the rate of spread by noxious weeds. Multiple infestations of insect parasites and tree pathogens already exist along the proposed pipeline route. Those occurrences increase the potential for new or expanded infestations or infections as direct result of pipeline construction. Pacific Connector has proposed a number of mitigation measures in order to reduce the likelihood of the proposed project increasing the spread of infestations.

Construction and operation of aboveground facilities would result in permanent impacts to vegetation. The Tule Lake/Russell Canyon/Buck Butte Meter Stations would affect 6.6 acres of agricultural land. The Clarks Branch Meter Station would affect approximately 1.0 acres of agricultural land and palustrine emergent vegetation, while the Shady Cove Meter Station would affect 3.1 acres of various vegetation types. The Butte Falls Compressor Station would occupy 7.4 acres of Mixed Conifer/Deciduous, Grasslands, Urban and Agricultural vegetation type. Eleven of the 12 mainline block valves would occupy less than 0.1 acre each and the twelfth would occupy approximately 0.5 acre. Other facilities such as pig launchers, receivers, and communication towers, would be located within the footprints of other aboveground facilities and would therefore not impact additional vegetation.

Insect and/or disease activity within 0.5-mile of the proposed pipeline include: Douglas-fir beetle, fir engraver, flatheaded borer, mountain pine beetle (ponderosa and sugar pine), western pine beetle, lodgepole pine needle cast, and Port-Orford-cedar root disease. Within the region around the proposed pipeline, the western pine beetle and fir engraver are most prevalent. Other diseases that may occur or have potential to occur within the area near the pipeline are annosus root rot, laminated root rot, dwarf mistletoe, and sudden oak death. In order to prevent the spread or establishment of these insects and/or diseases, Pacific Connector would implement the mitigation measures described in section 4.4.2.

The primary effects of the Pacific Connector Project on timber production would result from the cutting, clearing, and/or removal of forested areas as required for clearing of the pipeline construction right-of-way and adjacent TEWAs. The degree of impact would depend on the logging methods used, quantity of lumber removed, and the age of affected stands. The

proposed Pacific Connector Project would impact approximately 141.6 acres of Deciduous Forest, 1,059.3 acres of Evergreen Forest, 302.7 acres of Clearcut Forest, 1,106.2 acres of Regenerating Forest, and 346.1 acres of Mixed Forest Lands. Approximately 238 acres of forest land allocated to timber production (the area within the permanently cleared right-of-way on private forest land, state forest land, and matrix land on USFS and BLM-administered land) would be removed from the timber base. Future timber production would be lost on these acres for at least the life of the pipeline. In addition, approximately 1,106 acres of young stands would be cleared. These stands have not yet reached merchantable size; therefore, current timber production would be lost on private forest land, state forest land, and matrix land on USFS and BLM-administered land. Pacific Connector would compensate affected landowners for the lost timber production. We are also recommending that Pacific Connector prepare and file with the FERC detailed timber extraction plans.

Effects on Federal Lands

The Pacific Connector pipeline would cross approximately 4.6 miles of Riparian Reserves on federal lands (3.7 miles on BLM administrated lands and 0.9 mile on NFS lands). Short- to long-term impact to Riparian Reserves on federal lands would include clearing 28.7 acres of clearcut and regenerating forest. Short term impacts to Riparian Reserves on federal lands would include clearing 10.3 acres of unaltered non forested vegetation, 1.6 acres of agriculture, 6.9 acres of altered vegetation/developed areas, and 0.5 acre of wetlands. Long-term impacts to Riparian Reserves on federal lands would include the clearing of 37.4 acres of mature forested vegetation.

A total of 394.6 acres of land would be impacted within LSRs on NFS lands, most of which occurs within the Rogue River-Siskiyou National Forest (277.5 acres). A total of 133.8 acres of land would be impacted within LSR on BLM-administered lands, while a total of 874.2 acres of land would be impacted outside of LSR on BLM-administered lands. Of the 874.2 acres affected, over 527 acres involve forests over 80 years in age.

Approximately 8,540 thousand board feet (MBF) of timber would be harvested on NFS lands and 8,839 MBF on BLM-administered lands. Pacific Connector would submit a reforestation plan to the BLM and the USFS for approval during easement acquisition. Following construction, previously forested areas within the temporary construction right-of-way and TEWAs would be replanted in accordance with Oregon reforestation rules (OAR 629-610-0000 through 629-610-0090), BLM Management Directions, and USFS Standards and Guidelines (i.e., National Forest Management Act requirements and forest stocking stands). Areas within the 30-foot-wide maintained operational right-of-way would remain cleared and maintained in an herbaceous or low shrub state. This would result in a permanent loss of timber production on land allocated for timber production (matrix land) on approximately 134 acres within BLM-administered lands and on approximately 35 acres of NFS lands. Pacific Connector would compensate the government for this loss in productivity.

Riparian Reserves and LSRs are not available for programmed timber harvest. While Pacific Connector would be required to pay for all trees cut within the right-of-way, only trees within the Riparian Reserves and LSRs that the government determines would cause adverse impacts if left on the ground would be removed. Prior to any commercial harvest, resource specialists from the applicable resource management agency would evaluate whether felled trees should be removed and which should be retained to meet Riparian Reserve and LSR habitat objectives.

Danger trees adjacent to work areas would be felled in advance of logging, pipeline construction, road construction/reconstruction, and road maintenance. Falling and removal of danger trees may result in damage to standing trees, which could result in growth loss. Pacific Connector or its subcontractors would compensate the government for any trees removed and any loss in timber productivity due to danger tree felling and removal. We are recommending that Pacific Connector provide a plan that identified procedures for removal of danger trees outside of the approved construction work areas.

5.1.5 Wildlife and Aquatic Resources

The impact of the proposed project on terrestrial and aquatic species would vary depending on the timing of construction, techniques used, types of habitat affected, and the behavior of individual species. In general, impacts on wildlife would be short term because much of the area affected by construction would be restored back to its previous habitat type. Typically, mobile species would relocate to similar adjacent habitat during construction, and return after the area is restored. However, a 30-foot corridor along the pipeline would be permanently maintained in a herbaceous or low shrub condition to allow access for periodic maintenance.

Marine mammals and sea turtles may use the waterway for LNG marine traffic. The potential for LNG carrier strikes on marine mammals and sea turtles in the waterway during transit to and from the proposed LNG terminal is low, given the speed of the LNG carriers and historic records indicating that vessel strikes of marine animals rarely occur. Additionally, Jordan Cove would implement measures to minimize potential ship strikes to marine mammals and sea turtles.

Jordan Cove proposes a system capable of delivering filtered bay water to the LNG carriers for engine cooling water and ballast. This system would use a screened water intake to transfer water to land based storage containers, and then transfer back, through magnetic and pressure sealed system, to the ship at berth that would limit the entrainment and impingement of juvenile fish and other organisms. We are recommending that Jordan Cove continue to consult with NMFS and ODFW to ensure the final design meets their requirements.

We identified EFH for groundfish, coastal pelagic species, Pacific Coast salmon, and highly migratory species within the area that would be affected by the Project. Species with designated EFH could potentially be impacted by dredging, pile driving, and in-water activities associated with both construction and operation of the LNG terminal, and construction of the pipeline. Although there would be permanent impacts on EFH as a result of construction and operation, mitigation for impacts on EFH would be included in a Compensatory Mitigation Plan. We consolidated EFH consultations for the Project with the consultations required under the ESA, and will include an EFH assessment with our Biological Assessment for the Project. Upon completion, the BA and EFH Assessment will be submitted to the agencies with a request to initiate consultation. After reviewing the EFH Assessment, the NMFS will provide recommendations regarding further measures that can be taken to conserve EFH. The FERC will respond to any EFH Conservation Recommendations issued by the NMFS through the EFH/ESA consultation process.

Hydrodynamic and sediment transport modeling for the dredging of the LNG facility showed that the combined background and project-related suspended sediment concentrations would be well below the lethal level for fish, but would be a levels to cause some short term harm to aquatic resources near the active dredge areas. Review of sediment records and limited sampling

at the LNG region did not detect any elevated contaminant concentrations within the proposed dredge areas that could adversely affect aquatic species. Therefore, impacts on aquatic species from increased TSS and associated turbidity would be temporary and minor. Dredging would remove the current benthic population of organisms within the sediments, including clams, ghost shrimp, polychaete worms in the estuarine regions. Rates of recovery for these species may range from several months to as much as 2 to 3 years depending on substrate type and currents in the affected area.

Piles would be installed as part of the marine berth at the proposed LNG terminal. Most impact would be avoided by conducting pile driving within the excavated basin behind the earthen berm, prior to removing the berm and exposing the slip to Coos Bay. To further minimize impacts on aquatic, Jordan Cove would observe the in-water work window for the Coos Bay and would use vibratory pile driving as conditions allow, and pile caps. In addition, Jordan Cove would use bubble curtains around each pile, and only operate the pile driving with flows around piles remain low enough for the bubble curtain to remain effective.

The proposed pipeline would cross about 110 waterbodies with known fish populations, including Coos Bay and Coostan Channel estuary. In-water activities would be avoided in the largest freshwater waterbodies by the use of the HDD construction methods. Impacts on streams crossed using typical open-cut pipeline construction methods would include temporary increased downstream turbidity and suspended sediment, impedance of local fish movements, and benthic prey organism loss. But most effects should not be long-term to water temperature, pH, dissolved oxygen, benthic invertebrate populations, or fish populations. To reduce sedimentation and erosion that may affect waterbodies crossed by the pipeline, PCGP would implement its ECRP. Most waterbody crossings would occur under the stream and estuarine crossing window periods designated by ODFW to protect fish resources. However Pacific Connector estimates that 36 crossing may not be crossed during the designated crossing window due to conflicts with other restricted windows (e.g., marbled murrelet).

During construction and operation of the proposed pipeline, habitat modification, increased noise and lighting, and vegetative clearing could adversely affect terrestrial species occurring along the pipeline route. In order to minimize potential impacts to breeding northern spotted owls and marbled murrelets, Pacific Connector is working on a schedule to avoid the nesting season.

Pacific Connector would use approximately 58 million gallons of water to test the pipeline along the route and may discharge the water at 81 different locations. While the goal is to reduce water transfer between basins some may occur. This water discharge could transfer organisms from one basin to another and may include non-native species to the basins. Also, the large volume of water discharged has the potential to cause erosion into streams if not properly managed. We are recommending that Pacific Connector continue to consult with the USFS and BLM regarding specific plans for hydrostatic test water withdrawal and discharge on USFS and BLM lands,

Concerns were expressed about the potential spread of aquatic nuisance species along the proposed pipeline. To prevent the potential introduction of aquatic nuisance species, Pacific Connector would implement measures from the *Oregon Aquatic Nuisance Species Management Plan*. In addition, we are recommending that Pacific Connector provide a more-specific plan to ensure the pipeline would result in spread of aquatic nuisance species.

Following construction of the LNG terminal and pipeline, habitat and ecosystem function would be restored in place, where possible, and where not possible, mitigation in various forms would occur. Permanent impacts on aquatic and terrestrial resources would be mitigated by restoring habitat with similar ecological function. As part of its Compensatory Mitigation Plans, Jordan Cove and Pacific Connector propose to preserve or restore habitat in Coos Bay and along the pipeline route. The Port and Jordan Cove would plant about 2 acres of eel grass bed to replace the 1.1 acres of eel grass lost from construction of the terminal, and would restore an additional 30.74 acres of low and high march habitat in Coos Bay to mitigate for other estuarine (non-eelgrass) habitat loss. Pacific Connector would replant eelgrass beds (nearly 40 acres) along the pipeline route in Coos Bay to ensure successful replacement for the temporary loss from pipeline installation. Pacific Connector proposes to add LWD to waterbodies crossed on both private and public land to replace LWD lost at waterbody crossings. We are recommending that Pacific Connector develop a stream habitat mitigation plan that identifies site-specific details for stream habitat improvements, including placement of LWD, and includes agency concurrence with those details.

Effects on Federal Lands

The Pacific Connector pipeline would cross or affect riparian vegetation at 51 waterbody crossings on lands administered by the BLM and NFS, of which 18 are known or suspected to contain fish. Most of the streams crossing areas are on small streams less than 5 feet wide. Additionally the pipeline would cross area within key watersheds on NFS and BLM lands, including three Tier one (South Umpqua River, North and South Forks Little Butte, Spencer Creek) and one Tier 2 (Clover Creek) watersheds. Overall the potential effects of pipeline construction on turbidity, temperature, water quality, and hazardous substances on fisheries on Federal lands crossed by the pipeline would be similar to non-federal lands, except that no estuarine or marine habitat would be affected on Federal lands.

5.1.6 Threatened, Endangered, and Other Special Status Species

Based on informal consultations with the FWS and NMFS, 35 federally listed species were identified as potentially occurring in the general vicinity of the Project. A variety of measures have been proposed by Jordan Cove and Pacific Connector that would avoid or minimize environmental impacts on threatened, endangered, and other special status species. These measures include, but are not limited to:

- reducing the size of the LNG terminal footprint to avoid or minimize impacts on wetlands and Henderson Marsh;
- routing the Pacific Connector pipeline to avoid or minimize impacts to sensitive environmental features, habitats, and/or species;
- use of the HDD or bore technique during construction of the Pacific Connector pipeline to avoid or minimize disturbance of waterbodies containing sensitive aquatic species or habitats;
- minimizing potential water quality impacts by using erosion control measures;
- restoring temporary construction work areas by implementing appropriate restoration and revegetation techniques;
- controlling the spread of noxious and/or invasive plants;

-
- providing screened water intakes at the LNG terminal to provide cooling and ballast water to the LNG carriers while unloading to minimize entrainment and impingement of juvenile fish; and
 - development of a plan to minimize potential ship strikes to marine species by LNG carriers.

Additionally, Jordan Cove and Pacific Connector have proposed a compensatory mitigation program (CMP) to address impacts and effects that cannot be otherwise mitigated. The goal of the CMP is to compensate for unavoidable impacts to listed species and their habitats through substitute habitat and/or habitat stewardship. Unmitigated impacts have been identified in accordance with ODFW and FWS criteria and include impacts that cannot be mitigated in-proximity and/or in-kind, and impacts to high value habitat that is unique and irreplaceable.

We are also recommending in this EIS additional mitigation measures or plans for the marbled murrelet, northern spotted owl, vernal pool fairy shrimp, Applegate's milk-vetch, Gentner's fritillary, Kincaid's lupine, Point Reyes bird' beak, and Cox's mariposa lily.

After further consultations with the FWS and NMFS, completion of field surveys, and review of Jordan Cove and Pacific Connector's proposed measures to avoid, minimize, or mitigate impacts on listed species, together with our recommended measures, we have determined that the proposed Project would likely adversely affect eight federally listed species: MAMUs, NSOs, coho salmon (in both the Southern Oregon/Northern California Coast and Oregon Coast ESUs), Lost River suckers, shortnose suckers, Applegate's milk-vetch, Gentner's fritillary, and Kincaid's lupine. In compliance with section 7 of the ESA, the FERC staff is currently preparing a BA and EFH Assessment for the proposed projects which will be submitted to the FWS and NMFS with a request to initiate formal consultation. The FWS and NMFS would prepare BOs as to whether or not the federal actions associated with the Project would likely jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat. The FERC would only authorize the Project to proceed if the FWS' and NMFS' BOs find the Project would not jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat (assuming reasonable or prudent alternatives are not available). We are recommending that construction should not begin until after the FERC staff completes formal consultations under the ESA.

5.1.7 Land Use, Recreation, and Visual Resources

About half of the area along the shore of the waterway for LNG marine traffic is industrial open space, with recreation the main land use. There are a number of houses and commercial buildings within the communities along the waterway overlapped by the Zones of Concern for LNG marine traffic. The urban areas along the waterway include the unincorporated communities of Charleston, Barview, and Empire and the city of North Bend and a portion of the city of Coos Bay. In addition, the Zones of Concern overlap the entirety of the North Spit, including the Coos Bay Shorelands SRMA, portions of the Oregon Coast National Wildlife Refuge at Gregory Point, the Siuslaw National Forest, the Coos Head Air Naval Facility, and some state and local parks.

The Jordan Cove Project could have minor impacts on commercial fishing and recreational users of Coos Bay. Maximum delays while an LNG carrier passes would be 30 minutes. Boaters and fishermen may have to briefly move out of the way of LNG marine tankers as they move through

the channel to the LNG terminal, as the Coast Guard would impose a moving 500-yard safety and security zone around LNG carriers transiting up the waterway. This zone would be an area over which the Coast Guard would have authority and is not meant to be an exclusion zone. Smaller waterborne recreationists such as sea kayakers typically stay in shallow water outside of the navigation channel. The effects of wakes from LNG carriers on small craft would be no different than the effects from wakes from the large vessels that currently access Coos Bay.

LNG marine traffic may also have visual impacts for people residing in the shoreline communities, traveling along highways adjacent to the waterway, using the parks and public interest areas within the Zones of Concern, or other bay users. Visual impacts would be short term, as it would typically take an LNG carrier only a few minutes to pass through a viewshed while traveling at average speeds between 4 and 10 knots. In addition, residents are accustomed to seeing other commercial ships move up and down the Coos Bay channel.

The proposed LNG terminal would be located within a 159-acre tract mostly around the Port of Coos Bay. The land would be leased to Jordan Cove for construction of the LNG terminal and slip. This land is currently vacant, forested and open land, historically used for the Henderson Ranch. The western portion of the tract to be obtained from the Port is relatively flat, is covered by brush, and was formerly used by the COE to deposit materials dredged during maintenance of the Coos Bay navigation channel. The eastern portion includes a forested dune.

Construction of the LNG terminal would affect a total of about 531.2 acres, while operational facilities would cover 373.1 acres, including excavated and dredged material disposal areas. It is estimated that after the terminal is constructed, structures would cover a total of about 3.5 acres, while about 10.7 acres would be paved roadways.

The LNG terminal and western portion of the pipeline would be within the designate Coastal Zone. Jordan Cove and Pacific Connector have prepared consistency determinations but these have been found to be incomplete by the ODLCD. We are recommending that both applicants file with the Commission documentation of concurrence from the ODLCD that their respective projects would be consistent with the CZMA.

There are no residences closer than one mile from the proposed LNG terminal. Temporary construction impacts on nearby residents could include inconveniences caused by noise generated during dredging of the maneuvering area and pile driving for the marine berth, as well as dust. Potential operational impacts on residences in the vicinity of the terminal include lighting, noise, and visual impacts, however because of the distance between the nearest residences and the proposed terminal, these impacts would be minor.

The most visible part of the LNG terminal would be the LNG storage tanks, which would be about 180 feet high. Visual impacts of the LNG facility would be minor because views would be screened by landscape, topography, and distance. The facilities would be painted to blend into the backdrop of the sandy soils and dunes of the area. An earthen berm enclosing the LNG onshore facilities would provide an additional visual barrier between the bay and the terminal.

The pipeline would have limited visual impacts, because it would be buried underground. The clearing of forest for the pipeline construction right-of-way and temporary work areas would have long-term visual impacts.

Construction of the pipeline and associated aboveground facilities would disturb about 2,669 acres of forest and 599 acres of agricultural/rangeland. Other land uses crossed by the pipeline include residential areas, commercial/industrial areas, open land, and water. About 1,800 acres would be retained as part of the permanent operational right-of-way for the pipeline, aboveground facilities, and new permanent access roads. Of this, about 1,776 acres would be within the operational pipeline right-of-way, and about 835 acres would be within a 30-foot-wide corridor centered on the pipeline that would be maintained in a herbaceous or low shrub condition.

Pacific Connector has identified 15 residences within 100 feet of the construction right-of-way and work areas, and has proposed measures to minimize impacts on these residences during construction. However, because survey access has not been granted for the entire pipeline route, additional residences may be identified. We are recommending that Pacific Connector provide additional information including the results of a civil survey of the entire pipeline route that identifies all residences and commercial structures within 50 feet of the construction right-of-way, a plan outlining measures that would be implemented to mitigate pipeline construction impacts on domestic water supply systems and septic systems, and additional measures that would be implemented for any residence closer than 25 feet to the construction work area.

Effects on Federal Lands

The proposed pipeline would cross the BLM Coos Bay District Upper Rock Creek ACEC. Pacific Connector rerouted the pipeline to avoid most of the ACEC, but has not avoided it entirely. Pacific Connector has proposed no specific measures to mitigate or further reduce impacts to this area, therefore, we are recommending that Pacific Connector continue to consult with the BLM as necessary to ensure that appropriate site-specific mitigation measures for the crossing of this ACEC are included in the POD.

The greatest long-term visual effects from the pipeline would occur where new pipeline right-of-way is cleared through forestlands. Pacific Connector has sited much of the pipeline along ridgetops with low visibility or on hillsides that face away from sensitive visual receptor locations. The exception to this generalization is the proposed pipeline alignment along Clover Creek Road in Klamath County, where the pipeline would be placed in the immediate foreground for 18.2-miles. This high-recreation-use road leads to two wilderness areas, lakes used for recreation, and the PCT trailhead.

Straight, parallel right-of-way clearings are deemed visually Unacceptable Modification by the USFS Visual Management System (USFS Agricultural Handbook 462) but achieve the standards of BLM-VRM Class 4 (Maximum Modification). This type of right-of-way clearing may draw attention and does not blend in with natural occurring form, line, color or texture in the landscape. The Pacific Connector pipeline would meet BLM-VRM Classes except at MP 51.7 at the Highway 42 crossing and along Clover Creek Road at MP 169. On NFS lands, without visual resource mitigation, the Pacific Connector Pipeline would meet the USFS-VQO definition of Unacceptable Modification because of its straight edge clearing limits. With implementation of visual resource mitigation measures, the pipeline would meet USFS VQOs of Partial Retention, Modification, or Maximum Modification, but would not meet Retention VQOs at three locations. We are recommending that Pacific Connector continue to consult with the BLM and USFS as necessary to develop visual resource protection design and mitigation measures that

would be included in the POD for construction and operation of the pipeline on federally managed lands.

5.1.8 Socioeconomics

No appreciable changes to the local population are expected to occur as a result of the proposed Project. Construction of the slip is expected to take approximately 20 months and employ an average workforce of 27 people for the duration of construction. The workforce would peak at 45 people during months 7 through 10. Assuming that 41 percent of the slip construction workforce would commute daily from their homes to the job site, the number of non-local workers would average 16 over the construction period, with a peak of 27 non-local workers in months 7 through 10. Construction of the LNG terminal is anticipated to last for 36 months. Jordan Cove estimates the construction labor force would peak at 929 workers in the 18th month, with an average of 430 people on site each month. Approximately 41 percent of the construction workforce would be expected to commute daily from their homes in the area.

Combining the workers constructing the slip with the workers constructing the LNG terminal, an average of about 556 non-local employees per month would be working on the Jordan Cove project during peak periods. This would represent about a 9 percent increase in the total population of Coos County and a 21 percent increase in the combined populations of the cities of Coos Bay and North Bend. While these numbers indicate a large influx of new people into the local communities to work on the Jordan Cove Project, this influx would be relatively short term, with peak construction lasting for about ten months (between months 14 and 23 after construction begins). At non-peak periods, we estimate an average of 241 non-local workers per month, or an increase of 4 percent over the present county total population and about a 9 percent increase in the combined populations of the cities of Coos Bay and North Bend. We believe that the local communities could absorb an increase of less than 10 percent of their populations without significant adverse impacts.

Pacific Connector would construct its pipeline using five construction spreads and estimates the average workforce for each construction spread would be about 280 workers per month, with a peak of 369 workers mid-season. The greatest activity would occur during the second year of construction, with an estimated peak construction workforce of 1,844 over five spreads. Pacific Connector estimates that approximately 50 percent of the construction jobs for its pipeline would be filled by local workers. The average local union hiring for the Pacific Connector Project would be about 700 people. Local firms would be hired to perform some specific tasks, such as logging, surveying, and environmental protection and restoration. The number of non-local hires would peak at approximately 922 workers, or 184 per construction spread, with an average monthly total of 140 non-local workers.

Jordan Cove estimates that operation of the proposed LNG terminal would require a permanent staff of 56 employees. As many as 70 percent or 39 employees could be hired locally, with the remaining 17 workers hired from elsewhere and relocating to the area. The Port does not anticipate that additional staff would be needed to operate the slip. Pacific Connector estimates that operation of the pipeline would require a permanent staff of five employees, stationed and residing at different locations along the pipeline, but reporting to a main office in Eugene, Oregon. The permanent addition of 22 workers and their families to the local communities, spread between Coos Bay and Malin, would not be a significant adverse impact to the regional population.

The Project should not adversely affect property values. Studies of areas surrounding existing LNG peak shaving plants have not found any negative impacts on property values, and other independent research found that the presence of a pipeline on a tract of property had little influence on its sale price.

Construction and operation of the proposed Project may have beneficial effects on the local economy. The Port estimated it may charge Jordan Cove up to \$60 million for capital investment services. In addition, the Port may collect receipts from users of the terminal up to \$5.5 million per year, and \$2 million and year in maintenance fees. Jordan Cove estimates that during operation it would spend about \$4 million on salaries per year, and up to \$10 million per year in direct expenditures for goods and services. These employees would reside within Coos County and support an additional indirect (128 jobs) and induced (63 jobs) in the county, and result in a total of \$17.8 million in personal income being paid in the county. In addition, the terminal would support an estimated 11 direct jobs, and 167 indirect and 107 induced jobs elsewhere in Oregon, as well as an estimated additional \$19 million in personal income.

Marine vessel services associated with operation of the terminal are estimated to result in an estimated 26 direct jobs, and 38 indirect and 21 induced jobs in Coos County, with total associated personal income of approximately \$5.9 million. Vessel services would also support an estimated 30 indirect and 22 induced jobs elsewhere in Oregon, as well as an additional \$9.6 million in personal income.

One estimate developed for the South Coast Development Council concluded that operation of the proposed LNG terminal, the Pacific Connector pipeline, and LNG vessel operations would generate annual net tax revenues of approximately \$34.4 million by 2016, with \$13.6 million generated in Coos County and \$20.8 million generated elsewhere in Oregon.

Effects on Federal Lands

Pacific Connector prepared a Financial Efficiency Analysis that assesses the net present value of costs and benefits that would accrue to the federal government as a result of construction and operation of the proposed project. This analysis was prepared in general accordance with direction contained within the USFS Handbook. Costs and benefits were projected over a 50 year time period, where appropriate, and discounted using a real discount rate of 4 percent. The analysis identifies two sources of direct government revenue: 1) Pacific Connector's payment for timber that would need to be cut, and 2) Pacific Connector's rental payments for construction access and the pipeline right-of-way. The analysis also identifies two sources of government costs: 1) the value of lost timber productivity along the new right-of-way, and 2) the incremental cost of future maintenance for existing roads that Pacific Connector may upgrade above their existing federal maintenance level. The projected net present value of the Pacific Connector Project based on this analysis is \$2.91 million in 2007 dollars.

5.1.9 Transportation

The Pilots that work in the Coos Bay navigation channel currently encounter an average of six recreational boats and two commercial fishing boats during the transit of each deep draft wood chip carrier along the waterway. LNG carriers would likely travel through the waterway at slack high tide during daylight hours, with the travel time between the offshore buoy at the beginning of the waterway and the entrance to the ship berth at the proposed LNG terminal estimated at up

to 90 minutes. Based on an estimated total of 80 LNG carriers visiting the proposed terminal each year, Jordan Cove estimates that operation of the terminal would impact recreational and other boating activity during about 1.3 percent of annual daylight hours and have similar impacts to the on-going traffic of cargo vessels that call at Coos Bay to collect wood chips. Delays to other ship traffic related to LNG carrier traffic would occur on average once every 4.5 days.

Jordan Cove conducted a preliminary traffic analysis of traffic impacts during construction of the LNG terminal, which concluded that traffic operations at the intersection of U.S. Highway 101 and the Trans-Pacific Parkway would fail if the entire construction work force arrived and departed in single occupancy vehicles during a concentrated period of time. In order to mitigate this potential impact, Jordan Cove proposes to reduce the number of single occupancy vehicle trips by establishing an offsite parking area for construction employee vehicles. Jordan Cove is evaluating two areas for temporary offsite parking, both located adjacent to the southern end of the McCullough Bridge in North Bend. Employees would be transported from the parking area to the proposed LNG terminal site on buses. To minimize impacts at the intersection of U.S. Highway 101 and the Trans-Pacific Parkway from construction traffic, a maximum of 117 personal vehicles would be allowed on site on a daily basis for management and supervisory personnel.

ODOT reviewed they generally agreed with the analysis, but raised concerns about potential impacts on traffic patterns if there would be construction on weekends during the summer. We are recommending that Jordan Cove clarify if any construction would occur on weekends during the summer, and if so, provide an updated transportation study.

Once the LNG terminal is placed in service, regular operation would consist of three daily shifts. The results of the traffic impact analysis indicate that the addition of personal vehicle trips for these three shifts to projected 2011 background traffic levels would have a negligible impact on study area intersections.

The Southwest Oregon Regional Airport is located in the city of North Bend, directly across Coos Bay and less than one mile from the proposed LNG terminal site. The airport includes two runways used for air traffic, and the approaches to both runways cross the Coos Bay Navigation Channel, which borders the airport to the north. Ships in transit to the Roseburg Forest Products facility presently cross the approach to one runway (runway 4-22), and vessels in transit to the proposed LNG terminal would also cross this approach. The end of runway 4-22 is approximately 0.9 nautical miles from the center of the channel. The number of wood chip cargo vessels calling at Coos Bay has declined from about 200 vessels 10 years ago to about 50 today, and Port authorities expect it will remain at this level. The addition of 80 LNG carriers would increase the number of deep-draft vessels calling at Coos Bay, and crossing the approach to runway 4-22, to about 130 per year. The airport has operated since 1943 without conflict with vessel traffic in the Coos Bay navigation channel. The FAA commented that Jordan Cove may need to file a formal notice with the FAA for the review of airspace utilization, and that a feasibility study should be prepared to evaluate alternatives and the relationship of the airport and surrounding airspace to the proposed LNG terminal. We are recommending that Jordan Cove submit a request for a FAA feasibility study, and if necessary appropriate notice to the FAA under FAR 77.

Major state and federal transportation routes and highways that would be crossed by the Pacific Connector pipeline include U.S. Highway 101 and State Route 42 in Coos County; Interstate 5 in Douglas County; State Highway 62 and State Route 140 in Jackson County; and State Route 66, State Route 39, and U.S. Highway 97 in Klamath County. Pacific Connector has identified existing egress and ingress points to and from the proposed construction right-of-way to provide for safe, efficient construction and movement of equipment and materials. In some areas, it would be necessary to grade or widen existing roads (to allow large equipment a turning radius) to access the construction right-of-way. Pacific Connector has estimated that modifications of 62 existing access roads may be required outside of the existing road bed resulting in about 17 acres of disturbance.

We received comments from residents on the east side of the proposed Rogue River crossing concerned about Pacific Connector's proposed use of Old Ferry Road to access the right-of-way and river crossing HDD site during construction. The Old Ferry Road Committee suggested an alternative access point that Pacific Connector has already identified as a proposed access road. We are recommending that Pacific Connector file a plan prior to the end of the comment period on the draft EIS that identifies measures that would either avoid entirely the need to use Old Ferry Road as temporary access, or would allow use of the road but without improvements.

Pacific Connector would need to construct 18 new temporary access roads with a total length of approximately 3.2 miles, affecting approximately 6.1 acres, portions of which are on federal lands. Construction of new temporary access roads would be a short-term impact, lasting for approximately two years during the construction phase of the Pacific Connector Project only. All new temporary roads would be restored to preconstruction conditions following completion of construction.

Pacific Connector would need to construct 16 new permanent access roads, with a total length of approximately 0.9 mile, portions of which would be on federal lands. These roads would provide access during construction as well as for operations and maintenance activities while the Pacific Connector Project is in service. Most of the new permanent access roads would be located within Pacific Connector's permanent pipeline easement. Construction of these roads would permanently impact approximately 2.8 acres.

During pipeline construction there could be impact on traffic on local roads in the vicinity of the proposed pipeline as a result of increased traffic by personal vehicles and construction equipment. The majority of the construction workforce would travel each morning from their permanent or temporary home to the construction yard established for the spread they are working on, and then make the return trip in the evening. It is projected that 80 percent of the workforce for each spread would be transported from the contractor yard to and from the right-of-way on crew buses, with the remaining 20 percent using their own vehicles (92 vehicles during peak construction) and moving from site-to-site along the right-of-way using local roads and highways. Pacific Connector would comply with all traffic control requirements of road crossing permits, and has developed a preliminary draft Transportation Plan for Non-Federal Lands. This plan describes the measures Pacific Connector would take to access the construction right-of-way and maintain public access on non-federal roads around construction areas.

Effects on Federal Lands

Pacific Connector has estimated that modifications of 62 existing access roads may be required outside of the existing road bed resulting in about 17 acres of disturbance. Of this, modifications to 10 existing roads requiring about 6.1 acres would be on BLM managed lands, and 10 roads resulting in disturbance to 2.6 acres would be on NFS lands. However, the USFS has stated that a number of additional USFS roads that Pacific Connector has identified as construction access roads would require improvements prior to use, in some cases requiring clearing, grading, widening, and drainage improvements. Pacific Connector has begun to identify this impact, but much of the specific road improvement requirements would not be identified until closer to construction. These areas would be identified and addressed in the POD prepared in consultation with the USFS and BLM.

Pacific Connector would need to construct 18 new temporary access roads with a total length of approximately 3.2 miles, affecting approximately 6.1 acres, portions of which are on federal lands. Construction of new temporary access roads would be a short-term impact, lasting for approximately two years during the construction phase only. All new temporary roads would be restored to preconstruction conditions following completion of construction. Pacific Connector would need to construct 16 new permanent access roads, with a total length of approximately 0.9 mile, portions of which would be on federal lands. These roads would provide access during construction as well as for operations and maintenance activities while the Pacific Connector Project is in service. Most of the new permanent access roads would be located within Pacific Connector's permanent pipeline easement.

Pacific Connector has also developed a draft transportation management plan to support the federal Right-of-Way Grant required on federal lands. The transportation management plan for federal lands would be finalized and submitted with the POD in early 2009. It would be completed in consultation with the land-managing agencies and would identify all roads on federal lands that would be used during construction and operations. This plan would specify in detail the activities that would occur on federal roads and the standards that would be utilized where improvements are necessary.

The USFS and BLM have stated that many roads that may be used by Pacific Connector during construction have cost-share agreements, permits, and right-of-way grants held by other parties, and that all of these parties must be identified prior to review and approval of the right-of-way grant. Pacific Connector has not yet identified all of the potentially affected parties on these roads, and we have recommended that they do so prior to construction. We are recommending that Pacific Connector identify all construction access roads on federal lands, or access roads leading to federal lands, where non-government parties hold existing cost-share agreements, permits, and/or right-of-way grants, and provide this information to the FERC and USFS, BLM, and BOR prior to the end of the comment period on the draft EIS.

Pacific Connector proposes to provide the USFS and BLM 24-hour notice prior to using roads on federally managed lands, however the USFS and BLM have stated this would not allow the agencies sufficient time to notify the public of closures and use restrictions. We are recommending that Pacific Connector provide a construction work plan, updated weekly during construction, that would provide the agencies an estimate of when access on federally managed roads would be impeded or restricted.

5.1.10 Cultural Resources

A literature review and site file search indicated that there are 24 known previously recorded archaeological sites and 15 known previously recorded individual historic resources overlapped by the Zones of Concern. No significant impacts on cultural resources (archaeological sites or historic structures) within the Zones of Concern are expected from the proposed LNG marine traffic in the waterway to the Jordan Cove LNG terminal.

Intensive pedestrian inventories of the proposed Jordan Cove LNG terminal identified one site (35CS221). Archaeological testing has been recommended to evaluate the NRHP eligibility of site. Subsurface testing and monitoring was also recommended in two other portions of the APE. The SHPO has concurred with these recommendations.

As of August 2007, Pacific Connector had surveyed about 203 miles of the proposed 230-mile pipeline route in addition to potential access roads, TEWA outside of the 400-foot-wide corridor, and source and/or disposal yards. The surveys identified 111 new archaeological sites and 134 isolated finds. Pacific Connector's cultural resources contractors recommended that all of the isolated finds and 13 sites be considered not eligible for the NRHP, requiring no further investigation. It was also recommended that pipeline project design modifications be made to facilitate avoidance for 10 sites. The remaining sites were unevaluated, or were considered potentially eligible for the NRHP, and testing was recommended to clarify their eligibility.

A geoarchaeological investigation identified 21 locations with the greatest potential to contain soils of the appropriate age to contain deeply buried archaeological deposits. Further geoarchaeological investigations may be warranted at two locations where construction may involve HDD technology. The Oregon SHPO has concurred with this assessment. These investigations would be conducted prior to construction to allow enough time to identify, evaluate, and mitigate for adverse effects to cultural resources in the event they are identified.

We have not yet completed the process of complying with the NHPA for this Project. For example, not all ethnographic studies and results of consultations with Indian tribes to identify traditional cultural properties, or sites of religious or cultural importance in the APE, in accordance with section 101(d)(6) of the NHPA, Part 800.2(c)(2)(ii), and the AIRFA, have been filed with the Commission.

Jordon Cove has not yet documented that all necessary cultural resources surveys have been conducted or that these studies have been reviewed by SHPO. Cultural resources inventories been not yet been completed for the entire route of the Pacific Connector pipeline, and related ancillary facilities and temporary construction use areas. In addition, Pacific Connector needs to provide the results of archaeological testing at unevaluated sites that cannot be avoided, before we could reach conclusions about eligibility.

We are recommending that Jordan Cove and Pacific Connector not construct or use any of their proposed facilities, including related ancillary areas for staging, storage, temporary work areas, and new or to-be-improved access roads, until we have completed all studies and consultations necessary to complete compliance with the NHPA.

Effects on Federal Lands

Based on the cultural resources surveys conducted by Pacific Connector we identified 21 archaeological sites within the APE on BLM or NFS lands. The SHPO indicated that it considers three of the sites on federal lands (35JA743, 35LK3039, and 35KL3040) to be not eligible for the NRHP, requiring no further work. Additional data are needed for 18 sites on federal lands before we could make determinations of eligibility and effect.

The Pacific Connector pipeline would cross 25 irrigation features associated with the Klamath Project that are under the jurisdiction of the BOR, between MPs 200.5 and 214.2. The BOR considers the entire Klamath Project eligible for the NRHP, because of its age and importance to regional history and the agricultural development of the Klamath Basin. However, Pacific Connector has not yet documented consultations with the BOR over the proposed treatment for the eligible features of the Klamath Project that the pipeline would cross.

5.1.11 Air Quality and Noise

Air pollutants would be emitted as a result of both construction and operation of marine vessels on the waterway for LNG marine traffic, the proposed LNG terminal, the Pacific Connector pipeline, and the Butte Falls Compressor Station.

Emissions from the marine vessel traffic would be periodic and transient, and they are not expected to result in significant long-term air quality impacts, although there could be short-term localized impacts. LNG carriers transporting the LNG are typically oil-fired or dual-fueled. To minimize emissions while docked, Jordan Cove has committed to using only LNG carriers that are capable of “cold-ironing” (i.e., those that can use electrical power from land, rather than using their own engines to generate electricity).

Pacific Connector has stated it may control fugitive dust from construction of the pipeline by utilizing either a synthetic product such as Dustlock® or water. Aprons would be used where necessary at construction ingress/egress locations on paved roads to control the track-out of mud from construction vehicles. Additionally, at the end of each construction day where mud may get tracked onto paved roads, the contractor would be required to remove any remaining mud from the paved road.

Jordan Cove and Pacific Gas Connector Pipeline would minimize air emissions from operation of the LNG terminal and Butte Falls Compressor Station through the use of clean fuel (primarily natural gas and a limited amount of ultra low sulfur diesel oil). Both the LNG regasification and natural gas compression would be conducted using gas-fired equipment.

Both the LNG terminal and the Butte Falls Compressor Station would require preconstruction permits from the Oregon Department of Environmental Quality (ODEQ). Jordan Cove submitted a permit application for the terminal in August 2007 and submitted an addendum to that application on June 20, 2008 that committed the LNG carriers to “cold-ironing”. Pacific Connector submitted the permit application for the compressor station. Both permit applications confirm that the worst-case impacts of the maximum emissions from both sources would comply with all ambient air quality standards.

The ODE has noted that life-cycle greenhouse gas (GHG) emissions associated with combusting gas obtained from LNG are higher than those associated with combusting gas obtained from

domestic sources (i.e., considering emissions associated with transoceanic LNG transport and vaporization), but that life-cycle emissions associated with either gas would continue to be much lower than those from combusting coal until carbon capture and sequestration (CCS) technology is commercially feasible.

During construction of the pipeline there would be temporary emissions from pipeline construction equipment that have not yet been quantified. We are recommending that prior to the end of the comment period on the draft EIS Pacific Connector provide an estimate of all criteria pollutants and GHG emissions from pipeline construction.

Noise would be generated during the 3-year construction period at the LNG terminal. In general, construction activity at the LNG terminal would be limited to daytime hours. Construction of berth facilities would require pile-driving operations. The Port would limit pile driving to daytime periods, five days per week over a period of approximately 32 weeks. The NSAs closest to the LNG terminal are single-family homes in the City of North Bend along the south side of Coos Bay (NSA1) about 1.4 miles south of the center of the proposed LNG terminal site. The nearest NSAs to the east of the proposed terminal site are single-family homes on Russell Point (NSA2), east of US Highway 101 and about 2.3 miles from the center of the proposed terminal. Noise from heavy equipment operations would generally be reduced to 33 dBA or less at NSA1, and to less than 30 dBA at NSA2. Pile driving would be expected to generate peak noise levels of about 48 dBA at NSA1, with somewhat lower noise levels at NSA2. These construction noise levels would not be a significant noise impact. Dredging and pile-driving operations during construction of berth facilities would not be expected to generate significant underwater noise levels in Coos Bay because the berth area would be separated from the Coos Bay ship channel by an earthen berm until the access channel to the berth area is dredged at the end of the berth construction period.

Predicted operational noise increments from the LNG terminal would be an L_{dn} of 45.4 dBA at NSA1 and an L_{dn} of 30.1 dBA at NSA2. During operation of the proposed LNG terminal, additional noise would also be generated by the LNG carriers transiting the Coos Bay Navigation Channel. Noise generated from the LNG carriers would be similar to noise generated from large vessels that currently traverse the ship channel. Current ship traffic at the Port of Coos Bay is about 50 ship calls per year. The increase in the annual number of ship calls proposed for the Jordan Cove Project would result in total port vessel traffic of less than one ship movement per day. Noise levels during ship movements are estimated to be about 63 dBA at a distance of 300 feet during each passby event. The increased ship traffic would not be expected to create a significant change in overall noise levels along the Coos Bay Navigation Channel.

During construction of the proposed Pacific Connector pipeline, neighbors in the vicinity of the construction right-of-way would hear construction noise. Only 0.64 percent of the land crossed by the proposed pipeline (1.48 miles of pipeline corridor) is categorized as having residential, commercial, or industrial use. Pipeline construction activities generally would be limited to daytime hours. Due to the assembly-line nature of pipeline construction, activities in any area could occur intermittently over a period lasting from several weeks to a few months.

Pacific Connector proposes to use HDD technology to cross three rivers: the Coos River, the Rogue River, and the Klamath River. Some portions of HDD operations would occur as 12-hour work shifts, while other activities would normally occur as 24-hour per day operations. The

overall duration of HDD operations is site-specific, and would be determined by the drilling contractor. It would not be unusual for HDD drilling operations to take 2 to 4 weeks at each site. Pacific Connector has identified noise mitigation options for each HDD site. We believe that with implementation of these measures, temporary noise impact on NSAs from pipeline construction would be acceptable.

Pacific Connector would construct the Butte Falls Compressor Station in Jackson County, Oregon, at about MP 127 on the Pacific Connector pipeline and about 1,500 feet north of Butte Falls Highway. Approximately 30 residences are located within 1 mile of the proposed compressor station site, with the closest residential dwelling (currently not occupied) about 1,900 feet from the center of the proposed site. Two other residences are about 2,000 feet from the center of the proposed compressor site. Construction of the compressor station would take approximately 9 months. Construction equipment noise levels would vary during the construction period, but typically would be less than 50 dBA at the nearest NSAs. Because construction activity would generally be limited to daytime hours, estimated construction activity noise levels would not represent a significant noise impact.

The Butte Falls Compressor Station would include a variety of noise mitigation design features. The proposed noise mitigation features are predicted to keep Leq noise levels at nearby NSAs to less than 35 dBA, and thus comply with Oregon noise regulation requirements. The predicted L_{dn} levels at these NSAs are all less than 40 dBA, and thus comply with the FERC L_{dn} limit of 55 dBA. Consequently, the proposed Butte Falls Compressor Station would not have a significant noise impact on surrounding NSAs. However, to ensure that actual operational noise is at or below the predicted noise, and that there would be no significant impact to noise quality at the nearest NSAs, we are recommending that Pacific Connector file the results of a noise survey no later than 60 days after the compressor station is placed in service to demonstrate that noise at nearby NSAs does not exceed 55 dBA L_{dn}.

In addition to the Butte Falls Compressor Station, aboveground facilities associated with the proposed Pacific Connector Project would include four meter stations (Coos Bay, Clarks Branch, Tulelake, and Tuscarora), four pig launchers/receivers co-located with other aboveground facilities, and 16 MLVs spaced along the pipeline in accordance with DOT requirements. There would be limited noise generated by these facilities. To ensure that there would be no significant impact to noise quality at the nearest NSAs as a result of metering station/interconnect operations, we are recommending that Pacific Connector file the results of a noise survey no later than 60 days after the meter station is placed in service to demonstrate that noise at nearby NSAs does not exceed 55 dBA L_{dn}.

Effects on Federal Lands

The nearest federal PSD Class I areas to any of the proposed facilities are at least 110 km away, and impacts from Project air emissions at these locations would be minimal and well within compliance with federal standards. Air pollution regulations treat other (Class II) federal lands in the same manner as non-federal Class II lands. The nearest federal lands include the Oregon Dunes National Recreation Area about 1.8 miles north of the proposed Jordan Cove LNG terminal site, various BLM, USFS, and BOR lands that would be crossed by the proposed pipeline. Air quality impacts at these locations would be less than the maximum Class II impacts identified above.

Estimated noise from LNG terminal construction and operation at the southern boundary of the Oregon Dunes Recreation Area would be well below an Ldn of 55 dBA, the noise level used by the EPA and FERC to protect the public from activity interference and annoyance outdoors in residential areas. During pile driving for installation of LNG terminal berth facilities, predicted noise levels at the BLM boat ramp located about 1 mile southwest of the LNG terminal site would exceed 55 dBA, and would be noticeable to users of the BLM boat ramp. The Port of Coos Bay would limit pile driving to daytime periods, five days per week over a period of approximately 32 weeks. This impact would be a temporary annoyance to users of the boat ramp. During operation, predicted noise from operation of the LNG terminal would be below 55 dBA at the BLM boat ramp, which would be below a noise level that would interfere or be an annoyance for users of the boat ramp.

During operation of the LNG terminal, BLM and COE lands near the Coos Bay navigation channel would receive limited noise impacts from LNG vessels arriving at and departing from the LNG terminal. Noise levels during ship movements are estimated to be about 63 dBA at a distance of 300 feet during each pass by an LNG carrier (less than once per day), which would be similar to noise generated from large vessels that currently traverse the channel. Noise from LNG carriers would not be expected to create a noticeable change in overall noise levels at BLM and COE lands along the Coos Bay navigation channel.

During construction of the Pacific Connector pipeline, there would be temporary noise impacts on federal lands crossed by the pipeline or crossed by construction access roads. Construction noise could have localized and temporary impact on recreational users and wildlife within federal lands. Assuming the operation of a piece of equipment results in typical noise levels of 88 dBA at 50 feet, the noise impact of that equipment would be 82 dBA at 100 feet and 72 dBA at 300 feet from the equipment. If two items of equipment operate concurrently in the same area, typical construction noise levels would be about 91 dBA at 50 feet, 85 dBA at 100 feet, and 75 dBA at 300 feet from the equipment. This noise impact would be a temporary annoyance to recreational users near the pipeline during active construction. Noise would diminish rapidly as the distance from the noise source increases, and the annoyance would be present only during active construction.

5.1.12 Reliability and Safety

We evaluated the safety of both the proposed facilities and the related LNG vessel transit through the Coos Bay Navigation Channel. As part of our evaluation, we performed a cryogenic design and technical review of the proposed terminal design and safety systems. Several areas of concern were noted with respect to the proposed facility, and we identified specific recommendations to be addressed by Jordan Cove before initial site preparation, before construction after final design, before commissioning, or before commencement of service.

Thermal radiation distances were calculated for 1,600 to 10,000 British thermal units per square foot per hour (Btu/ft²-hr) incident flux levels for an LNG storage tank impoundment fire. The resulting distances would be 482 feet for the 10,000 Btu/ft²-hr zone; 776 feet for the 3,000 Btu/ft²-hr zone; and 967 feet for the 1,600 Btu/ft²-hr zone. Because portions of the 1,600 and 3,000 Btu/ft²-hr thermal exclusion zones for the LNG storage tanks and the marine area impoundment basin extend beyond the plant fence line, Jordan Cove entered into an option for an easement with the Oregon International Port of Coos Bay to satisfy the thermal exclusion zone requirements of 49 CFR 193.2057. This option for an easement would give Jordan Cove an

easement on and over the portion of land that is required by FERC for siting purposes. Flammable vapor hazard distances were calculated for accident scenarios in the process area which resulted in a distance of 257 feet to the 2.5 percent average gas concentration.

Thermal radiation and flammable vapor hazard distances were calculated for an accident or an attack on a 140,000-m³ LNG carrier. For 1.0-, 1.4-, 2.5-, 3.0-, and 3.9-meter-diameter holes in an LNG cargo tank, we estimated distances to range from 2,154 to 5,225 feet for a thermal radiation level of 1,600 Btu/ft²-hr, the level, which is hazardous to unprotected persons located outdoors. Based on a 1.0-meter-diameter hole, an unignited release would result in an estimated pool radius of 421 feet. The unignited vapor cloud would extend to 10,237 feet to the lower flammable limit (LFL) and 13,618 feet to one-half the LFL. The results of these calculations are in agreement with the Zones of Concern used by the Coast Guard in assessing the waterway suitability. However, the evaluation of safety is more than an exercise in calculating the consequences of worst case scenarios. Rather, it is a determination of the acceptability of risk which considers: the probability of events, the effect of mitigation, and the consequences of events. Based on the extensive operational experience of LNG shipping, the structural design of an LNG carrier, and the operational controls imposed by the Coast Guard and the local pilots, the likelihood of a cargo containment failure and subsequent LNG spill from a vessel casualty – collision, grounding, or allision – is highly unlikely. As a result, the risk to the public from accidental spills from LNG carriers should be considered negligible.

Unlike accidental causes, historical experience provides little guidance in estimating the probability of a terrorist attack on an LNG carrier. For an LNG import terminal proposal that would involve having a large volume of energy transported and stored, the perceived threat of a terrorist attack is a primary concern of the local population and requires that resources be directed to mitigate possible attack paths. While the risks associated with the transportation of any hazardous cargo can never be entirely eliminated, they can be managed.

If an accidental or intentional breach of an LNG carrier resulting in a release of LNG were to occur during transit along the waterway, impacts on the various environmental resources within the Zones of Concern could result. LNG would not contaminate water, because it is not soluble, it floats, and the LNG would vaporize shortly after being spilled. The primary hazard from an LNG spill would be a pool fire if the vapors are ignited. A pool fire could have adverse effects on vegetation, wildlife, structures, and people. In general, the area of effect of an LNG release and any resulting fire would be fairly limited in area and short-lived. The severity and duration of the impacts would vary depending on the resource and its distance from the source, as resources in Zone 1 would be more severely impacted than resources in Zone 3. However, with implementation of the mitigation measures described in the Coast Guard's Waterway Suitability Report (WSR), a release would be highly unlikely and the potential impact on resources would be less than significant.

In accordance with 33 CFR 127.007, Jordan Cove submitted an LOI to the Coast Guard on April 10, 2006 conveying its intention to construct and operate an LNG import terminal at the proposed site. With its LOI Jordan Cove submitted a preliminary WSA to the Coast Guard in accordance with the guidance in NVIC 05-05. On April 27, 2006, the Coast Guard notified Jordan Cove that the LOI submission was complete and the Coast Guard would begin the process of assessing the safety and security issues associated with LNG traffic. The Coast Guard, with input from marine pilots, towing industry representatives, members of the Ports and

Waterways Safety Committee, the Area Maritime Security Committee, local law enforcement, and emergency response organizations, completed a review of Jordan Cove's WSA in accordance with the guidance in NVIC 05-05. The WSA review focused on the navigation safety and maritime security risks posed by LNG marine traffic, and the measures needed to responsibly manage these risks.

As part of our marine traffic analysis, we considered how vessel security requirements for LNG carriers calling on the proposed LNG terminal might affect other ship and boat traffic in Coos Bay. Based on the Coast Guard's review of Jordan Cove's WSA and consultations, the Coast Guard advised the FERC in its WSR dated July 1, 2008 that to make Coos Bay suitable for the LNG marine traffic associated with the Jordan Cove Project, specific risk mitigation measures would be necessary.

While the LOR would address the suitability of Coos Bay for LNG marine transportation, it would not constitute a final authority to commence LNG operations. Issues related to the public impact of safety and security zones would be addressed later in the development of the Coast Guard's LNG Vessel Transit Management Plan. This plan would be developed in conjunction with state and local law enforcement and emergency response communities.

An issue that has developed for several LNG terminal projects, including the Jordan Cove Project, is a concern that local communities would have to bear some of the costs of ensuring the security/emergency management of the LNG facility and the LNG vessel while in transit and unloading at the dock. The specific security/emergency management costs for the proposed project are not yet available. The final costs associated with security would be determined after the specific security needs and responsibilities have been established by the Coast Guard through consultations with other federal, state, and local agencies.

Section 3A(e) of the NGA, added by section 311 of the EPA Act of 2005, requires the LNG terminal operator to develop an ERP in consultation with the Coast Guard and state and local agencies. Jordan Cove has filed a draft ERP with FERC for review. The draft ERP submitted by Jordan Cove is still in the process of being completed and items required to be included in the ERP, such as the Cost Sharing Plan, have not yet been finalized. Therefore, we are recommending that Jordan Cove develop an ERP (including evacuation) and coordinate procedures with the Coast Guard; state, county, and local emergency planning groups; fire departments; state and local law enforcement; and appropriate federal agencies. The ERP must include a Cost-Sharing Plan that contains a description of any direct cost reimbursements the applicant agrees to provide to any state and local agencies with responsibility for security and safety at the LNG terminal and near vessels that serve the facility.

During active construction the contractor and company personnel present on the job would limit access to the public to potentially hazardous situations on the construction right-of-way such as operation of heavy equipment, or blasting for trench excavation. During construction off hours, the public could be exposed to hazards such open trench or loose rock. Locating the pipeline in non-populated areas helps to minimize the chance for unauthorized public access to the right-of-way. Where the pipeline would be placed within residential areas, Pacific Connector would minimize impacts and potential safety hazards by ensuring that the construction proceeds quickly through such areas, and by installing safety fencing along the edge of the construction work areas where construction work area would be within 50 feet of a residence. In residential areas Pacific

Connector would also limit the period of time the trench remains open prior to backfilling. For the residences within 50 feet of the proposed right-of-way, Pacific Connector has developed site-specific plans showing the temporary and permanent rights-of-way and noting special construction techniques and mitigation measures. The BLM and USFS can also require Pacific Connector to incorporate additional specific public safety measures into the Plan of Development as a condition of a Right-of-Way Grant for use of federal lands.

Effects on Federal Lands

The USFS has expressed concern about public safety during construction of the Pacific Connector Pipeline. Active pipeline construction can increase safety risks to the public generally in two ways, from an increase of traffic on roadways in the vicinity of the pipeline, and from potential exposure to construction activity itself within the construction right-of-way. Pacific Connector has developed draft Transportation Plans for both private and federal lands that describe measures that it would implement to minimize public access and safety concerns as a result of construction vehicle traffic and construction activity at roadway crossings. In addition, Pacific Connector would obtain all necessary permits for public roadway crossings and roadway use, and would comply with traffic control and public safety mitigation measures that are conditions of these permits.

During pipeline construction, the general public could be exposed to safety hazards within the pipeline construction right-of-way itself. Hazards would be typical of a construction site involving clearing, grading, and excavation, and could include timber felling, heavy equipment operation including on steep slopes, open trench, falling or rolling rock on steep slopes, and fly rock from blasting. During active construction the contractor and company personnel present on the job would limit access to the public to potentially hazardous situations such as operation of heavy equipment, or blasting for trench excavation. During construction off hours, unauthorized public use of the right-of-way could expose the public to hazards such open trench or loose rock. Locating the pipeline in non-populated areas helps to minimize the chance for unauthorized public access to the right-of-way.

Pacific Connector has proposed mitigation measures to protect the public from construction activity where the pipeline would be within residential areas. The BLM and USFS can require Pacific Connector to incorporate additional specific public safety measures into the Plan of Development as a condition of a Right-of-Way Grant for use of federal lands.

5.2 FERC STAFF'S RECOMMENDED MITIGATION

If the Commission approves the proposed JCE & PCGP Project, we recommend that the Commission's authorizations include the measures recommended below to further mitigate the environmental impacts associated with the construction and operation of the proposed Project.

Recommendations 1 through 13 are typically included as environmental conditions in Commission Orders for LNG and pipeline projects and shall apply to Jordan Cove and Pacific Connector.

1. Jordan Cove and Pacific Connector shall follow the construction procedures and mitigation measures described in their applications, supplemental filings (including

-
- responses to staff data requests), and as identified in the EIS, unless modified by the Order. Jordan Cove and Pacific Connector must:
- a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;
 - b. justify each modification relative to site-specific conditions;
 - c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and
 - d. receive approval in writing from the Director of the OEP before using that modification.
2. For pipeline facilities, the Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the Pacific Connector Project. This authority shall allow:
- a. the modification of conditions of the Commission's Order; and
 - b. the design and implementation of any additional measures deemed necessary (including stop work authority) to assure continued compliance with the intent of the environmental conditions as well as the avoidance or mitigation of adverse environmental impact resulting from project construction and operation.
3. For LNG facilities, the Director of OEP has delegated authority to take all steps necessary to ensure the protection of life, health, property, and the environment during construction and operation of the project. This authority shall include:
- a. stop-work authority and authority to cease operation; and
 - b. the design and implementation of any additional measures deemed necessary to assure continued compliance with the intent of the conditions of the Order.
4. **Before any construction for the LNG terminal and the pipeline**, Jordan Cove and Pacific Connector shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, EIs, and contractor personnel will be informed of the EI's authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs before becoming involved with construction and restoration activities.
5. The authorized facility locations shall be as shown in the EIS, as supplemented by filed alignment sheets, and shall include all of the staff's recommended facility locations. As soon as they are available, and before the start of construction for the LNG terminal and the pipeline, Jordan Cove and Pacific Connector shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.
6. Jordan Cove and Pacific Connector shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, pipe storage yards, new access roads, and other areas that would be used or disturbed and have not been

previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, and documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of OEP before construction in or near that area.

This requirement does not apply to extra workspace allowed by the Plan, minor field realignments per landowner needs, and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

- a. implementation of cultural resources mitigation measures;
- b. implementation of endangered, threatened, or special concern species mitigation measures;
- c. recommendations by state regulatory authorities; and
- d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

7. **At least 60 days before construction of the LNG terminal and the pipeline begins,** Jordan Cove and Pacific Connector shall file an Implementation Plan with the Secretary for review and written approval by the Director of OEP describing how Jordan Cove and Pacific Connector will implement the mitigation measures required by the Order. Jordan Cove and Pacific Connector must file revisions to the plan as schedules change. The plan shall identify:

- a. how Jordan Cove and Pacific Connector will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;
- b. the number of EIs assigned per spread, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;
- c. company personnel, including EIs and contractors, who will receive copies of the appropriate material;
- d. the training and instructions Jordan Cove and Pacific Connector will give to all personnel involved with construction and restoration (initial and refresher training as the Project progresses and personnel change), with the opportunity for OEP staff to participate in the training session(s);
- e. the company personnel (if known) and specific portion of Jordan Cove and Pacific Connector's organization having responsibility for compliance;
- f. the procedures (including use of contract penalties) Jordan Cove and Pacific Connector will follow if noncompliance occurs; and

-
- g. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:
- (1) the completion of all required surveys and reports;
 - (2) the mitigation training of onsite personnel;
 - (3) the start of construction; and
 - (4) the start and completion of restoration.
8. Jordan Cove and Pacific Connector shall develop and implement an environmental complaint resolution procedure. The procedure shall provide landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the Project and restoration of the right-of-way. Before construction of the LNG terminal and the pipeline, Jordan Cove and Pacific Connector shall mail the complaint procedures to each landowner whose property would be crossed or affected by the Project.
- a. In its letter to affected landowners, Jordan Cove and Pacific Connector shall:
- (1) provide a local contact that the landowners shall call first with their concerns; the letter shall indicate how soon a landowner shall expect a response;
 - (2) instruct the landowners that, if they are not satisfied with the response, they shall call Jordan Cove and Pacific Connector's Hotline; the letter shall indicate how soon to expect a response; and
 - (3) instruct the landowners that, if they are still not satisfied with the response from Jordan Cove and Pacific Connector's Hotline, they shall contact the Commission's Enforcement Hotline at (888) 889-8030.
- b. In addition, Jordan Cove and Pacific Connector shall include in its weekly status report a copy of a table that contains the following information for each problem/concern:
- (1) the date of the call;
 - (2) the identification number from the certificated alignment sheets of the affected property;
 - (3) the description of the problem/concern; and
 - (4) an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.
9. Jordan Cove and Pacific Connector shall employ at least one EI at the LNG terminal and one EI per pipeline spread. The EI shall be:
- a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;

-
- b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 7 above) and any other authorizing document;
 - c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;
 - d. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and
 - e. responsible for maintaining status reports.
 10. Jordan Cove and Pacific Connector shall file updated status reports prepared by the EI with the Secretary on a **weekly** basis until all construction and restoration activities are complete. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:
 - a. the current construction status of the Project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;
 - b. a listing of all problems encountered and each instance of noncompliance observed by the EI(s) during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);
 - c. corrective actions implemented in response to all instances of noncompliance, and their cost;
 - d. the effectiveness of all corrective actions implemented;
 - e. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and
 - f. copies of any correspondence received by Jordan Cove and Pacific Connector from other federal, state or local permitting agencies concerning instances of noncompliance, and Jordan Cove and Pacific Connector's response.
 11. Jordan Cove and Pacific Connector must receive written authorization from the Director of OEP before commencing service from the Project. Such authorization will only be granted following a determination that the LNG facility and the pipeline and associated facilities have been constructed in accordance with Commission approval and applicable standards, can be expected to operate safely as designed, and the rehabilitation and restoration of areas disturbed by construction are proceeding satisfactorily.
 12. **Within 30 days of placing the authorized facilities in service**, Jordan Cove and Pacific Connector shall file an affirmative statement with the Secretary, certified by a senior company official:
 - a. that the facilities have been constructed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or

-
- b. identifying which of the conditions of the order Jordan Cove and Pacific Connector has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.
 13. Jordan Cove and Pacific Connector shall develop and fund a third-party environmental monitoring program to be implemented **during construction** of the LNG terminal and pipeline. The program shall allow for on-site, third-party compliance monitors representing the FERC to be present full-time during all pipeline construction phases, and periodically during LNG terminal construction, to ascertain that the project is being built as outlined in this EIS, and in accordance with the environmental conditions of the FERC Order. **Prior to construction**, Jordan Cove and Pacific Connector shall file a plan describing the third-party environmental monitoring program with the Secretary for the review and written approval of the Director of OEP.

Recommendations 14 through 21 shall apply to the LNG terminal, and shall be addressed by Jordan Cove before the end of the comment period on the draft EIS.

14. **Before the end of the comment period on the draft EIS**, Jordan Cove shall file with the Secretary an updated breakdown of LNG carrier water uses, including cooling water intake, discharge, and related thermal effects in Coos Bay. (EIS section 4.3)
15. **Before the end of the comment period on the draft EIS**, Jordan Cove shall model the effects of prop wash and waves from LNG carriers and tug boat propellers on shoreline erosion and fish strandings in Coos Bay, and submit the findings to the Commission and the NMFS. Jordan Cove shall consult with the NMFS to determine if mitigation measures are required to reduce or eliminate excessive shoreline erosion and fish strandings, and shall file the results of the consultations with the Secretary. (EIS section 4.5)
16. Jordan Cove shall continue to consult with the NMFS and ODFW regarding the details of its proposed fish screening design to ensure the final design meets the requirements of these agencies. Jordan Cove shall file the results of this consultation, and any necessary revisions to its proposed screening design, for the review and approval of the Director OEP, **before the end of the comment period on the draft EIS**. (EIS section 4.5)
17. **Before the end of the comment period on the draft EIS**, Jordan Cove shall document review of DEA's Jordan Cove Energy Project Transportation Impact Analysis by Coos County and the City of North Bend, and comments on the study shall be filed with the Secretary. Jordan Cove shall also clarify if any construction at the terminal would occur on weekends during the summer, and if so, the transportation study should be updated to account for this. Any revised study shall be submitted to the ODOT, Coos County, and the City of North Bend for review, and their comments shall be filed with the Secretary. (EIS Section 4.9)
18. Jordan Cove shall submit a request for a FAA feasibility study under IAW FAA Order 7400.2G, 6-1-6. Jordan Cove shall consult with the FAA to ensure proper aspects of project alternatives are studied. **Before the end of the comment period on the draft EIS**, Jordan Cove shall file with the Secretary documentation of consultations with the FAA, and a copy of the feasibility study. (EIS section 4.9)

-
19. **Before the end of the comment period on the draft EIS**, Jordan Cove shall file with the Secretary information or design revisions which address the following issues:
 - a. a minimum flow recycle line shall be provided from the sendout pumps to the LNG storage tanks. The piping, including the isolation valve upstream of the discharge to the storage tanks, shall have the same pressure and temperature rating as the piping at the discharge of the sendout pumps;
 - b. relief valves and pressurized drains shall discharge to the LNG storage tanks; and
 - c. provisions shall be included to drain LNG from each vaporizer. (EIS section 4.12)
 20. **Before the end of the comment period on the draft EIS**, Jordan Cove shall file revised vapor production rate (source strength) calculations which address the following:
 - a. an analysis of an LNG spill from a break of the 6-inch-diameter recirculation line from the LNG unloading line;
 - b. step-by-step calculations for LNG flow velocity and LNG liquid height in the trenches, using methods consistent with those used to size the trenches and including technical justifications for all assumptions, selected parameters, and calculation methods; and
 - c. step-by-step calculations for the vapor production rate from a single trench element over a 10-minute time period, including technical justifications for all assumptions, selected parameters, and calculation methods. (EIS section 4.12)
 21. **Before the end of the comment period on the draft EIS**, Jordan Cove shall file information which provides the following:
 - a. a demonstration that the ambient temperature, relative humidity, and wind speed selected are a combination of those which result in longer predicted downwind dispersion distances than other weather conditions at the site at least 90 percent of the time, based on recorded data for the area;
 - b. technical justification for the lapse rate, ground surface material properties, and wind profile used to determine the downwind dispersion distances;
 - c. a grid sensitivity analysis that supports the selection of grid size and demonstrates the convergence of the downwind dispersion distances;
 - d. a sensitivity analysis and/or technical justification that supports the slip factor value used to determine the downwind dispersion distances;
 - e. technical justification for the vapor fence dimensions and material properties used to determine the downwind dispersion distances;
 - f. revised vapor dispersion calculations if the analyses from a-f does not support the values used in the March 28, 2008 submittal; and
 - g. input files (*.fds) and output files (*.out) used to determine the downwind dispersion distances. (EIS section 4.12)

Recommendations 22 through 45 shall apply to the pipeline and shall be addressed by Pacific Connector before the end of the comment period on the draft EIS.

-
22. **Before the end of the comment period on the draft EIS**, Pacific Connector shall incorporate Route Variation WC-1A into its proposed route between approximately MPs 0.5 and 2.5, and file with the Secretary updated alignment sheets and resource tables for the new route. (EIS section 3.1)
 23. **Before the end of the comment period for the draft EIS**, Pacific Connector shall incorporate the Southern Route Variation into its proposed route between approximately MPs 50.2 and 53.0, and file with the Secretary updated alignment sheets and resource tables for the new route, documentation of potential impacts on residences within 50 feet of the construction right-of-way, and measures to be implemented to mitigate those impacts. (EIS section 3.1)
 24. Pacific Connector shall consult with the landowners between about MPs 69.7 to 69.8 to identify ways to reduce potential impacts on future development of their property. Pacific Connector shall file the results of this landowner consultation with the Secretary, **before the end of the comment period on the draft EIS**. (EIS section 3.1)
 25. **Before the end of the comment period of the draft EIS**, Pacific Connector shall file with the Secretary documentation of consultations with the Oregon Women’s Land Trust, and updated alignment sheets and resource tables for any pipeline route changes resulting from those consultations. (EIS section 3.1)
 26. Pacific Connector shall continue to consult with the USFS to identify a preferred route for the segment of the pipeline in the area of Peavine quarry between about MPs 109 to 111. **Before the end of the comment period on the draft EIS**, Pacific Connector shall file with the Secretary the results of this additional consultation, and updated alignment sheets and resource tables for any pipeline route changes resulting from those consultations. (EIS section 3.1)
 27. Pacific Connector shall incorporate the C-2 Cattle Company Variation into its proposed route between approximately MPs 142 and 148, and file with the Secretary updated alignment sheets and resource tables for the new route, together with documentation of consultations with C-2, **before the end of the comment period on draft EIS**. (EIS section 3.1)
 28. Pacific Connector shall incorporate the PCT Variation into its proposed route between approximately MPs 167.8 to 168.1. **Before the end of the comment period on the draft EIS**, Pacific Connector shall file with the Secretary updated alignment sheets and resource tables for the new route. (EIS section 3.1)
 29. Pacific Connector shall incorporate the Clover Creek Road Variation into its proposed route between about MPs 171 and 187.6, with minor adjustments to reduce construction impacts related to topography. **Before the end of the comment period for the draft EIS**, Pacific Connector shall file with the Secretary updated alignment sheets and resource tables, and documentation of consultations with the BLM and USFS regarding the new route. (EIS section 3.1)
 30. **Before the end of the comment period for the draft EIS**, Pacific Connector shall file with the Secretary a listing by MPs for the USFS LSRs that would be crossed by the proposed pipeline and describes the rationale for routing the pipeline within LSRs and the measures that were, or would be, implemented to minimize impacts. (EIS section 3.1)

-
31. Pacific Connector shall conduct supplemental site-specific hazard analyses:
- a. that determine the potential liquefaction and lateral spreading hazards at locations currently listed as “unknown” in table 4.1.3.2-2 of this EIS;
 - b. at locations where potentially active faults would be crossed, determine whether there is evidence of Holocene displacement (MP 174, MP 178, and MP 213); and
 - c. at locations characterized as having moderate to high landslide potential.
- Pacific Connector shall include appropriate mitigation and detailed design measures for the sites identified above and file the results of these analyses with the Secretary **before the end of the comment period on the draft EIS**. (EIS section 4.1)
32. Pacific Connector shall continue to consult with the USFS and BLM regarding whether additional acreage should be restored to offset the topsoil segregation on NFS and BLM forested lands. Pacific Connector shall file the results of this consultation, including any resulting restoration plans, with the Secretary **before the end of the comment period on the draft EIS**. (EIS section 4.2.)
33. Pacific Connector shall continue to consult with the USFS and BLM regarding specific plans for hydrostatic test water withdrawal and discharge on NFS and BLM lands. As requested by the USFS, Pacific Connector shall provide additional details for mitigating potential impacts from hydrostatic testing on NFS lands. The results of the consultations with the USFS and BLM regarding hydrostatic test water withdrawal and discharge shall be filed with the Secretary **before the end of the comment period on the draft EIS**. (EIS section 4.3.)
34. Pacific Connector shall continue consultations with the USFS regarding additional details for the specific BMPs it would employ when crossing East Fork Cow Creek at about MP 108.9 to prevent the resuspension of existing mercury contamination, and shall file the results of those consultations with the Secretary **before the end of the comment period on the draft EIS**. (EIS section 4.3)
35. Pacific Connector shall develop a management plan that would ensure that the right-of-way and all work areas within marbled murrelet suitable habitat be kept clear of construction debris and food wastes that could attract marbled murrelet predators. **Before the end of the comment period on the EIS**, Pacific Connector shall file the plan with the Secretary, for the review and approval of the Director of OEP. (EIS section 4.6)
36. Pacific Connector shall prepare an avoidance and minimization plan that identifies additional measures to reduce the proposed impacts on northern spotted owl habitat. **Before the end of the comment period on the EIS**, Pacific Connector shall file the plan with the Secretary, together with documentation of any consultations with the FWS, for the review and approval of the Director of OEP. (EIS section 4.6)
37. Pacific Connector shall develop a mitigation plan that would avoid or minimize adverse impact on Applegate’s milk-vetch. The mitigation plan shall address both construction and operation of the pipeline. **Before the end of the comment period on the EIS**, Pacific Connector shall file the plan with the Secretary, together with documentation of any consultations with the FWS, for the review and approval of the Director of OEP. (EIS section 4.6)

-
38. Pacific Connector shall develop a mitigation plan that would avoid or minimize adverse impact on Gentner's fritillary. The mitigation plan shall address both construction and operation. **Before the end of the comment period on the EIS**, Pacific Connector shall file the plan with the Secretary, together with documentation of any consultations with the FWS, for the review and approval of the Director of OEP. (EIS section 4.6)
 39. Pacific Connector shall develop a mitigation plan that would avoid or minimize adverse impact on known locations of Kincaid's lupine. The mitigation plan shall address both construction and operation. **Before the end of the comment period on the EIS**, Pacific Connector shall file the plan with the Secretary, together with documentation of any consultations with the FWS, for the review and approval of the Director of OEP. (EIS section 4.6)
 40. Pacific Connector shall develop a mitigation plan that would avoid or minimize adverse impact on Point Reyes bird's-beak. The mitigation plan should address both construction and operation. **Before the end of the comment period on the EIS**, Pacific Connector shall file the plan with the Secretary, together with documentation of any consultations with the FWS, for the review and approval of the Director of OEP. (EIS section 4.6)
 41. Pacific Connector shall develop a mitigation plan that would avoid or minimize adverse impact on known locations of Cox's mariposa lily. The mitigation plan should address both construction and operation. **Before the end of the comment period on the EIS**, Pacific Connector shall file the plan with the Secretary, together with documentation of any consultations with the FWS, for the review and approval of the Director of OEP. (EIS section 4.6)
 42. Pacific Connector shall file with the Secretary, **before the end of the comment period on the draft EIS**, a plan that identifies measures that would either avoid entirely the need to use Old Ferry Road as a temporary access road, or would allow use of the road but without improvements. Measures should include, but not necessarily be limited to:
 - a. using BLM road 34-1-23 to access the right-of-way on the east side of the Rogue River between MPs 122.7 and 124.9; and
 - b. restricting use of Old Ferry Road to vehicles and equipment that could safely traverse the road as-is, with no need for improvements or road closures for the residents along the road. (EIS section 4.9)
 43. Pacific Connector shall submit its draft Transportation Plan for Non-Federal Lands to the ODOT and appropriate county agencies for review **before the end of the comment period on the draft EIS**. Pacific Connector shall file comments on its plan, revise the plan as necessary based on input from state and county officials, and file the revised plan with the Secretary, for the review and approval of the Director of OEP, **prior to the start of construction**. (EIS section 4.9)
 44. Pacific Connector shall identify all construction access roads on federal lands, or access roads leading to federal lands, where non-government parties hold existing cost-share agreements, permits, and/or right-of-way grants. Pacific Connector should provide a list of these parties, and the respective road and federal land management unit affected, to the USFS, BLM, and BOR, and file a copy of these data with the Secretary **before the end of the comment period on the draft EIS**. (EIS section 4.9)

-
45. Pacific Connector shall continue to consult with the BLM and USFS as necessary to develop visual resource protection design and mitigation measures that would be included in the POD for construction and operation of the proposed facilities on federally managed lands. Pacific Connector shall file with the Secretary, **before the end of the comment period on the draft EIS**, the additional design or mitigation measures that result from the consultation. (EIS section 4.7)

Recommendations 46 to 50 apply to both the LNG terminal and pipeline, and shall be addressed by Jordan Cove and Pacific Connector prior to the start of construction, prior to commissioning of the LNG terminal, and prior to the initiation of service on the pipeline.

46. **Prior to the start of construction**, Jordan Cove and Pacific Connector shall file with the Commission the following information on nonjurisdictional facilities that would be constructed as a result of their respective Projects:
- a. final placement or routing and design information, including maps depicting the location of the facilities;
 - b. documentation of consultations with the appropriate agencies and the status of federal, state, or local permits or approvals required for their construction and operation; and
 - c. status and copies of agency clearances (or copies of any surveys and reports prepared) for wetlands, threatened and endangered species, and cultural resources. (EIS section 2.2)
47. Jordan Cove and Pacific Connector shall be required to implement the following peer review process:
- a. **Prior to construction of the LNG terminal and pipeline**, Jordan Cove and Pacific Connector shall retain a “Board of Consultants” (Board) composed of three or more qualified independent engineering consultants experienced in the critical disciplines of geotechnical, civil, structural, and mechanical engineering, to review the final design and to perform construction quality inspections of the civil and structural aspects of the project in accordance with the specifications contained in the FERC’s Draft Seismic Design Guidelines and Data Submittal Requirements for LNG Facilities (FERC Seismic Guidelines) and other measures agreed to by Jordan Cove and Pacific Connector.
 - b. Jordan Cove and Pacific Connector shall file with the Secretary the names and qualifications of the Board members for approval by the Director of OEP.
 - c. The Board shall certify that all civil and structural detailed design calculations, analyses, and construction documents are in compliance with all applicable codes and standards, project-specific civil, structural, and mechanical design criteria, and other engineering requirements of the Order, including the FERC Seismic Guidelines. The Board shall further certify, based on construction inspections by the Board that all civil and structural construction of the terminal facilities is in conformance with the project construction documents. The Board shall also certify that all procured equipment has been properly seismic qualified in conformance with the project-specific seismic qualification requirements, and the FERC Seismic Guidelines, that seismic detailing of structures has been properly implemented, and

the pipeline has been designed to minimize the hazard of rupture due to ground instability.

- d. Among other things, the Board shall assess the adequacy of the following:
- o final geotechnical investigations necessary to support all final foundation designs in satisfying the FERC Seismic Guidelines, and final pipeline routing/mitigation measures through geologically hazardous areas;
 - o field tests and associated results used to verify ground improvement, pile driving, and all civil and structural construction;
 - o selection and implementation of the final seismic design categorization of all structures, systems, and components of the LNG terminal in satisfying the FERC Seismic Design Guidelines;
 - o proposed seismic recording instrumentation and shutdown alarms in satisfying the FERC Seismic Guidelines;
 - o construction procedures and progress; and
 - o continuous and/or periodic inspections made by the Board to ensure that the construction quality of all Seismic Category I, II, and III structures, systems, and components is acceptable.
- e. The Board shall meet as necessary to allow the timely progress of the final design approvals and construction of the project in accordance with Jordan Cove and Pacific Connector's production of acceptable interim and final design data.
- f. Before each meeting, Jordan Cove and Pacific Connector shall file the following material with the Commission and furnish copies to members of the Board, and other appropriate federal and/or state agencies at the request of the Director of OEP:
- o a statement of the specific level of review the Board is expected to provide;
 - o an agenda for the meeting;
 - o a list of the items to be discussed;
 - o a discussion of significant events in the design and construction that have occurred since the previous Board meeting;
 - o drawings of the design and construction features; and
 - o documentation of the details, calculations, and analyses of the design and construction features to be discussed.
- g. Jordan Cove and Pacific Connector shall ensure that the Commission and the Board has sufficient time to review all pertinent materials before each meeting.
- h. **Within 30 days** of each Board meeting, Jordan Cove and Pacific Connector shall file with the Commission copies of the Board's report and a statement of intent to comply with the Board's recommendations or a statement of a plan to resolve the

issue(s). Jordan Cove and Pacific Connector must provide detailed reasons for any recommendation of the Board not implemented.

- i. The Board's review comments shall be submitted prior to or simultaneously with Jordan Cove and Pacific Connector's request(s) for approval to proceed with any specific construction-related activities that may be required by the Order. The Director of OEP must approve in writing all requests to proceed with construction. (EIS section 4.1)
48. **Prior to commissioning** of the LNG terminal or commencing service through the pipeline, Jordan Cove and Pacific Connector shall file the Board's final report, which shall contain a statement indicating the Board's opinion with respect to the construction, safety, and adequacy of the LNG terminal structures and mitigation measures employed along the pipeline route in areas subject to ground instability. (EIS section 4.1)
49. Jordan Cove and Pacific Connector shall not construct or use any of their proposed facilities, including related ancillary areas for staging, storage, temporary work areas, and new or to-be-improved access roads until:
- a. the Commission staff completes formal consultations with the NMFS and FWS; and
 - b. Jordan Cove and Pacific Connector have received written notification from the Director of OEP that construction and/or implementation of conservation measures may begin. (EIS Section 4.6)
50. Jordan Cove and Pacific Connector shall not construct or use any of their proposed facilities, including related ancillary areas for staging, storage, temporary work areas, and new or to-be-improved access roads, until:
- a. Jordan Cove and Pacific Connector file with the Secretary the results of all additional cultural resource surveys, ethnographic studies, site evaluation investigations, a historic properties management plan, revised unanticipated discovery plan, and any necessary avoidance/treatment plans;
 - b. Jordan Cove and Pacific Connector file with the Secretary the comments of land managing agencies, the SHPO, and interested Indian tribes on all cultural resources reports or plans;
 - c. The ACHP has been given an opportunity to comment if any historic properties would be adversely effected by the Project; and
 - d. The Director of OEP reviews and approves all cultural resources reports and plans, and notifies Jordan Cove and Pacific Connector in writing that treatment plans/mitigation measures may be implemented or construction may proceed.
- All materials filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "CONTAINS PRIVILEGED INFORMATION – DO NOT RELEASE." (EIS section 4.10)

Recommendations 51 to 54 apply to the LNG terminal, and shall be addressed by Jordan Cove prior to the start of construction, or prior to commissioning of the LNG terminal.

51. Jordan Cove shall develop site-specific tsunami wave runup heights and wave velocities for the LNG terminal site based upon the most current DOGAMI data on tsunami sources and runup height determination procedures for the Coos Bay site. The computer simulated runup heights, flow depths, and velocities should consider the most current bathymetric and topographic conditions after construction of the proposed terminal. Design of the barrier wall should consider the effects of tsunami waves, including scour and deposition in the path of the scenario tsunamis, flow velocities, any highly probable impact loads from potential floating objects including adrift vessels and barges, breaking waves (if determined likely), prolonged inundation, and the effects of tectonic subsidence (prolonged changes in tidal elevation inherent in the earthquake source scenarios used for tsunami generation). Submittals that demonstrate compliance shall be filed with the Secretary **prior to construction**. (EIS section 4.1)
52. Jordan Cove shall continue to consult with the COE, NMFS, ODSL, and ODFW, and other appropriate resource agencies to develop a final compensatory mitigation plan for permanent impacts on eelgrass. Jordan Cove shall file the final plan, including documentation of agency consultations, with the Secretary **prior to construction** of the LNG terminal, for the review and approval of the Director of OEP. (EIS section 4.3)
53. **Prior to construction** of the LNG terminal, Jordan Cove shall file with the Secretary documentation of concurrence from the ODLCD that the proposed LNG terminal and slip would be consistent with the CZMA. (EIS section 4.7)
54. If the LNG terminal meets the notification standards outlined in 14 CFR Subchapter E, then Jordan Cove shall submit the appropriate notice to the FAA under FAR 77, with a copy filed with the Secretary **with its Implementation Plan**. (EIS section 4.9)

Recommendations 55 to 69 apply to the pipeline, and shall be addressed by Pacific Connector prior to the start of construction, prior to being placed in service, or during operation.

55. Pacific Connector's exercise of eminent domain authority granted under section 7h of the NGA in any condemnation proceeding related to the Order for the pipeline must be consistent with the authorized facilities and locations. Pacific Connector's right of eminent domain granted under section 7h of the NGA does not authorize it to increase the size of its natural gas pipeline to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas. (EIS section 2.3)
56. In situations where Pacific Connector uses the power of eminent domain under section 7h of the NGA to acquire a permanent right-of-way on non-federal or non-tribal lands the width of that easement shall not exceed 50 feet. (EIS section 2.3)
57. Pacific Connector shall prepare a plan to address the unanticipated discovery of contaminated soils or groundwater during construction. The plan shall include notification of the appropriate agencies and landowners and the development of mitigation measures based on site-specific conditions. The plan should be filed with the Secretary **prior to construction of the pipeline**, for the review and approval of the Director of OEP. (EIS section 4.3)

-
58. Pacific Connector shall consult with all surface water intake operators with active intakes located within 3 miles downstream from a stream crossing location and establish a process for advanced notification of instream work. A summary of the consultations shall be filed with the Secretary **prior to construction of the pipeline.** (EIS section 4.3)
 59. Pacific Connector shall file detailed timber extraction plans with the Secretary **120 days prior to construction.** Timber extraction plans shall be prepared in consultation with the respective landowners and land managing agencies, and separate plans shall be prepared for state, BLM, and NFS lands. At a minimum, timber extraction plans should include the following information: timber volume to be cleared, tree sizes, log grades, dollar value of timber, logging system(s) to be used for each harvest segment, yarding methods and locations, volume of timber that would be yarded at each landing, the location of landings and decks, roads that would be used to haul the logs, and the haul distance for each harvest segment. (EIS section 4.4)
 60. Pacific Connector shall prepare a danger tree plan that outlines a procedure for removal of trees that present a hazard located outside of approved construction areas. The plan should be filed for review and approval by the Director of OEP **at least 120 days prior to construction.** (EIS section 4.4)
 61. Pacific Connector shall develop a project-specific Aquatic Species Nuisance Prevention Plan, based on the Oregon Aquatic Nuisance Species Management Plan. This plan shall address at a minimum, movement of equipment and hydrostatic test water between USGS hydrologic basins crossed by the proposed pipeline. The plan procedure should be specific on methods to be used to ensure species such as Quagga mussels, zebra mussels, New Zealand mud snails, Chytrid fungus, and other species would be prevented from both entering waterbodies in the pipeline project area and being transferred between waterbodies. The plan should be filed with the Secretary **prior to construction.** (EIS section 4.5)
 62. Pacific Connector shall develop a stream habitat mitigation plan for placement of LWD or other stream improvements that would ensure that agency concurrence is received for site-specific details at each waterbody crossing where mitigation is proposed. The plan shall include at a minimum, details of when, where, and what structures (e.g., LWD) would be placed in streams, and/or describe the process for making those decisions. The plan shall also identify agency input received during the development of the plan. The plan shall be filed with the Secretary **prior to construction.** (EIS section 4.5)
 63. Pacific Connector shall confirm the presence or absence of vernal pool fairy shrimp at all pipe storage yards, and file this information with the Secretary **prior to construction.** For yards that contain the species, Pacific Connector shall either defer use of the yard or develop and file for review and approval of the Director of OEP a plan to avoid both direct and indirect impacts to vernal pool fairy shrimp habitat. (EIS section 4.6)
 64. Pacific Connector shall file with the Secretary, **prior to construction of the pipeline,** documentation of concurrence from the ODLCD that the proposed pipeline would be consistent with the CZMA. (EIS section 4.7)

-
65. **Before pipeline construction begins**, Pacific Connector shall file with the Secretary, for the review and written approval of the Director of OEP:
- a. the results of a civil survey of the entire pipeline route that identifies all residences and commercial structures within 50 feet of the construction right-of-way;
 - b. a plan outlining measures that should be implemented to mitigate pipeline construction impacts on domestic water supply systems and septic systems; and
 - c. For any residence closer than 25 feet to the construction work area, Pacific Connector shall file a site-specific plan with the Secretary for the review and written approval of the Director of OEP **before pipeline construction**. The plan should include:
 1. a description of construction techniques to be used (such as reduced pipeline separation, centerline adjustment, use of stove-pipe or drag-section techniques, working over existing pipelines, pipeline crossover, bore, etc.), and include a dimensioned site plan that shows:
 - A. the location of the residence in relation to the new pipeline and, where appropriate, the existing pipelines;
 - B. the edge of the construction work area;
 - C. the edge of the new permanent right-of-way; and
 - D. other nearby residences, structures, roads, or waterbodies.
 2. a description of how Pacific Connector would ensure the trench is not excavated until the pipe is ready for installation and the trench is backfilled immediately after pipe installation; and
 3. evidence of landowner concurrence if the construction work area and fencing would be located within 10 feet of a residence. (EIS section 4.7.3)
66. Pacific Connector should continue to consult with the BLM as necessary to ensure that appropriate site-specific mitigation measures are included in the POD, including revegetation, to reduce or mitigate impacts on the Upper Rock Creek ACEC at MP 43.85. The results of these consultations should be filed with the Secretary **before pipeline construction begins**. (EIS section 4.7)
67. In order to provide the USFS and BLM adequate time to provide notice to the public and other road users, Pacific Connector shall provide a construction work plan, **updated weekly** during construction, that would provide the agencies an estimate of when access on federally managed roads would be impeded or restricted. This should include work on any non-federal roads that would directly affect access to federally managed roads. Pacific Connector shall initiate additional discussion with the USFS and BLM on road closure notification **prior to preparing the POD**. Pacific Connector shall file with the Secretary the results of these consultations, **prior to pipeline construction**. (EIS section 4.9)

-
68. Pacific Connector shall make all reasonable efforts to ensure its predicted noise levels from the Butte Falls Compressor Station are not exceeded at NSAs, and file noise surveys showing this with the Secretary **no later than 60 days** after placing the compressor station in service. If the noise attributable to the operation of the compressor station exceeds an Ldn of 55 dBA at any NSA, Pacific Connector shall file with the Secretary a report on what changes are needed and should install additional noise controls to meet the state and FERC standards **within 1 year of the in-service date**. Pacific Connector shall confirm compliance with these requirements by filing a second noise survey with the Secretary **no later than 60 days after it installs the additional noise controls**. (EIS section 4.11)
69. Pacific Connector shall make all reasonable efforts to ensure its predicted noise levels from metering stations/interconnects are not exceeded at NSAs, and file noise surveys showing this with the Secretary **no later than 60 days after placing the metering stations/interconnects in service**. If the noise attributable to the operation of any metering station/interconnect exceeds 55 dBA Ldn at an NSA, Pacific Connector shall file with the Secretary a report on what changes are needed and should install additional noise controls to meet the level **within 1 year of the in-service date**. Pacific Connector shall confirm compliance with these requirements by filing a second noise survey with the Secretary **no later than 60 days after it installs the additional noise controls**. (EIS section 4.11).

Recommendation 70 shall apply to Jordan Cove’s terminal design and construction details. Information pertaining to this recommendation shall be filed with the Secretary for review and approval by the Director of OEP either: prior to initial site preparation; prior to commencing final design; prior to construction; or prior to commissioning as indicated by each specific subsection of the recommendation. All detailed design documents (drawings, calculations, specifications, etc.) and design submittals shall satisfy the requirements of Section 4, Part II of the FERC’s draft “Seismic Design Guidelines and Data Submittal Requirements for LNG Facilities,” January 2007 (FERC Seismic Guidelines).

70. In consideration that the LNG terminal design is currently at the FEED stage, Jordan Cove shall implement the following **prior to construction**:
- a. Final seismic specifications to be used in conjunction with the procuring Category I, II, and III equipment as described in section 3.10 of Part II of the Commission’s Draft Seismic Design Guidelines and Data Submittal Requirements for LNG Facilities (FERC Seismic Guidelines) shall be submitted for review **prior to commencing final design**. The final seismic specifications shall satisfy Part I of the FERC Seismic Guidelines.
 - b. Final Quality Control and Assurance procedures as described in section 3.11 of Part II of the FERC Seismic Guidelines that would be used for design and construction shall be submitted for review **prior to commencing final design** of the LNG terminal. The Final Quality Control and Assurance procedures shall satisfy Part I of the FERC Seismic Guidelines.
 - c. A final list of Seismic Category assignments for all structures, systems and components shall be submitted for review **prior to commencing final design** as described in section 3.6 of Part II of the FERC Seismic Guidelines. The final

classification definitions and assignments shall satisfy Part I of the FERC Seismic Guidelines.

- d. Final Seismic Design Criteria shall be provided for all Seismic Design Category I, II, and III structures, systems, and components as described in section 3.7 of Part II of the FERC Seismic Guidelines **prior to commencing final design**. The Final Seismic Design Criteria shall satisfy Part I of the FERC Seismic Guidelines.
- e. LNG Tank and Foundation Design shall comply with Part I of the FERC Seismic Guidelines. Submittals that demonstrate compliance shall be provided **prior to commencing final design**.
- f. The Seismic Isolation system for the LNG tanks shall comply with the design, analysis and testing requirements of Chapter 17 of ASCE 7-05. Peer Review of the design shall be performed as required by Chapter 17. Submittals that demonstrate compliance shall be provided **prior to commencing final design**.
- g. Potential zones of liquefaction at the terminal site shall be mitigated. Details of the liquefaction mitigation method(s), procedures, plan extent, and verification methods proposed to verify mitigation of liquefaction potential shall be provided **prior to commencing final design**.
- h. Where necessary, detailed calculations of seismic slope stability and lateral movements anticipated after the liquefaction mitigation is implemented shall be provided **prior to commencing final design** to verify the stability of critical structures for the Project LNG terminal design earthquake motions.
- i. Final foundation design recommendations including foundation design and/or liquefaction mitigation measures for all other structures shall be submitted for review and approval **prior to construction**. Final foundation design recommendations shall satisfy Part I of the FERC Seismic Guidelines.
- j. The results of the hydrostatic load tests on the LNG storage tanks, including settlement data as described in section 7.4.1 shall be provided **prior to commissioning**. (EIS section 4.1)

The following measures shall apply to the Jordan Cove LNG terminal. Information pertaining to these specific recommendations shall be filed with the Secretary for review and written approval by the Director of OEP either prior to initial site preparation; prior to construction of final design; prior to commissioning; or prior to commencement of service, as indicated by each specific condition. Specific engineering, vulnerability, or detailed design information meeting the criteria specified in Order No. 683 (Docket No. RM06-24-000), including security information, shall be submitted as critical energy infrastructure information (CEII) pursuant to 18 CFR 388.112. See Critical Energy Infrastructure Information, Order No. 683, 71 Fed. Reg. 58,273 (October 3, 2006), FERC Stats. & Regs. ¶ 31,228 (2006). Information pertaining to items such as offsite emergency response; procedures for public notification and evacuation; and construction and operating reporting requirements will be subject to public disclosure. All information shall be filed a minimum of 30 days before approval to proceed is required.

- 71. **Prior to initial site preparation**, Jordan Cove shall file finalized documentation of the easement agreement, which demonstrates that the thermal exclusion zones extending

-
- beyond the plant property line comply with 49 CFR 193.2007 and 193.2057 (EIS section 4.12)
72. **Prior to initial site preparation**, Jordan Cove shall file finalized documentation of the easement agreement, which demonstrates that the vapor dispersion exclusion zones extending beyond the plant property line comply with 49 CFR 193.2007 and 193.2059. (EIS section 4.12)
73. Complete plan drawings and a list of the hazard detection equipment shall be filed **prior to initial site preparation**. The list shall include the instrument tag number, type and location, alarm locations, and shutdown functions of the proposed hazard detection equipment. Plan drawings shall clearly show the location of all detection equipment. (EIS section 4.12)
74. Jordan Cove shall provide a technical review of its proposed facility that:
- a. identifies all combustion/ventilation air intake equipment and the distances to any possible hydrocarbon release (LNG, flammable refrigerants, flammable liquids and flammable gases); and
 - b. demonstrates that these areas are adequately covered by hazard detection devices and indicates how these devices would isolate or shutdown any combustion equipment whose continued operation could add to or sustain an emergency.
 - c. Jordan Cove shall file this review **prior to initial site preparation**. (EIS section 4.12)
75. Complete plan drawings and a list of the fixed and wheeled dry-chemical, fire extinguishing, and other hazard control equipment shall be filed **prior to initial site preparation**. The list shall include the equipment tag number, type, size, equipment covered, and automatic and manual remote signals initiating discharge of the units. Plan drawings shall clearly show the planned location of all fixed and wheeled extinguishers. (EIS section 4.12)
76. Facility plans showing the proposed location of, and area covered by, each monitor, hydrant, deluge system, hose, and sprinkler, as well as piping and instrumentation diagrams, of the firewater system shall be filed **prior to initial site preparation**. (EIS section 4.12).
77. A copy of the hazard design review and list of recommendations that are to be incorporated in the final facility design shall be filed **prior to initial site preparation**. (EIS section 4.12)
78. Drawings of the storage tank piping support structure and support of horizontal piping at grade shall be filed **prior to initial site preparation**. (EIS section 4.12)
79. Procedures shall be developed for offsite contractors' responsibilities, restrictions, and limitations and for supervision of these contractors by Jordan Cove staff, **prior to initial site preparation**. (EIS section 4.12)
80. Complete plan drawings of the security fencing and of facility access and egress shall be provided **prior to initial site preparation**. (EIS section 4.12)

-
81. Jordan Cove shall develop an Emergency Response Plan (including evacuation) and coordinate procedures with the Coast Guard; state, county, and local emergency planning groups; fire departments; state and local law enforcement; and appropriate federal agencies. This plan shall include at a minimum:
- a. designated contacts with state and local emergency response agencies;
 - b. scalable procedures for the prompt notification of appropriate local officials and emergency response agencies based on the level and severity of potential incidents;
 - c. procedures for notifying residents and recreational users within areas of potential hazard;
 - d. evacuation routes/methods for residents and other public use areas that are within any transient hazard areas along the route of the LNG marine traffic;
 - e. locations of permanent sirens and other warning devices; and
 - f. an “emergency coordinator” on each LNG vessel to activate sirens and other warning devices.

The Emergency Response Plan shall be filed with the Secretary for review and written approval by the Director of OEP **prior to initial site preparation**. Jordan Cove shall notify the FERC staff of all planning meetings in advance and shall report progress on the development of its Emergency Response Plan at **3-month intervals**. (EIS section 4.12)

82. The Emergency Response Plan shall include a Cost-Sharing Plan identifying the mechanisms for funding all project-specific security/emergency management costs that will be imposed on state and local agencies. In addition to the funding of direct transit-related security/emergency management costs, this comprehensive plan shall include funding mechanisms for the capital costs associated with any necessary security/emergency management equipment and personnel base. The Cost-Sharing Plan shall be filed with the Secretary for review and written approval by the Director of OEP **prior to initial site preparation**. (EIS section 4.12)
83. Jordan Cove shall provide information/revisions related to the 20 responses to the October 31, 2007 Engineering Information Request, which stated that corrections or modifications would be made to the design. The **final design** shall specifically address response numbers 3, 9, 10, 16, 17, 26, 31, 37, 38, 39, 43, 62, 63, 64, 65, 68, 69, 70, 71, and 74 using management of change procedures. (EIS section 4.12)
84. The P&IDs in the **final design** shall show and number all valves including drain, vent, main, and car sealed. (EIS section 4.12)
85. The **final design** shall specify that piping and equipment that may be cooled with liquid nitrogen are designed for liquid nitrogen temperatures, with regard to allowable movement and stresses. (EIS section 4.12)
86. The **final design** shall include a HAZOP review of the completed design. A copy of the review and a list of the recommendations shall be filed. (EIS section 4.12)
87. The **final design** shall specify that the LNG tank carbon steel piping support plates and connections to piping supports shall be designed to ensure that corrosion protection is adequately provided and provisions for corrosion monitoring and maintenance of carbon

-
- steel attachments are to be included in the design and maintenance procedures. (EIS section 4.12)
88. The **final design** of the tank foundation shall include an inclinometer, instrumented to record and display tank settlement, and a minimum of eight permanent reference points, equally spaced around the base for elevation survey measurement. (EIS section 4.12)
 89. The **final design** shall include details of the LNG tank tilt settlement and differential settlement limits between each LNG tank and its piping, as well as the procedures to be implemented in the event that those limits are exceeded. (EIS section 4.12)
 90. The **final design** shall include detailed drawings of the spill control system to be applied to the LNG tank roof. (EIS section 4.12)
 91. The **final design** shall include details of the boiloff gas temperature measurement for each tank. (EIS section 4.12)
 92. The **final design** shall specify that the first isolation valve at the inlet to the sendout pumps will be a weld end shutoff valve. In the case that flanged valves are specified, the sendout system shall be shutdown in the event of a leak. (EIS section 4.12)
 93. The **final design** shall specify that the first isolation valve at the inlet to the deethanizer feed pumps will be a weld end shutoff valve. In the case that flanged valves are specified, the deethanizer system shall be shutdown in the event of a leak. (EIS section 4.12)
 94. The **final design** shall specify that the first isolation valve at the inlet to the NGL product pumps will be a weld end shutoff valve. In the case that flanged valves are specified, the NGL system shall be shutdown in the event of a leak. (EIS section 4.12)
 95. The **final design** shall provide provisions to shutdown the sendout pumps in the event that the discharge flow falls below the minimum recommended flow specified by the manufacturer. (EIS section 4.12)
 96. The **final design** shall specify that dual low low temperature elements and shutdown are to be provided at the discharge of the vaporizers. (EIS section 4.12)
 97. The **final design** shall include a pilot relief valve or operated vent valve sized for thermal relief at the discharge of each vaporizer, upstream of the isolation valves. (EIS section 4.12)
 98. The **final design** shall include P&IDs and drawings of the natural gas meter station. (EIS section 4.12)
 99. The **final design** shall include P&IDs and drawings of the NGL product meter station. (EIS section 4.12)
 100. The **final design** of the vapor return system shall specify that the vapor inlet piping to the desuperheater knockout drum, shall be designed to ensure that LNG, from the desuperheater and LNG piping discharging to the drum, cannot back flow to the vapor return piping. (EIS section 4.12)
 101. The **final design** shall specify that all drains from high-pressure LNG systems are to be equipped with double isolation and bleed valves. (EIS section 4.12)

-
102. The **final design** shall include piping specifications that include pressure ratings consistent with standard ratings of the flange classes proposed for the facility. (EIS section 4.12)
 103. The piping specifications for the **final design** shall specify that the minimum temperature for all piping in cryogenic service shall be -325 °F. (EIS section 4.12)
 104. The **final design** shall specify that for LNG and natural gas service, branch piping and piping nipples less than 50mm (2 inches), shall be no less than schedule 160. (EIS section 4.12)
 105. The layout and elevation drawings of the process equipment that are appropriate for the proposed operation and maintenance of the facility shall be included in the **final design** and filed with the FERC at the time that the EPC contractor issues the drawing for review. This milestone shall be included in the project schedule. (EIS section 4.12)
 106. The **final design** shall include provisions for the future installation of an LNG pump for the desuperheater knockout drum. (EIS section 4.12)
 107. The **final design** shall include provisions for the future installation of an LNG pump for the BOG compressor suction drum. (EIS section 4.12)
 108. The **final design** shall specify that the vapor inlet piping to the BOG compressor suction drum shall be designed to ensure that LNG, from the desuperheater and LNG piping discharging to the drum, cannot back flow to the vapor return piping. (EIS section 4.12)
 109. The **final design** shall ensure that the LNG spray control valve at the desuperheater, upstream of the BOG compressor suction drum and the associated controls are designed to prevent operation when boiloff vapor is not flowing through the drum. (EIS section 4.12)
 110. The **final design** shall include provisions to install temporary high pressure boiloff compression in the event that sendout operation is curtailed, or ceased for a period in excess of 30 days.
 111. Details shall include plans and drawings of the boiloff gas recovery system and specifications of the equipment and compressors to be installed. (EIS section 4.12)
 112. The **final design** shall specify that the design pressure of sendout equipment containing LNG in low pressure service shall not be less than the design pressure of the piping system. (EIS section 4.12)
 113. The **final design** shall specify that LNG relief valves and LNG drains shall not discharge into the vapor system. (EIS section 4.12)
 114. The **final design** shall include provisions to control venting of the deethanizer system to the flare vent. (EIS section 4.12)
 115. The **final design** of the blow down drum shall include a fail closed shutoff valve in the drain line, actuated by low temperature in the drum. (EIS section 4.12)
 116. The **final design** shall provide each LNG pump suction vessel with a pressure relief valve. (EIS section 4.12)

-
117. The **final design** shall specify that the hazardous area classification of the LNG pump area and vaporizer LNG inlet and outlet piping areas are classified as Class 1 Group D, Division 1. (EIS section 4.12)
 118. The **final design** shall include details of the air gaps to be installed downstream of all seals or isolations installed at the interface between a flammable fluid system and an electrical conduit or wiring system. Each air gap shall vent to a safe location and be equipped with a leak detection device that shall continuously monitor for the presence of a flammable fluid; shall alarm the hazardous condition; and shall shutdown the appropriate systems. (EIS section 4.12)
 119. The **final design** of the hazard detection equipment shall identify manufacturer and model. (EIS section 4.12)
 120. The **final design** shall specify that all hazard detection equipment shall include redundancy and fault detection as well as fault alarm monitoring in all potentially hazardous areas and enclosures. (EIS section 4.12)
 121. The **final design** of the fixed and wheeled dry-chemical, fire extinguishing and high expansion foam hazard control equipment shall identify manufacturer and model.
 122. The **final design** shall include an updated fire protection evaluation carried out in accordance with the requirements of NFPA 59A 2001, chapter 9.1.2. (EIS section 4.12)
 123. The **final design** of the firewater system shall include provisions to measure and record the discharge flow and pressure from each of the firewater pumps. (EIS section 4.12)
 124. The **final design** shall include emergency shutdown of equipment and systems activated by hazard detection devices for flammable gas, fire, and cryogenic spills, when applicable. (EIS section 4.12)
 125. The **final design** shall include details of the shut down logic, including cause and effect matrices for alarms and shutdowns. (EIS section 4.12)
 126. The **final design** shall specify that all ESD valves are to be equipped with open and closed position switches connected to the DCS/SIS. (EIS section 4.12)
 127. The **final design** of the boiloff compressor shelter/building shall provide permanent protection of the equipment and operating and maintenance personnel from adverse weather conditions. The design details and procedures to record and to prevent the tank fill rate from exceeding the maximum fill rate specified by the tank designer shall be filed prior to commissioning. (EIS section 4.12)
 128. The maintenance procedures to be filed **prior to commissioning** shall state that a foundation elevation survey of all LNG tanks shall be made on an annual basis. (EIS section 4.12)
 129. All valves including drain, vent, main, and car sealed, or locked valves shall be tagged in the field during construction and **prior to commissioning**. (EIS section 4.12)
 130. A tabulated list of the proposed hand-held fire extinguishers shall be filed **prior to commissioning**. The information shall include a list with the equipment number, type, size, number, and location. Plan drawings shall include the type, size, and number of all hand-held fire extinguishers. (EIS section 4.12)

-
131. Operation and maintenance procedures and manuals, as well as safety procedure manuals, shall be filed **prior to commissioning**. (EIS section 4.12)
 132. The contingency plan for failure of the LNG tank outer containment shall be filed **prior to commissioning**. (EIS section 4.12)
 133. A copy of the criteria for horizontal and rotational movement of the inner LNG storage tank for use during and after cooldown shall be filed **prior to commissioning**. (EIS section 4.12)
 134. The FERC staff shall be notified of any proposed revisions to the security plan and physical security of the facility **prior to commencement of service**. (EIS section 4.12)
 135. **Until commencement of service**, Jordan Cove shall **annually** review its WSA relating to LNG marine traffic for the project; update the assessment to reflect changing conditions which may impact the suitability of the waterway for LNG marine traffic; provide the updated assessment to the cognizant Captain of the Port/Federal Maritime Security Coordinator for review and validation and if appropriate, further action by the Captain of the Port/Federal Maritime Security Coordinator relating to LNG marine traffic; and provide a copy to FERC staff. (EIS section 4.12)
 136. Progress on construction of the project shall be filed in monthly reports. Details shall include a summary of activities, projected schedule for completion, problems encountered and remedial actions taken. Problems of significant magnitude shall be reported to the FERC **within 24 hours**. (EIS section 4.12)

In addition, we recommend that the following measures shall apply throughout the life of the LNG facility:

137. The facility shall be subject to regular FERC staff technical reviews and site inspections on at least an **annual basis** or more frequently as circumstances indicate. Prior to each FERC staff technical review and site inspection, Jordan Cove shall respond to a specific data request including information relating to possible design and operating conditions that may have been imposed by other agencies or organizations. Up-to-date detailed piping and instrumentation diagrams reflecting facility modifications and provision of other pertinent information not included in the semi-annual reports described below, including facility events that have taken place since the previously submitted semi-annual report, shall be included. (EIS section 4.12)
138. **Semi-annual** operational reports shall be filed with the Secretary to identify changes in facility design and operating conditions, abnormal operating experiences, activities (including LNG carrier arrivals, quantity and composition of imported LNG, vaporization quantities, boil-off/flash gas, etc.), plant modifications including future plans and progress thereof. Abnormalities shall include, but not be limited to: unloading/carrier problems, potential hazardous conditions from offsite vessels, storage tank stratification or rollover, geysering, storage tank pressure excursions, cold spots on the storage tanks, storage tank vibrations and/or vibrations in associated cryogenic piping, storage tank settlement, significant equipment or instrumentation malfunctions or failures, non-scheduled maintenance or repair (and reasons therefore), relative movement of storage tank inner vessels, vapor or liquid releases, fires involving natural gas and/or from other sources, negative pressure (vacuum) within a storage tank, and higher than predicted

boiloff rates. Adverse weather conditions and the effect on the facility shall also be reported. Reports shall be submitted **within 45 days** after each period ending **June 30 and December 31**. In addition to the above items, a section entitled "Significant plant modifications proposed for the next 12 months (dates)" shall also be included in the semi-annual operational reports. Such information will provide the FERC staff with early notice of anticipated future construction/maintenance projects at the LNG facility. (EIS section 4.12)

139. In the event the temperature of any region of any secondary containment becomes less than the minimum specified operating temperature for the material, the Commission shall be notified **within 24 hours** and procedures for corrective action shall be specified. (EIS section 4.12)
140. Significant non-scheduled events, including safety-related incidents (i.e., LNG or natural gas releases, fires, explosions, mechanical failures, unusual overpressurization, and major injuries) and security-related incidents (i.e., attempts to enter site, suspicious activities) shall be reported to FERC staff. In the event an abnormality is of significant magnitude to threaten public or employee safety, cause significant property damage, or interrupt service, notification shall be made **immediately**, without unduly interfering with any necessary or appropriate emergency repair, alarm, or other emergency procedure. In all instances, notification shall be made to Commission staff **within 24 hours**. This notification practice shall be incorporated into the LNG facility's emergency plan. Examples of reportable LNG-related incidents include:
- a. fire;
 - b. explosion;
 - c. estimated property damage of \$50,000 or more;
 - d. death or personal injury necessitating in-patient hospitalization;
 - e. free flow of LNG that results in pooling;
 - f. unintended movement or abnormal loading by environmental causes, such as an earthquake, landslide, or flood, that impairs the serviceability, structural integrity, or reliability of an LNG facility that contains, controls, or processes gas or LNG;
 - g. any crack or other material defect that impairs the structural integrity or reliability of an LNG facility that contains, controls, or processes gas or LNG;
 - h. any malfunction or operating error that causes the pressure of a pipeline or LNG facility that contains or processes gas or LNG to rise above its maximum allowable operating pressure (or working pressure for LNG facilities) plus the buildup allowed for operation of pressure limiting or control devices;
 - i. a leak in an LNG facility that contains or processes gas or LNG that constitutes an emergency;
 - j. inner tank leakage, ineffective insulation, or frost heave that impairs the structural integrity of an LNG storage tank;
 - k. any condition that could lead to a hazard and cause a 20 percent reduction in operating pressure or shutdown of operation of a pipeline or an LNG facility;

-
- l. safety-related incidents to LNG carriers at or en route to and from the LNG facility;
or
 - m. an event that is significant in the judgment of the operator and/or management even though it did not meet the above criteria or the guidelines set forth in an LNG facility's incident management plan.

In the event of an incident, the Director of OEP has delegated authority to take whatever steps are necessary to ensure operational reliability and to protect human life, health, property or the environment, including authority to direct the LNG facility to cease operations. Following the initial company notification, Commission staff will determine the need for an on-site inspection by Commission staff, and the timing of an initial incident report (normally within 10 days) and follow-up reports. (EIS section 4.12)

- 141. **Throughout the life of the facility**, Jordan Cove shall ensure that the facility and any LNG carrier transiting to and from the facility comply with all requirements set forth by the Coast Guard Captain of the Port Sector Portland, including all risk mitigation measures recommended in the WSR. (EIS section 4.12)