EXECUTIVE SUMMARY

This final environmental impact statement (EIS) for the Bradwood Landing Project, proposed by Bradwood Landing LLC and NorthernStar Energy LLC (collectively referred to as NorthernStar), has been prepared by the staff of the Federal Energy Regulatory Commission (FERC or Commission) to fulfill the requirements of the National Environmental Policy Act of 1969 (NEPA) and the Commission's implementing regulations under Title 18 Code of Federal Regulations Part 380. The purpose of this document is to inform the public and the permitting agencies about the potential adverse and beneficial environmental impacts of the proposed project and its alternatives, and to recommend mitigation measures that would avoid or reduce any significant adverse impacts.

The FERC is the federal agency responsible for authorizing onshore liquefied natural gas (LNG) import and interstate natural gas transmission facilities under the Natural Gas Act, and is the lead federal agency for the preparation of this EIS in compliance with the requirements of the NEPA. The U.S. Department of Homeland Security, Coast Guard (Coast Guard) and the U.S. Army Corps of Engineers (COE) are cooperating agencies for the development of this EIS. The Coast Guard has authority over the safety and security of LNG carriers, and the waterway for LNG marine traffic. The Coast Guard determines the suitability of the waterway for LNG marine traffic by issuing a Letter of Recommendation (LOR). The COE has authority to issue dredging and wetland permits for the project under section 10 of the Rivers and Harbors Act and section 404 of the Clean Water Act (CWA).

The Pipeline and Hazardous Materials Safety Administration of the U.S. Department of Transportation (DOT), is participating as a cooperating agency in accordance with an interagency agreement between the DOT, the FERC, and the Coast Guard. The DOT has authority to enforce safety regulations and standards for the LNG terminal beginning at the last valve before the storage tanks and the design and operation of the natural gas sendout pipeline.

PROPOSED ACTION

The purpose of the Bradwood Landing Project is to import and store LNG to provide a new source of natural gas to the Pacific Northwest. LNG is natural gas cooled to about -260 degrees Fahrenheit (F) to reduce its volume so that it can be transported long distances across oceans in specially designed ships from its point of origin to foreign markets. NorthernStar proposes to provide up to 1.3 billion cubic feet per day of natural gas to the region through interconnects at two industrial facilities, an intrastate pipeline, and an interstate pipeline system.

The waterway for LNG marine traffic would extend from the boundary of the U.S. territorial sea, located 12 nautical miles off the Pacific Coast, up the Columbia River approximately 38 miles to the LNG terminal. The proposed LNG terminal is located at the former townsite of Bradwood, in Clatsop County, Oregon, and would occupy about 40 acres of land within a 411-acre site controlled by NorthernStar. About 46 acres within a 58-acre area in the Columbia River would be dredged to create a ship maneuvering area for the terminal berth. The LNG terminal facilities would include:

- a single ship berth capable of receiving and unloading LNG carriers with cargo capacities ranging from 100,000 to 200,000 cubic meters (m^3);
- two 160,000 m^3 insulated LNG storage tanks;
- vapor handling system, and vaporization equipment capable of regasifying the LNG for delivery into the natural gas sendout pipeline; and
- piping, ancillary buildings, safety systems, and other support facilities.

The natural gas pipeline facilities would include:

- a 36.3-mile-long, underground, high-pressure steel sendout pipeline consisting of approximately 18.9 miles of 36-inch-diameter pipeline in Clatsop and Columbia Counties, Oregon and 17.4 miles of 30-inch-diameter pipeline in Columbia County, Oregon and Cowlitz County, Washington; and

- associated pipeline support facilities, including five meter and regulation stations, four interconnects, two pig[1] launchers, and two pig receivers.

The sendout pipeline would extend from the LNG terminal to an interconnect with the existing Williams Northwest Pipeline Corporation (Williams Northwest) interstate pipeline system north of Kelso, Washington. Between the LNG terminal and the terminus at the Williams Northwest system, the sendout pipeline would interconnect with Northwest Natural Gas Company's intrastate pipeline system, Georgia Pacific's Wauna paper mill, and Portland General Electric Company's Beaver Power Plant.

In addition to the LNG terminal and natural gas pipeline facilities, the Bradwood Landing Project would require construction of facilities that do not fall under the Commission's jurisdiction. These include electric transmission facilities, three natural gas pipeline laterals, and NorthernStar's Salmon Enhancement Initiative.

PROJECT IMPACTS AND MITIGATION

The major issues identified in our[2] analysis are geologic hazards, dredging-related impacts, fish entrainment, forest clearing, impacts on residents and river users, and safety. These are discussed below. The final EIS includes 110 recommended measures to mitigate or avoid environmental impacts.

Geology and Soils

The proposed Bradwood Landing LNG terminal is located in an area of a high seismic risk and is susceptible to soil liquefaction during a major earthquake. The critical safety-related components of the facility would be designed to withstand an earthquake of approximately magnitude 9 originating beneath the site on the Cascadian Subduction Zone mega-thrust fault. Measures currently proposed to mitigate soil liquefaction impacts include supporting the LNG tanks and other integral structures on deep foundations and vibroflotation to compact existing soils and new fill. The final engineering design for the LNG terminal would incorporate detailed seismic specifications and other measures to mitigate the impacts of seismic hazards and would be subject to final review and approval by the FERC's Director of the Office of Energy Projects prior to construction. We are also recommending that prior to construction NorthernStar retain the services of an independent Board of Consultants to provide oversight of the design and construction of all civil and structural components of the project with particular emphasis on the seismic design requirements and geological hazard mitigation measures for both the LNG terminal and sendout pipeline.

Landslide areas along the pipeline route would be mitigated by one or more of the following: relocation of the pipeline route; horizontal directional drill crossing of the feature to place the pipeline below potential failure surfaces; and instrumentation of the pipe and/or the surrounding rock or soil to monitor strain in the pipe and movement of the surrounding ground. NorthernStar would conduct additional studies and produce a Final Pipeline Design Geotechnical Report with site-specific mitigation

[1] A pig is an internal tool used to clean and dry a pipeline and/or to inspect it for damage or corrosion.
[2] The pronouns "our," "we," and "us" refer to the environmental staff of the FERC's Office of Energy Projects.

measures prior to construction which would be subject to review by the Board of Consultants and approval by the Director of OEP.

About 700,000 cubic yards of sediment would be dredged from the Columbia River bottom to create the proposed ship maneuvering area adjacent to the navigation channel. NorthernStar tested samples of sediments from the dredge area. Although some contaminants were detected in the samples, the concentrations were relatively low, and none exceeded screening levels or threshold affects levels used to identify concentrations of concern. The sediments are primarily sand and would settle quickly. As a result, the size of the sediment plume would be small and confined to an area immediately surrounding the dredging site. Modeling conducted by NorthernStar indicates that dredging for the maneuvering area would cause a reduction in stream flow through Clifton Channel and minor changes to the main navigation channel of the Columbia River. NorthernStar prepared a *Shoreline Monitoring Plan* for the LNG terminal to address shoreline erosion that may occur as a result of dredging for the maneuvering basin. NorthernStar proposes to place up to the entire 700,000 cubic yards of dredged material at the terminal site. Any sediments not placed at the terminal site would be deposited at the existing Wahkiakum County Sand Pit site on the northwestern end of Puget Island via a temporary pipeline.

Water and Wetlands

Water would be appropriated from the Columbia River during construction for ground improvement, hydrostatic testing, and general purposes. During operation, river water would be withdrawn for weekly testing of the fire suppression system. Permanent and temporary surface water intakes that withdraw water from the Columbia River would be screened in accordance with the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) and Oregon Department of Fish and Wildlife (ODFW) requirements to minimize impacts on aquatic resources. In addition, ballast and engine cooling water would be taken on during LNG carrier offloading operations. NorthernStar would construct and install a system capable of delivering filtered river water to the LNG carriers. This system would use a screened water intake located at the ship berth that would minimize the entrainment and impingement of juvenile fish. Since the issuance of the draft EIS, NorthernStar has stated that some LNG carriers may arrive at the terminal without the necessary retrofitting in place to allow the use of the screened water supply system. NorthernStar would continue to offer incentive-based contractual agreements for vessels to accommodate the screened water supply system. We are recommending that NorthernStar require that LNG carriers are retrofitted or develop an alternative system for non-retrofitted carriers that would offer similar protection.

LNG carriers that have not been retrofitted to use the proposed screened water supply system could routinely discharge cooling water at the wharf. We are recommending that NorthernStar develop performance standards that address water quality impacts from cooling water discharges at the LNG terminal. Operation of the submerged combustion vaporizers (SCV) at the LNG terminal would generate up to 160 gallons per minute of condensate water. The condensate water would be neutralized and discharged to the Columbia River using an outfall/diffuser system designed to rapidly mix the 68 °F condensate with the river water.

Ninety-four waterbodies would be crossed by the pipeline. The HDD or conventional bore method would be used at up to 23 of the waterbody crossings to avoid or minimize impacts on aquatic resources. Construction of the LNG terminal facilities would result in impacts on about 15 acres of wetlands and, of these, about 13 acres would be permanently lost. Construction of the pipeline facilities would affect about 98 acres of wetlands, while operation of the pipeline would result in the permanent conversion of approximately 15 acres of forested wetlands to other wetland types within the permanent right-of-way. Impacts on wetlands and water resources would be minimized through measures specified

in *Erosion and Sediment Control Plan for Oregon – Bradwood Landing Pipeline* (ESC), *Construction Stormwater Pollution Prevention Plan for Washington – Bradwood Landing Pipeline* (SWPPP), and *Wetland and Waterbody Construction and Mitigation Procedures Plan*; and the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures). NorthernStar would also mitigate construction-related impacts by complying with CWA section 404 and section 401 permit conditions. In addition, NorthernStar has proposed a *Preliminary Engineering Design Draft Mitigation Plan* (Compensatory Mitigation Plan), including restoration and/or preservation programs at Hunt Creek, Svensen Island, and Delameter Creek, to create or enhance wetland habitats as compensation for wetlands and habitats impacted by its project.

Vegetation and Wildlife

Construction of the LNG terminal, and its associated power line, would affect about 31 acres of forest and 13 acres of shrub-scrub vegetation in upland areas. The 37 acres of the terminal site affected by construction that are not permanently converted to industrial use would be replanted with native species. About 180 acres of forest and 7 acres of shrub-scrub vegetation would be affected by construction of the pipeline. Non-forested portions of the pipeline right-of-way would be restored and seeded after construction. Upland forest would be replanted with in-kind trees, except for a 30-foot-wide strip over the pipeline centerline. Routine maintenance of a 10-foot-wide corridor centered on the pipeline would keep that area in an herbaceous state. To minimize impacts from the potential spread of noxious weeds from the disturbed right-of-way, NorthernStar developed a *Noxious Weed and Soil-borne Plant Disease Control Plan.*

We have identified Essential Fish Habitat (EFH) that may be affected by the project for more than 90 species of groundfish, 5 coastal pelagic species, 2 species of salmon, and 13 highly migratory aquatic species. Our EFH assessment was combined with our Biological Assessment (BA) and submitted to the NMFS and U.S. Department of the Interior, Fish and Wildlife Service (FWS). We identified federally listed endangered or threatened species that potentially occur in the vicinity of the Bradwood Landing Project, including: 13 anadromous salmonids and the North American green sturgeon; four reptiles (sea turtles); nine mammals (including seven whales, Steller sea lion, and Columbian white-tailed deer); six birds; one invertebrate; and three plants. In response to our BA and EFH Assessment, the NMFS and FWS requested additional information; therefore, the FERC staff is currently revising that document. The revised analysis will be provided to the NMFS and FWS, and consultation under the Magnuson-Stevenson Act and Endangered Species Act will be concluded before any construction of facilities is allowed to proceed.

Land Use, Residences, and Recreation

Communities overlapped by the Zones of Concern along the waterway for LNG marine traffic include Warrenton and Astoria in Oregon, and Skamokawa and Cathlamet in Washington. The Zones of Concern along the waterway would also overlap state and local parks and public recreation or special use areas such as marinas. In addition, the Lewis and Clark National Wildlife Refuge and the Julia Butler Hansen National Wildlife Refuge are located along the waterway. LNG marine traffic may have visual impacts for people residing in the shoreline communities, traveling along highways adjacent to the waterway, using the parks and public interest areas, or using the river. Visual impacts would be short term, as it would typically take an LNG carrier only a few minutes to pass through a viewshed while traveling at average speeds between 8 and 12 knots.

The closest residences to the LNG terminal are about 0.5 mile away on Puget Island in Wahkiakum County, Washington. Construction impacts on these residences could include inconvenience caused by terminal lighting. We are recommending that NorthernStar submit a final lighting plan to

mitigate those operational impacts. The LNG storage tanks at the terminal may have minor visual impacts for river users and residents of Puget Island, Cathlamet, and Skamokawa, Washington. Visual impacts from the LNG terminal would generally be minor, because views are modified by topography, vegetation, and distance. Three homes have been identified within 50 feet of the construction right-of-way for the pipeline. We are recommending that NorthernStar file site-specific residential mitigation plans prior to construction. The project would not be located in areas that have a disproportionately high percentage of minorities, Native Americans, or low income populations.

The Bradwood Landing Project is subject to a federal Coastal Zone Consistency Review because it would involve activities within the coastal zone of Oregon and require several federal permits and approvals. We are recommending that prior to construction, NorthernStar should be required to demonstrate that its project is consistent with Oregon's Coastal Management Program.

Socioeconomics

The project would have a beneficial impact on the local economy. Total construction costs are estimated to be over $700 million, with a total outlay for wages and benefits of about $110 million. Operation of the LNG terminal would generate 65 jobs, with a total annual payroll of about $3.9 million. In addition, NorthernStar would spend about $1.4 million per year for tug boat rentals, and the tug boats would employ about 40 people. During operation of the LNG terminal, NorthernStar would pay about $7.8 million per year in property taxes to Clatsop County, Oregon. Taxes would also be paid to Columbia County, Oregon, and Cowlitz County, Washington during operation of the pipeline.

There may be impacts on public services in the unlikely situation of an accident involving an LNG carrier or at the terminal. In addition to NorthernStar's proposed safety and security measures, the Coast Guard would enforce additional measures to ensure the safety of the waterway and LNG terminal. However, some local communities have expressed concerns that their current staffing and equipment for law enforcement, fire fighting, and rescue are not adequate to respond to a project-related accident. NorthernStar has developed a draft Emergency Response Plan (ERP), which includes a Cost-Sharing Plan to assist local first responders to acquire necessary resources. We will review the draft ERP in consultation with the appropriate agencies and NorthernStar would file a revised ERP before construction could begin.

Cultural Resources

NorthernStar provided cultural resources survey reports to the Oregon and Washington State Historic Preservation Offices (SHPO). Those reports identified the Lewis and Clark National Historic Trail and the Astoria and Columbia River Railroad as properties within the area of potential effect that may be eligible for the National Register of Historic Places (NRHP). However, we and the SHPOs agree that the project would have no adverse effect on those properties.

We contacted Native American tribes that may have historically occupied or used the project area and might attach religious or cultural significance to historic properties in the area of potential effect. No traditional cultural properties, religious, cultural, or sacred sites that may be affected by the project were identified by any tribe, NorthernStar's cultural resources consultant, or by the SHPOs.

We have not yet completed the process of complying with section 106 of the National Historic Preservation Act for this project. Cultural resources surveys are still needed for about 11 miles of the proposed pipeline route and associated ancillary facilities where access has not yet been obtained. Furthermore, both SHPOs have requested additional data. Once survey data are complete, the FERC, in consultation with the cooperating agencies and the SHPOs, would make determinations of NRHP

eligibility and project effects. If any historic properties would be affected by the proposed project, we would seek ways to resolve adverse effects. We are recommending that NorthernStar defer construction until: 1) cultural resource surveys are completed and evaluation reports, any required treatment or avoidance plans, and a cultural resources management plan are filed with the Secretary; 2) the SHPOs' comments on reports and plans are filed with the Commission; and 3) the Advisory Council on Historic Preservation has been given an opportunity to comment if any historic properties would be adversely affected.

Air Quality and Noise

Operation of the proposed LNG terminal would result in air emissions from stationary equipment (SCVs and emergency engines), LNG carriers, and tugs. NorthernStar would minimize air emissions from the LNG terminal through the use of clean fuel, best management practices for operation and maintenance procedures, and limiting annual hours of operation from the diesel-fired units. Based upon the air quality modeling, operational emissions from the LNG terminal would not have a significant effect on regional air quality. In addition, the emissions from construction of the LNG terminal and associated pipeline would not be regionally significant. Operation of the pipeline would result in little emissions and would not be significant.

Noise would be generated during construction of the pipeline and during construction and operation of the LNG terminal. In most areas, the increase in noise during construction would be localized, temporary, and limited primarily to daylight hours. However, noise associated with dredging operations could occur up to 24 hours per day, 7 days per week for a period of approximately 2 months. NorthernStar would incorporate noise attenuation measures during construction and operation to minimize impacts on nearby noise-sensitive areas and meet the FERC and local requirements. We are recommending that NorthernStar provide plans to mitigate noise from construction and operation of the facilities.

Safety and Reliability

We evaluated the safety of both the proposed facilities and the related LNG carrier transit through the Columbia River navigation channel. As part of our evaluation, we performed a cryogenic design and technical review of the proposed terminal design and safety systems. Several areas of concern were noted with respect to the proposed facility, and we identified specific recommendations to be addressed by NorthernStar prior to initial site preparation, prior to construction after final design, prior to commissioning, or prior to commencement of service.

Thermal radiation distances were calculated for 1,600 to 10,000 British thermal units per square foot per hour (Btu/ft^2-hr) incident flux levels for an LNG storage tank impoundment fire. The resulting distances would be 377 feet for the 10,000 Btu/ft^2-hr zone; 714 feet for the 3,000 Btu/ft^2-hr zone; and 912 feet for the 1,600 Btu/ft^2-hr zone. Although the flammable vapor dispersion exclusion zones would extend off-site into the navigation channel, there are no prohibited land uses within the channel. Therefore, the vapor exclusion zone requirements of 49 CFR 193.2059 would be met. Flammable vapor hazard distances were calculated for accident scenarios in the process area which resulted in a distance of 243 feet to the 2.5 percent average gas concentration.

Thermal radiation and flammable vapor hazard distances were calculated for an accident or an attack on a 140,000-m^3 LNG carrier. For 1.0-, 1.4-, 2.5-, 3.0-, and 3.9-meter-diameter holes in an LNG cargo tank, we estimated distances to range from 2,154 to 5,225 feet for a thermal radiation level of 1,600 Btu/ft^2-hr, the level, which is hazardous to unprotected persons located outdoors. Based on a 1.0-meter-diameter hole, an unignited release would result in an estimated pool radius of 421 feet. The unignited

vapor cloud would extend to 10,237 feet to the lower flammable limit (LFL) and 13,618 feet to one-half the LFL. The results of these calculations are in agreement with the Zones of Concern used by the Coast Guard in assessing the waterway suitability. However, the evaluation of safety is more than an exercise in calculating the consequences of worst case scenarios. Rather, it is a determination of the acceptability of risk which considers: the probability of events, the effect of mitigation, and the consequences of events. Based on the extensive operational experience of LNG shipping, the structural design of an LNG carrier, and the operational controls imposed by the Coast Guard and the local pilots, the likelihood of a cargo containment failure and subsequent LNG spill from a vessel casualty – collision, grounding, or allision – is highly unlikely. As a result, the risk to the public from accidental spills from LNG carriers should be considered negligible.

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

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

Based on its review of NorthernStar's Waterway Suitability Assessment (WSA), the Coast Guard advised the FERC in its WSR dated February 28, 2007 that to make the Columbia River suitable for the LNG marine traffic associated with the Bradwood Landing Project, specific risk mitigation measures would be necessary. These measures would include a 500-yard moving safety and security zone around LNG carriers in transit, a 200-yard fixed security zone around the LNG carriers moored at the proposed LNG terminal, and one-way traffic in designated portions of the waterway.

ALTERNATIVES CONSIDERED

Alternatives considered by the FERC include no action or postponed action, system alternatives, LNG terminal site alternatives, LNG terminal layout alternatives, and pipeline route alternatives. While denying project approval or taking no action (or postponing action) would eliminate the environmental impacts identified in this EIS, the project objective would not be met of providing a new source of natural gas for the Pacific Northwest.

We did not identify any existing interstate pipeline systems that could provide additional supplies of natural gas to the Pacific Northwest equivalent to the volumes proposed for the Bradwood Landing Project without major expansions. Converting one of the five Pacific Northwest LNG "peak shaving" storage facilities into an import terminal would not be feasible. An offshore LNG terminal near the mouth of the Columbia River would not be a viable alternative to the Bradwood Landing Project. This is due to rough sea conditions off the Oregon Coast, technological limitations related to offshore LNG

import terminal designs; and the additional environmental impacts associated with a longer sendout pipeline. We considered five newly proposed jurisdictional interstate pipelines as system alternatives to the Bradwood Landing Project but did not find any of them to be environmentally preferable. A number of proposed onshore LNG import terminals along the West Coast in North America were examined as potential alternatives. However, we concluded that none of these facilities would meet all the objectives of the Bradwood Landing Project. We considered alternative LNG terminal locations along the coast of Washington and Oregon and along the Columbia River, but that none appear to have clear environmental advantages over the Bradwood Landing location. The FERC would review individual projects based on their own merits and allow the market to decide which projects ultimately are built.

We have reviewed the various alternatives related to LNG terminal facility design and power line route designs, and found that NorthernStar's current proposal is reasonable given technical, engineering, economic, and environmental considerations. Furthermore, we did not identify dredge material placement alternatives that were preferable to the proposed action

We evaluated four major sendout pipeline routes as alternatives to the route proposed by NorthernStar, but none would provide significant environmental advantages over the proposed pipeline route. NorthernStar adopted some minor route variations that we found environmentally preferable to its original route, but other route variations did not need to be adopted because they had no clear environmental advantages. However, additional route modifications would likely be necessary following completion of the Final Pipeline Design Geotechnical Report to minimize slope stability problems along the pipeline.

The proposed action for the Coast Guard is to issue an LOR finding the waterway suitable for LNG marine traffic with conditions. Among the conditions that may be included are: 1) establishment of a 500-yard moving safety/security zone during LNG vessels' transit of the waterway, including the requirements for one-way LNG marine traffic along certain portions of the waterway such as at turns and for a 200-yard security zone around the LNG vessel when it is moored at the LNG terminal; 2) a 50-yard security zone around the LNG terminal when there is not a vessel at the dock; 3) the submission by the applicant of an annual review of its WSA to evaluate if any conditions in the waterway have changed that would require issuance of a new LOR and submit the annual review to the Captain of the Port (COTP) for his/her review and issuance of a new LOR if necessary; 4) the requirement that LNG vessels must board a pilot(s) at least 5 miles before the Columbia River Buoy and for at least the first 6 months, at least two pilots must be on board throughout the transit and that at least two tugs escort the vessel along the waterway with a third to assist with turning and mooring; 5) implementation of a Coast Guard-approved *LNG Vessel Transit Management Plan*; 6) improvements to the Columbia River's Vessel Traffic Information System; and 7) availability of Coast Guard as well as other safety and security resources to implement the above security measures. If these and other conditions to the LOR are imposed, the potential for accidental releases or releases from terrorist attacks would be minimized.

Reasonable alternatives to the Coast Guard's proposed action with conditions include: 1) issuance of a Coast Guard LOR finding the waterways suitable for LNG marine traffic without conditions; and 2) issuance of a Coast Guard LOR finding the waterways not suitable for LNG marine traffic (no action alternative). The Coast Guard's preferred alternative is to issue an LOR finding the waterway suitable for LNG traffic with certain conditions.

The no action alternative for the Coast Guard would avoid any project-related environmental effects in the waterway; however, it would also prevent LNG carriers from delivering LNG to the proposed import terminal and the project objectives would not be met. A reasonable alternative to the Coast Guard action of issuing an LOR, which finds the waterway suitable for LNG marine traffic with certain conditions, is to issue an LOR without any conditions. With this alternative, some of the adverse

economic effects of the conditions would be lessened. However, the potential for adverse environmental effects would be greater if conditions were not imposed.

In summary, we have determined that NorthernStar's proposed project, as modified by our recommended mitigation measures, is the preferred alternative that can meet the project objectives.

PUBLIC INVOLVEMENT AND AREAS OF CONCERN

As part of the Commission's Pre-filing Process, on September 23, 2005, the FERC issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Proposed Bradwood Landing LNG Project, Request for Comments on Environmental Issues, and Notice of Joint Public Meeting, and Site Visit*. This notice was sent to elected federal, state, and local government officials; agency representatives; environmental and public interest organizations; Native American tribes; and local libraries and newspapers. The notice encouraged project stakeholders or interested parties to provide input on environmental issues that should be addressed during the environmental review process. The Coast Guard published a notice in the Federal Register on September 9, 2005 for preparing an LOR as to the suitability of the Columbia River navigation channel for LNG marine traffic.

On September 29, 2005, the Coast Guard and FERC staff conducted a joint public scoping meeting in Knappa, Oregon, to provide an opportunity for the general public to learn more about the proposed project. The FERC held a second public meeting in Cathlamet, Washington on October 26, 2005 to answer questions regarding the Commission's Pre-filing and the NEPA review processes. Through the scoping process, we received comments on a variety of environmental issues. Those issues are addressed in this EIS.

The FERC issued a Notice of Availability (NOA) of the draft EIS on August 17, 2007. The NOA established a 120-day period for comments on the draft EIS, ending on December 24, 2007 (later extended to December 26, 2007). In addition, a total of six public comment meetings were held November 5 through November 8 in Clatskanie and Knappa, Oregon and in Longview and Cathlamet, Washington. Comments from the public meetings, as well as written comments on the draft EIS, are provided along with our responses in Appendix K.

MAJOR CONCLUSIONS

We conclude that construction and operation of the Bradwood Landing Project would have limited adverse environmental impacts. However, that implementation of NorthernStar's proposed mitigation measures, and additional measures we recommend, would substantially reduce the environmental impact of the project. The primary reasons for our decision are:

- the final engineering design for the LNG terminal would incorporate detailed seismic specifications and other measures to mitigate the impacts of seismic hazards, and mitigation measures would be implemented along the pipeline route to address landslides and other geological hazards;

- NorthernStar would implement its project-specific ESC Plans, a SWPPP, and *Wetland and Waterbody Construction and Mitigation Procedures Plan*, and follow the FERC staff's Plan and Procedures to mitigate impacts on soils, wetlands, and water resources;

- NorthernStar would implement various mitigation plans to compensate for impacts on waterbodies, wetlands, vegetation, and habitats;

- consultations with the COE, Coast Guard, NMFS, FWS, Oregon Department of Land Conservation and Development, Oregon Department of Environmental Quality, Oregon Department of State Lands, ODFW, Washington Department of Ecology, Washington Department of Fish and Wildlife, Oregon and Washington SHPOs, and other appropriate agencies would be completed before NorthernStar would be allowed to begin construction;

- the proposed LNG terminal would meet the federal safety regulations regarding the thermal radiation and flammable vapor dispersion exclusion zones, and appropriate safety features would be incorporated into the design and operation of the LNG import terminal and LNG carriers; and

- an environmental inspection and mitigation monitoring program would be implemented to ensure compliance with all mitigation measures that become conditions of any FERC authorization.

In addition, our decision is based on the Coast Guard's preliminary determination in the WSR that the waterway may be suitable for LNG marine traffic if additional measures and operational controls are implemented, including:

- availability of Coast Guard as well as other safety and security resources, including additional safety measures when a cruise ship is in port, security boardings, waterway monitoring, shoreline patrols, and vessel escorts to implement the additional security measures;

- establishment of a safety/security zone around the LNG vessel and the dock;

- a restriction on the size of LNG carriers to a capacity of 148,000 m^3 until a completed site-specific risk analysis for larger ships is approved by the COTP;

- operational and pilotage requirements, including tug escorts and multiple pilots;

- upgrades to navigational aids including installation of three aids at Bradwood, a Physical Oceanographic Real-Time System station at Bradwood contracted with the National Oceanographic and Atmospheric Administration to provide real-time river level, current, and weather data, and a Doppler docking station;

- augmentation of shoreside firefighting capabilities to provide protection services to the facility as well as communities along the transit route;

- implementation of a public notification system to notify the public along the transit route;

- implementation of a Regional Communication Plan and associated equipment to ensure that the facility, associated command centers, emergency responders, Coast Guard, tug operators, escort vessels, and pilots are able to communicate effectively; and

- improvements to the Columbia River's Vessel Traffic Information System, including: augmentation of a camera monitoring system capable of monitoring the entire route and detecting vessel traffic in wind, rain, fog, and dark conditions; and installation of an Automatic Identification System repeater located in Astoria.