

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF THE STAFF'S ENVIRONMENTAL ANALYSIS

The conclusions and recommendations presented are those of the FERC environmental staff. While our conclusions and recommendations were developed with input from the Coast Guard, COE, NOAA Fisheries, EPA and Maine DEP as cooperating agencies, each of these agencies may present its own conclusions and recommendations when it has completed its review of the project.

The primary impacts associated with construction and operation of the Downeast LNG Project include the permanent conversion of forest land communities to an herbaceous community along the proposed sendout pipeline; increased ship traffic along the ship channels, which could potentially affect marine mammals (e.g., vessel collisions, acoustic harassment, physical harassment, and exposure to pollutants and marine debris); permanent loss of forested wetlands; and alteration of visual character to viewers within close proximity of the terminal. We have determined that construction and operation of the Downeast LNG Project would result in some adverse environmental impacts. However, most of these impacts would be reduced to less-than-significant levels with the implementation of Downeast's proposed mitigation measures and the additional measures we recommend in this EIS. Our assessment is the product of an interdisciplinary review by the FERC staff and our cooperating federal and state agencies. Our assessment is based on the analysis and critical review of information compiled from field investigations by the FERC staff; literature research; alternatives analysis; comments from federal, state, and local agencies; input from public groups and individual citizens; and information provided by Downeast and its technical consultants.

As part of our analysis, we developed specific mitigation measures that would appropriately and reasonably avoid, minimize, and/or mitigate for environmental impacts resulting from construction and operation of the proposed project. These measures would further reduce the environmental impact that otherwise would result from implementation of the project, and we recommend that these measures be attached as conditions to any authorization issued by the Commission. We conclude that, if the project is implemented as planned with the identified mitigation measures during design, construction, and operation, it would be an environmentally acceptable action.

The conclusions and recommendations presented here pertain to the Downeast LNG Project facilities. Recommendations for the M&NE downstream expansion would be presented in a subsequent FERC review, if and when M&NE files an application for authorization to construct those facilities. We are recommending that Downeast consult with M&NE and file an updated estimate of the M&NE facilities required to accommodate Downeast's throughput, during the draft EIS comment period. We will provide an updated discussion of the M&NE downstream expansion facilities in the final EIS. Downeast is currently coordinating with EMEC on the use of EMEC's transmission line right-of-way for a portion of Downeast's pipeline right-of-way; therefore we are recommending that Downeast not begin construction of the pipeline from MP 17.7 to 27.2 until updated alignment sheets, developed in coordination with EMEC, are filed with the Secretary.

5.1.1 Geology

No significant impacts on surficial geology, bedrock, mineral resources, or paleontological resources would occur along the waterway from the increase in LNG traffic or from an accidental release of LNG along the waterway. There is a low but steady rate of seismic activity in Maine where the marine transit route is located. However, we do not expect seismicity, soil liquefaction, or subsidence to significantly affect LNG traffic using the waterway. The shoreline of the waterway for LNG marine traffic is not considered susceptible to potentially hazardous landslides.

Construction and operation of the project would have minimal impact on geological resources in the area, and the potential for significant geologic hazards or other natural events to significantly impact the project is low. The existing topography at the onshore portion of the LNG terminal site would be permanently changed to accommodate the storage tanks and terminal facilities; however, topographic contours and drainage conditions disturbed during construction of the sendout pipeline would be restored as closely as possible to preconstruction conditions. Some blasting is anticipated at the terminal site (for the LNG storage tanks and spill containment basins) and along the pipeline, but appropriate precautions would be taken to protect dwellings and water supplies. No mineral resources were identified at or adjacent to the LNG terminal. Three former borrow pits are located more than 0.5 mile away from the pipeline right-of-way; however, these would not be impacted by construction or operation of the sendout pipeline. Paleontological resources are not anticipated to be encountered in the area of the terminal or sendout pipeline. Soil liquefaction, subsidence, and landslides are not expected to occur in the project area. Flash flooding is possible at stream crossings along the sendout pipeline; however, the pipeline crossings would be designed and protected to mitigate against damage from flooding. All of the structures at the site of the LNG terminal and storage area are located at an elevation high enough to avoid projected future increases in sea level.

The potential for seismicity associated with surficial fault displacement does not represent a significant risk to the proposed project. Additional geotechnical investigations of the site and further details regarding the applicant's proposed seismic design criteria for foundations and critical structures are necessary to clearly demonstrate compliance with NFPA 59A and the FERC's Seismic Guidelines. We are recommending that Downeast comply with all pertinent data submittal requirements detailed in the FERC's Seismic Guidelines and that additional details be provided for our review and approval, prior to construction.

5.1.2 Soils and Sediments

No significant impacts on soils or sediments would occur along the waterway resulting from LNG traffic or in the unlikely event of an accidental release of LNG along the waterway. The waterway is an existing shipping channel with large vessel traffic and there are no sensitive soils along the shoreline that are prone to erosion; therefore, LNG vessel traffic would not cause an increase in shoreline erosion. In the unlikely event of an unignited LNG spill, shoreline soils within Zone 1 would be exposed to extreme cold temperatures. An ignited LNG spill would expose soils in Zones 1 and 2 to the effects of radiant heat. Temporary adverse affects would occur to prime farmland, farmland of statewide importance, and hydric soils that are located within Zone 2 along the waterway; however, with the implementation of the safety measures

proposed by Downeast and the risk mitigation measures recommended in the Coast Guard's WSR, a release and any resulting soils impacts would be extremely unlikely.

Of the approximate 80 acres of land at the terminal location, construction and operation of the LNG terminal would permanently disturb approximately 26.9 acres of soils classified as farmland of statewide importance and susceptible to compaction; and 19.7 acres of "potentially highly erodible" soils. Some low level sediment contamination was identified in the general area of proposed pier construction activities; however, Downeast would not perform any dredging, trenching, or substrate-disturbing activity other than pile installation and the pile driving operation is expected to cause limited resuspension of sediments.

Construction of the sendout pipeline would impact approximately 7.24 acres of land considered prime farmland and 38.89 acres of land classified as farmland of statewide importance. These areas are not used for active agriculture and would be restored to preconstruction conditions; therefore, impacts on farmland and agriculture are insignificant. Construction of the sendout pipeline would temporarily impact soils with high or potentially high erosion potential, high compaction potential, poor revegetation potential, and hydric conditions. To minimize and mitigate for adverse impacts due to soil erosion in the area of the LNG terminal and sendout pipeline, Downeast would implement its Plan, Procedures, and *Soil Erosion and Sediment Control Guidelines*.

Along the sendout pipeline route, 28 sites associated with the storage, potential release, or disposal of petroleum products or hazardous materials were identified within 0.5 mile from the sendout pipeline; however, no sites would be located within the construction limits of the sendout pipeline route. These identified sites would not be affected by pipeline construction or operation.

5.1.3 Water Resources

5.1.3.1 Groundwater

Construction and operation of the project would have no significant impact on groundwater quality and quantity. No impacts on groundwater would occur in the vicinity of the waterway for LNG marine traffic as a result of vessel transit or in the unlikely event of a LNG spill. No public supply wells or related wellhead protection areas are within 150 feet of the LNG terminal facilities. Blasting could cause areas of increased turbidity in groundwater near the blast area; however any impacts would be short-term and localized. Minor amounts of groundwater would be used during construction of the LNG terminal for miscellaneous construction purposes (e.g., dust suppression) and to initially fill the vaporizers prior to SCV system start-up. During operations, Downeast would utilize groundwater wells as a potable water source for the LNG terminal. Based upon sampling and analysis of monitoring wells, an adequate and acceptable water supply exists in the bedrock beneath the LNG terminal for proposed construction and operational water requirements.

Dewatering would likely be necessary during construction/excavation of the tank foundations and spill containment basins. A detailed site grading plan, that addresses control and collection of ground water, would be prepared prior to construction.

The sendout pipeline route crosses designated significant sand and gravel aquifers from MP 13.8 to MP 14.1, MP 25.4 to MP 25.5, and MP 28.4 to 29.0. The Baileyville WPA would be traversed by the proposed sendout pipeline route between MP 25.4 and 25.6, and between MP 28.6 and MP 28.7. Neither of the two wells operated by the BUD is within 150 feet of the proposed sendout pipeline route. Downeast has proposed to HDD in the area of the Baileyville WPA to minimize potential surface impacts. State and local officials expressed concerns that the HDD proposed in this area could alter groundwater flow patterns and potentially cause contaminated groundwater associated with a nearby landfill to migrate towards the Baileyville WPA. Because of the groundwater flow direction in this area, and the distance between the abandoned landfill and the proposed pipeline, we believe that the installation and presence of the pipeline in this area would not impact the WPA. Downeast has made a commitment to take special care in maintaining good housekeeping and spill prevention and control practices during pipeline installation and maintenance in areas overlying the significant sand and gravel aquifers. Based on these assurances, the Maine CDC Drinking Water Program indicated that the “current pipeline alignment does not appear to pose a significant threat to the public water supply.” We concur.

Downeast identified 18 private homes within 50 feet of the proposed sendout pipeline route in areas where public water supplies are not available, but has not completed surveying the entire proposed pipeline route for private wells. We are recommending that Downeast file the location of all private wells and springs within 150 feet of construction activities and conduct pre- and post-construction monitoring of well yield and water quality for these wells. In the event a water well or system is damaged as a result of construction, we are recommending that Downeast arrange for a temporary source of potable water, and provide for the repair of the well or replacement of the water supply.

The greatest potential for impact on groundwater would be from spills, leaks, or other releases of hazardous substances during construction or operation. Downeast has developed a template SPCC Plan to address potential spills of fuel, lubricants, and other hazardous materials. Each contractor would develop a project-specific SPCC Plan that conforms to Downeast’s template, prior to construction. We have reviewed the template SPCC Plan and believe it adequately addresses potential spills and would minimize or eliminate the potential for adverse impacts on groundwater resources.

5.1.3.2 Surface Water

During operations, LNG vessel activity would have limited potential for impacts on surface waters. No ballast water would be discharged from LNG vessels along the waterway or at the terminal. However, LNG vessels would take on ballast water to maintain stability and trim as they offload their cargo. The amount of ballast water required by each LNG vessel would vary according to its size and weather conditions. The largest vessel that would be accommodated at the LNG terminal (165,000 m³) would require about 17.11 million gallons of water. This water withdrawal would constitute a minor but long-term impact to water resources of Passamaquoddy Bay. LNG vessels would comply with the Coast Guard’s mandatory ballast water management and exchange standards.

LNG vessels would also require the intake of cooling water during transit along the waterway and while docked at the terminal berth. Over a 21-hour period, a 165,000 m³ LNG vessel would

require a maximum of about 55.5 million gallons of water to support engine cooling while at the pier. Discharge of the cooling water would raise the water temperature at the discharge location. However, Downeast's numerical modeling of the mixing zone indicates that the discharge plume would be relatively minor and reach near ambient conditions at approximately 15 to 30 meters from the point of discharge. Further, due to the comparatively small volume of this water in relation to the flow of Passamaquoddy Bay (estimated to be about 0.001 percent of the quantity of water that flows in and out of Passamaquoddy Bay during one tidal cycle), and the swift currents that would cause rapid mixing, we believe that there would be no discernable impact on the water quality of Passamaquoddy Bay from cooling water discharge activities.

The likelihood of potential surface water impacts associated with an accidental release of LNG is extremely remote. LNG vaporizes rapidly upon contact with the relatively warm air and water. Because LNG is not soluble in water and would completely vaporize shortly after being spilled, there would be no liquid left that could mix and/or contaminate the water.

Accidental spills or releases of hazardous materials could also impact water quality along the waterway. Through compliance with MARPOL and VGP permit requirements, water quality effects associated with the discharge of graywater, blackwater, or potential accidental releases would be effectively minimized. During operations, wakes and propeller wash associated with LNG and associated escort vessel activity may cause minor resuspension of bottom sediments and temporary increases in turbidity. Impacts would be localized and would not significantly increase turbidity along the transit corridor.

Construction of the LNG terminal could temporarily adversely affect surface water quality in Mill Cove. The primary effect on water quality would be minor increases in suspended solids in the water column in the vicinity of the pile installation activities and from marine construction vessels. The presence of low levels of sediment contamination would not adversely affect water quality during the terminal construction. Due to the currents and significant tidal volume exchange, any localized water quality impacts would quickly return to preconstruction conditions. There is a potential for the inadvertent release of fuel to the waters of Mill Cove and Passamaquoddy Bay from vessels working to construct the offshore portions of the LNG terminal. To minimize the likelihood of spills as well as to minimize environmental impacts in the event that a spill was to occur during construction or operation of the terminal, we are recommending that Downeast file a Marine SPCC Plan for our review and approval, prior to construction of the LNG terminal.

Operational impacts of the LNG terminal would include generation of freshwater effluent from the SCV technology used to process the LNG. The SCVs would produce excess water at a rate of 85 gpm when the LNG terminal is operating at normal sendout capacity and up to 109 gpm during peak capacity. Downeast proposes to use recovered SCV water to supply its firewater system and sell surplus SCV water to an independent party for offsite use, yet to be identified. To ensure impacts are minimized in the event that the SCV water cannot be sold, we are recommending that Downeast file a final plan for the discharge of excess SCV water for our review and approval, prior to construction of the LNG terminal facilities. The plan should include discharge locations, rates, mitigation measures, and copies of applicable permit applications.

Hydrostatic testing of each LNG storage tank would involve filling the inner tank with approximately 28 million gallons of water, principally obtained from Passamaquoddy Bay. Test water would be discharged into Passamaquoddy Bay using an aeration type energy dissipater to prevent potential erosion and scouring of the bottom sediments. To minimize potential water quality impacts, all test water would be analyzed for chemical composition, treated if necessary, and discharged at a rate determined in the Maine PDES permit issued by the Maine DEP.

Other potential impacts on water resources involve the uptake of water from Passamaquoddy Bay for backup emergency firewater pumps. This would constitute a minor impact to water resources given the immense tidal flow of Passamaquoddy Bay, with an estimated 70 billion cubic feet of water entering and leaving twice daily on the turn of the tide.

The proposed sendout pipeline would cross 22 surface waterbodies. Activities that could affect surface waters include clearing, grading, trenching, blasting, backfilling, and right-of-way maintenance. Downeast proposes to cross 9 of the 22 waterbodies using the HDD crossing method. We are recommending that, prior to the end of the draft EIS comment period, Downeast should file a site-specific HDD Plan for each proposed HDD crossing, including a contingency plan for crossing the feature if the HDD is unsuccessful. We will provide further analysis of Downeast's proposed HDDs in the final EIS. In the event that any waterbody or wetland crossing plan requires amendment due to site-specific conditions encountered during construction, we are recommending that Downeast file an amended crossing plan for our review and approval, concurrent with the appropriate state and federal applications for any required permits. The measures detailed in Downeast's Plan, Procedures and *Soil Erosion and Sediment Control Guidelines* and applicable permits would minimize both short- and long-term impacts on water resources.

One of the largest HDD crossings proposed by Downeast is the 6,621-foot crossing of the St. Croix River and Magurrewock Stream Outlet between MP 14.1 and MP 15.3. Because of the length and curvature of the proposed St. Croix River HDD, we are recommending that Downeast file a geotechnical feasibility assessment, site-specific construction diagrams, and a detailed open-cut contingency plan should the HDD fail. Due to the potential environmental risks should the HDD fail, we are recommending that this information be filed prior to the end of the draft EIS comment period so we are able to provide further analysis of this proposed HDD in the final EIS.

Prior to being placed into service, the sendout pipeline would be hydrostatically tested to DOT standards, as listed in 49 CFR 192. Approximately 6.1 million gallons of water would be obtained from the BUD for hydrostatic testing of the entire sendout pipeline. Following testing, the hydrostatic test water would be discharged to an unnamed creek at MP 17.5 or to the BUD sewer system. Discharges of hydrostatic test water would require permitting from the Maine DEP, in addition to a permit under the Maine PDES, as regulated by the CWA. The appropriate Section 401 Water Quality Certification and Section 404 permit must also be obtained prior to discharge of hydrostatic test water into surface waterbodies.

5.1.4 Wetlands and Vegetation

5.1.4.1 Wetlands

There would be no impacts on the subtidal, intertidal, or palustrine wetlands within any of the three Zones of Concern as a result of normal LNG transit. In the event of an unignited spill, the extreme cold temperatures could cause tissue damage and dieback of subtidal or intertidal vegetation near the water surface. An ignited spill would not significantly affect the subtidal wetland areas, as the vegetation is submerged; however, any exposed vegetation would be burned. These impacts could be significant depending on the level of exposure; however, the effects would be temporary as new wetland vegetation would grow subsequent to any adverse impacts. With the implementation of the safety measures proposed by Downeast and the risk mitigation measures recommended in the Coast Guard's WSR, a release would be highly unlikely. Therefore, we consider these potential impacts to be insignificant.

Construction and operation of the pier pilings would directly disturb 0.1 acre of wetland. Indirect impacts on wetlands include shading and potentially altered hydrodynamic processes in the vicinity of the pier. In addition, approximately 9 acres of forested and scrub-shrub freshwater wetlands would be permanently affected by the onshore LNG terminal facilities. To mitigate for the unavoidable wetland alterations associated with the proposed terminal, Downeast is proposing a combination of preservation, enhancement, and restoration at off-site locations. In order to ensure that adequate wetlands compensation is provided to the satisfaction of the relevant agencies, we are recommending that Downeast continue consultation with the COE, Maine DIFW, and Maine DEP to finalize its wetland compensation plan, and file the final plan with the Secretary prior to construction.

Approximately 26.56 acres of wetlands would be affected during construction of the sendout pipeline, of which approximately 14.19 acres would be affected by maintenance of a 30-foot-wide permanent right-of-way during operation. To minimize the extent and duration of wetland impacts, Downeast would use a 55 to 65-foot-wide construction right-of-way and would implement its Plan, Procedures, and *Soil Erosion and Sediment Control Guidelines*. Following restoration, Downeast would monitor the success of wetland revegetation annually for the first five years after construction or until wetland vegetation is successful. Vegetation maintenance would not be conducted over the full width of the permanent right-of-way in wetlands. A 10-foot-wide area directly over the pipeline would be mowed on an annual basis and shrubs and trees may be selectively removed within 15 feet of the pipeline. Forested wetlands within the permanent right-of-way would be converted to herbaceous and scrub shrub wetland types.

Downeast identified 20 vernal pools, of which 11 were determined to meet the criteria necessary to be classified as SVP. Downeast would HDD all vernal pools directly crossed by the pipeline; therefore, no vernal pool basin would be directly affected by pipeline construction. To minimize impacts on adjacent upland habitats, Downeast would also HDD under the 250-foot buffer surrounding each vernal pool, with the exception of two buffer areas at MP 12.9 and MP 13.1. Because Downeast would HDD under all SVPs directly crossed by the pipeline and would maintain more than 75 percent of the upland forest habitat within the 250-foot buffer surrounding each SVP, we do not expect that compensatory mitigation would be required for impacts on SVPs.

A majority of the impacts on wetlands resulting from construction and operation of the proposed sendout pipeline would be temporary. Based on communication with the COE and the Maine DEP, Downeast does not anticipate providing mitigation for the temporary impacts associated with the sendout pipeline installation.

5.1.4.2 Marine Vegetation

Along the waterway for LNG marine traffic, in the event of an unignited LNG spill, marine vegetation near the surface of the water would likely suffer mortality due to the extreme cold temperatures of LNG. The risk of a release of LNG during transit of the LNG vessels is very small and can be managed by implementing the risk mitigation measures recommended in the WSR.

Terminal construction activities that may affect marine vegetation include sediment disturbance due to piling installation and the anchoring of barges. Development of the pier and berthing facility would result in the permanent loss of a small quantity of algae as a result of pile installation and shading; however, the footprint of the pilings is relatively small, and the height and orientation of the pier would create a very limited shadow effect. The pilings of the pier would provide increased surface areas suitable for supporting shade-tolerant algae species. During the construction and operation of the terminal, marine water withdrawals for hydrostatic testing, fire suppression systems testing, and ship ballast and hoteling may also have short-term and localized impacts on phytoplankton. Specifically, cooling water uptake by the LNG vessels would impact phytoplankton located proximal to the vessel's intake. However, any mortality would be replaced through tidal action from the larger phytoplankton population within the Passamaquoddy Bay.

5.1.4.3 Terrestrial Vegetation

Island and shoreline vegetation along the waterway for LNG marine traffic is generally described as wooded with ledge rock outcrops. During normal LNG transit operations or in the event of an unignited LNG spill, there would be no adverse impacts on these habitats. In the event of an ignited LNG spill, tissue burns to the vegetation and adverse effects to organic material and microorganisms in the soil could occur. However, the risk of a release of LNG due to an accident or intentional breach during transit of the LNG vessels is very small and can be managed by implementing the risk mitigation measures recommended in the WSR.

Development of the 80 acre terminal site would result in the permanent clearing of approximately 47 acres of land, including 9 acres of wetland and 38 acres of forest. The remaining approximately 33 acres of vegetation would be left undisturbed. An additional eight acres of grassland located offsite would be temporarily disturbed during construction of the LNG terminal for use as ATWS.

Construction of the sendout pipeline and associated valve station would affect an estimated 175.4 acres of forest, of which approximately 112.2 acres would be permanently converted into a non-forested vegetation community. The sendout pipeline would also affect an estimated 31.3 acres of open land (which includes developed land, agricultural land, and grassland), of which approximately 18.9 acres would be permanently maintained right-of-way. The widening and improvement of access roads would impact approximately 10 acres of land, of which

0.5 acre is forested and 9.5 acres are developed land. Staging areas would temporarily impact approximately 13.5 acres of forest and 5.2 acres of open habitats.

Downeast located the proposed right-of-way immediately adjacent to existing rights-of-way to the greatest extent practical to minimize forest habitat loss and fragmentation. Upon completion of construction, the right-of-way would be revegetated according to seed mixtures recommended by the NRCS. A permanent right-of-way would be maintained to permit access for routine inspection, maintenance, and emergency repairs. In uplands, the entire 50-foot-wide permanent right-of-way may be cleared every three years. A 10-foot-wide area directly over the pipeline would be mowed on an annual basis. Construction, revegetation, and maintenance procedures would follow Downeast's Plan, Procedures, and *Soil Erosion and Sediment Control Guidelines* to ensure successful restoration of the right-of-way.

5.1.4.4 Unique or Invasive Plant Communities

There are no rare plants or communities present in Zones 1 or 2 along the waterway for LNG marine traffic. There are two significant natural communities and one rare plant species partially located within Zone 3. There are 121.52 acres of eelgrass beds with moderate or dense cover and 81.94 acres with very sparse or sparse cover in Zone 3. During normal LNG transit operations, there would be no adverse impacts on these habitats. The likelihood of a release of LNG due to an accident or intentional breach during transit of the LNG ships is extremely remote and can be managed by implementing the risk mitigation measures recommended in the WSR; therefore, we consider potential impacts to these communities to be insignificant.

No rare or invasive plant species are located at the site of the proposed LNG terminal. Two invasive plant species, purple loosestrife and alder-buckthorn, were identified in several places along the pipeline route. During installation, operation, and maintenance of the sendout pipeline, Downeast would employ measures in its *Soil Erosion and Sediment Control Guidelines* to prevent introducing new invasive species and avoid encouraging the spread of undesirable species already present.

5.1.5 Wildlife and Aquatic Resources

5.1.5.1 Terrestrial Wildlife

Impacts on coastal and marine avifauna resulting from construction and operation of the project would include temporary alteration and permanent loss of habitat. Wildlife habitats crossed by the project include waterfowl and wading bird habitat in coastal and inland locations, shorebird feeding and roosting areas, vernal pools, mature forested uplands, early successional habitats, agricultural and open lands (which include freshwater wetlands), and forested wetlands.

Significant Wildlife Habitats occur within and near the waterway for LNG marine traffic. These include IWWH, TWWH, shorebird nesting, feeding and staging areas, and seabird nesting islands. The primary impact from LNG marine traffic would be harassment (i.e., physical and acoustic) to coastal and marine birds. The long-term effect of bird and vessel collisions would not have measurable consequences to bird populations in the project area. Because known sea and shorebird nesting occurrence near the waterway for LNG marine traffic is low, it is anticipated that proposed LNG marine vessel operations would not adversely affect these species. In the event of a large ignited spill, birds within Zones 1 and 2 may be injured or suffer

fatality. In the event of an unignited spill, birds in Zones 1 and 2 may be asphyxiated. The impacts on wildlife along the vessel transit route from an ignited or unignited spill could be significant; however, we expect most birds would exhibit avoidance behavior and the likelihood of a spill is extremely remote.

Impacts on wildlife from the LNG terminal construction and operation would include temporary and permanent loss of habitat in Mill Cove from the pier (6.6 acres of shading) and onshore from the terminal (47.0 acres). To mitigate impacts on nocturnal species, Downeast would strategically locate light fixtures to minimize light pollution beyond the terminal area. In consultation with the Maine DIFW, Downeast has finalized its revised Shorebird Mitigation Plan, in which, among other compensation measures, Downeast has agreed to acquire conservation easements or provide property acquisition funds to offset any potential impacts on shorebird habitat. Short-term impacts, such as disruption and disturbance to wildlife outside of the boundary of the facility would be expected only due to noise and activity associated with construction. Operational noise is not expected to impact wildlife communities outside of the terminal site.

The primary impact on wildlife associated with the sendout pipeline would be clearing of forested habitats and temporary disturbance during construction. Less mobile species may be injured or fatally wounded. Short-term direct effects to terrestrial mammals and breeding or migrating waterbirds would occur during construction of the sendout pipeline in the form of increased noise and human presence. Some forested habitats would be permanently converted to open or shrubland habitats as a result of vegetation maintenance during operation. Due to the amount of significant wildlife habitat that would be disturbed by the proposed project, the Maine DEP requested compensation from Downeast. Downeast developed, in consultation with the Maine DEP, Maine DIFW, FWS, COE and EPA, several mitigation alternatives that specifically focus on preserving inland wetlands that contain significant wildlife habitat. Downeast continues to consult with these agencies for approval of a final, comprehensive wetland mitigation plan that addresses coastal and freshwater wetlands, areas used by tidal and inland wading waterfowl, and significant vernal pools. Based on Downeast's proposed avoidance of shorebird wading habitat during sensitive breeding periods, its adherence to protective measures in its Plan, Procedures, and *Soil Erosion and Sediment Control Guidelines*, and its agreement to finalize an acceptable wetland mitigation and compensation plan, impacts on wildlife from construction and operation of the proposed project would be limited, and not significant.

In responding to concerns raised by state and federal agencies, Downeast has proposed to use HDD methods to cross each SVP and its 250-foot upland habitat buffer. Where HDD methods are implemented, impacts on sensitive wildlife and wildlife habitats would be minimized or avoided.

The sendout pipeline crosses one DWA twice between MP 16.72 and 16.80, and from MP 16.86 to 17.02, affecting 2.19 acres. During construction of the sendout pipeline, this DWA would not be available to overwintering deer, representing a loss of cover and forage. While much of the affected right-of-way would be allowed to revegetate over time, a portion of the right-of-way would be subject to routine vegetation clearing and represents a permanent loss of DWA habitat. To minimize impacts, Downeast would consult with the Maine DIFW to develop DWA mitigation measures. We are recommending that Downeast complete its consultations and file its final DWA mitigation package with the Secretary, prior to pipeline construction.

5.1.5.2 Aquatic Wildlife

Potential impacts on aquatic wildlife that use waters in or near the proposed LNG marine traffic route may include exposure to pollutants from accidental spills and marine debris; impingement and entrainment during cooling water intake; thermal impacts from engine cooling water discharge; and the potential to introduce non-native aquatic species. Through compliance with MARPOL and VGP permit requirements for vessel discharges, water quality effects and associated impacts on aquatic habitats would be effectively minimized. There are potential impacts to aquatic wildlife associated with an ignited or unignited LNG release during vessel transit; however, the potential for a release to occur is highly unlikely and can be managed by implementing the risk mitigation measures recommended in the WSR.

Impingement and/or entrainment of aquatic organisms (including fish eggs and larvae) would likely occur during transit as a result of water withdrawals to support vessel operational requirements. However, because vessels would be drawing water as they transit across deep open waters, the potential impact would be transient and therefore not a significant impact on any particular localized aggregation of aquatic organisms. Based on CORMIX modeling, thermal impacts associated with vessel engine cooling water discharges are also expected to be minor and insignificant. Adverse environmental effects associated with the introduction of exotic/invasive/non-native species through ballast water exchange are not expected; ballast water would not be discharged while transiting or unloading cargo at the berth. Through implementation of industry standard and Coast Guard mandatory practices, we conclude that the introduction of non-indigenous attached organisms via ship hulls is also not likely to significantly alter the local biotic community.

Entrainment and impingement of fish and other aquatic organisms could occur during water withdrawals for hydrostatic testing at the LNG terminal. Downeast would minimize entrainment and impingement of fish by regulating the intake rate and by the use of screens on intake hoses.

Aquaculture also occurs in the vicinity of the transit route. The shorelines along most of the transit route in Western Passage and Friar Roads are steep and rocky offering little habitat for soft-shell clams or mussels. In addition, the majority of the habitat that does exist is closed to harvesting due to bacterial contamination. Commercial lobster fishing and commercial harvesting of marine worms occur along the proposed transit route. Downeast in cooperation with the Maine DMR continues to meet with representatives of the local lobster fishery to further define and detail the lobstermen's key concerns and to confirm the individual lobstermen fishing in any areas potentially affected. This information would be used in Downeast's ongoing effort to update and revise the original Fisherman Communication, Coordination and Compensation Plan.

During LNG terminal construction, impacts on aquatic organisms would result from turbidity and sedimentation, acoustic harassment, and displacement from habitats within Mill Cove. Water from Mill Cove would be withdrawn for hydrostatic testing, LNG vessel engine cooling, hoteling, and ballasting operations, and fire suppression system testing. Downeast would use screens to prevent entrainment of fish during hydrostatic testing; however, screens would not prevent the impingement and entrainment of plankton and ichthyoplankton, nor are fine screens available for use on LNG vessels. Despite estimated losses, we conclude that the impacts on zooplankton, ichthyoplankton, and mysid shrimp would have an inconsequential effect on

overall community populations and associated fish stocks. This conclusion is based on the significant tidal fluctuations and water exchange that occurs in the project area; the high densities of zooplankton and ichthyoplankton; quick recovery times of mysid shrimp that occur in the surrounding Passamaquoddy Bay; and the comparatively small amount of water withdrawn.

Impacts on commercial fisheries at the LNG terminal would occur as a result of pier installation, through the alteration of traditional fishing patterns, specifically lobstering and weir operation. In areas that have been identified as commercial lobster harvesting areas or areas of weir operations that would be disturbed or removed as the result of construction activities, Downeast has agreed to compensate fishermen for any adverse fisheries-related fiscal loss.

Underwater noise during terminal and pier construction activities would be temporary and long term noise impacts are not expected to be significant. To mitigate for potential impacts of construction-related noise at the terminal, Downeast is currently consulting with the appropriate agencies regarding the timing of construction activities to avoid particularly sensitive periods. We are recommending that Downeast continue to consult with the agencies to determine appropriate mitigation strategies to minimize acoustic impacts on marine species and file these mitigation measures during the draft EIS comment period. We are also recommending that Downeast consult with the appropriate agencies to determine any recommended seasonal or construction timing restrictions to minimize impacts on marine species and habitats and file these mitigation measures in time for us to discuss them in the final EIS.

Downeast proposes to cross streams primarily using dam and pump crossing techniques. In the event that dam and pump crossings are not practicable at these locations, an open-cut crossing technique may be applied. Impacts on water quality and associated aquatic habitats in the sendout pipeline right-of-way would include sedimentation, turbidity, altered water temperatures and dissolved oxygen levels, and introduction of contaminants, all of which can affect the ability of aquatic life to survive and reproduce. Impacts would also include the physical disturbance or destruction of instream cover due to trenching and removal of riparian vegetation. Construction activities could also result in blockage of fish migrations and interruption of spawning activities.

Downeast's stream habitat surveys have confirmed that five stream crossings are riffle and pool complexes that meet the COE criteria as special aquatic sites. Approximately 4,640 square feet of riffle pool habitat would be affected by pipeline construction. Downeast would use the HDD method at two streams with riffle pool habitat and would attempt to avoid installing the pipe in riffle habitats, where possible. Where impacts are unavoidable, Downeast would minimize the discharge of fill to the streams using construction measures outlined in its Plan, Procedures, and *Soil, Erosion, and Sediment Control Guidelines*.

Although there are no suitable habitat conditions for Atlantic salmon in the streams crossed by the sendout pipeline, Downeast has initiated consultation with Maine ASC to ensure that any potential impact to Atlantic salmon is avoided and/or minimized. Downeast would continue to consult with the appropriate agencies to determine any site-specific timing restrictions for construction. Downeast's Procedures, and *Soil, Erosion, and Sediment Control Guidelines* define a time window for construction in designated cold-water fisheries (June 1 through September 30) and also require that Downeast provide to FERC staff a waterbody crossing schedule that identifies when trenching and blasting would occur in each waterbody designated as a coldwater fishery or greater than 10-feet-wide.

Impacts on EFH would include habitat disturbance and alteration associated with the LNG terminal and sendout pipeline. An EFH Assessment has been included in the BA, in Appendix C of this EIS. The EFH Assessment includes a detailed description of the life history characteristics and habitat preferences of EFH species and a discussion of the potential for these species to occur within the proposed project's area of potential effect. We are requesting that NOAA Fisheries consider this draft EIS as notification of initiation of EFH consultation.

5.1.5.3 Threatened and Endangered Species and Marine Mammals

Informal consultations with the Maine DIFW, FWS, NOAA Fisheries, Maine NAP, and a review of published information about previous M&NE pipeline expansion projects, identified special status species and protected marine mammals that potentially occur in the project area. Federally listed whale species including the North Atlantic right, fin, humpback, sei, blue, and sperm whales have been recorded within the proposed waterway for LNG vessels. Another five species of marine mammals under the protection of the MMPA are likely to occur in the waterway including minke whale, gray seal, harbor seal, harbor porpoise, and white-sided dolphin. There are also state-listed species of reptiles, birds, plants, and invertebrates that could be found in the project area.

The primary impacts on federally-protected species associated with the proposed project could include vessel strikes, alteration of prey base, and underwater noise. Currently, about 125 ships per year (primarily bulk carriers and a few cruise ships) pass through the Head Harbor Passage near Campobello Island. The proposed project would increase vessel traffic by about one vessel every five to seven days in the winter and every eight to ten days in the summer. All LNG vessels transiting to the Downeast LNG terminal would be required to comply with NOAA Fisheries regulated practices to protect the right whale. NOAA Fisheries has established regulations to limit vessel speed of ships 65 feet or longer that transit certain management areas along the U.S. east coast (50 CFR Part 224). The regulations limit ship speed to 10 knots or less during times and in areas where relatively high right whale and ship densities overlap and calls for temporary voluntary speed limits in other areas or times when sightings of aggregate whales are confirmed. NOAA Fisheries also prohibits approaching right whales within 500 yards (50 CFR Part 224). In addition, Downeast has indicated its commitment to take the necessary precautions to reduce the risk of injury to right whales and other marine mammals and sea turtles. LNG vessels would follow IMO regulations to report any sightings of right whales and would undertake precautionary measures to avoid any contact with the species. Downeast would direct that LNG vessel speeds be limited to 10 knots or less in the transit route and/or in areas where marine mammals are present, under safe navigation rules as recommended by NOAA Fisheries.

Downeast LNG terminal construction and operation crews would also receive environmental training that stresses individual responsibility for marine mammal awareness and reporting. All on-board crew members would receive training on marine mammal sighting and reporting, as required by IMO standards. Additionally, the Captains/Pilots of LNG vessels associated with the proposed Downeast LNG Project would be responsible for monitoring communications for sighting reports of the North Atlantic right whale, including local Notice to Mariners, NAVTEX warnings, NOAA Weather Radio, and any other means. Following a received whale sighting warning, LNG vessels would comply with required IMO regulations and federal regulations, and all attempts to avoid contact and reduce the risk of ship strikes to whales would be made. In the

event that a vessel strike occurs, the Coast Guard would be notified and the crew would follow the ensuing procedural guidance.

Downeast is consulting with the FWS, NOAA Fisheries, and other relevant federal and state agencies to develop a Prevention and Mitigation Manual to minimize adverse impacts on threatened and endangered species from construction and operation of the project. We expect that the manual would not be finalized until completion of Section 7 ESA consultations. We are recommending that Downeast file the Prevention and Mitigation Manual with the Secretary prior to construction.

To estimate the effects of underwater sound propagation produced during construction and operation of the proposed project on marine wildlife, Downeast conducted a comprehensive underwater acoustic modeling analysis. Downeast is consulting with the FWS, NOAA Fisheries, and other relevant federal and state agencies to discuss appropriate mitigation measures. Noise associated with construction of the proposed project could temporarily limit use of the proposed project area during active construction, but species would return to the area once construction has ceased. To reduce potential noise impacts on federally-listed species and other resources, Downeast would install pier piles primarily using a vibropiling method, with limited impact driving used as necessary to seat the piles into the rock. Additionally, Downeast proposes to construct the pier using land-based equipment and an “over the top” construction method to reduce the amount of equipment and duration of in-water disturbance. Downeast would employ at least one full-time EI during terminal construction to monitor the presence of sea turtles. As discussed above in section 5.1.5.2, we are recommending that Downeast continue its consultations to determine appropriate mitigation strategies to minimize acoustic impacts as well as any recommended seasonal or construction timing restrictions to minimize impacts on marine species and habitats.

Increased sediment suspension and turbidity would temporarily increase during construction of the pier but would not adversely affect marine mammals. Water withdrawals for hydrostatic testing, vessel engine cooling, vessel ballasting, vessel hoteling, and fire suppression pump testing would result in the entrainment of phytoplankton and zooplankton. Considering the minimal effect to phytoplankton and zooplankton from entrainment, the loss would have a minimal impact on this prey base for marine mammals.

Downeast would conduct pre-construction clearance surveys at the terminal site for bald eagles, a state-listed species. In the event that confirmed nesting bald eagles are discovered, Downeast would consult with Maine DIFW to establish a comprehensive bald eagle mitigation plan, including seasonal restrictions on construction activities within 0.25 mile of identified nesting areas.

During the aerial surveys of the sendout pipeline route in 2006 and 2008, no new eagle nests were observed within the study corridor or within the 0.25-mile zone on either side. Based on these surveys, active bald eagle nest sites would not be affected by construction of the sendout pipeline. A single historic nest was identified near MP 9.5. Construction activities that have the potential to disturb foraging bald eagles or known roosts would be minimal, localized, and temporary. Downeast has indicated it may also modify the timing of periodic inspections and/or repair of the sendout pipeline to ensure avoidance and minimization of disturbance during

sensitive periods if a pipeline section occurs within the protected buffer of any active bald eagle nesting/breeding site.

A BA has been included in Appendix C of this draft EIS. The BA details the environmental baseline for federally listed species and critical habitat; direct, indirect, interdependent and interrelated, and cumulative effects; proposed conservation measures; and determinations of effect. In the project action area, 16 species were initially identified by FWS and NOAA Fisheries as federally listed threatened, endangered, proposed, or candidates for listing under the ESA. Of the 16 federally-protected species, we determined that 12 species and one critical habitat could occur within or adjacent to the proposed project. We have determined that the project would result in no effect to three species (shortnose sturgeon, Atlantic wolffish, and New England cottontail). We have determined that the project may affect, but is not likely to adversely affect, five species and one critical habitat (Atlantic sturgeon, Atlantic salmon and designated critical habitat, Leatherback sea turtle, blue whale, and sperm whale). We have determined that the project is likely to adversely affect the fin, humpback, North Atlantic right, and sei whales. We are requesting that the FWS and NOAA Fisheries consider this draft EIS as notification of initiation of section 7 ESA consultation. To ensure compliance with ESA, we are recommending that Downeast not begin construction until we complete formal and informal ESA consultations, as required, and Downeast receives written notification from the Director of OEP that construction or use of mitigation may begin.

5.1.6 Land Use, Recreation, and Visual Resources

5.1.6.1 Land Use and Recreation

There is no critical infrastructure such as nuclear power plants, refineries, major bridges or tunnels, major ports, or industrial areas within the Zones of Concern along the waterway for LNG marine traffic.

Construction of the Downeast LNG Project would affect a total of 317.7 acres of land. The terminal site primarily is comprised of forested land in various stages of succession. The closest residence is located 125 feet from the proposed LNG terminal boundary. There are no public lands or other designated federal, state, or local recreation areas located on or within 0.25 mile of the LNG terminal site. Only 0.1 acre of submerged land would be directly affected by the piles for the pier. However, the pier would have a surface area of 3.6 acres, mostly over open water, which would require a lease or easement from the state of Maine.

Land use along the sendout pipeline right-of-way is generally comprised of existing right-of-way, forested land, developed land, agricultural land, and grassland. Construction of the sendout pipeline and associated aboveground facilities would temporarily disturb a total of 259.2 acres, of which 141.8 would be permanently maintained as right-of-way. The construction right-of-way would partially overlap an existing EMEC electric transmission line right-of-way for approximately 9.5 miles, and an existing M&NE pipeline right-of-way for approximately 2.5 miles. Pending negotiations with EMEC, the permanent right-of-way may also partially overlap the existing transmission line right-of-way. The sendout pipeline route would avoid the Moosehorn NWR, and the Gardner Wildlife Sanctuary. Pipeline installation would cross a network of ATV trails; however, the use of these trails would not be affected by construction or operation.

Downeast identified 18 residences within 50 feet of the permanent right-of-way for the sendout pipeline and filed site-specific plans (see Appendix Q of this EIS). These site-specific plans include a number of standard construction practices, but do not include all the safety measures that Downeast committed to in supplemental filings, as described in section 4.7.2.3 of this EIS. We are recommending that Downeast confirm that these safety measures would be implemented in all residential areas and incorporate these measures into the site-specific plans. We are also recommending that prior to the end of the draft EIS comment period Downeast provide site-specific plans for any additional residences that are located within 50 feet of the construction work areas that have not been previously identified. In addition, to reduce impacts on each residence, Downeast has included possible routing and construction method alternatives in its site-specific residential plans. We believe that Downeast should further investigate these alternatives; therefore, we are recommending that Downeast revise the residential site-specific plans in Appendix Q of this draft EIS, to identify a preferred alternative that minimizes impacts on the residences. We are specifically requesting landowner comments on the residential site-specific plans and will provide further analysis and recommendations to minimize impacts in the final EIS.

LNG vessels transiting to the LNG terminal would pass by developed areas in Eastport, Maine and St. Andrews, New Brunswick, and scattered seasonal and permanent residences along the route. Portions of Eastport are within Zones of Concern 1, 2, and 3. St. Andrews is within Zone 3. The LNG marine traffic route would pass in close proximity to Gleason Point Park, Frost Island, an unnamed island in Perry, Carlow Island/Moose Island Scenic Area, Shackford Head State Park, Sumac Island, an unnamed island in Eastport, and Quoddy Head State Park in Lubec. No federal parks occur in the transit route or within the Zones of Concern. The southern portion of Roosevelt Campobello International Park is located within Zone 3. No historic structures within the International Park are located within Zone 3. The shoreland and offshore waters of Mill Cove receive light recreational use for clamming, lobstering, boating, and fishing. Other recreational areas in the vicinity of the terminal include two scenic turnouts along U.S. Route 1. Damage from an ignited LNG release to boaters, man-made structures, and vegetation ranges from mild to severe with the greatest impacts occurring within Zone 1 and decreasing outward through Zones 2 and 3. However, the likelihood of a spill from an LNG vessel is extremely remote and can be managed by implementing the risk mitigation measures recommended in the WSR.

As part of its WSR, the Coast Guard has recommended the establishment of comprehensive safety and security zones around LNG vessels during transit up Head Harbor Passage, Western Passage, and Passamaquoddy Bay for the protection of the LNG vessels, other waterway users, and area residents. This is discussed further in section 5.1.11. Moving security zones, safety zones at the terminal, and one-way traffic would affect other commercial and recreational traffic using the waterway. These would cause temporary impacts on recreational boating and fishing, HMSC research vessels, and the tidal energy construction vessels while the LNG vessel is in transit or moored at the vessel unloading facility. Because the vessel in transit security zone would move with the vessel, the impacts would be of short duration at any given point along the shipping route. In addition, recreational boating and fishing in the area is relatively light. Due to the limited time that nearby marine traffic could be interrupted, impacts on commercial marine activity, including fishing boats, whale watching vessels, and ferries, would be insignificant.

5.1.6.2 Visual

LNG vessels within the waterway could be viewed by motorists on U.S. Route 1 and other roads with views to Passamaquoddy Bay, and by tourists, boaters, hikers, and residents with sporadic views of the marine traffic route. Although the vessels would be large and highly visible, they would be viewed for only short durations in areas already used for shipping by tankers and other such vessels.

Due to the forested rolling hills in the area of the LNG terminal, much of the onshore facility would be screened from areas to the north, south, and west. The Downeast LNG pier would be primarily visible from Trimble Mountain and along the coast, U.S. Route 1, Mill Cove and portions of Passamaquoddy Bay, the St. Croix River, St. Andrews, New Brunswick, and visitors to the interpretive center for the St. Croix International Historic Site in Canada. Portions of the storage facilities and terminal would be viewed by four abutting residences, several residences on the north side of Mill Cove, and residences in the vicinity of the intersection of U.S. Route 1 and Ridge Road. To reduce the potential visual impact of the facility, Downeast has proposed to paint the storage tanks a neutral color; preserve a 50-foot-wide vegetative buffer along U.S. Route 1; maintain a 250-foot-wide tree buffer along Passamaquoddy Bay; and use equipment specifically designed to reduce off-site light spillage.

No designated visual resource areas would be affected. The impacts associated with construction of the pipeline would be short-term, the construction right-of-way would be restored to pre-existing conditions and the permanent right-of-way would be maintained in an herbaceous state. The majority of the sendout pipeline is adjacent to existing rights-of-way and in an area of sparse development; therefore, the permanent right-of-way would not be visible to many motorists or residents.

5.1.6.3 Coastal Zone Management

The proposed waterway for LNG marine traffic from Friar Roads to Mill Cove lies within the designated coastal zone management area. Both the LNG terminal and a portion of the sendout pipeline within the towns of Robbinston and Calais are within the designated coastal zone management area. Federal actions affecting Maine coastal resources require a consistency review to determine the project's consistency with state and local environmental laws, regulations, standards and coastal policies. The Maine SPO coordinates the consistency review as necessary and serves as a single point of contact to receive requests for consistency reviews. Downeast submitted its request for consistency review in December 2006; it was withdrawn by Downeast in November 2007 and will be resubmitted in the third quarter of 2009. Since the project has not yet received its determination, we are recommending that Downeast not begin construction until it files with the Secretary documentation of concurrence from the Maine SPO, that its project is consistent with the Maine Coastal Zone Management Program. As part of the CZMA, the Maine Mandatory Shoreland Zoning Act requires that municipalities protect shoreland areas by adopting shoreland zoning maps and ordinances. The Town of Robbinston Planning Board granted a land use permit for the LNG terminal on February 16, 2006 under its Shoreland Zoning Ordinance and a Conditional Land Use Permit. The City of Calais determined that the sendout pipeline, as a regulated utility facility, would fall under zoning exemptions within its shoreland district. Downeast filed an application for a Permit by Rule under the NRPA and an application under the Site Location of Development Law with the Maine DEP in

December 2006, which were withdrawn by Downeast along with other State permit applications on November 11, 2007, and will be resubmitted in the third quarter of 2009.

5.1.7 Socioeconomics

The project area would benefit from the proposed project, as it would provide small increases in population to an area that has declined in population over past decades, improved employment and training opportunities for local residents, increased personal income, and an improved tax base with increases in local revenues. There may be short-term adverse impacts on local public safety and other services during the construction phase, but these impacts would be localized and insignificant. Long-term adverse impacts would be negligible. Environmental justice impacts would be beneficial.

Most impacts would occur in Washington County, although adjacent counties and other areas may furnish a portion of the labor for the project construction, and could also benefit from purchases of equipment and supplies. Impacts would likely be concentrated in the eastern portion of Washington County, in the vicinity of the LNG facilities and pipeline.

Along the Downeast LNG transit route are small towns such as Eastport, Lubec, Perry, and Robbinston, Maine, the Pleasant Point Reservation, and Campobello Island, West Isles, Pennfield, and St. Andrews, New Brunswick, Canada, all of which lie primarily within Zone of Concern 3. Less than 0.4 percent of the population within the Zones of Concern lives within Zone 1, while 69 percent live within Zone 3. The severity of impacts on populations within Zones 1 to 3 would depend on the location of the incident relative to the population, the scope of the incident, and whether the LNG released ignited or evaporated. This could be a significant impact, with injuries ranging from mild to fatal, being most severe in Zone 1 and decreasing outward through Zones 2 and 3. However, because of the implementation of the risk mitigation measures recommended in the Coast Guard's WSR during marine transit, the likelihood of a marine LNG spill is extremely remote.

Commercial marine traffic and other economic activity along the waterway could be affected by the passage of the LNG vessels or by an ignited or unignited spill during LNG vessel transit; however the likelihood of a marine LNG spill is extremely remote. Impacts on commercial vessels could result from the safety and security zones around the LNG vessel during transit. In certain locations, vessels could experience delays; however, some vessels may be allowed to transit through the LNG vessel security zones with the specific permission of the COTP, determined on a case-by-case basis.

Downeast has developed a comprehensive compensation plan to address any potential loss of fishing equipment or income as a result of unavoidable impacts by Downeast LNG vessels. Downeast continues to consult with the Cobscook Bay Fishermen's Association, the Fundy North Fishermen's Association, and other sources to update this Fishermen Communication, Coordination, and Compensation Plan to reduce and/or mitigate any adverse impacts on commercial fishing from the project. To ensure that appropriate compensation and mitigation planning measures are developed, we are recommending that Downeast continue to consult with the Maine DMR and appropriate representatives of the local lobster fishery to finalize its Fishermen Communication, Coordination and Compensation Plan and file the plan prior to operation of the Downeast LNG terminal. Downeast has negotiated an agreement with the Mill

Cove herring weir owner for compensation in the event of any loss that may result from the operations of the LNG facilities.

The Town of Robbinston and Downeast finalized a “Host Community Benefits Agreement” that specifically outlines a number of commitments by Downeast if the project is developed. These commitments, outlined early in the project development phase, serve to ensure that project benefits are shared with the people of Robbinston and that certain Downeast obligations and services are documented in a legally binding document.

5.1.8 Transportation

5.1.8.1 Onshore Traffic

A project-specific traffic capacity analysis in the area of Robbinston, Maine was performed by Downeast to evaluate future roadway levels of service with the addition of construction and facility operation traffic. Traffic impacts associated with construction of the LNG terminal were estimated for both material delivery and worker transportation. Limited traffic delays could occur at pipeline roadway crossing locations. The traffic analysis concluded that the site driveway, U.S. Route 1, and Ridge Road would operate with acceptable levels of service, given the predicted traffic increases from project construction and operation. Downeast has agreed to provide traffic mitigations, including the use of flaggers, daily roadway cleaning, the construction of turning lanes at the facility entrance, roadway striping and signage, and the prohibition of employee parking on U.S. Route 1. Finally, Downeast would consult with the Maine DOT and the Road Departments of affected communities regarding the need for improvements that might be identified and deemed necessary in the future.

5.1.8.2 Marine Traffic

Downeast has indicated that construction materials would be delivered by land, via U.S. Route 1. Marine traffic associated with construction of the terminal would be minimal and limited to the arrival and departure of construction barges and tugs. With coordination and advance notice regarding the construction barges, impacts on fishing vessels, ferries, and other marine traffic would be minimal.

During operations, Downeast estimates one LNG vessel every five to seven days in the winter and one every eight to ten days in the summer; approximately 60 vessels per year. A typical transit, from the time an LNG vessel would enter Head Harbor Passage to the time it would reach the proposed Downeast LNG terminal, would take approximately 2.5 to 3.5 hours; however, the time it would take for an LNG vessel (traveling at an estimated speed of 10 knots) to pass any given point would correspond to about 18 minutes. LNG vessels would follow a circuitous route through both U.S. and Canadian waters, virtually the same route as currently used by all deep-draft vessels servicing Passamaquoddy Bay port areas, including the ports of Bayside, New Brunswick, and Eastport, Maine. These ports receive on average an estimated 125 to 130 deep-draft vessel arrivals per year. The Downeast LNG project would therefore result in a roughly 50 percent increase in anticipated deep-draft vessel traffic. Coordination with the Coast Guard and other waterway and port authorities in the area, and advance notice of the arrival and departure of LNG tankers, along with the implementation of vessel traffic management practices

recommended by the Coast Guard's WSR, would reduce impacts on other marine traffic, both commercial and recreational, to an insignificant level.

5.1.9 Cultural Resources

In its January 25, 2007 letter to Downeast's cultural resources consultant, the SHPO found that the LNG vessel transit, in and of itself, is not likely to affect aboveground or archaeological resources. We concur. Downeast indicated that no historic structures within the Roosevelt Campobello International Park would be within the Zones of Concern. Downeast identified three properties listed on the NRHP in the town of Robbinston and four individual NRHP listed buildings and one Historic District in Eastport that would be overlapped by the Zones of Concern. In addition, the West Quoddy Head Lighthouse, which is listed on the NRHP, would be within Zone 3. The Coast Guard mitigation measures outlined in its WSR would render the possibility of an LNG carrier incident to a low probability event, and therefore, LNG marine traffic in the waterway is not likely to adversely affect any historic properties.

Downeast conducted a marine archaeological survey of 57 acres offshore adjacent to its proposed LNG terminal, covering the proposed pier and berthing area. This survey found no evidence of submerged cultural resources. However, four historic-era fish weirs were recorded by onshore historic archaeological surveys. Downeast's consultant recommended that these resources should be considered not eligible for the NRHP, requiring no further work. Onshore archaeological and architectural surveys did not identify any other resources within the terminal APE. Downeast believes that the LNG terminal would have no adverse visual impacts on the Saint Croix Island International Historic Site in Bayside, New Brunswick, about 5.2 miles northwest. We and the SHPO agree that no historic properties would be affected within the APE for the proposed LNG terminal.

Downeast documented archaeological surveys of portions of the sendout pipeline route. These surveys recorded one prehistoric site and seven historic sites. All of these sites appear to be outside of the proposed pipeline construction right-of-way and would not be adversely impacted. Downeast also conducted an architectural survey that identified five historic complexes near the pipeline route recommended as eligible for the NRHP. However, the SHPO's June 25, 2007 review of the architectural survey report disagreed with those recommendations, and requested additional information. We defer our opinions until Downeast produces an architectural report acceptable to the SHPO.

In January 2008, Downeast advised the SHPO of the amended pipeline route and requested continued consultation on the project. The SHPO responded on January 31, 2008, requesting additional archaeological and architectural surveys covering the new pipeline route. The results of all cultural resources inventories, including the amended pipeline route and associated facilities, have not yet been filed with the Commission. We will defer making determinations of eligibility and effect until the entire APE for the pipeline is inventoried, and the SHPO has had the opportunity to comment on all reports, including a revised architectural survey report that addresses its previous concerns. Therefore, we are recommending that Downeast not begin construction and use of all proposed facilities until it files the remaining survey and evaluation reports, any required treatment plans, comments of the SHPO and appropriate Indian Tribes, and the Director of OEP notifies Downeast in writing that it may proceed with treatment or construction.

In a February 29, 2008 letter to the Commission, the BIA expressed concern that the project may have an impact on the cultural and religious interests of the Passamaquoddy Tribe. The Passamaquoddy Tribe has raised a number of issues regarding potential project impacts on cultural sites or aboriginal fishing rights. The Tribe objected to the placement of the pipeline across islands within the St. Croix River. Downeast proposes to use HDD to cross the St. Croix River and, in response to this comment, has amended the pipeline route to avoid encroaching on any designated Indian trust lands. Downeast has not yet resolved other issues raised by the Tribe. We are recommending that Downeast file documentation of continued consultations with the Passamaquoddy Tribe and other Native Americans interested in the project's potential impacts on cultural resources and seek resolution of identified project-related impacts on archaeological sites, burials, existing historic properties, and sites of religious or cultural importance within the APE.

5.1.10 Air Quality and Noise

5.1.10.1 Air Quality

Construction of the marine and land-based portions of the LNG terminal would be performed simultaneously. These construction activities would generate tailpipe emissions (due to fossil fuel combustion from equipment and vehicles) and fugitive emissions (ground and roadway dust). The majority of construction emissions would be CO, NO_x, and PM₁₀. The worst case emissions for any given year of construction are estimated at 23.9, 46.9, and 37.5 tons, respectively. Computer simulation suggests that anticipated emissions would be only a fraction of the major emission source threshold levels. Therefore, emissions due to construction activities would not have a significant impact.

Estimated worst case annual emissions generated by construction of the sendout pipeline include 109.7 tons of NO_x, 35.11 tons of VOCs, and 17.4 tons of PM₁₀. Anticipated emissions would be only a fraction of the major emission source threshold levels.

Operation of the Downeast LNG terminal would generate air pollutant emissions from stationary combustion equipment, both onshore and offshore, and from LNG tankers and support vessels that travel to and from the facility. The primary emissions of concern from maritime vessel activities associated with Downeast are NO_x and CO. Vessel emissions that would occur while the LNG vessel is moored at the terminal are estimated at 28.4 and 7.0 tons per year, respectively. Downeast did not provide the total vessel emissions from the pilot station to the LNG terminal. Therefore, we are recommending that Downeast quantify the total criteria emissions produced by the LNG vessel and support vessels while traveling between the pilot station and the import terminal berth, and file the results prior to the end of the draft EIS comment period. In addition, Downeast did not provide emissions of CO₂, N₂O, and methane from the project to properly quantify the greenhouse gas emissions. We are recommending that Downeast provide estimates of these emissions from construction and operation of the LNG terminal and associated pipeline facilities, and file the results with the Secretary prior to the end of the draft EIS comment period. We will provide further analysis of these emissions in the final EIS.

The primary emissions of concern from non-vessel LNG terminal operations are also NO_x and CO, with estimated annual emissions of 70.9 and 50.3 tons per year, respectively. In total, the

cumulative long-term emissions for NO_x, and CO would be 99.3 and 57.3 tons per year, respectively. Computer simulation suggests that the impact of the Downeast primary emissions would not pose a threat to the Maine AAQS and would remain below the significant impact levels for both Class I and Class II areas in the region.

The Downeast LNG project would be a minor emission source and is therefore not required to perform a cumulative air quality impact assessment to obtain an air license from the Maine DEP. However, more information is necessary to evaluate potential impacts on nearby Class I and Class II areas. We are recommending that, prior to the end of the draft EIS comment period, Downeast provide a cumulative air quality impact analysis that includes both stationary and mobile emissions (including vessel emissions along the transit route) and quantifies the primary and secondary emissions from existing or proposed pollution sources in the region. In the final EIS, we will provide further analysis of the potential air quality impacts on the Roosevelt-Campobello International Park, the Acadia National Park and the Moosehorn Wilderness.

5.1.10.2 Noise

Noise would affect the local environment during both the construction and operation of the proposed Downeast LNG terminal. At any location, both the magnitude and frequency of noise associated with the project may vary considerably over the course of the day or throughout the week. Noise would be associated with a variety of different project-related activities including LNG marine traffic, construction and operation of marine-based and land-based facilities, and construction of the sendout pipeline. Potential underwater noise impacts were also assessed for project construction and operation.

Noise generated by LNG vessel traffic along the waterway from the territorial sea to the proposed LNG terminal would be similar to noise from other large ships currently using the waterway. Downeast prepared a noise assessment for four of the closest points of land along the route. The highest day-night sound level (L_{dn}) of 51 dBA was predicted for a nighttime transit past the east shore of Moose Island at a close-in distance of 600 feet. Noise associated with the normal operation of the additional LNG vessels along the waterway would cause an insignificant incremental increase in noise impacts.

Noise produced during construction of the Downeast LNG terminal and associated pipeline could create short-term annoyances to some residences, and could have short-term impacts on some aquatic species, nesting birds, and other wildlife in the area. Noise impacts during the construction phase would be localized and would attenuate quickly as the distance from the noise source increases. The sound generated by construction vessels is proportionate to ship size, speed, engine load and rpm with broadband source levels driven primarily by propeller cavitations, hydrodynamic flow over the hull and hull appendages, and operation of machinery onboard. Aside from tug operations, the primary sources of underwater noise during construction of the LNG terminal would be the installation of the steel pilings. Construction of the sendout pipeline is primarily land-based but would also rely on special techniques for crossing waterbodies, roads, railroads, and utilities such as HDD. Activities during the construction phase have the potential to cause noise impacts on the surrounding area. Noise associated with most construction equipment would be intermittent, and all major construction activity would be limited to daytime or daylight hours. From measurements of similar HDD operations, estimates show that sound levels within approximately 1,500 feet of the drill site

would have the potential to exceed 55 dBA. Where 24-hour drilling is necessary and L_{dn} sound levels at NSAs are expected to exceed 55 dBA, Downeast would reduce noise levels at the NSAs by implementing noise control measures. These mitigation measures would reduce sound levels from HDD operations up to levels ranging from 10 to 15 dBA. To ensure that this mitigation is sufficient, we are recommending that prior to construction, Downeast file an HDD noise mitigation plan for our review and approval, monitor noise levels during drilling, and make all reasonable efforts to restrict noise to no more than an L_{dn} of 55dBA at the NSAs.

Noise from operation of the LNG terminal facility has been estimated to be below the FERC limit of 55 dBA L_{dn} and should not create a significant noise impact at NSAs near the project site. To determine actual noise from operation of the terminal, we are recommending that Downeast file a noise survey no later than 60 days after placing the terminal in service and install additional noise controls if necessary. At typical cruising speeds, source sound levels emitted by LNG vessels are dominated by propeller cavitation. Underwater noise associated with the pilot vessel would be expected to be negligible in comparison to that generated from the LNG vessel and assist tugs. The use of LNG vessel thrusters would be minimized when docking to the pier, due to the reliance on tugboats that would actively assist during docking. The buried sendout pipeline would not contribute to aboveground noise levels. Operational noise associated with the sendout pipeline would be limited to the immediate vicinity of the three mainline block valves, located at each end of the pipeline and at MP 17.2. Some minor noise may be heard immediately around metering stations, but it would not be significant.

5.1.11 Reliability and Safety

In order to analyze the safety, operability, and reliability of the proposed facilities, we performed a cryogenic design and technical review of the proposed terminal design and safety systems. Our evaluation of the front-end-engineering design of the proposed LNG storage facility included a review of the cryogenic safety, thermodynamics, heat transfer, instrumentation, cryogenic processes, and other relevant safety systems. As a result of this technical review, we identified a number of concerns and have made recommendations to address these issues. Compliance with these recommendations would need to be demonstrated by Downeast either prior to initial site preparation, prior to construction after final design, prior to commissioning, or prior to commencement of service. Therefore, we believe that appropriate features and modifications to enhance the safety and operability of the proposed LNG facility would be incorporated into the facility design.

We also evaluated the exclusion zone modeling performed to ensure compliance with the federal siting standards. Because our modeling indicates that portions of the vapor dispersion exclusion zones would extend beyond the proposed site, we have recommended that Downeast provide revised modeling which demonstrates compliance with Title 49 CFR 193 prior to the end of the draft EIS comment period.

In accordance with 18 CFR 157.21 and Navigation and Vessel Inspection Circular 05-05, Downeast submitted a Follow-On WSA to the Coast Guard that proposed mitigation measures to address identified navigation safety and maritime security risks posed by LNG marine traffic. On January 6, 2009, the COTP, Sector Northern New England, issued a Letter of Recommendation and a WSR which summarized the recommended safety and security measures, as well as the port community's capabilities to implement these measures. Based on

the results of the assessment of potential risks to navigation safety and maritime security associated with the Downeast proposal, the Coast Guard has determined that the waterway along the intended transit route, which takes in waters of the Gulf of Maine, Bay of Fundy, Grand Manan Channel, Head Harbor Passage, Friar Roads, Western Passage, and Passamaquoddy Bay, is suitable for the type and frequency of marine traffic associated with this proposed project, provided that all the recommended risk mitigation measures outlined in section 4.6 of the WSR are fully implemented. The risk mitigation measures include, among others, the following:

- development of standard operating parameters for the safe and secure movement of LNG vessels through Canadian and U.S. waters;
- transit of loaded or partially loaded LNG carriers only during daylight hours;
- a minimum of two miles of visibility for the movement of LNG vessels in U.S. waters, at the discretion of attending pilot(s) and Fundy Traffic;
- a sustained wind speed up to 25 knots is the maximum wind speed in which an inbound or outbound transit would be allowed to commence, with concurrent agreement of the attending pilot(s), Fundy Traffic, and COTP;
- one-way vessel traffic scheme during transit operations, at the discretion of the attending pilots and Fundy Traffic;
- no anchoring of LNG vessels in Friar Roads, except for emergency situations;
- maintenance of ample separation distance by loaded, inbound LNG vessels transiting Head Harbor Passage and Western Passage;
- establishment and enforcement of comprehensive safety and security zones;
- mandatory pilotage throughout the transit route and during docking and undocking;
- implementation of an Automatic Identification System for all LNG vessels;
- implementation of appropriate vessel speed restrictions;
- implementation of appropriate environmental operating parameters, based on factors such as currents, tides, visibility, wind velocity, etc;
- development of an Emergency Response Plan required by Section 311 of the Energy Policy Act of 2005, 15 U.S.C § 717b-1(e), including emergency procedures, resources required to respond to an emergency, coordinated marine firefighting training, and incident management training;
- development and implementation of full mission bridge simulator training for all pilots providing services to LNG carriers;
- development of a Transit Management Plan, in consultation with the Coast Guard and other cognizant agencies, that clearly outlines the roles, responsibilities, and specific procedures for the LNG carrier, the LNG terminal, and various stakeholders with responsibilities for managing the risks of LNG marine traffic;
- preparation of an Operations Manual, as required by 33 C.F.R. § 127.305, an Emergency Manual, as required by 33 C.F.R. § 127.307, and a Facility Security Plan as required by 33 C.F.R. § 105.120;

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- written verification of collaboration with and acceptance from the Passamaquoddy Nation, ensuring its jurisdictional interests and public safety and security needs are adequately met; and
 - compliance with all applicable Canadian laws and regulations applicable to the safe and secure navigation and the regulation of maritime traffic that comply with customary international law.

To ensure that Downeast responsibly manages the maritime safety and security risks associated with LNG marine traffic, we are recommending that throughout the life of the facility, Downeast ensure that the facility and any LNG vessel transiting to and from the facility complies with all recommendations set forth by the Coast Guard COTP, Sector Northern New England, including all risk mitigation measures contained in the WSR.

In accordance with Section 3A of the Energy Policy Act of 2005, we are recommending that Downeast develop an ERP that includes a Cost-Sharing Plan. The Cost-Sharing Plan must contain a description of any direct cost reimbursements Downeast agrees to provide to any state and local agencies with responsibility for security and safety at the LNG terminal and vessels that serve the facility. This ERP, which would have to be approved prior to initial site preparation at the facility site, would address concerns of local communities about the costs related to security/emergency management of the proposed LNG facility and LNG marine traffic.

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture. The DOT is mandated to provide pipeline safety under Title 49, U.S.C. Chapter 601. The natural gas pipeline and associated aboveground facilities proposed for the Downeast LNG Project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. The sendout pipeline would be continuously monitored from a SCADA system at an operations control center. Downeast would prepare an Operations and Maintenance Procedures manual for the pipeline system that meets the requirements of section 192.605. The pipeline would be patrolled and inspected on the ground on a periodic basis per DOT requirements. Under section 192.615, Downeast would establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency.

Available data show that natural gas pipelines continue to be a safe, reliable means of energy transportation. Based on approximately 301,000 miles in service, the rate of public fatalities for the nationwide mix of transmission and gathering lines in service is 0.01 per year per 1,000 miles of pipeline. Using this rate, the Downeast LNG Project, including the M&NE downstream expansion represents a risk probability of one single fatality per 622 years. This would represent a slight increase in risk to the nearby public.

5.1.12 Cumulative Impacts

We considered a wide variety of projects and activities in the general area that, in concert with the proposed Downeast LNG Project, could result in cumulative impacts. We evaluated four LNG projects, one transmission line project, one offshore gas project, two natural gas pipelines,

four tidal energy projects, one road construction project, one border crossing facility, one aquaculture facility, one airport, one wind power project, and the Port of Eastport warehouse project.

Construction of the Downeast LNG Project and some or all of the other LNG project proposals in the area could cause significant construction related impacts, especially if they are constructed at the same time. Marine water quality could be affected from turbidity and potential spills. Marine fisheries and aquatic resources would be affected from disturbance of bottom habitats, increased turbidity, and noise. These impacts would be localized, short term, and most likely not occur at the same time. Because the construction time periods and physical impact areas for these projects are not expected to overlap, cumulative impacts on marine fisheries and aquatic organisms during construction of the projects would be insignificant. During operation, the Downeast LNG Project, together with the other projects in the area, would contribute to increased ship traffic along the ship channel, and cumulative impacts on marine water quality from water withdrawals and discharges, installation of structures (ocean current generation modules), and impacts on marine fisheries and mammals. Downeast has attempted to minimize the area of permanent impact on marine habitat through terminal siting, design, and operational controls. It is expected that other projects would follow a similar approach to avoid, minimize, and mitigate for permanent impact on marine habitats during their respective regulatory review and approval processes.

The permanent conversion of forest land communities to an herbaceous community along the Downeast sendout pipeline and associated potential M&NE downstream expansion pipelines in combination with other past, present, or reasonably foreseeable future projects, would fragment some wildlife habitats and degrade important wetland habitats. In most instances, cumulative effects of temporary wetlands impacts would be minimal because of the limited temporal and spatial overlap between the projects. Although the Downeast LNG Project and other projects would result in the degradation of some wildlife habitats, compensatory mitigation programs for each of these projects would likely be designed to provide a net benefit to the ecosystem.

The Downeast LNG Project, together with the other projects in the area, would cumulatively benefit the local economy through job creation and wages, increased income in the region, purchases of goods and materials, and increased tax revenues. A further effect would be a small increase in the area's population, which is considered a benefit given declining populations in recent decades. We recognize that the project could spur entrepreneurial innovation; however, we do not believe that the Downeast LNG Project would set a precedent for energy generation or industrialization in the area. Any new developments in the project area would require regulatory review to determine impacts, mitigation, and compensation.

Impacts associated with the proposed Downeast LNG Project would be relatively minor, and we have included recommendations in this EIS to further reduce the associated environmental impacts. Consequently, only a small cumulative effect is anticipated when the impacts of the proposed project are added to past, present, or reasonably foreseeable future projects in the area. We also believe that the Downeast project's incremental impact on air quality is likely minor; however, we have recommended additional data be filed to further define that impact and will provide additional analysis and conclusions in the final EIS.

5.1.13 Alternatives

Alternative analyses were completed as part of FERC's environmental review. Under the no action or postponed action alternative, Downeast would not be able to provide additional natural gas supplies in order to help meet the increasing natural gas demand in New England. We conclude that neither conservation measures nor renewable energy sources are expected to replace or significantly offset the demand for additional natural gas supplies in New England by the projected in-service date of the Downeast LNG Project.

We evaluated system alternatives that would make use of other existing or proposed LNG import terminals or natural gas pipeline systems. Expansion of existing, recently approved, or proposed onshore LNG facilities would require construction of new LNG storage and vaporization facilities, additional LNG vessel traffic, and new natural gas pipelines. Each of these alternatives would have an equal or greater environmental impact than the proposed Downeast LNG Project. The Cacouna and Rabaska projects would not supply the U.S. northeast markets. The Deep Panuke Project would partially meet the objectives of the Downeast LNG Project, but would also have its own set of environmental impacts, primarily from the development of offshore production facilities, onshore receiving facilities, and associated pipelines. It is possible that some combination of two or more of the existing or proposed LNG terminal projects, or future expansions of those projects, could serve as an alternative to the proposed Downeast LNG Project; however, such an alternative is speculative. Northeast Gateway and Neptune would have less environmental impact than the Downeast LNG Project; however, neither would provide LNG storage capacity. Furthermore, we recognize that market demand could justify construction of the Downeast LNG Project in addition to the existing Northeast Gateway Project and approved Neptune LNG Project.

Existing natural gas pipeline systems in New England may not have the capacity to transport the additional volumes of natural gas proposed in this project. While an expansion of one or more of these systems could potentially provide the capacity for natural gas volumes proposed by Downeast, such expansions would not provide a source of imported natural gas and additional natural gas storage facilities. In addition, an expansion of one or more of these other pipeline systems would include their own set of environmental impacts.

We evaluated alternative terminal sites, pier designs, and LNG vaporization technologies, none of which would provide significant environmental advantages over the proposed site. We also analyzed pipeline route alternatives and variations that may avoid or minimize environmental impact on specific sensitive areas or areas of concern. The preferred pipeline route no longer crosses the Moosehorn NWR and impacts on the Baileyville WPA would be minimized primarily through use of spill control practices. We have determined that the proposed sendout pipeline route, as modified throughout our review, is environmentally preferable to the identified alternatives.

We evaluated the alternative of a collocated sendout pipeline that would serve both the Downeast LNG and Quoddy Bay LNG or Calais LNG projects. The primary advantage of a collocation alternative would be the creation of a single new pipeline right-of-way as compared to two separate rights-of-way, as proposed. If the separate pipelines were constructed at different times, independently owned but collocated pipelines could result in some overlap of construction right-of-way to reduce the total area of disturbance. The disadvantage is that two separate rights-of-

way would still be required, even if collocated, and the total area of impact would be reduced only if the two pipelines were constructed at separate times. While a collocation alternative would avoid the creation of two separate rights-of-way, impact would be nearly doubled on affected individual properties. In addition, the period of construction disturbance that landowners would experience would be extended. Much of the potential benefit would be realized only through synchronization of the pipeline construction schedules. In practice, this synchronization would be difficult and would extend the impacted right-of-way width.

We also evaluated the alternative of a single pipeline that would serve either Downeast and Quoddy Bay or Downeast and Calais LNG. The primary advantage of the single sendout pipeline alternative would be creation of a single new pipeline right-of-way compared to two separate rights-of-way as proposed. The primary disadvantage would be the difficulty of coordinating a joint agreement between two separate project proponents with entirely separate project schedules, resulting in significant delay to the in-service date. We also analyzed alternatives for the M&NE downstream expansion facilities. However, because M&NE has not yet filed an application with the Commission for these facilities, we have not included recommendations for these pipeline alternatives.

We evaluated alternative LNG vessel designs that could reduce water usage. Vessels proposed for the Northeast Gateway and Neptune offshore LNG projects include on-board regasification systems that are capable of a unique heat exchange and water use reduction. Because the proposed Downeast LNG terminal is designed for accepting and storing LNG in its liquid phase, the LNG vessels calling on the terminal would be standard LNG vessels designed for transport and offloading of LNG in liquid phase. These vessels would not include on-board regasification systems, and would not be capable of the unique heat exchange that is proposed for the on-board regasification ships. Therefore, the opportunities to accomplish similar water use reductions through LNG vessel design would not be available to the Downeast LNG Project.

Overall, the proposed project would result in fewer environmental impacts than any alternatives considered. This includes consideration of the project's purpose and need, and the environmental impacts associated with the location, design, and construction methods of the alternatives. In addition, we have included recommendations in this EIS that would modify the Downeast proposal to further reduce and avoid impacts. In summary, we have determined that Downeast's proposed project, as modified by our recommended mitigation measures, is the preferred alternative that can meet the project objectives.

5.2 FERC STAFF'S RECOMMENDED MITIGATION

If the Commission authorizes the proposed Downeast LNG Project, we recommend that the following measures be included as specific conditions in the Commission's Order. We believe these measures would further mitigate environmental impacts associated with construction and operation of the proposed project.

1. Downeast 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 Commission's Order. Downeast must:

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- 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 OEP **before using that modification.**
2. 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. design and implementation of any additional measures deemed necessary to assure continued compliance with the intent of the conditions of the Order.
 3. For pipeline facilities, the Director of OEP has delegation authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the project. This authority shall allow:
 - a. modification of conditions of the Commission's Order; and
 - b. 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.
 4. **Prior to any construction**, Downeast shall file an affirmative statement with the Secretary, certified by senior company officials, that all company personnel, EIs, and contractor personnel will be informed of the EI's authority and have been or will be trained on 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. **As soon as they are available, and before the start of construction**, Downeast shall file with the Secretary 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.

Downeast's exercise of eminent domain authority granted under NGA section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Downeast's right of eminent domain granted under NGA section 7(h) 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.

6. Downeast 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, 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, 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 route variations recommended in this EIS or minor field realignments that do not affect sensitive environmental areas. 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 begins**, Downeast shall file an Implementation Plan with the Secretary, for review and written approval by the Director of OEP. Downeast must file revisions to the plan as schedules change. The plan shall identify:

- a. how Downeast will implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EIS, and required by the Order;
- b. how Downeast 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;
- c. the number of EIs assigned, and how the company would ensure that sufficient personnel are available to implement the environmental mitigation;
- d. company personnel, including EIs and contractors, who would receive copies of the appropriate material;
- e. the date and location of the environmental training Downeast would 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);
- f. the company personnel (if known) and specific portion of Downeast's organizations having responsibility for compliance;
- g. the procedures (including use of contract penalties) Downeast would follow if noncompliance occurs; and
- h. 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

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- (4) the start and completion of restoration.
8. Downeast 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. **Prior to construction of the pipeline**, Downeast shall mail the complaint procedures to each landowner whose property would be crossed by the project.
- a. In its letter to affected landowners, Downeast shall:
- (1) provide a local contact that the landowners should call first with their concerns; the letter shall indicate how soon a landowner should expect a response;
 - (2) instruct the landowners that, if they are not satisfied with the response, they should call Downeast'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 Downeast's Hotline, they should contact the Commission's Enforcement Hotline at (888) 889-8030.
- b. In addition, Downeast 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, would be resolved, or why it has not been resolved.
9. Downeast shall employ a team of EIs for both the terminal site and the pipeline facilities. The EIs 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. a full-time position, separate from all other activity inspectors;
 - e. 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
 - f. responsible for maintaining status reports.
10. Beginning with the filing of its Implementation Plan, Downeast shall file with the Secretary updated status reports regarding pipeline facilities **on a weekly basis until all pipeline construction and restoration activities are complete**. On request, these status

reports shall also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:

- a. an update on Downeast's efforts to obtain the necessary federal authorizations;
 - b. the current construction status of the project, work planned for the following reporting period, and any schedule changes for work in environmentally sensitive areas;
 - c. 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);
 - d. corrective actions implemented in response to all instances of noncompliance, and their cost;
 - e. the effectiveness of all corrective actions implemented;
 - f. a description of complaints that may relate to compliance with the requirements of the Order, and measures taken to satisfy its concerns; and
 - g. copies of any correspondence received by Downeast from other federal, state, or local permitting agencies concerning instances of noncompliance, and Downeast's response.
11. Downeast must receive written authorization from the Director of OEP **before commencing service** from the LNG terminal and other components of the project. Such authorization will only be granted following a determination that the facilities have been constructed in accordance with FERC approval and applicable standards, can be expected to operate safely as designed, and the rehabilitation and restoration of the right-of-way and other areas affected by the project are proceeding satisfactorily.
12. **Within 30 days of placing the certificated facilities in service**, Downeast 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 would be consistent with all applicable conditions; or
 - b. identifying which of the authorization or certificate conditions Downeast has complied with or would comply with. This statement shall also identify any areas where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.
13. **Prior to the end of the draft EIS comment period**, Downeast shall consult with M&NE and file with the Secretary an updated estimate of the M&NE facilities required to accommodate Downeast's proposed throughput. *EIS Section 2.1.2*
14. Downeast shall **not begin construction** of the pipeline from MP 17.7 to MP 27.2 **until** Downeast files with the Secretary updated alignment sheets, depicting the pipeline adjacent to the existing transmission line, that have been developed in coordination with EMEC. *EIS Section 2.2.2.1*
15. **Prior to the end of the draft EIS comment period**, Downeast shall file with the Secretary the proposed design values for the MCE ground motion parameters: "Ss" "S₁", and "T_L" (not adjusted for site effects), the MCE ground motion for "S_{MS}" and

“S_{MI}” (as adjusted for site effects), and “S_{DS}” and “S_{DI}” for the DE ground motion parameters adjusted for site effects, for all Seismic Category II and III structures, systems and components. *EIS Section 4.1.4.1.1*

16. **Prior to construction of the LNG terminal facilities**, Downeast shall comply with all pertinent data submittal guidelines contained in Part II Sections 3 and 4 and applicable Appendices of the Commission’s “Draft Seismic Design Guidelines and Data Submittal Requirements for LNG Facilities” (January 2007). Any modifications to the currently proposed design criteria or mitigation measures shall be clearly identified and addressed in a Design Basis Document as detailed in Appendices D and E. The final proposed seismic categorization of all structures, components, and systems, as described in Appendix C shall be filed with the Secretary. *EIS Section 4.1.4.1.1*
17. **Prior to construction of the pipeline facilities**, Downeast shall file with the Secretary the location by milepost of all private wells and springs within 150 feet of construction activities. Downeast shall conduct, with the well owner's permission, pre- and post-construction monitoring of well yield and water quality for these wells. Within 30 days of placing the facilities in service, Downeast shall file a report with the Secretary discussing whether any complaints were received concerning well yield or water quality and how each complaint was resolved. *EIS Section 4.3.1.4*
18. In the event a water well or system is damaged as a result of construction, Downeast shall arrange for a temporary source of potable water, if required, and provide for the repair of the well or replacement of the water supply. *EIS Section 4.3.1.4*
19. Downeast shall develop a Marine SPCC Plan to include procedures that would be implemented should spills of oil, gas, lubricants, or other hazardous materials occur during construction and operation of the marine terminal. In addition to addressing emergency spill response and clean-up procedures, this plan shall include a description of general spill prevention measures such as material handling practices, personnel training, and inspection. The Marine SPCC Plan shall be filed with the Secretary for review and approval by the Director of OEP **prior to the construction of the LNG terminal facilities**. *EIS Section 4.3.2.2*
20. **Prior to construction of the LNG terminal facilities**, Downeast shall file a final plan for the discharge of the excess SCV water, for the review and approval of the Director of OEP. The discharge plan shall include discharge location, rate and frequency of discharge, copies of applicable permit applications, and all measures to be used to mitigate environmental impacts at the discharge location. *EIS Section 4.3.2.2*
21. Downeast shall continue to consult with the COE and other appropriate state and federal resource agencies to develop site-specific HDD Plans for each of the proposed HDD crossings, which include site-specific construction diagrams showing the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction, and a contingency plan for crossing the feature in the event an HDD is unsuccessful. Downeast shall file the HDD plans, and any agency comments on the plans, with the Secretary for review and written approval by the Director of OEP **prior the end of the draft EIS comment period**. *EIS Section 4.3.2.3*

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22. Downeast shall file any amended waterbody or wetland crossing plans with the Secretary for review and written approval by the Director of OEP concurrent with the appropriate state and federal applications for any required permits or approvals to construct the crossing using this plan. *EIS Section 4.3.2.3*
23. **Prior to the end of the draft EIS comment period**, Downeast shall file with the Secretary the following information for the St. Croix River HDD:
- a. geotechnical feasibility assessment of the proposed HDD location;
 - b. site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction; and
 - c. a detailed description of the open-cut crossing plan that would be followed should the HDD fail. This shall include the following information:
 - (1) stream bottom profile of the proposed pipeline alignment on the riverbed;
 - (2) sediment core sampling data for potential contamination of the proposed pipeline alignment on the riverbed;
 - (3) the type and amount of equipment (barges, tugs, excavators, dredges, etc.) that would be used to open-cut the river;
 - (4) the duration for completing the open-cut crossing;
 - (5) the amount and location of any blasting that would be used to complete the crossing;
 - (6) the time of year for implementing crossing;
 - (7) site-specific construction diagrams that show the location and size of the staging, temporary work space, and storage areas;
 - (8) a detailed description of sediment control measures and other procedures to be implemented to ensure that adverse impacts on the river are avoided or minimized to the greatest extent possible;
 - (9) a detailed description of the disposition of trench spoils (i.e., sidecasting, remove, and replace) and dewatering fluids (if any);
 - (10) a detailed restoration plan for the river bottom, riverbank, and all temporary staging, workspace, and storage areas; and
 - (11) documentation of consultation with appropriate federal, state, and local agencies concerning the mitigation of the impacts from an open-cut crossing. *EIS Section 4.3.2.3*
24. Downeast shall continue consultation with the COE and the Maine DIFW and DEP to finalize its wetland mitigation and compensation plan. Downeast shall file the final plan with the Secretary, along with agency comments and applicable approvals, **prior to construction of the pipeline or LNG terminal facilities**. *EIS Section 4.4.1.2*
25. Downeast shall continue to consult with the Maine DEP, DIFW, and BEP to finalize its DWA mitigation package. **Prior to construction of the pipeline facilities**, Downeast shall file with the Secretary the final DWA mitigation package and copies of consulted agencies' comments on the final package and applicable approvals. *EIS Section 4.5.1.3*
26. Downeast shall continue to consult with NOAA Fisheries and other relevant federal and state agencies to determine appropriate mitigation strategies to employ during construction of the LNG terminal facility to minimize acoustic harassment or harm to

marine species (fish, sea turtles, pinnipeds, and other marine mammals). Downeast shall file with the Secretary copies of its correspondence with consulted agencies and a description of any mitigation measures it has agreed to implement, **prior to the end of the draft EIS comment period.** *EIS Section 4.5.2.2*

27. Downeast shall continue to consult with NOAA Fisheries, Maine DMR, and other appropriate agencies to determine any recommended seasonal or construction timing restrictions to minimize impacts on marine species and habitats during all proposed in-water work and pile driving activities at the LNG terminal. Downeast shall file with the Secretary copies of its correspondence with consulted agencies and a description of any mitigation measures it has agreed to implement, **prior to the end of the draft EIS comment period.** *EIS Section 4.5.2.2*
28. Downeast shall **not begin construction until:**
 - a. the staff completes consultation with the FWS/NOAA Fisheries; and
 - b. Downeast has received written notification from the Director of OEP that construction or use of mitigation may begin. *EIS Section 4.6*
29. **Prior to construction,** Downeast shall file its Prevention and Mitigation Manual with the Secretary. *EIS Section 4.6.2.1*
30. **Prior to the end of the draft EIS comment period,** Downeast shall file site-specific construction plans for all residences that are located within 50 feet of construction work areas and are not listed in Table 4.7.2.3-1. Downeast shall specify what safety measures described in section 4.7.2.3 would be implemented in each residential area and incorporate these measures into each site-specific plan. *EIS Section 4.7.2.3*
31. **Prior to the end of the draft EIS comment period,** Downeast shall revise all residential site-specific plans contained in Appendix Q of the draft EIS to identify a preferred alternative that minimizes impacts on the residences. *EIS Section 4.7.2.3*
32. **Prior to construction,** Downeast shall file with the Secretary documentation of concurrence from the Maine SPO that its project is consistent with the Maine Coastal Zone Management Program. *EIS Section 4.7.5.1*
33. Downeast shall continue to consult with the Maine DMR and appropriate representatives of the local lobster fishery to finalize its Fishermen Communication, Coordination and Compensation Plan. **Prior to operation of the LNG terminal,** Downeast shall file with the Secretary the final Fishermen Communication, Coordination and Compensation Plan, copies of consulted agency/organization comments on the final plan, and any applicable approvals. *EIS Section 4.8.2.4.1*
34. **Prior to construction,** Downeast shall file with the Secretary, for review and approval by the Director of OEP, documentation of continued consultations with the Passamaquoddy Tribe and other appropriate Indian tribes and Native Americans interested in the project's potential impacts on cultural resources, and seek resolution of identified project-related impacts on archaeological sites, burials, existing historic properties, and sites of religious or cultural importance within the APE.

All material 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 4.10.4*

35. Downeast **shall not begin implementation** of any treatment plans/measures, **construction** of facilities, **or use** of all staging, storage, or temporary work areas, and new or to-be-improved access roads, **until**:
- a. Downeast files with the Secretary all required cultural resources survey and evaluation reports, and any necessary treatment/avoidance plans;
 - b. Downeast files with the Secretary comments from the SHPO on all cultural resources investigation reports and plans;
 - c. the ACHP has been given an opportunity to comment if any historic property would be adversely affected by the project; and
 - d. the Director of OEP reviews all cultural resources investigation reports and plans, and notifies Downeast in writing that treatment plans 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 4.10.4*

36. **Prior to the end of the draft EIS comment period**, Downeast shall file with the Secretary the total criteria emissions (HAPS, N₂O, methane, and CO₂) produced by the LNG vessel and support vessels while traveling between the pilot station and the import terminal berth and the total CO₂, methane and N₂O emissions from construction and operation of the LNG terminal and associated pipeline facilities. *EIS Section 4.11.1.4.1 and 4.11.1.4.7*
37. **Prior to the end of the draft EIS comment period**, Downeast shall perform a cumulative air impact analysis to assess impacts on air quality (NAAQS and Maine AAQS) in both Class I and Class II areas, and AQRVs within the Class I areas, and shall file the results with the Secretary. The analysis shall include both stationary and mobile emissions, and vessel emissions along the transit route, as well as the primary and secondary emissions from other existing or proposed pollution sources in the region. *EIS Section 4.11.1.4.5*
38. Downeast shall file a noise survey with the Secretary **no later than 60 days after placing the LNG terminal in service**. If the noise attributable to the operation of the terminal at full load exceeds an L_{dn} of 55 dBA at any nearby NSA, Downeast shall install additional noise controls to meet that level **within one year** of the in-service date. Downeast shall confirm compliance with the Secretary **no later than 60 days** after it installs the additional noise controls. *EIS Section 4.11.2.3*
39. **Prior to construction of the pipeline**, Downeast shall file with the Secretary, for the review and written approval by the Director of OEP, an HDD noise mitigation plan to reduce the estimated noise level attributable to proposed drilling operations at NSAs.

During drilling operations, Downeast shall implement the approved plan, monitor noise levels, and make all reasonable efforts to restrict the noise attributable to the drilling operations to no more than an L_{dn} of 55 dBA at the NSAs. *EIS Section 4.11.2.4*

40. Downeast shall examine provisions to minimize any effects from flashing or jetting on the downwind dispersion distance of vapor from a release from pressurized piping at the LNG terminal. Measures to be considered may include, but are not limited to: vapor fencing; installation of spray shielding; or increasing the distance between leak sources and the plant property line. Downeast shall file final drawings and specifications for these measures **prior to the end of the draft EIS comment period**. *EIS Section 4.12.4*
41. **Prior to the end of the draft EIS comment period**, Downeast shall file revised modeling which demonstrates that the vapor dispersion exclusion zones at the LNG terminal stay within areas under legal control of Downeast. This information shall include an evaluation which addresses the scientific assessment and verification of the source term model used to determine pool spread and vaporization. *EIS Section 4.12.4*

The following measures shall apply to the Downeast 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 would be subject to public disclosure. All information shall be filed a minimum of 30 days before approval to proceed is requested. *EIS Section 4.12.2 and 4.12.6*

42. Downeast shall develop an ERP (including evacuation) and coordinate procedures with the Coast Guard; state/provincial, 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 public use areas that are within any transient hazard areas along the route of the LNG marine transit;
 - 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 ERP shall be filed with the Secretary for review and written approval by the Director of OEP **prior to initial site preparation**. Downeast shall notify the FERC staff of all planning meetings in advance and shall report progress on the development of its ERP at **3-month intervals**.

43. The ERP shall include a Cost-Sharing Plan identifying the mechanisms for funding all project-specific security/emergency management costs that would 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**.
44. 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.
45. Downeast 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.

Downeast shall file this review **prior to initial site preparation**.

46. 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.
47. Facility plans and drawings 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 fire water system shall be filed **prior to initial site preparation**.
48. 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**.
49. A complete specification of the proposed LNG tank design and installation shall be provided **prior to initial site preparation**.
50. Drawings of the storage tank piping support structure and support of horizontal piping at grade shall be filed **prior to initial site preparation**.

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51. Procedures shall be developed for offsite contractors' responsibilities, restrictions, and limitations and for supervision of these contractors by Downeast staff, **prior to initial site preparation**.
 52. Complete plan drawings of the security fencing and of facility access and egress shall be provided **prior to initial site preparation**.
 53. Downeast shall provide information/revisions related to those responses in their April 10, 2007 *Responses to FERC Staff Environmental Data Requests* which state that corrections or modifications would be made to the design. The **final design** shall specifically address response numbers 2, 8, 10, 12, 13, 15, 23, 24, 25, 26, 27, 30, 31, 33, 34, 38, 51, 54, 56, 59, 61, and 70 using management of change procedures.
 54. The **final design** of the fixed and wheeled dry-chemical, fire extinguishing hazard control equipment shall identify manufacturer and model.
 55. 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.
 56. The **final design** shall specify that the design pressure of sendout equipment containing LNG in low pressure service shall be not less than the design pressure of the piping system.
 57. The **final design** shall specify that LNG relief valves and LNG drains shall not discharge into the vapor system.
 58. The **final design** shall specify that LNG from relief valves and drains is to be returned to storage.
 59. The **final design** shall include provision for vehicle access roads to and from the north and south of the LNG pump and vaporizer area.
 60. The **final design** of the vapor return system shall include provisions for the addition of LNG transfer pumps to the Jetty Drum D-103. The vapor inlet piping to the drum shall be designed to insure that all LNG, from the desuperheater and LNG piping discharging to the drum, cannot back flow to the vapor return piping.
 61. The **final design** shall include provisions for the future installation of LNG pumps for the BOG drum.
 62. The **final design** shall specify that the vapor inlet piping to the BOG drum shall be designed to insure that all LNG, from the desuperheater and LNG piping discharging to the drum, cannot back flow to the vapor return piping.
 63. The **final design** shall specify that the Low Point Drain Drum is to be equipped to remove residual liquids without personnel accessing the spill containment sump.
 64. The **final design** of the Low Point Drain Drum shall include a pressure relief system, to protect the vessel in the event of isolation.

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65. The **final design** of the boil-off condenser system shall include a relief valve between the vapor inlet check valve and the fail closed LNG outlet control valve.
 66. The **final design** shall include provisions to recycle the boil-off compressor discharge to upstream of the BOG drum desuperheater.
 67. The **final design** shall include bypass valves around the intank pump ESD2 discharge valves, for cooldown of the 20-inch diameter header and piping.
 68. The **final design** shall include a shutoff valve at the suction and discharge of each high pressure pump.
 69. The **final design** shall specify that the minimum flow recycle line from the high pressure LNG pumps to downstream of the isolation valve to the LNG storage tanks shall be the same pressure and temperature rating as the piping at the discharge of the high pressure LNG pumps.
 70. 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.
 71. The **final design** shall include LNG tank fill flow measurement with high flow alarm.
 72. The **final design** shall include a discretionary vent valve for each LNG tank, operable through the DCS.
 73. The **final design** shall include boil-off gas flow and temperature measurement for each tank.
 74. The **final design** shall specify that all ESD valves are to be equipped with open and closed position switches connected to the DCS/SIS.
 75. The **final design** shall specify that, in addition to meeting the electrical design and installation code requirements for the Class 1 Group D hazardous area classification of the LNG pump area, vaporizer LNG inlet and outlet piping areas, the operating and maintenance procedures for those areas shall be in accordance with Class 1 Group D, Division 1.
 76. The **final design** shall specify that the radiation from a fire in the vaporizer spill impoundment would be less than 3,000 Btu/hr-ft² at the vaporizer and high pressure pump containment area.
 77. The **final design** shall specify that all drains from high pressure LNG systems are to be equipped with double isolation and bleed valves.
 78. The **final design** shall specify that for LNG and natural gas service, branch piping and piping nipples less than 50mm (2 inches), are to be no less than schedule 160.
 79. The **final design** shall specify that piping and equipment that may be cooled with liquid nitrogen is to be designed for liquid nitrogen temperatures, with regard to allowable movement and stresses.

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80. The **final design** shall include details of the shut down logic, including cause and effect matrices for alarms and shutdowns.
 81. 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.
 82. 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.
 83. The **final design** shall include a hazard and operability review of the completed design. A copy of the review and a list of the recommendations shall be filed.
 84. The **final design** shall include provisions to install temporary high pressure boil-off compression in the event that sendout operation is curtailed, or ceased for a period in excess of thirty days. Details shall include plans and drawings of the boil-off gas recovery system and specifications of the equipment and compressors to be installed.
 85. All valves including drain, vent, main, and car sealed, or locked valves shall be tagged in the field during construction and **prior to commissioning**.
 86. 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**.
 87. 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.
 88. Operation and Maintenance procedures and manuals, as well as safety procedure manuals, shall be filed **prior to commissioning**.
 89. 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**.
 90. **Until commencement of service**, Downeast 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 COTP/Federal Maritime Security Coordinator for review and validation and if appropriate, further action by the COTP/Federal Maritime Security Coordinator relating to LNG marine traffic; and provide a copy to FERC staff.
 91. Progress on construction of the project shall be reported in **monthly** reports filed with the Secretary. 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**.

In addition, the following measures shall apply throughout the life of the facility: *EIS Section 4.12.2 and 4.12.5.5*

92. The facility shall be subject to regular Commission staff technical reviews and site inspections on at least an annual basis or more frequently as circumstances indicate. Prior to each Commission staff technical review and site inspection, the Company 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 annual report, shall be submitted.
93. **Semi-annual** operational reports shall be filed with the Secretary to identify changes in facility design and operating conditions, abnormal operating experiences, activities (including ship arrivals, quantity and composition of imported LNG, vaporization quantities, boil-off/flash gas, etc.), and plant modifications including future plans and progress thereof. Abnormalities shall include, but not be limited to: unloading/shipping problems, potential hazardous conditions from off-site 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 boil-off 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 would provide the FERC staff with early notice of anticipated future construction/maintenance projects at the LNG facility.
94. In the event the temperature of any region of any secondary containment, including imbedded pipe supports, 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.
95. Significant non-scheduled events, including safety-related incidents (i.e., LNG or natural gas releases, fires, explosions, mechanical failures, unusual over pressurization, 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