



Swanson Bark & Wood Products, Inc.

ORIGINAL

SEP 17 2007  
SEP 17 P 3:03

September 7, 2007

Federal Energy Regulatory Commission  
Attn: Kimberly D. Bose, Secretary  
888 First Street NE, Room 1A  
Washington, DC 20426

Reference Docket #CP06-365-000

Dear Ms. Bose,

Swanson Bark & Wood Products, Inc. in Longview, WA is a manufacturing facility involved in wood residual products. Based on our rather limited knowledge of the NorthernStar Natural Gas Bradwood Landing proposal, we stand in support of this project.

CO1-1 | Businesses need gas, and we're short on natural gas in this area. Specifically, the price of natural gas is hurting southwest Washington's ability to dry wood, as well as generally to attract new business to our county. Approving the Bradwood Landing project will help fill the pipeline, expanding business opportunities and business competitiveness in our part of the state.

CO1-2 | We are confident in your agency's ability to safeguard the population and river habitat surrounding such a facility, and therefore do not feel safety is a major concern.

Sincerely,

John Leber  
President/CEO

# Companies and Organizations

CO1-1 Comment noted.

CO1-2 Comment noted.

K-615



Swanson Bark & Wood Products, Inc.

ORIGINAL

FILED  
OFFICE OF THE  
SECRETARY

October 1, 2007

2007 OCT -9 P 4: 01

Clatsop County Board of Commissioners  
800 Exchange St, Suite 310  
Astoria, OR 97103

CLATSOP COUNTY BOARD OF COMMISSIONERS

Re: Bradwood Landing's land use application

CP06-365-000

Dear Commissioners,

CO2-1

We really need natural gas in this area at this time. The price of gas is really hurting industrial manufacturing and, as the pipeline from Canada gets more users than capacity, the problem will get worse.

CO2-1

Comment noted.

At this point, the NorthernStar Natural Gas Bradwood Landing project appears to be the best option that's been presented and we urge you to allow it to go forward.

That said, and perhaps as an aside, I've had bad experiences with government condemnations of land. We would rather see you be overly fair with the silly people who demand too much than in any way stomp on the fair people who allow it to go forward with a relatively small amount of resistance.

Sincerely,

  
John Leber  
President

cc: Federal Energy Regulatory Commission

K-616

## Companies and Organizations



ORIGINAL

October 8, 2007

FILED  
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SECRETARY

2007 OCT 16 P 3:21

FEDERAL ENERGY REGULATORY COMMISSION

Federal Energy Regulatory Commission  
Attn: Kimberly D. Bose, Secretary  
888 First Street NE, Room 1A  
Washington DC 20426

Re: Docket # CP-06-365-000

Dear Board of Commissioners:

I am writing on behalf of Teevin Bros Land & Timber Co, LLC, a regional employer near Bradwood Landing, the proposed location for the NorthernStar Natural Gas facility, in Clatsop County, Oregon. We are also a neighbor to the proposed facility. Many of our business lines (timber, forestry, and quarry) fall within the impact area of the facility; and many of our employees and their families live nearby.

We have read the information provided by both the proponents and opponents of the project, and after review of facts and empirical evidence, and careful deliberation, we are in agreement with the draft Environmental Impact Statement. We live here, we raise our families here, and we hunt, fish, hike, camp, and otherwise recreate here. We see the project as proposed, having a short-term negative quality of life impact during construction; followed by a long-term positive impact to our community.

Weighing all parts of change, we see this as a net positive for our community. The proposed project will have minimal short-term impacts on the environment, with the mitigating projects having a substantial positive impact on our environment.

This project brings to our community diversification of the local economy, diversification of employment opportunities, sincere focus on preserving and enhancing our flora and fauna, with regional and national benefits of diversifying our source of supply for natural gas.

We realize this has become an emotional issue for many. And many of those opposed do not live here. We live here. We accept there will be some impact. We believe the project will contribute to the greater good of our region and our nation. The draft Environmental Impact Statement answers our concerns. We recommend approval of the EIS and the issuance of permits to construct this project.

Sincerely,

Paul Langner  
Property Manager  
For Teevin Bros Land & Timber Co, LLC

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CO3-1

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# Companies and Organizations 3

CO3-1 Comment noted.

K-617

*Susan B. Bergles, Esq.*

325 Broxton Rd.  
Baltimore, MD 21212  
Ph. 410-433-0413  
Fax 410-433-5016  
sbb@nwnatural.com

November 21, 2007

Ms. Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E., Room 1A  
Washington, D.C., 20426

Re: Comments of NW Natural on Draft Environmental Impact Statement for the  
Bradwood Landing LNG Terminal Docket Nos. CP06-365-000, et al.

Dear Secretary Bose:

Northwest Natural Gas Company (NW Natural) has received and reviewed the Draft Environmental Impact Statement (DEIS) for the Bradwood Landing LNG terminal project and the associated pipeline proposed by NorthernStar Energy LLC. The proposed project regards an LNG terminal to be built near Bradwood, Oregon, and the associated send-out pipeline would be located in Clatsop and Columbia Counties, Oregon and Cowlitz County, Washington.

NW Natural is an Oregon corporation that is a natural gas local distribution company serving about 641,000 customers through separate facilities located in western Oregon and southwestern Washington and is regulated by the Oregon Public Utility Commission and Washington Utilities and Transportation Commission, respectively.<sup>1</sup> Additionally, NW Natural is one of the members of Palomar Gas Holdings, LLC, the parent of Palomar Gas Transmission, LLC, which has proposed to build a new interstate natural gas pipeline in Oregon and which has initiated a pre-filing process at the Commission in Docket No. PF07-13-000.

NW Natural files these comments on the Bradwood project DEIS to clarify some inaccuracies in Section 2.1.6 of the DEIS regarding the Palomar pipeline project and its potential interconnections with NW Natural's local distribution system facilities, including its Mist underground natural gas storage facility (Mist). NW Natural's specific comments are set forth below.

In Section 2.1.6, Palomar Pipeline, the tenth and eleventh sentences in this section state, "The Palomar pipeline would then proceed northwest to interconnect with Northwest Natural's existing storage field at Mist. From Mist, the Palomar pipeline could branch

<sup>1</sup> NW Natural is exempt from FERC jurisdiction under Sections 1(b) and 1(c) of the Natural Gas Act for its systems, facilities, and services in Oregon and Washington. Portland Gas and Coke Company, 17 FPC 638 (1957).

CO4-1

off to serve the proposed Bradwood Landing LNG import terminal.” The discussion continues to say, “If the Bradwood Landing Project is not authorized, or not built, Palomar could still serve the Portland metropolitan area, and extend its pipeline out to Northwest Natural’s Mist storage field. Palomar would just not build the last segment between Mist and Bradwood Landing.”<sup>1</sup> These statements are not accurate and must be revised in the FEIS. As explained more fully below, the Palomar pipeline will not directly connect to Mist.

In 1989, NW Natural’s Mist storage field began storage operations for its core gas local distribution customers. Since 2001, NW Natural has made excess and new storage capacity that is pre-built in advance of core need available to customers in the interstate market pursuant to a limited jurisdiction blanket certificate issued by the Commission under its regulations set forth in 18 CFR § 284.224.<sup>2</sup> The Mist interstate services consist of bundled firm and interruptible storage and related transportation services on NW Natural’s system to and from the Mist storage facility. NW Natural’s primary use of Mist, however, is to provide reliable gas supplies to its core customers. As the needs of its retail customers grow, NW Natural can reduce the amount of storage capacity, not under contract, that is made available to the interstate market.<sup>3</sup>

Currently, the physical facility set up at Mist is such that it is not possible for a new pipeline to directly connect to Mist. Thus, the statement in the DEIS that indicates that Palomar would directly connect to the Mist storage field is not accurate and needs to be revised. In fact, if there will be any new interconnection(s) between the Bradwood send out pipeline, Palomar, or any other interstate pipeline and NW Natural’s facilities capable of reaching Mist, such interconnection(s) would be accomplished through an interconnection between NW Natural’s local distribution system facilities and the new interstate pipeline facility(ies). NW Natural prefers to expand its own infrastructure to any new facilities because this would enable it to design its facilities consistent with the needs of its system, including any associated upgrades, and will provide additional takeaway capacity from Mist that will facilitate future expansions that can be used for NW Natural’s core customers. It is also possible that any new interstate pipeline interconnection(s) with NW Natural’s system could be used as a receipt or delivery point for NW Natural’s interstate storage customers.

Further, with respect to Palomar, NW Natural would also likely request to have other interconnections on the western zone of the Palomar system located further south (between Mist and Molalla) to enable it to more easily receive gas from Palomar at various locations on NW Natural’s local distribution system where such gas is needed, and to potentially serve other new local distribution customers as well. Such interconnections are still being contemplated and thus no definitive plans currently exist for any such interconnections.

<sup>1</sup> Northwest Natural Gas Company, 95 FERC ¶ 61,242 (2001); see also 111 FERC ¶ 61,406 (2005) (rate settlement).

<sup>2</sup> *M.* at p. 4.

## Companies and Organizations 4

CO4-1 The discussion of the Palomar pipeline project has been moved from section 2.1.6 to section 3.1.2.2 and revised. Section 4.12 has been revised to reflect that the Palomar pipeline’s proposed western zone may have multiple interconnections with Northwest Natural’s local distribution system facilities and would not connect directly to the Mist storage facility.

# Companies and Organizations 4

CO4-1 cont'd For the reasons indicated above, NW Natural respectfully requests revisions to Section 2.1.6 to correctly reflect the facts that (1) Palomar's proposed western zone may have multiple interconnections with NW Natural's local distribution system facilities, and (2) interstate pipeline facilities will only connect to Mist through NW Natural's local distribution system facilities. Since there will not be any direct connection between the Palomar pipeline and Mist, any such references should be removed or revised.

We suggest the following language to replace the relevant portion of Section 2.1.6:

"The Palomar pipeline would then proceed northwest to interconnect with various points on NW Natural's distribution system. The Palomar pipeline could branch off to serve the proposed Bradwood Landing LNG import terminal...The Palomar pipeline would then proceed northwest to interconnect with Bradwood Landing's proposed pipeline near Wauna. If the Bradwood Landing Project is not authorized, or not built, Palomar could still serve the Portland metropolitan area via a planned interconnection at Mollala and via probable future interconnections with NW Natural's distribution system between Mollala and the terminus of the Palomar pipeline's western zone. Palomar would just not build the last segment to the Bradwood Landing pipeline."

CO4-2 Additionally, in this same Section, the sixth sentence should be updated to reflect that Palomar has initiated the pre-filing process at the Commission.

Thank you for the opportunity to provide these clarifying comments. If you have any further questions about NW Natural's comments, please feel free to contact me.

Sincerely,

/s/ Susan B. Bergles

Susan B. Bergles  
Attorney  
On behalf of Northwest Natural Gas Company

CO4-2 Sections 4.12 and 5.1 have been updated to indicate that Palomar has begun the FERC's Pre-filing Process. See also our response to comment CO4-1.

K-620

## Companies and Organizations 4

**CERTIFICATE OF SERVICE**

I hereby certify that I have this day caused a copy of the foregoing document to be served upon each person designated on the official service list compiled by the Federal Energy Regulatory Commission in this proceeding.

Dated at Baltimore, Maryland, this 21<sup>st</sup> day of November, 2007

/s/ Susan B. Bergles  
Susan B. Bergles



## Willapa Hills Audubon Society

P.O. Box 399, Longview, WA 98632-7255  
Gloria G. MacKenzie, Director at Large [gmack@qwest.net](mailto:gmack@qwest.net)

December 21, 2007

Ms. Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E., Room 1A  
Washington, DC 20426

Subject: DEIS Comments

Request for: A Comprehensive Needs Assessment  
A Programmatic EIS

Docket Nos. CP06-365 and 366  
NorthernStar Bradwood Landing LNG Project

Dear Secretary Bose,

Thank you for the opportunity to submit comments regarding the proposed project.

Section 4.6.1.2 State Listed Threatened and Endangered Species

CO5-1 Please refer to the Governor Kulongoski/Oregon State Agencies submittal to FERC #20071218-5063, pages 32 and 33 for specific bird information that was not included in the DEIS. Please add this information.

Section 4.6.1.3 Migratory Bird Treaty Act

CO5-2 The DEIS recognizes that the Columbia River estuary is one of the most important sites on the Pacific Flyway for migratory birds, more than 300 species occurring in the area throughout the year. Peak counts in the estuary during migration have been almost 150,000 birds.

## Companies and Organizations

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K-622

CO5-1 See our response to comments SA1-146 through SA1-153, SA1-158, and SA1-159.

CO5-2 Sections 4.6.2.2 and 4.6.2.3 have been revised to include additional information relating to the potential impacts on migratory birds due to operation of the Bradwood Landing Project. We believe the analysis of cumulative impacts on wildlife have been addressed adequately in section 4.12. Potential cumulative impacts on wildlife are recognized, but not considered significant due to implementation of our recommendations.

Secretary Bose  
Page Two - 12/21/07

CO5-2  
cont'd | While the DEIS does recognize potential impact during construction, there is no mention of the impact to migratory routes arising from noise and light of the terminal during the operational phase. There is no explanation of the cumulative overall impacts, which can be expected over the lifespan of the facility. Please explain.

Section 4.7.2.4 Coastal Zone Management

CO5-3 | Please explain the relationship between 306(c)(5) and ORS 196.435. It would seem that this is a typographical error, because CZMA 306(c)(5) refers to the 'Allocation of grants to coastal states'. 306 (d)(5) would make more sense.

CO5-4 | Coastal Zone Management Act Consistency Certification, was not made a part of the DEIS. It is my understanding that comments, and public hearing(s) regarding the application for certification will be accepted during the 6-month period, which began October 23, 2007.

CO5-5 | In conclusion, the current process of reviewing each LNG terminal proposal on a case-by-case basis is wasteful and draining. I would like to recommend that a Comprehensive Needs Assessment be made along with a Programmatic EIS. If the applicant seeks to involve the whole State of Oregon with its proposed terminal and adjunct pipelines, it is strongly suggested that this be done.

Sincerely,

Gloria G. MacKenzie  
Director at Large  
Willapa Hills Audubon Society

K-623

## Companies and Organizations

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CO5-3 The reference to the CZMA has been changed to section 306(d)(5) in the final EIS.

CO5-4 Section 4.7.2.4 has been revised to reflect this information.

CO5-5 See our response to comment PM5-74.

UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION

Bradwood Landing LLC	)	Docket No.	CP06-365-000
NorthernStar Energy LLC	)	Docket Nos.	CP06-366-000
	)		CP06-376-000
	)		CP06-377-000

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT BY  
THE NORTHWEST INDUSTRIAL GAS USERS

Intervenor<sup>1</sup>, Northwest Industrial Gas Users ("NWIGU") respectfully submit these comments regarding the Draft Environmental Impact Statement in the above-referenced dockets. In support of its Comments, NWIGU states as follows:

**I. BACKGROUND**

NWIGU is a nonprofit association comprised of thirty-five industrial end users of natural gas with major facilities in the states of Oregon, Washington, and Idaho. NWIGU members include diverse industrial interests, including food processing, pulp and paper, wood products, electric generation, aluminum, steel, chemicals, electronics, and aerospace. The association provides an informational service to its members and participates in various regulatory matters that affect member interests. NWIGU member companies purchase substantial quantities of natural gas in order to operate their facilities in Oregon, Washington and Idaho. Because the proposed LNG terminal and related pipeline project would bring substantial quantities of natural gas into the Pacific Northwest, it is vitally important to NWIGU that FERC properly considers the needs of the Pacific Northwest industrial gas consumers for more gas supplies as it reaches a

<sup>1</sup> See NWIGU's Petition to Intervene filed July 6, 2006 in FERC Docket Nos. CP06-365-000 et al.

# Companies and Organizations

K-624

decision on NorthernStar Energy's application to construct an LNG terminal and related pipeline facilities in Oregon and Washington.

**II. COMMENTS**

CO6-1

NWIGU concurs with the conclusions reached in the Draft EIS regarding the growing market demand for natural gas in Oregon, Washington and Idaho. As proposed, the Bradwood Landing LNG terminal and connected pipeline will have the capability to deliver approximately one BCF per day of natural gas into the heart of the Pacific Northwest gas markets. Such a significant new source of natural gas would be available year round to meet future demand for natural gas in our region.

The Northwest Gas Association in its latest update of the supply demand picture for the region shows that the Pacific Northwest needs access to new supplies of natural gas. NWIGU hereby incorporates as Exhibit A to these Comments a copy of Northwest Gas Outlook 2007, Natural Gas Demand Supply, and Service Capacity in the Pacific Northwest. See [www.nwga.org](http://www.nwga.org)

The study reaches the following conclusions that are highly relevant to this proceeding.

- Regional demand for natural gas will grow over the next five years, paced by demand for gas-fired electrical generation and continued growth in the number of residential customers.
- Natural gas consumption in the region (measured by energy content, or decathemms - Dth) can be expected to grow an average of 1.9 percent per year, with a cumulative projected growth rate of 7.2 percent through 2012 (see data table A.1., Appendix page 29). Most of this increase reflects an anticipated rebound in demand by electrical generation as well as continued growth in residential demand.
- Recently adopted climate change policies will drive additional demand for natural gas because its clean-burning attributes are vital in helping to reduce carbon emissions.

# Companies and Organizations 6

CO6-1

We have used the Northwest Gas Association's report, Northwest Gas Outlook 2007, along with a number of other sources for information for our analysis of purpose and need in section 1.1.

K-625

CO6-1  
cont'd

- Relatively higher natural gas prices and energy efficiency efforts continue to limit growth in industrial demand for natural gas.
- Other regions of North America will increasingly access gas supplies from production areas upon which the Northwest depends.
- To meet future regional and continental demand growth – particularly in response to climate change policies – North America will require new incremental supplies. Sources of additional natural gas are plentiful and include liquefied natural gas (LNG) imported from overseas and new supply sources closer to home such as Alaskan gas, Canadian frontier gas (Mackenzie River Delta), offshore resources and unconventional resources such as coal-bed methane, shale and biogas.
- Like most commodities, natural gas prices reflect the relative balance between supply and demand. Increased demand for natural gas – driven in part by regional climate change policies – and more competition from other North America markets will only tighten the region's demand/supply balance.
- In addition to ensuring that energy is utilized as efficiently and effectively as possible, policymakers must explore and encourage increased access to new and existing supplies.
- New energy policies to mitigate climate change are increasingly driving demand for natural gas both regionally and continentally because its clean-burning attributes are recognized as an important tool in reducing carbon emissions.

Northwest Gas Outlook pp. 1-2.

The uncontroverted fact is that the Pacific Northwest needs access to new gas supplies and that the LNG terminal proposed by NorthernsStar would help meet those needs. What is abundantly clear is that claims by opponents of LNG that new gas supplies are not needed in the Pacific Northwest are patently false. The energy supply picture in the Pacific Northwest overwhelmingly shows that our region will benefit from the siting of an LNG terminal in Oregon. To suggest, as some have, that the only beneficiaries of such a terminal would be California consumers ignores all the realities facing gas consumers in Oregon, Washington and Idaho.

## Companies and Organizations

CO6-2

Under federal law, FERC is directed to consider feasible alternatives to the proposed action, and address in the Final EIS the relative environmental impacts of the proposed action and feasible alternatives. Federal law does not require a need determination to be made because no natural gas ratepayers are at risk for higher rates or stranded investment resulting from construction of the marine terminal and the Bradwood Landing Pipeline. Only those that use the terminal and pipeline will pay for the facilities. NorthernStar investors have all of the financial risk of failure. Thus, no traditional utility need determination is mandated by federal law.

CO6-3

By providing more access to natural gas, however the NorthernStar LNG terminal would have positive environmental benefits. Natural gas is the cleanest fossil fuel source for end users, and is an important fuel source for electric generation in the Pacific Northwest. Gas-fired generation is being used in the Pacific Northwest to help replace power that was previously generated by coal, nuclear power plants and hydroelectric facilities. Electricity from coal, nuclear and hydroelectric sources has declined in the Pacific Northwest in the past fifteen years in response to environmental and public safety concerns raised regarding those sources of electric generation. Gas-fired generation fueled by LNG can replace lost generation from other sources that are deemed to have greater environmental impacts. Furthermore, natural gas-fired electric generation will be critical in order to back up new renewable sources of power, especially wind.

CO6-4

Through the National Environmental Protection Act (NEPA) process, FERC is considering the environmental impacts of the proposed action. The impacts are being carefully scrutinized through this process. NWIGU urges FERC to also consider the positive environmental impacts of the infrastructure that is avoided by siting a terminal in Oregon. Given the growing demand for natural gas, if the gas does not come from LNG,

# Companies and Organizations 6

CO6-2 Comment noted.

CO6-3 Comment noted.

CO6-4 An expanded discussion of newly proposed pipelines from the Rockies to Oregon has been added in section 3.1.2.2.

K-627

CO6-4  
cont'd

it will have to come from Canada, the Rockies or eventually Alaska. To access any of those alternatives, at least hundreds, and more likely thousands, of miles of natural gas pipelines would need to be constructed to deliver an additional BCF of gas into the Pacific Northwest. To bring Rockies gas, pipeline facilities would be needed in Wyoming, Idaho, and Eastern Washington or Eastern Oregon. To deliver Rockies gas to the West side of the Cascades, either a pipeline expansion from East to West would be necessary through the Columbia Gorge, or a new pipeline would have to cross the Cascade Mountain Range. To bring new supplies from Canada, extensive new pipeline facilities would be require through Alberta and British Columbia in Canada, and then from the Washington/Canadian border south through Washington and Oregon. To have Alaskan gas reach this region would require thousands of miles of pipeline facilities and such facilities are many years away, if they are ever to be constructed.

CO6-5

NWIGU suggests that the Northwest Gas Outlook report clarifies that there is no "build no new gas facilities" option available for the Pacific Northwest if the region's energy needs are going to be met at all, let alone at reasonable prices. The LNG terminal proposed Bradwood Landing is part of the energy reality of the foreseeable future. The ways in which the energy requirements of Pacific Northwest consumers will be met are changing dramatically. Natural gas, including LNG, will help provide the region with a bridge to our energy future. Until a technological break through enables us to meet all of our energy needs in an affordable way from energy sources that cause no environmental impacts, policy officials will be forced to make informed choices. NWIGU believes LNG is an important informed solution to meeting the regions energy needs for the foreseeable future.

# Companies and Organizations

CO6-5 Comment noted.

K-628

CO6-6

New sources of natural gas from LNG also will help address unprecedented price increases that Pacific Northwest consumers have faced in recent years. Because of the tight regional supplies and increasing demand, by the winter of 2005-06, natural gas was selling for \$10 to \$12 per MMBtu. Just ten years ago, natural gas prices were regularly below \$2.00 per MMBtu in the winter, and at times sold for \$1.00 in the summer. The rapid rise in natural gas prices has placed unprecedented strains on NWIGU member companies. Large volume users of natural gas struggle to keep their manufacturing facilities profitable despite the price volatility they face when purchasing natural gas. Industrial use of natural gas has declined significantly in recent years, down 45 percent in 2005 from the consumption levels of 1998. Gas Outlook p. 1. *Id.* While some of the decline is due to aggressive implementation of conservation measures, much of the decline is due to demand destruction stemming from curtailed production at manufacturing facilities throughout the region with the corresponding loss of jobs and revenues for local communities.

For NWIGU member companies, high-priced natural gas is an impediment to retaining or expanding their businesses in the region. Many manufacturers in the Pacific Northwest have been forced to reduce production in part because of the exponential increase in natural gas prices, and these manufacturers continue to be constrained by the ongoing high level of natural gas prices. Access to LNG supplies through a marine terminal such as the Bradwood Landing Terminal proposed by NorthernStar would have positive benefits for the Pacific Northwest economy by helping to stabilize natural gas prices and provide industrial consumers with purchasing opportunities that will not otherwise exist.

## Companies and Organizations

CO6-6 Comment noted.

K-629

The record in this proceeding supports a finding in the final EIS that gas consumers in the Pacific Northwest will benefit greatly from the siting of an LNG terminal such as the one proposed by NorthernStar at Bradwood, Oregon. NWIGU urges the Commission to grant the necessary certificates.

DATED: December 21, 2007.

Respectfully submitted,



Edward A. Finklea OSB No. 84216  
Chad M. Stokes OSB No. 00400  
Cable Huston Benedict  
Haagensen & Lloyd, LLP  
1001 SW 5<sup>th</sup> Avenue, Suite 2000  
Portland, OR 97204  
Telephone: (503) 224-3092  
Facsimile: (503) 224-3176  
E-Mail: [efinklea@cablehuston.com](mailto:efinklea@cablehuston.com)  
[cmstokes@cablehuston.com](mailto:cmstokes@cablehuston.com)  
Of Attorneys for the  
Northwest Industrial Gas Users

## Companies and Organizations

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on December 21, 2007 I caused to be served via electronic mail and/or US Mail (if no email address is provided) the foregoing COMMENTS OF THE DRAFT EIS BY THE NORTHWEST INDUSTRIAL GAS USERS on the attached Service List obtained on this date from the Federal Energy Regulatory Commission's Website as follows:

**Service List for CP06-365-000, CP06-366-, CP06-376 and CP06-377  
Bradwood Landing LLC**

Party	Primary Person or Counsel of Record to be Served	Other Contact to be Served
Bradwood Landing LLC	John Buchovecky Van Ness Feldman P.C. 1050 Thomas Jefferson St., NW Seventh Floor Washington, DC 20007 jjb@vnf.com	Bradwood Landing LLC
Christian Bock	Scott Jerger Columbia Riverkeeper 610 SW Alder, Suite 910 Portland, OR 97205 Scott@fieldjerger.com	Christian Bock
City of Clatskanie	John Salisbury, Partner Salisbury & Callahan LLP P.O. Box 288 Clatskanie, OR 97016 salisbu@clatskanie.com	City of Clatskanie
CLATSOP, COUNTY OF	E. Jordan, Attorney Individual (No Detailed Affiliation Given) Two Centerpointe Drive, 6th Floor Lake Oswego, OR 97035 andy.jordan@jordanschrader.com	CLATSOP, COUNTY OF
COLUMBIA COUNTY DEVELOPMENT AGENCY	Sarah Hanson Assistant County Counsel Columbia County, a political subdivision, Oregon Columbia County Courthouse 230 Strand St. Helens, OR 97048 hansons@co.columbia.or.us	COLUMBIA COUNTY DEVELOPMENT AGENCY
Columbia County, a political subdivision of	Sarah Hanson Assistant County Counsel Columbia County, a political subdivision of Oregon	Columbia County, a political subdivision of the State of Oregon

CERTIFICATE OF SERVICE

# Companies and Organizations

K-631

# Companies and Organizations

K-632

the State of Oregon	Columbia County Courthouse 230 Strand St. Helens, OR 97048 hanson@co.columbia.or.us	
Columbia River Inter-Tribal Fish Comm.	Julie Carter Columbia River Inter-Tribal Fish 729 NE Oregon St., Suite 200 Portland, OR 97232 carj@crtifc.org	Columbia River Inter-Tribal Fish Comm.
Columbia Riverkeeper	Scott Jerger Columbia Riverkeeper 610 SW Alder, Suite 910 Portland, OR 97205 Scott@fieldjerger.com	Daniel Ryan Serres Program Coordinator Columbia Riverkeeper P.O. Box 2478 Grants Pass, OREGON 97528 dserras@oregonwaters.org
Cowlitz County	Vickie Musgrove, Commissioners Cowlitz County 207 4th Ave N Kelso, WASHINGTON 98626 musgrovev@co.cowlitz.wa.us	Cowlitz County
Fisherman's Protective Union	*Scott Jerger Columbia Riverkeeper 610 SW Alder Suite 910 Portland, OREGON 97205 UNITED STATES Scott@fieldjerger.com	Fisherman's Protective Union
Friends of Living Oregon Waters (FLOW)	Scott Jerger Columbia Riverkeeper 610 SW Alder Suite 910 Portland, OREGON 97205 UNITED STATES Scott@fieldjerger.com	Friends of Living Oregon Waters (FLOW)
Gas Transmission Northwest Corporation	Carl Fink Assistant General Counsel Gas Transmission Northwest Corporation 1400 SW Fifth Avenue Suite 1400 Portland, OREGON 97201 UNITED STATES carl_fink@transcanada.com	John A. Roscher Director, Rates & Regulatory Gas Transmission Northwest Corporation 1400 SW Fifth Avenue Suite 900 Portland, OREGON 97201 john_roscher@transcanada.com
GreenWood Resources, Inc.	Jeff Nuss, President/CEO GreenWood Resources, Inc. 121 SW Salmon St., Suite 1020 Portland, OR 97204 jnuss@greenwoodresources.com	GreenWood Resources, Inc.

CERTIFICATE OF SERVICE

# Companies and Organizations

K-633

Individual (No Detailed Affiliation Given)	Wanda Derby Individual (No Detailed Affiliation Given) 81036 Erickson Dike Rd. Clatskanie, OREGON 97016 wderby@earthlink.net	Individual (No Detailed Affiliation Given)
Individual (No Detailed Affiliation Given)	Stephen Rasmussen Individual (No Detailed Affiliation Given) PO Box 416 Lake Forest, CA 92609-0416 serasmussen@cox.net	Individual (No Detailed Affiliation Given)
Individual (No Detailed Affiliation Given)	William&Doris Dragich William&DorisDragich Trust Individual (No Detailed Affiliation Given) 954 Fall Creek Rd Longview, WA 98632-9741 Dragich@aol.com	Individual (No Detailed Affiliation Given)
Knappa-Svensen-Burnside RFPD	Paul Olheiser Individual (No Detailed Affiliation Given) 43114 Hillcrest Loop Astoria, OREGON 97103 olheiser@knappafire.com	Knappa-Svensen-Burnside RFPD
Landowners and Citizens for a Safe Comm	Scott Jerger Columbia Riverkeeper 610 SW Alder Suite 910 Portland, OREGON 97205 Scott@fieldjerger.com	Landowners and Citizens for a Safe Comm
National Marine Fisheries Service		Robert Markle Fishery Biologist National Marine Fisheries Service 1201 NE Lloyd Blvd Suite 1100 Portland, OREGON 97232 Robert.Markle@noaa.gov
National Marine Fisheries Service	Christopher Fontecchio Attorney-Advisor Fontecchio, Christopher 7600 Sand Point Way NE Seattle, WASHINGTON 98115 chris.fontecchio@noaa.gov	Cathy Tortorici National Marine Fisheries Service 1201 NE Lloyd Blvd Suite 1100 Portland, OREGON 97232 Cathy.Tortorici@noaa.gov
NEZ PERCE TRIBE	Mike Lopez Staff Attorney	

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# Companies and Organizations

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	NEZ PERCE TRIBE 100 Agency Road P.O. Box 305 Lapwai, IDAHO 83540 mikel@nezperce.org	
NorthernStar Energy LLC	John Buchovecky Van Ness Feldman P.C. 1050 Thomas Jefferson St., NW Seventh Floor Washington, DC 20007 jfb@vnf.com	**Gary R. Coppedge NorthernStar Energy LLC 905 Commercial St Astoria, OREGON 971034516 Clatsop
Northwest Industrial Gas Users	Edward Finklea Energy Advocates LLP 1001 SW 5th Ave. Suite 2000 Portland, OREGON 97204 efinklea@cablehouston.com	Northwest Industrial Gas Users
Northwest Natural Gas Company	Susan Bergles Attorney at Law 325 Broxton Rd. Baltimore, MARYLAND 21212 sbb@nwnatural.com	Northwest Natural Gas Company
Oregon Department of Energy	Susan Hughes Senior Policy Analyst Oregon Department of Energy 625 Marion St. NE Salem, OREGON 97301-3737 susan.c.hughes@state.or.us	Oregon Department of Energy
Oregon Department of Energy	Janet Prewitt Sr. AAG Oregon Department of Justice 1162 Court St. NE Salem, OREGON 97310 janet.prewitt@doj.state.or.us	Oregon Department of Energy
Peter Huhtala	Scott Jerger Columbia Riverkeeper 610 SW Alder, Suite 910 Portland, OREGON 97205 Scott@fieldjerger.com	Peter Huhtala
Port of Astoria	Heather Reynolds Attorney at Law Individual (No Detailed Affiliation Given) PO Box 145 Astoria, OREGON 97103 reynoldh@pacfier.com	Port of Astoria
Port of Kalama	Mark Stermitz	

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# Companies and Organizations

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	Bullivant, Houser Bailey PC Individual (No Detailed Affiliation Given) 300 Pioneer Tower 888 SW Fifth Ave. Portland, OREGON 97204 mark.stermitz@bullivant.com	Port of Kalama
Port of St. Helens	Peter Williamson Port of St. Helens P.O. Box 598 St. Helens, OREGON 97051 dudley@portsh.org	Port of St. Helens
Port of Vancouver, Washington	Raymond Kindley Schwabe, Williamson & Wyatt, P.C. Pacwest Center, Suites 1600-1900 1211 SW Fifth Avenue Portland, OREGON 97204-3795 rkindley@schwabe.com	Port of Vancouver, Washington
Port Westward LNG, LLC	James McGrew Bruder, Gentile & Marcoux LLP 1701 Pennsylvania Avenue, N.W. Suite 900 Washington, DC 20006-5807 jhmcgrew@brudergentile.com	Port Westward LNG, LLC
Port Westward LNG, LLC	Robert Ramage President Port Westward LNG, LLC P. O. Box 627 Centerport, NEW YORK 11721 ramage@pwlng.com	Port Westward LNG, LLC
Portland General Electric Company	Rob Potter FERC Analyst Individual (No Detailed Affiliation Given) 121 SW Salmon St 1-wtc-0408 Portland, OREGON 97204 rob.potter@pgn.com	Portland General Electric Company
Renewable Resources LLC	Raymond Kindley Schwabe, Williamson & Wyatt Pacwest Center, Suites 1600-1900 1211 SW Fifth Avenue Portland, OREGON 97204-3795 rkindley@schwabe.com	Renewable Resources LLC
Rivervision	Scott Jerger	

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# Companies and Organizations 6

	Columbia Riverkeeper 610 SW Alder Suite 910 Portland, OREGON 97205 Scott@fieldjerger.com	Rivervision
Salmon For All, Inc.	Hobe Kytr Administrator Salmon For All, Inc. P O Box 56 Astoria, OREGON 97103-0056 saforal@pacifier.com	**Jim Wells President Salmon For All, Inc. PO Box 56 Astoria, OREGON 971030056 Clatsop
Salmon For All, Inc.	Thane Tienson, Attorney Landye Bennett Blumstein LLP 1300 SW 5th Avenue Suite 3500 Portland, OREGON 97201 ttienson@landye-bennett.com	**Steve Fick Salmon For All, Inc. PO Box 56 Astoria, OREGON 971030056 Clatsop
Sierra Club	Scott Jerger Columbia Riverkeeper 610 SW Alder, Suite 910 Portland, OREGON 97205 Scott@fieldjerger.com	Sierra Club
Southwest Gas Corporation	Douglas Canter, Attorney McCarthy, Sweeney & Harkaway 2175 K Street, N.W. Washington, D.C. 20817 dmcwash@msshpc.com	Southwest Gas Corporation
U.S. Fish and Wildlife Service		**State Supervisor U.S. Fish and Wildlife Service Oregon Fish & Wildlife Office 2600 SE 98th Ave Ste 100 Portland, OREGON 972661325 Multnomah
U.S. Fish and Wildlife Service	**Duane Mecham Senior Attorney U.S. Fish and Wildlife Service Pacific Northwest Region 500 NE Multnomah St Ste 607 Portland, OREGON 972322036	Joseph Zisa U.S. Fish and Wildlife Service 2600 SE 98th Avenue Portland, OREGON 97213 joe_zisa@fws.gov
Wahkiakum County	Holly Pfenniger Administrative Coordinator Individual (No Detailed Affiliation Given) 64 Main Street Cathlamet, WASHINGTON 98612 pfennigerh@co.wahkiakum.wa.us	Wahkiakum County

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# Companies and Organizations

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Wahkiakum Friends of the River	Scott Jerger Columbia Riverkeeper 610 SW Alder Suite 910 Portland, OREGON 97205 Scott@fieldjerger.com	George Exum Wahkiakum Friends of the River 541 W. Birnie Slough Rd 541 W. Birnie Slough Rd Cathlamet, WASHINGTON 98612 geo@wwestsky.net
Washington Department of Fish & Wildlife	William Frymire Senior Counsel Washington Office of the Attorney General PO Box 40100 Olympia, WASHINGTON 98501 billf@atg.wa.gov	Washington Department of Fish & Wildlife
Washington State Department of Ecology	Joan Marchioro Senior Counsel Office of Attorney General P.O. Box 40117 Olympia, WASHINGTON 98504-0117 JoanM2@atg.wa.gov	Washington State Department of Ecology
Washington State Dept. of Natural Resources	Terry Pruitt Assistant Attorney General Individual (No Detailed Affiliation Given) 1125 Washington St. SE PO BOX 40100 Olympia, WASHINGTON 98504 UNITED STATES terryp@atg.wa.gov	Lisa Faubion Aquatics Land Manager Washington State Dept. of Natural Resources 601 Bond Road PO Box 280 Castle Rock, WASHINGTON 98611-0280 lisa.faubion@wadnr.gov
Washington State Dept. of Natural Resources	Elizabeth Ellis Planner Washington State Dept. of Natural Resources 1111 Washington ST SE PO Box 47027 Olympia, WASHINGTON 98513 UNITED STATES elizabeth.ellis@dnr.wa.gov	Washington State Dept. of Natural Resources
Washington State Dept. of Natural Resources	Steve Reneaud Assistant Attorney General Individual (No Detailed Affiliation Given) 1111 Washington St. SE PO Box 40100 Olympia, WASHINGTON 98504 UNITED STATES resolyef@atg.wa.gov	Washington State Dept. of Natural Resources

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Washington Utilities and Transportation Commission	Donald Trotter Senior Counsel Washington Utilities and Transportation Commission 1400 S Evergreen Pk Dr SW PO Box 40128 Olympia, WASHINGTON UNITED STATES dtrotter@wutc.wa.gov	Washington Utilities and Transportation Commission
Willapa Hills Audobon Society	Scott Jerger Columbia Riverkeeper 610 SW Alder Suite 910 Portland, OREGON 97205 UNITED STATES Scott@fieldjerger.com	Willapa Hills Audobon Society

DATED this 21<sup>st</sup> day of December, 2007.

Respectfully submitted,



Edward A. Finklen OSB No. 84216  
 Chad M. Stokes OSB No. 00400  
 Cable Huston Benedict  
 Haagensen & Lloyd, LLP  
 1001 SW 5<sup>th</sup> Avenue, Suite 2000  
 Portland, OR 97204  
 Telephone: (503) 224-3092  
 Facsimile: (503) 224-3176  
 E-Mail: [efinklen@chbb.com](mailto:efinklen@chbb.com)  
[estokes@chbb.com](mailto:estokes@chbb.com)  
 Of Attorneys for the  
 Northwest Industrial Gas Users

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# Companies and Organizations

K-638



**Portland General Electric Company**  
122 SW Salmon Street • FW1C1715 • Portland, Oregon 97204  
(503) 464-8800 • Fax: (503) 464-3222

**J. Jeffrey Dudley**  
Vice President  
General Counsel &  
Corporate Compliance Officer

December 24, 2007

VIA ELECTRONIC FILING

The Honorable Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street N.E.  
Washington, DC 20426

Re: CP06-365-000 et al

Dear Ms. Bose:

Attached please find a copy of Portland General Electric Company's comments on the Federal Energy Regulatory Commission's draft Environmental Impact Statement (EIS) in the above referenced docket and published in the Federal Register on August 17, 2007. Please accept these electronically filed comments of Portland General Electric Company.

Respectfully submitted,

  
J. Jeffrey Dudley  
Vice President, General Counsel and  
Corporate Compliance Officer

cc: Service list

## Companies and Organizations

UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION

Bradwood Landing LLC ) Docket No. CP06-365-000  
Northern Star Energy LLC ) Docket No. CP06-376-000  
Docket No. CP06-377-000

COMMENTS OF  
PORTLAND GENERAL ELECTRIC COMPANY

I. COMMENTS

Portland General Electric Company ("PGE") hereby submits comments in the above referenced proceedings. PGE is a public utility, incorporated in Oregon. PGE provides electric service to approximately 775,000 retail customers throughout a 4,000-square-mile service area. PGE is owner and operator of the Beaver Generating Facility and the Port Westward Generating Facility in Clatskanie, Oregon. The Beaver plant has a 545,000 kW capability and Port Westward provides approximately 400,000 kW of generating capability. Both plants are used to serve PGE's customers.

PGE is a co-owner in the Kelso-Beaver Pipeline ("K-B Pipeline"), a natural gas pipeline that delivers natural gas to the Beaver and Port Westward plants. The K-B Pipeline is an interstate natural gas pipeline subject to FERC jurisdiction that extends from an interconnection with Northwest Pipeline Corporation in Kelso (Cowlitz County) Washington, to a delivery point at PGE's Beaver Generating Facility in Columbia County, Oregon.

# Companies and Organizations

# Companies and Organizations

PGE supports the development of liquefied natural gas ("LNG") facilities in the Pacific Northwest. The Bradwood Landing LNG importation terminal, storage facility and associated natural gas pipeline (collectively "Bradwood Facility") proposed by Bradwood Landing, LLC and NorthernStar Energy, LLC (Owners) raises certain questions and concerns as it relates to the K-B Pipeline and our Port Westward and Beaver facilities. Those concerns are outlined below and we ask that they be considered in this permitting process.

CO7-1

**The close proximity of the proposed Bradwood Facility natural gas pipeline to the K-B Pipeline necessitates safety precautions during its construction.**

The Bradwood Facility natural gas pipeline is located approximately fifty (50) linear feet south of the K-B Pipeline for an extended distance. Because of the proximity of the Bradwood Facility natural gas pipeline to the K-B Pipeline, PGE has safety and operational concerns about the construction and operation of the Bradwood Facility.

During construction, physical disturbances, direct damage, erosion or other indirect impacts on the K-B Pipeline caused by the construction are possible. Such impacts could lead to safety risks to PGE employees or other persons located in the vicinity.

Additionally, Bradwood Facility natural gas pipeline construction activities could interfere with PGE or its operator's access and ability to properly maintain or repair the K-B Pipeline as may be needed. Finally, outages of the K-B Pipeline caused by Bradwood Facility natural gas pipeline construction may impact the operation of the Beaver and Port Westward generating plants, ultimately harming PGE's ability to provide reliable electrical service to its customers.

CO7-1

As discussed in section 2.3.3, where the Bradwood Landing pipeline would be adjacent to the existing KB pipeline, the proposed temporary construction right-of-way would overlap onto the existing pipeline's permanent right-of-way. The overlap would be up to 10 feet on the spoil side of the pipe trench, but no closer than 15 feet from the existing pipeline. This would allow room to keep construction equipment off the operating pipeline, thus avoiding potentially damaging the existing pipeline. Various activities and practices would be implemented to reduce the risk of damage to existing utilities. For example, prior to construction, NorthernStar would survey and mark its right-of-way and pipeline centerline, and conduct electronic surveys to locate existing underground utilities in the construction work area. NorthernStar would implement an environmental monitoring program to ensure that construction activities are confined to approved work spaces and to address issues such as off-site erosion, should it occur. NorthernStar's erosion control measures are contained in the ESC Plan and SWPPP, which are available on the FERC's eLibrary for PGE's review. This document is available for viewing by the public on the FERC's internet web page at [www.ferc.gov](http://www.ferc.gov), through the eLibrary link, selecting "General Search," entering the docket number minus the last three digits (i.e., CP06-365), and putting in the proper date range.

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## Companies and Organizations

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CO7-1  
cont'd

To remedy these concerns, PGE requests that the Federal Energy Regulatory Commission ("FERC") impose the following conditions. Specifically, prior to construction of the Bradwood Facility natural gas pipeline, its developers/contractors ("Bradwood Contractors") shall perform field locations to determine the exact location of the K-B Pipeline and flag the existing right of way for the K-B Pipeline. PGE believes that by keeping the Bradwood Contractors off the K-B Pipeline right of way, it will help protect the K-B Pipeline from equipment damage and will also help keep the existing vegetation undisturbed, thereby reducing erosion problems. PGE requests a daily inspection report from Bradwood Contractors and Owners verifying that they have avoided entering or traversing through the K-B Pipeline right of way.

Additionally, PGE requests to review the Bradwood Facility natural gas pipeline drainage control plan, as well as erosion sediment control plans and to have the opportunity to modify or revise such plans as may be reasonably necessary to avoid potential harm to the K-B Pipeline. We are concerned that check dams, water bars and grade changes could affect the drainage around the K-B Pipeline and result in piping and sinkholes.

PGE is also concerned that construction of the Bradwood Facility natural gas pipeline could activate land slides. PGE requests any land slides activated due to construction or drainage issues related to the construction become the sole responsibility of the Owners and are promptly remedied.

**The Bradwood Facility's natural gas pipeline crossing of the K-B Pipeline near PGE's Port Westward Facility requires additional safeguards.**

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CO7-2 In addition to general concerns and safeguards required by the close proximity of the Bradwood Facility natural gas pipeline to the K-B Pipeline, at one specific point the Bradwood pipeline crosses the K-B Pipeline. Such a crossing requires even greater precautions to avoid safety and reliability problems. PGE requests that in addition to the Owners performing field location of the K-B Pipeline prior to construction, that it shall have visually located the K-B Pipeline prior to the excavation of the bore pit. We request that PGE be allowed to be present during the visual location process, and that a forty-eight (48) hour notice be provided by the Bradwood Contractor and Owners to PGE prior to excavation around the K-B Pipeline in order to have PGE personnel or its pipeline operator on site during such work.

CO7-3 **The Bradwood Facility natural gas pipeline requires adequate cathodic protection to avoid harm to the K-B Pipeline.**

The close proximity to, and the crossing of, the K-B Pipeline by the Bradwood Facility also poses a potential cathodic protection ("CP") issue. The Bradwood Facility's chosen method of galvanic and/or impressed current CP has the potential to increase corrosion and possible hydrogen embrittlement on the K-B pipeline, which can ultimately lead to pipeline failure or costly repairs. These problems can be mitigated by coordinating design of CP systems between both the K-B and Bradwood pipelines, so that CP designed to protect one pipeline against corrosion will not negatively affect the other pipeline by reversing the polarity of the ionic charges in the soil in the vicinity of the other pipeline.

To avoid such cathodic harm to the K-B Pipeline, PGE requests that, prior to construction of the Bradwood Facility natural gas pipeline, the Bradwood Contractors

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CO7-2 Language has been added to section 2.4.2 to address the concerns of PGE regarding crossing the KB pipeline.

CO7-3 The Bradwood Landing pipeline cathodic protection system would be designed and operated in accordance with 49CFR 192 which requires, among other things, the electrical isolation of new pipelines from other underground metallic structures (49CFR 192.467) and that impressed current cathodic protection systems be designed to minimize adverse effects on existing, adjacent underground metallic structures (49CFR 192.473). Additionally, NorthernStar has indicated it would coordinate with KB pipeline during design of the cathodic protection system and monitor for interference during required system surveys.

CO7-3  
cont'd

and Owners are required to develop and install such a cathodic protection system for any pipeline that is within an underground distance of one hundred (100) feet of the K-B Pipeline. PGE also requests that it be allowed engineering review and approval of such a system prior to construction of the Bradwood Facility natural gas pipeline.

II. NOTICE

The following persons are authorized to receive notices and communications in the above captioned dockets:

Richard George  
Assistant General Counsel  
Portland General Electric Company  
121 SW Salmon Street, 1WTC1301  
Portland, Oregon 97204  
Telephone: (503) 464-7611  
Facsimile: (503) 464-2200  
E-mail: [richard.george@pge.com](mailto:richard.george@pge.com)

Rob Potter  
FERC Compliance Analyst  
Portland General Electric Company  
121 SW Salmon Street, 1WTC0408  
Portland, Oregon 97204  
Telephone: (503) 464-8784  
Facsimile: (503) 464-2236  
E-mail: [rob.potter@pge.com](mailto:rob.potter@pge.com)

III. CONCLUSION

Based on the above comments, PGE urges the Commission to adequately consider the comments of PGE. PGE will continue to monitor these dockets and will continue to participate in future FERC proceedings.

Respectfully submitted,



J. Jeffrey Dudley,  
Vice President, General Counsel and  
Corporate Compliance Officer

# Companies and Organizations

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding on December 21<sup>st</sup>, 2007.

  
\_\_\_\_\_  
J. Jeffrey Dudley,  
Vice President, General Counsel and  
Corporate Compliance Officer

## Companies and Organizations

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K-645



December 24, 2007

Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E., Room 1A  
Washington, DC 20426

Re: Bradwood Landing Docket Numbers: CP06-365, 366 and 377;  
Oregon LNG Docket Number: PF 07-10-000

Dear Secretary Bose,

The Oregon Chapter of the International Non-Governmental Organization, Physicians for Social Responsibility, strongly opposes all four Liquid Natural Gas Terminals and their pipeline delivery systems (three in the Columbia River and one in Coos Bay) that are slated for construction in our beautiful state. The destructive environmental impacts, the possible health risks to our citizens, the continued foreign energy dependence and the potential security risks are too many dangers that we are not willing to accept in trade for minimal economic benefit.

Our membership supports renewable energy resources that reduce carbon footprints for companies, individuals and government. Therefore, we oppose LNG for the following reasons:

- CO8-1  LNG is not sustainable or clean energy.
- CO8-2  It has expensive transportation costs since it is imported from countries like Indonesia, Nigeria, Russia and Iran.
- CO8-3  Oregon does not need this energy source and there is considerable evidence that California does not need it past 2015.
- CO8-4  Small businesses that we treasure, our local family-owned farms, would be irrevocably harmed, including the habitats and water sources that they work hard to protect.
- CO8-5  Bradwood Landing, the terminal on the fastest track to approval, will cause enormous ecological damage and consequence to Columbia River estuarine health that is not acceptable.
- CO8-6  Our forests and private landowners would lose their properties to multinational corporations that do not care about protecting our land as we do.
- CO8-7  And one accident or terrorist act could cause potential thermal radiation burns a half mile from the initial LNG pool fire.

Oregon Physicians for Social Responsibility works diligently to support energy sources that do not damage our environment or our citizens. We urge federal and state tax dollars that would be

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- CO8-1 We disagree. While natural gas is a non-renewable resource, we will not be running out of it any time soon. There are about 1,191 Tcf of recoverable natural gas reserves in the United States, and about 5,211 Tcf world wide. Natural gas is the cleanest burning fossil fuel, and is the energy source most in demand for new electric generation plants because it has less impact on air emissions than other fuels, such as oil and coal. Natural gas has and will play an important part in the energy mix of the Pacific Northwest, as explained in section 1.1.
- CO8-2 The cost of LNG may fluctuate over time and place. It could also be imported from Alaska, Australia, and Trinidad and Tobago. LNG may prove to be competitive with domestically produced natural gas, and its importation may result in price stabilization or perhaps even reductions in energy costs, as explained in section 1.1.
- CO8-3 The need for an additional source of natural gas is described in section 1.1. California is not a target market for the project. See our response to comment PM1-23.
- CO8-4 There is no evidence that the project would harm small businesses. In fact, as shown in section 4.8, the project should benefit the local economy. As discussed in section 4.7, the majority of agricultural land would be restored to its previous condition after installation of the proposed pipeline. As discussed in section 4.8.3.3, NorthernStar would compensate the landowner for crop damages and use of the land, through the easement negotiation process. Impacts on waterbodies are discussed in section 4.3.2 and potential effects on habitat are addressed in section 4.4.2.
- CO8-5 The Bradwood Landing is not on a fast track for approval. See response to comment PM2-20. The EIS documents that the Bradwood Landing Project would not cause enormous ecological damage to the lower Columbia River estuary, and the mitigation measures proposed by NorthernStar may result in net benefits for habitat.
- CO8-6 No private lands would be lost to multinational corporations. NorthernStar is incorporated in the United States. It would acquire a utility easement for its pipeline, and the land would still belong to the current owner. Potential impacts on forest and NorthernStar's mitigation measures to reduce impacts are discussed in section 4.4.2.
- CO8-7 With implementation of the mitigation measures described in the Coast Guard's WSR (Appendix H), an LNG release would be highly unlikely. Section 4.11 discusses the hazards associated with a release of LNG and section 4.11.8 discusses terrorism and security issues.

allocated to assist any LNG terminals or pipelines to be re-directed to renewable, local energies such as wind and solar power. We adamantly oppose any State or Federal endorsement of such a dangerous, unnecessary and costly expense to our environment and our health.

Sincerely,

Rachel Larson  
Executive Director  
Oregon Physicians for Social Responsibility  
[rachel@oregonpsr.org](mailto:rachel@oregonpsr.org)  
503.274.2720

Oregon PSR would like to thank the supplying of materials that assisted in the composing of this letter from: National Physicians for Social Responsibility, Oregon Citizens against the Pipelines, Columbia River Intertribal Fish Commission, Columbia Riverkeepers and local farmers.

## Companies and Organizations

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Credible.  
Independent.  
In the public interest.

1155 North State Street, Suite 609, Bellingham, WA 98225 Phone 360-543-5686 Fax 360-543-0978 <http://pipelinesafetytrust.org>

December 24, 2007

Ms. Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E., Room 1A  
Washington, D.C., 20426

Re: Draft Environmental Impact Statement (DEIS) for the Bradwood Landing  
LNG Project (Docket Nos. CP06-365-000, et al.)

Dear Secretary Bose:

Thank you for this opportunity to comment on the proposed Bradwood  
Landing LNG facility and associated pipelines. The Pipeline Safety Trust was  
formed after the pipeline tragedy in Bellingham, Washington that killed three  
young people in a park, along with every living thing in two miles of a  
salmon stream that runs through Bellingham. After investigating and hearing  
that case the U.S. Justice Department and a federal judge saw the need for  
an independent organization to watchdog both the pipeline industry and the  
regulators that are supposed to ensure the public's safety. They provided  
money as part of the criminal settlement of that case to start the Pipeline  
Safety Trust for that purpose.

Staff of the Pipeline Safety Trust are members of the Washington State  
Citizen Committee on Pipeline Safety, and the U.S. Department of  
Transportation's Technical Hazardous Liquid Pipeline Safety Standard  
Committee and Pipelines and Informed Planning Alliance.

For the past month we have reviewed the DEIS for the Bradwood facility and  
associated pipelines, and would like to provide the following comments and  
requests for clarifications and corrections.

**Proof of Need**

CO9-1 | Clearly the best alternative from the point of public safety and  
environmental impact is no facility at all. If the need for natural gas is great  
enough, than a facility with mitigation measures to ensure public safety and

CO9-1 We discuss the no action alternative in section 3.1.1. We have revised  
section 1.1 to cite other studies from independent agencies and  
organizations regarding the need for this project. The Commission would  
make its comprehensive determination of need in the project Order.

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CO9-1  
cont'd

minimal environmental impacts may be justified. After reviewing the DEIS we did not find any compelling proof of the need for this facility or the associated pipeline. These are our specific concerns:

- In the DEIS (pages 1-4,1-5, 3-2), FERC justified the need for this additional gas by referencing reports from the Northwest Gas Association (NWGA) and Energy and Environmental Analysis (EEA) Inc. The Northwest Gas Association is a trade organization of the Pacific Northwest natural gas industry, and as such has a clear conflict of interest and should not be considered a valid independent source. EEA is a private consulting firm that does a lot of work for the natural gas industry. On their website (<http://www.eea-inc.com/ngservices/marketanalysis.html>) under "Gas Market Scenario Analysis" they state "Construct Your View Of The Future - EEA provides market projections that are based on your strategic planning assumptions." This clear statement that their market projections are based on a client's wishes, not the best available information, should also clearly make their report used to justify the need for this project suspect.

If this project is to be approved based on need, then a more complete, independent analysis of the future need in the Pacific Northwest needs to occur, and we ask that the states of Oregon and Washington be included in designing that analysis.

CO9-2

- The project's need is also based on the future need for more natural gas in the Northwest, yet there is no information in the DEIS that this project will provide **more** gas to market than is currently available. The proposed pipeline will connect the LNG facility at Bradwood to the William's Northwest Pipeline at Kelso, Washington. Williams has stated numerous times that their Northwest Pipeline is at capacity, and there is no indication in the DEIS that there is any plan to expand that capacity in any way. Without such expansion of capacity in the Williams pipeline then this proposed facility would not provide any **more** gas to market, only an alternative source of gas. The DEIS was not based on the need for an alternative source of natural gas, but on the need for additional natural gas. Again, the analysis for this DEIS is flawed and needs to be redone to either show how this facility will provide additional gas, or why an alternative source of gas is necessary enough to justify this proposal. We ask that such additional analysis occur, and that it includes a discussion of how this project compares to other proposals for additional gas to the region from the Rocky Mountains, Canada, and Alaska.

CO9-3

- There are at least four other competing pipelines - the Oregon Pipeline, the Palomar Pipeline, the Pacific Connector pipeline, and El Paso's Ruby Pipeline - proposed to bring natural gas to Oregon. There was no discussion in the DEIS about how these other proposed pipelines relate to the need for this project. In particular the Palomar Pipeline and the Oregon Pipeline

CO9-2

The EIS states that the proposed project would bring in new supplies of natural gas through the importation of LNG. See section 1.1. The existing Williams Northwest system does not have to be expanded to handle the additional volumes that would become available through an interconnection with the proposed Bradwood Landing Project. See our response to comment PM1-10.

CO9-3

The EIS has been revised. Section 3.1.2.2 discusses Palomar and Ruby as newly proposed pipeline alternatives. The Oregon Pipeline is discussed as part of the Oregon LNG Project, and the Pacific Connector Gas Pipeline is discussed as part of the Jordan Cove LNG Project in section 3.1.3.4 Proposed LNG Import Terminals in Oregon.

CO9-3  
cont'd appear to have the ability to serve this same LNG facility, but these alternative pipelines to the pipeline proposed with this facility was not discussed. If this is to be a regional facility, then the DEIS should address the regional impacts. Why build three pipelines, with three sets of environmental impacts, if one pipeline would be sufficient? This is a critical failure of the DEIS, and we ask that it be addressed by including, at a minimum, the Palomar and Oregon pipelines as part of the alternative review.

CO9-4 • The DEIS also fails to provide any discussion regarding the need for this particular LNG facility compared to the many others proposed for the west coast of the United States and Canada. It is clear that at most only a handful of these facilities will be needed, so why is there no discussion in the DEIS of which facilities will have the least environmental impact and pose the least threat to public safety? Does the Bradwood facility provide for better safety and less environmental impact than the other proposed facilities? Why does FERC continue to place such a financial and emotional burden on multiple states, local jurisdictions, and citizens to review multiple proposals when it is clear that economically not all of them will be built? We ask that a discussion of how this particular facility compares to other competing facilities regarding public safety and environmental impacts be included in the final EIS.

**Public Safety of Ships Traveling the Columbia River**

CO9-5 There are many unaddressed concerns raised by others more knowledgeable than us regarding the specifics of LNG spill models used in the DEIS to discuss potential public safety impacts. We hope these issues are more fully addressed.

One concern we have with all the LNG proposals we have reviewed is the lack of acknowledgement of the potential for a cascading failure of containment tanks if a terrorist attack was to occur. In February of this year the Government Accountability Office (GAO) made a recommendation to Congress that such a cascading failure of containment after such an attack is the leading concern not currently being addressed, and that further research needs to be done. There was no new research provided in the DEIS, and this concern was not addressed adequately. With LNG tankers transiting many miles up the Columbia River such a cascading failure, particularly near Astoria, Oregon, could have catastrophic effects. We ask that the possibility of a cascading failure be adequately addressed in the final EIS.

**Pipeline Construction Issues**

We agree with the concerns raised by the Washington State Citizen Committee on Pipeline Safety, and include them again below to lend our

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CO9-4 The need for this project is discussed in section 1.1. Our alternatives analysis explains why the Bradwood Landing Project would serve a specific purpose that may not be served as well by other LNG import terminals in Canada, Mexico, or California. We offer a comparison of environmental impacts for other proposed LNG import terminals proposed in Oregon, where we have data for those other sites, in section 3.1.3.4. No other project was identified that had significantly less environmental impacts. There is no great burden on states or local governments to review the LNG proposals, because under the NGA and EPCRA 2005 the FERC is the sole agency with authority to site onshore LNG import terminals, and it is our staff which has the burden of reviewing the applications and preparing this EIS. Any project authorized by the FERC would have equal protection for the public with regard to safety and security issues. The FERC does not choose between projects and would review each project independently on its own merits. See also our responses to comments PM2-23, PM2-27 and PM2- 31.

CO9-5 Section 4.11.5.3 includes a discussion on the effects of a cascading scenario on the overall fire hazard and has been updated to include a discussion on the GAO reports position on cascading issues.

support to making sure they are addressed before this project moves forward.

- CO9-6 • We agree with FERC that the current amount of information available regarding seismic and landslide hazards is insufficient, and ask that pipeline construction not begin until FERC, PHMSA, and the WUTC are satisfied with the analysis and any proposed routing changes and mitigation that come from it.
- CO9-7 • We are concerned about possible jurisdiction, coordination, and expertise issues between the Federal Energy Regulatory Commission (FERC), the Pipeline and Hazardous Materials Safety Administration (PHMSA), and the Washington Utilities and Transportation Commission (WUTC). For these reasons we ask that FERC allow the WUTC full access to the pipeline and related construction documents for the purpose of inspection during the construction phase. We also ask that PHMSA grant the WUTC permission to carry out these construction inspections as part of their delegated interstate authority. We ask that this be incorporated in the final EIS.
- CO9-8 • We are concerned that the DEIS does not clearly call for the non-destructive (e.g., radiographic or ultrasonic methods) inspection of every girth weld on the pipeline. Given the difficult terrain, the pipeline is highly susceptible to abnormal loading, we ask that the final EIS makes clear that every girth weld will be 100% inspected by non destructive testing, and that these girth weld nondestructive test records be retained and made available to governmental inspectors for the life of the pipeline.
- CO9-9 • We are concerned with the level of confidence that FERC seems to put in the use of strain gauges for providing warning against landslides. While strain gauges can be valuable for predicting problems on slow moving slide areas, they provide little or no protection for landslides in geologic formations that make them prone to catastrophic failures (e.g. slopes susceptible to high hydrology gradients such as that in Western Washington). This again points to the need for better analysis of landslide areas and rerouting if necessary.
- CO9-10 • The use of HDD to get under streams and landslide areas is extensive in the construction plans. While we do support the use of HDD in such situations, we also know that even with the best geologic analysis HDD can fail. For this reason we ask that the final EIS clearly state what methods will be used in each situation if the HDD methods turns out not to work in an area. For streams this would include which method would be used in place of HDD, and for slide areas this would include whether the pipeline will be rerouted to avoid the slide or what other mitigation may be employed.

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- CO9-6 Comments CO9-6 through CO9-16 were also submitted as part of comment letter SA3. For these comments, our responses refer to the response previously provided.  
See our response to comment SA3-3.
- CO9-7 See our response to comment SA3-1.
- CO9-8 See our response to comment SA3-2.
- CO9-9 See our response to comment SA3-4.
- CO9-10 See our response to comment SA3-5.

CO9-11 | • Sometimes, during the HDD process under streams frac-outs occur that can dump harmful quantities of fine silt materials into fish bearing streams. In the DEIS it states that response to such frac-outs would occur within 30 minutes. We believe that the detection and response to frac-outs should occur much quicker than 30 minutes and we would like to see this reflected in the final EIS.

**Right-of-way Issues**

CO9-12 | • It is our understanding that FERC has a policy to encourage the use of existing right-of-ways when possible. It is unclear from the DEIS exactly why this proposed pipeline from the Bradwood facility is not following the existing KB Pipeline for more of its route through Washington. Please either explain this more explicitly in the final EIS, or require this pipeline to follow that existing KB Pipeline right-of-way since they are both going to the same place.

CO9-13 | • The DEIS states that this proposed pipeline would be serving the Beaver power plants. This would appear to make the KB pipeline obsolete, and its existing right-of-way more available for this proposed pipeline. Please discuss the future need for the KB pipeline, and why the replacement of that pipeline with a larger pipeline was not considered as an alternative to the Washington part of this proposal.

CO9-14 | • The DEIS states that after construction trees will be planted on the right-of-way in forest areas and wetlands within 5-15 feet of the pipeline to reduce the visual impact and protect habitat. The DEIS also states that property owners will not be allowed to plant trees anywhere on the permanent fifty foot right-of-way. We support the planting of trees as suggested for forest and wetland areas, and ask that similar planting also be approved for property owners in consultation with the pipeline operator.

CO9-15 | • The DEIS states that after construction trees will be planted on the right-of-way in forest areas and wetlands within 5-15 feet of the pipeline, and that such plantings will create a nearly full canopy cover. While we support this planting of trees, and ask that it remains a part of this plan, it does bring up the question of how the company plans to meet its inspection obligations under CFR 49 Part 192.705. Please describe in the final EIS what inspection methods the company plans to use if a nearly complete canopy precludes aerial inspections.

**Proximity to Residences**

CO9-16 | • The DEIS states that there are six residences within Washington State, which are within 100 feet of the pipeline. We appreciate the care taken to try to avoid residential areas as much as possible, but according to the C-FER

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CO9-11 See our response to comment SA3-6.

CO9-12 See our response to comment SA3-7

CO9-13 See our response to comment SA3-8

CO9-14 See our response to comment SA3-9.

CO9-15 See our response to comment SA3-10.

CO9-16 See our response to comment SA3-11.

CO9-16 Technologies report (A Model For Sizing High Consequence Areas Associated  
cont'd With Natural Gas Pipelines - 2000) that is used to help determine high  
consequence areas, these residents, and probably others, are well within the  
hazard area. We ask that the final EIS include a list of all residences within  
the hazard area as defined by the C-FER Report, and that either the route be  
adjusted to remove these residences from the hazard area, or that an  
explanation of why that is not possible be given.

Thank you for considering our comments on this proposed facility. If you  
have questions feel free to contact me.

Sincerely,

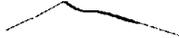


Carl Weimer  
Executive Director

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ORIGINAL

MONTINORE  
ESTATE



Kimberly D. Bose, Secretary Willamette Valley Oregon  
Federal Energy Regulatory Commission  
888 First Street, N.E., Room 1A  
Washington, DC 20426

FILED  
CLERK OF THE  
SECRETARY  
2007 DEC 18 P 3:00  
FEDERAL ENERGY REGULATORY COMMISSION

Re: Docket No. CP06-365-000 et al.

Dear Ms Bose

CO10-1

I am writing you regarding the natural gas pipelines proposed to cross our state. I am a winery owner in the northern Willamette Valley farming 220 acres of wine grapes. I have met with representatives of the pipeline companies and based on the information they provided I have concluded that construction of these pipelines is and dangerous and unnecessary. They propose to bury a 3-foot diameter high-pressure pipeline 3 feet below ground. In the same section of our vineyard where they would like to place this pipeline just last summer my vineyard crew punctured a irrigation line 4 feet below grade when performing the routine maintenance of replacing an end post. If they had ruptured a gas line five of my crew would have been killed and most probably many members of the families that live adjacent to our vineyard. Farmers regularly disturb soil below 3 feet when installing drainage lines, water lines, fence posts or in the process of sub-soiling. The proposed pipeline installation is dangerous to our farmers, their families and our neighbors. I'm sure the Oregon Department of Agriculture shares these concerns.

CO10-2

The pipeline proposal does not make sense from a need/risk perspective. We don't need this volume of gas in Oregon. The majority of the gas to be carried is to be sent to California customers yet we Oregonians are expected to bear the risks of this project. If Californians need the gas let them accept the terminals on their coastline and the pipelines crossing their properties.

CO10-3

Another problem with this proposal is that the gas companies are not using existing right of ways but rather proposing to cross private lands near homes and schools and across agricultural and forestry lands. This is in direct opposition of the Oregon guidelines for this type of project.

CO10-4

Not least is the issue of environmental impact especially at the coast near the docking terminals. Our Oregon coast is on of the healthiest and most beautiful in the country and a great source of pride for all Oregonians.

As our government representative charged with balancing the energy needs of Americans with safety and impact I respectfully request that you oppose the LNG projects and require the Federal Energy Regulatory Commission to

3663 SW Dilley Rd • PO Box 490 • Forest Grove OR 97116-0490  
Phone: (503) 359-5012 Fax: (503) 357-4113 Web: www.Montinore.com

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CO10-1 The Bradwood Landing pipeline would not cross any portion of the Willamette Valley, and therefore would not affect the Montinore Estate farm or vineyard.

CO10-2 The purpose and need discussion in section 1.1 has been expanded and clarifies that the natural gas would not be going to markets in California.

CO10-3 See our response to comment SA3-37. The Bradwood Landing pipeline follows existing rights-of-way to the extent possible, for about 22 percent of its route.

CO10-4 The proposed Bradwood Landing LNG terminal is not located on the Oregon coast, but 38 miles up the Columbia River from its mouth.

consider all of the Oregon LNG projects in a single environmental impact statement that specifically addresses why Oregon should host an LNG plant that is intended to send California gas.

Rudy Marchesi

  
President, Montinore Vineyards

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# Companies and Organizations 11

Due to the length of the Columbia Riverkeeper comment letter (comment letter CO11), we have summarized the issues raised and include them in the following table along with our responses. A copy of the complete letter follows the response table.

Comment Number	Comment (Summary)	Response
CO11-1	There is no proven "need" for the project in the Pacific Northwest. The EIS assumes that LNG is a vital resource for the future of the Pacific Northwest; however, no impartial information is given that shows the need for the enormous scale of the Bradwood Landing proposal. What evidence is there of the need for gas in Oregon; where would the gas that is planned for import to Oregon go?	See our response to comment PM1-8. The Commission will make its determination of need in the project Order.
CO11-2	The draft EIS states that the purpose of this project is to import LNG to supplement regional supplies, when in fact NorthernStar's purpose for the project is to tap into the California market and supplement California's natural gas supplies.	See our response to comment PM1-23.
CO11-3	California gas needs should be evaluated as part of the draft EIS needs analysis.	California is not a target market for the Bradwood Landing Project and therefore should not be included in the assessment of need.
CO11-4	LNG imports will help stabilize the supply and price for the region, is a false statement. LNG imports are notoriously unreliable because of uncertainties in the supply and demand of the global market. The purpose and need should be re-evaluated in light of these observations, the effects importing LNG will have on the regional supplies, and prices should be stated.	We disagree based on a number of sources as cited in our discussion of purpose and need in section 1.1.
CO11-5	The draft EIS rests its need analysis largely on a national presumption of need for LNG imports, and is inadequate in its evaluation of the regional need for LNG imports.	See our response to comment CO11-1.
CO11-6	Data from the Northwest Gas Association can not be considered unbiased, due to Northwest Natural Gas, a member of the Association, who is a partner and will likely be a future owner of the Bradwood Landing pipeline.	Section 1.1 was revised to cite a number of independent studies.
CO11-7	The details of Williams pipeline and its lack of capacity to accept NorthernStar's gas needs to be addressed in greater detail.	Section 1.0 has been revised to include a discussion of the Williams Northwest pipeline capacity. See our response to comment PM1-10.
CO11-8	The size of the LNG ships that will transport LNG to the proposed Bradwood terminal is inconsistent.	The LNG terminal is designed to accept LNG carriers up to 200,000 m <sup>3</sup> . The WSR would limit the size of the LNG carriers to a capacity of 148,000 m <sup>3</sup> until a completed site-specific risk analysis for larger carriers is approved by the COTP. At that time, NorthernStar would prepare a follow-on WSA with the proposed LNG carrier size for approval by the Coast Guard.
CO11-9	The number of LNG storage tanks proposed has been inconsistent (two or three?).	The number of LNG storage tanks has consistently been presented as two in the EIS and in the current versions of the JPA and JARPA. Because two storage tanks were proposed in NorthernStar's application to the FERC, and analyzed in the EIS, if the Commission authorizes the project, only two tanks could be built at the LNG terminal.
CO11-10	The draft EIS does not provide a description of the routes the LNG vessels will travel to and from the proposed LNG terminal, making it	We have modified section 4.6.2.1 to indicate that NorthernStar would minimize impacts on whales by contractually requiring that the LNG carriers travel in a defined area that would narrow to 10 nautical miles in width between 126

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Due to the length of the Columbia Riverkeeper comment letter (comment letter CO11), we have summarized the issues raised and include them in the following table along with our responses. A copy of the complete letter follows the response table.

Comment Number	Comment (Summary)	Response
	extremely difficult to assess vessel strikes.	degrees (west of the toe of the continental slope) to the marshalling area off the mouth of the Columbia River. Also we are recommending that NorthernStar coordinate with the NMFS to determine appropriate LNG carrier speed and seasonal restrictions, or other applicable measures, to avoid or minimize impacts on whales.
CO11-11	The draft EIS ignores the Palomar Pipeline as a connected action.	As discussed in further detail in section 3.1.2.2, we consider the Palomar Project to be a separate undertaking from the Bradwood Landing Project. Neither project is inter-dependent on the other. The two projects can be considered as competitors to supply natural gas from different sources to the same market. The FERC intends to do an independent environmental review of the Palomar Project. See our response to comment PM1-24.
CO11-12	An inadequate analysis of alternatives has been given due to the unreasonably narrow definition of the purpose and need of the project.	As indicated in sections 1.1 and 3.1, the primary objective of the Bradwood Landing Project is to provide a new source of natural gas to the Pacific Northwest through the importation of LNG. In order to accomplish that objective, NorthernStar would need to interconnect with the existing Williams Northwest jurisdictional interstate system, and the existing system of Northwest Natural, which is the nonjurisdictional LDC for northern Oregon and southern Washington. Related to that objective would be the ability to directly serve industrial customers in the Pacific Northwest, such as the Georgia-Pacific paper mill at Wauna, Oregon and the PGE Beaver Power Plant at Port Westward.
CO11-13	There are cleaner, safer, and more affordable energy alternatives.	See our response to comment PM1-12. Natural gas is the cleanest burning fossil fuel. Its affordability will vary with market conditions. See our responses to comments CO8-1 and CO8-2. As explained in section 4.11, natural gas is safe.
CO11-14	Evidence is not provided to support the conclusion that LNG is an economically reasonable source of gas supply for the region.	Market conditions will dictate whether LNG is economical in any given year. As indicated in section 1.1, NorthernStar believes that imported LNG can compete with domestically produced natural gas.
CO11-15	How would the siting of an LNG terminal, in the Lower Columbia act to stimulate or encourage the development of electrical power generating facilities and other energy intensive industries?	One of the goals of the Bradwood Landing Project is to supply natural gas to the Beaver Power plant. As discussed in section 1.1, natural gas is growing as the fuel of choice for electric generation plants because it produces less air emissions than other fossil fuels, such as oil or coal. The conversion of power plants from oil or coal to natural gas could have benefits in terms of better air quality, and lower production of GHG.
CO11-16	The DOE estimates there are decades of natural gas remaining in North America.	The supply and demand for natural gas is discussed in sections 1.1. It has been estimated that there are about 1,191 Tcf of recoverable natural gas reserves in the United States. However, it may not be possible to extract that gas and transport it to markets in the Pacific Northwest in the near future.
CO11-17	The EIS does not consider an alternative that would remove impurities (non-methane components) from the LNG.	See response to comment PM1-22.
CO11-18	How would the proposed project be consistent with Oregon's renewable	We discuss Oregon's renewable energy standard in section 3.1.1.2 of the EIS.

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Due to the length of the Columbia Riverkeeper comment letter (comment letter CO11), we have summarized the issues raised and include them in the following table along with our responses. A copy of the complete letter follows the response table.

Comment Number	Comment (Summary)	Response
	energy standard and how could it increase political pressure to weaken the standard to allow for greater combustion of gas?	In an editorial that appeared in The Oregonian newspaper on April 27, 2008, Gregg Kantor, President of Northwest Natural, indicated that renewable energy sources currently account for only 4 percent of Oregon's electricity, and new supplies of natural gas from imported LNG are needed in the near future to bridge the energy gap until Oregon's goal is reached of having 25 percent of its energy produced from renewables by 2025.
CO11-19	The EIS does not consider the Palomar pipeline as an alternative to the proposed sendout pipeline.	As discussed in section 3.1.2.2, the proposed Palomar pipeline would not be a substitute for the proposed Bradwood Landing sendout pipeline; but can be viewed as a newly proposed system that would provide an alternative path for gas supplies to reach markets.
CO11-20	The FERC should more thoroughly evaluate Rockies gas as an alternative, including the Bronco and Ruby pipelines.	The Rockies and Bronco pipelines have been analyzed as system alternatives to the proposed project in section 3.1.2.2.
CO11-21	The draft EIS does not evaluate a range of projections for Canada's natural gas exports to the United States.	Sections 1.1 has been revised to present predictions for future production of natural gas in the WCSB and potential export volumes to the Pacific Northwest.
CO11-22	The EIS should consider potential LNG terminal sites in northern California because a large proportion of the natural gas from the project is planned to go to California.	A large portion of natural gas from the project is not planned to go to California. We considered LNG import terminals in California as alternatives discussed in section 3.1.3.3.
CO11-23	The alternatives section does not justify why open-cut methods are being used to cross waterbodies in some areas.	As discussed in sections 2.4.2.2 and 4.3.2.4, the standard waterbody crossing method is the open-cut method. However, NorthernStar would use the HDD or conventional bore method to cross sensitive waterbodies.
CO11-24	The FERC did not consider a smaller sized facility or smaller sized LNG carriers as alternatives.	Section 3.1.6 of the EIS discusses alternative LNG terminal designs. We feel that NorthernStar's proposed LNG terminal is the smallest footprint feasible to meet its economic and engineering design objectives. An operating terminal covering only 40 acres would be smaller than many other existing and proposed LNG terminals in the United States.
CO11-25	The EIS dismisses alternative regasification strategies.	See our response to IND107-4.
CO11-26	The EIS does not provide adequate analysis of its major pipeline route alternatives.	The analysis of major pipeline route alternatives considered numerous factors (see table 3.1.3-1). We do not believe that any of the alternative routes offer an environmental advantage over the proposed pipeline route.
CO11-27	The dredge disposal alternatives analysis is inadequate.	We believe the various dredge disposal alternatives were analyzed adequately to determine that the proposed action of placing the dredged material at the terminal site and at the Wahkiakum County Sand Pit is a reasonable and environmentally sound alternative.
CO11-28	The alternatives analysis is inadequate and fails to consider reasonable alternatives that would avoid impacts on aquatic ecosystems.	We evaluated a variety of alternatives but did not find any feasible alternatives that had clear environmental advantages over the proposed project and that could meet all of the project objectives.
CO11-29	There are inconsistencies (e.g., with respect to wetlands) between the alternatives analysis in the draft EIS and the JPA and JARPA.	NorthernStar used different assumptions while calculating impacts to wetlands than we did. For example, it did not include permanent impact acreages with its

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Due to the length of the Columbia Riverkeeper comment letter (comment letter CO11), we have summarized the issues raised and include them in the following table along with our responses. A copy of the complete letter follows the response table.

Comment Number	Comment (Summary)	Response
CO11-30	The EIS should evaluate alternatives in light of SIGTTO standards.	temporary impact acreages, whereas our temporary impacts include the permanent impacts. The SIGTTO standards are taken into consideration and implemented as appropriate.
CO11-31	Due to the nature of this facility and its regional location the following geologic hazards were inadequately addressed. <ul style="list-style-type: none"> <li>• Poor foundation soils that have potential to undergo liquefaction.</li> <li>• Volcanism</li> <li>• Seismicity</li> <li>• Tsunamis</li> <li>• Landslides/Rock fall/Debris flow</li> <li>• Slope stability</li> <li>• Shoreline erosion</li> <li>• Subsidence</li> </ul>	See our responses to comments SA1-4, SA1-92, and SA1-100 through SA1-112.
CO11-32	Evaluate OBE and SSE for magnitude 8.0 to 8.5 earthquakes not on the Cascadian Subduction Zone.	The OBE and SSE design response spectra were established per the requirements in the 2001 NFPA 59A standard. In their seismic analysis, URS (2006a) determined that the largest earthquakes producing the largest ground motions at the terminal site would occur on the CSZ. Therefore, the OBE and SSE are based on earthquakes that would occur on the CSZ.
CO11-33	The draft EIS failed to analyze: the adverse impacts on the location, structure, and dynamics of aquatic communities; shoreline and substrate erosion and deposition rates; the deposition of suspended particulates; the rate and extent of mixing of dissolved and suspended components of the waterbody; and water stratification.	The EIS discusses the impacts of dredging on the benthic community at the LNG terminal site as well as indirect impacts on the aquatic resources that forage on benthic species. We also addressed turbidity, sedimentation, and water quality issues associated with dredging.
CO11-34	The draft EIS fails to assess how aquatic life in the estuary will be harmed by the resuspension of contaminated sediments into the water column.	Based on the results of sampling and analysis of the sediments proposed for dredging, aquatic life would not be harmed by the resuspension of contaminated sediments into the water column.
CO11-35	The draft EIS fails to analyze what will be done with any possibly contaminated water from dredging activities.	Based on the results of sampling and analysis of the sediments proposed for dredging, contaminated water would not be generated during dredging activities.
CO11-36	The draft EIS fails to analyze whether the maintenance dredging is realistic, (i.e. NorthernStar predicts it will need to dredge every 2 – 4 years. However, maintenance dredging is required if the turning basin or channel fills in with 1 foot of sediment.)	The frequency of maintenance dredging is an estimate based on modeling. Permits, which require environmental review, would be obtained from the COE for maintenance dredging.
CO11-37	The draft EIS fails to consider the stability of the dredge side slopes.	We have confirmed with the COE that a side slope of 1 (vertical) to 3 (horizontal) is appropriate for the river sediments in the area of the LNG terminal. See also the response to comment IND82-3.

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Due to the length of the Columbia Riverkeeper comment letter (comment letter CO11), we have summarized the issues raised and include them in the following table along with our responses. A copy of the complete letter follows the response table.

Comment Number	Comment (Summary)	Response
CO11-38	The draft EIS failed to qualify how 0.5 percent spillage of sediments during dredging was ascertained.	WEST (2006) determined the spillage rate in its hydrodynamic and sediment transport assessment for the dredging of the ship berth and maneuvering area.
CO11-39	The draft EIS indicates that phytosterols were found in the proposed dredge sediments but fails to analyze the effects phytosterols will have upon aquatic organisms if the phytosterols are released from dredge material.	The relatively low TOC content of the sediments within the dredge prism suggests a limited potential to mobilize phytosterols from the sediments during dredging or from the leave surface during operation of the facility.
CO11-40	The draft EIS failed to produce a plan for contaminated sediments and water from dredging activities.	Based on the results of sampling and analysis of the sediments proposed for dredging, such a plan is not necessary.
CO11-41	The draft EIS does not analyze the capacity of the Wahkiakum County Sand Pit site, or show that the site will be able to accommodate all the dredged materials from initial dredging as well as future maintenance dredging.	The final EIS has been revised to reflect that NorthernStar would place less dredged material at the Wahkiakum County Sand Pit site, up to the amount of capacity that is available.
CO11-42	Bradwood should be required to conduct soil contaminant testing in areas likely to be disturbed during construction by clearing, grading, or excavation activities before any construction ensues.	Prior to construction, NorthernStar would prepare a CMMP that would specify the procedures to identify, characterize, and properly manage potentially contaminated materials.
CO11-43	The draft EIS fails to adequately evaluate the potential for releasing contaminants from the soil during Bradwood road construction.	See our response to CO11-41.
CO11-44	The draft EIS states that the infiltration capacity of the soils will be sufficient for the water to percolate into the ground before running off into the river, but does not provide support for these statements with any reference to calculations or other scientific evidence.	An assessment of the permeability of the soils at the site is based on the geotechnical analysis of the site performed by URS as detailed in "Final Geotechnical Report, Proposed LNG Import Terminal, Bradwood Oregon, 2005" available on the FERC's eLibrary.
CO11-45	The study conducted by Bradwood to analyze the contamination in the sediments had a flawed design. The replacement cores were lost, and not enough information on these replacements was provided. It should be required that Bradwood not only redo sampling, but analyze individual samples without compositing.	We are satisfied that the sampling and analysis of the sediments at the LNG terminal site met the objectives of the study and provided sufficient information to properly evaluate the materials to be dredged. The sampling and analysis plan was approved by the RMT and we do not believe the deviations from the work plan adversely affected the study results.
CO11-46	The draft EIS does not adequately describe how impacts of dredging are being mitigated.	Some of the impacts of dredging, such as increased turbidity, are short-term and localized and do not require mitigation. We have included new text in section 4.1.3.3 regarding NorthernStar's plan to monitor shorelines in the area of the LNG terminal to determine if dredging has contributed to shoreline erosion and implement mitigation measures if necessary. Furthermore, we added a recommendation that NorthernStar monitor the side slopes of the maneuvering basin for lateral migration and implement slope protection measures if necessary.
CO11-47	Additional pollutants such as excess total organic carbon and total volatile solids were not addressed in the draft EIS.	The total organic carbon and total volatile solids content are an indication of organic matter in the sediments; they are not pollutants.
CO11-48	The Mitigation Plan on file for this project is insufficient. An updated and detailed mitigation plan to account for the full scope of the project	NorthernStar's Waterbody and Wetland Construction and Mitigation Procedures Plan provides details on different BMPs in wetlands and waterbodies. This document is available for viewing by the public on the FERC's Internet web

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# Companies and Organizations 11

Due to the length of the Columbia Riverkeeper comment letter (comment letter CO11), we have summarized the issues raised and include them in the following table along with our responses. A copy of the complete letter follows the response table.

Comment Number	Comment (Summary)	Response
	<p>including the following should be provided:</p> <ul style="list-style-type: none"> <li>• What will the final effects of the proposed project be?</li> <li>• Provide more detail about how the mitigation measures would be required and if they are not required what basis FERC relies on to assume that they would actually be implemented.</li> </ul>	<p>page at <a href="http://www.ferc.gov">www.ferc.gov</a>, through the eLibrary link, selecting "General Search," entering the docket number minus the last three digits (i.e. CP06-365), and putting in the proper date range. As described in section 2.1.5, NorthernStar is currently revising its Compensatory Mitigation Plan. The revised plan will be submitted to the NMFS and FWS as part of the FERC's BA and EFH Assessment.</p>
CO11-49	The listing of BMPs to be used in the ESC Plans is inadequate for a proper analysis of the probative value of the proposed sediment control measures.	NorthernStar has indicated that it would follow applicable state and local sediment control measures. Furthermore, NorthernStar has agreed to follow the FERC staff's Procedures. In addition, we have recommended that NorthernStar revise its pipeline ESC Plan and SWPPP to include measures from the FERC staff's plan that would provide greater protection.
CO11-50	The draft EIS claims that any scale and sediments in the water from the pipeline hydrostatic testing will be filtered out by straw bales, but provides no basis for the accuracy of this statement.	Because clean, new pipe would be used for the pipeline, no measureable scale or sediment is expected to be produced from the hydrostatic testing.
CO11-51	The Mitigation Plan will be insufficient to mitigate the adverse impacts of the filling of the log pond. A more thorough analysis concerning the filling of the log pond should be provided.	As described in section 2.1.5, NorthernStar is currently revising its Compensatory Mitigation Plan. The revised plan will be submitted to the NMFS and FWS as part of the FERC's BA and EFH Assessment.
CO11-52	The draft EIS failed to consider the impacts from terminal construction on the changes in salinity gradient, nutrient balance, dissolved oxygen balance, and how these changes will adversely affect communities of aquatic life, introduce populations of nuisance organisms, modify habitat, reduce food supply, restrict movement of aquatic fauna, and change the adjacent upstream and downstream areas.	<p>We believe that sections 4.3.2.3 and 4.5.2.1 adequately discuss the potential impacts of construction and operation of the LNG terminal on water resources and aquatic resources, respectively. However, additional information on these topics will be included in the revised BA and EFH Assessment.</p> <p>Section 4.5.2.1 has been revised to reflect the extent of saltwater intrusion into Columbia River. The additional dredging that would occur for the terminal area would be an approximate 0.1 percent increase to the existing dredged navigation channel from the mouth of the Columbia River to Portland. Therefore, effects to saltwater intrusion along the Columbia River are not expected to be significant.</p>
CO11-53	The draft EIS fails to analyze how water temperature will be changed due to increases in turbidity and how any changes in water temperature resulting from increased turbidity due to dredging activities will exacerbate the ODEQ 303 (d) water quality limited status of these waters. How will dredging affect the dissolved oxygen?	As described in the COE's SEIS for the Columbia River Channel Improvement Project, "Navigation channel dredging... would not result in significant water quality impacts. Dredging of fine-grained organic rich sediments could result in limited short-term elevations of chemicals and possible decrease in dissolved oxygen in the immediate area of the dredging." Impacts from the significantly smaller area that would be dredged for construction of the terminal berthing area would also not be expected to be significant.
CO11-54	The draft EIS does not provide any information on the accuracy of turbidity models.	The EIS is a summary document. An assessment of the accuracy of turbidity models is outside the scope of this EIS.
CO11-55	The draft EIS fails to consider the impact on water quality and the fact the proposed dredging, filling, and pipeline construction will cause violations of both Oregon's and Washington's numeric and narrative water quality standards, including harming designated uses.	Potential impacts on water quality due to construction activities associated with the LNG terminal are described in sections 4.3.2.2 and 4.3.2.4, respectively. As described in table 1.3-1, NorthernStar would obtain section 401 water quality certificates from the ODEQ and the WDE demonstrating that the discharges

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Due to the length of the Columbia Riverkeeper comment letter (comment letter CO11), we have summarized the issues raised and include them in the following table along with our responses. A copy of the complete letter follows the response table.

Comment Number	Comment (Summary)	Response
CO11-56	The draft EIS does not assess the impacts that the lateral pipelines and power line will have on water quality.	associated with the project comply with federal and state water quality standards.  The lateral pipelines are non-jurisdictional facilities that would be constructed by parties other than NorthernStar. No information is available on the routes in order to assess impacts at this time. Additional information discussing the potential impacts on water quality due to construction of the power line has been included in section 4.3.2.2.
CO11-57	The procedures for dechlorination of the hydrostatic test water being discharged back into the river are vague and insufficient to evaluate the procedure proposed.	See our response to comment FA1-12.
CO11-58	The draft EIS fails to assess the impact of permanently filling at least 14 acres of estuarine and freshwater wetlands at the terminal site, and the impact of destroying the log pond habitat.	Section 4.4.1.2 includes a discussion of both temporary and permanent impacts on wetlands at the LNG terminal site, including the log pond. Potential impacts on aquatic resources due to habitat modification at the LNG terminal site are discussed in sections 4.5.2.1 and 4.6.2.2.
CO11-59	The draft EIS fails to consider that construction activities, including terminal construction, replacement of the Hunt Creek Bridge, power line construction, relocation of the railroad tracks, and temporary parking lot construction, will destroy acres of vegetation. The draft EIS fails to adequately analyze the full scope of vegetation removal on surrounding habitats, and the problems associated with revegetating areas in the vicinity of the project site.	The total acres of vegetation impacted by construction and operation of the LNG terminal and associated facilities are provided in table 4.4.2-1. It is important to note that the railroad realignment, widening of Bradwood Road, and Hunt Creek Bridge replacement are included in the total acreage impacted. In addition, specific impacts on vegetation due to construction and operation of the LNG terminal are described in section 4.4.2.2. We believe that our analysis of potential impacts on vegetation, including revegetation, due to construction and operation of the LNG terminal is adequate.
CO11-60	The draft EIS fails to adequately analyze the quantity and type of vegetation to be destroyed as a result of construction activities at and around the proposed terminal site, road improvements, construction of temporary roads, or other various acts of construction.	See our response to comment CO11-58.
CO11-61	The draft EIS fails to take into account the difficulty of establishing some species of trees that will be removed during construction.	Section 4.4.1.2 has been revised to include additional information describing the proposed monitoring at the LNG terminal site to ensure survival and to verify that success criteria are met in areas planted for site restoration and compensatory mitigation.
CO11-62	The vegetation that will be cleared may be disposed of by being burned; the draft EIS does not discuss this source of pollution.	As stated in section 4.4.2.3, no trees, slash, or woody vegetation would be burned during construction of this project.
CO11-63	The draft EIS failed to consider the impacts to the changes in salinity, nutrient balance, dissolved oxygen balance, turbidity, temperature and how these factors will influence the aquatic wildlife.	See our responses to comments CO11-51 and CO11-52.
CO11-64	The draft EIS fails to analyze the effect of light pollution, and fish entrainment during dredging activities.	Section 4.5.2.1 includes a discussion of the potential impacts on aquatic resources due to terminal lighting and entrainment due to dredging activities.
CO11-65	The combination of losing shallow water habitat from dredging and losing shallow water habitat from filling wetlands will be a devastating hit to the	As described in section 4.3.2.3, no shallow water habitat would be impacted by dredging activities. However, potential impacts on aquatic resources due to

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Comment Number	Comment (Summary)	Response
	estuary ecosystem. The EIS must analyze the habitat loss of the dredge and fill cumulatively.	habitat modification are discussed in section 4.5.2.1.
CO11-66	The dredged hole at the head of the Clifton channel will cause a decrease in the velocity of the water which will harm salmon by increasing the travel time for smolts traveling to the ocean. The draft EIS fails to discuss how dredging and the project overall will affect salmon recovery.	Any decrease in velocity associated with dredging at the head of Clifton Channel would be localized to a relatively small area in relation to the migration path, and resulting impacts on travel time due to any decrease in velocity are not expected to have a significant impact on juvenile salmonid out-migration.
CO11-67	The draft EIS does not analyze the impacts of fish entrainment due to dredging.	Section 4.5.2.1 (see <i>Impacts on Aquatic Resources, In-water Construction Activities, Dredging, Entrainment</i> ) describes the potential for small fish to be entrained during dredging operations. NorthernStar would minimize fish entrainment during dredging activities by keeping the cutterhead within 3 feet of the river bottom and conducting dredging activities during specified in-water work window when the densities of fish in the project area is lowest.
CO11-68	The draft EIS ignores the impacts of wave action on salmon stranding outside the terminal area.	See our response to comment FA2-19.
CO11-69	The draft EIS fails to adequately consider the impact to the millions of individuals of salmon, sturgeon, lamprey, and other resident species that utilize this area as habitat at various times in their lifecycles. This project will destroy habitat for 13 ESUs of Columbia and Snake River salmon that are threatened under the ESA.	Because the EIS is a summary document, we believe that the level of detail provided in sections 4.5 and 4.6.2 on the potential impacts from the proposed project on aquatic resources (including salmonids) is adequate. However, as they relate to federally listed species and designated critical habitat, these topics will be addressed in additional detail in the revised BA and EFH Assessment.
CO11-70	The draft EIS does not adequately describe the nature and effectiveness of the SEI, or alternatives to the SEI.	See our response to comment FA4-12.
CO11-71	The introduction of invasive species may harm the aquatic ecosystem.	Section 4.5.1.1 has been revised to include additional information on the potential for introduction of aquatic species to the lower Columbia River system.
CO11-72	The draft EIS does not adequately address the monitoring for the presence of pinnipeds and fails to discuss conditions under which more than one monitor could be used, under what conditions monitoring activities will be sufficiently doubtful to stop pile driving, and the methods Bradwood will use to monitor small and elusive marine mammals, such as harbor seals.	See our response to comment FA2-28.
CO11-73	Removal of vegetation near the shorelines of the Columbia River and Hunt Creek during construction activities will also adversely affect aquatic species by removing a source of food.	Potential impacts on aquatic resources due to habitat modification are discussed in section 4.5.2.1.
CO11-74	The draft EIS does not adequately describe how controlling noxious weeds will directly benefit salmon and offset the type of impacts the project will have at the site where terminal construction and dredging will destroy dozens of acres of critical habitat.	See our response to comment FA3-3.

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Comment Number	Comment (Summary)	Response
CO11-75	The draft EIS fails to consider that a 25 percent increase in deep draft vessels due to the LNG terminal will increase the risk of vessel strikes to marine mammals and sea turtles.	Section 4.6.2.1 discusses the potential for increased ship strikes to both sea turtles and marine mammals as a result of increased vessel traffic during operation of the Bradwood Landing Project.
CO11-76	The release of contaminated water back into the river can be highly toxic to aquatic life. The draft EIS fails to assess the complete impact of contaminants (including but not limited to metals) on salmon, macro-invertebrates, and other aquatic life.	Although discharges into the Columbia River would meet ODEQ standards and NPDES permit requirements, the long-term bioaccumulative effects of pollutants on fish, humans, and other wildlife resulting from construction and operation of the Bradwood Landing Project can not be characterized with the best available science. Bioaccumulative effects can result from a variety of physical, chemical, and biological processes. However, the concentration of contaminant levels reported in section 4.2.2.2 of the EIS does not indicate a significant biological effect is likely.
CO11-77	The wetland fill at the LNG terminal will degrade the habitat used by birds, amphibians, mammals, and invertebrates.	We agree that filling of wetlands at the LNG terminal site would result in a loss of potential habitat for both aquatic and terrestrial wildlife. However, only about 13 acres of wetlands would be permanently filled at the Bradwood Landing LNG terminal, and NorthernStar will be required to mitigate for permanent impacts on wetland habitats through the implementation of its final Compensatory Mitigation Plan. See also the response to comment FA2-10.
CO11-78	The draft EIS fails to analyze adequately the impact on protected wildlife habitat in the Julia Butler Hansen Wildlife Refuge, Lewis and Clark Wildlife Refuge, and Fort Stevens State Park.	Additional information has been added to sections 4.5.1.1 and 4.5.2.1 regarding potential impacts on unique and sensitive wildlife habitats, including the JBHNWR, LCNWR, and Fort Stevens State Park.
CO11-79	The draft EIS fails to consider that noise impacts from construction activities may disturb various birds, including the Bald Eagle, and other animals, like the Columbia white-tailed deer, and cause them to avoid the areas impacted.	Sections 4.5.2.3 and 4.6.2 describe potential impacts on terrestrial wildlife due to construction and operation of the LNG terminal.
CO11-80	The pipeline construction will disrupt fish passage by damming the streams during the trenching and pipeline placement.	Potential impacts on aquatic resources due to pipeline construction are discussed in section 4.5.3.1.
CO11-81	If a frac-out should occur during pipeline boring or HDD, bentonite will be introduced into the waterway. Bentonite smothers fish habitat and fouls streams.	We believe that NorthernStar's HDD Contingency Plan adequately addresses potential modes of failure for each phase of the drilling process as well as mitigation measures for frac-outs to waterbodies.
CO11-82	The draft EIS fails to mention the behavioral modifications to salmonids and other organisms in the area due to noise impacts underwater.	Potential impacts on aquatic resources (including salmonids) due to increased noise levels during construction of the proposed LNG terminal are discussed in section 4.5.2.1.
CO11-83	The analysis for the Columbian White-tailed deer fails to account for fragmentation of habitats between population pockets in the estuary. The draft EIS fails to analyze the potential of fragmentation on terrestrial organisms that migrate through the region.	See our response to comment FA4-6.

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# Companies and Organizations 11

Due to the length of the Columbia Riverkeeper comment letter (comment letter CO11), we have summarized the issues raised and include them in the following table along with our responses. A copy of the complete letter follows the response table.

Comment Number	Comment (Summary)	Response
CO11-84	The draft EIS fails to consider the harm to multiple ESA-listed mammals and turtles including: green leatherback, loggerhead and olive ridley sea turtles; blue, fin, humpback, north pacific right, sei, killer, and sperm whales; and Steller sea lions.	Potential impacts on federally listed species are discussed in section 4.6.2. More specifically, potential impacts on federally listed sea turtles, whales, Steller sea lions, and other marine mammals (i.e., harbor seals and California sea lions) along the waterway for LNG marine traffic are discussed in section 4.6.2.1. Potential impacts on Steller sea lions and other marine mammals potentially occurring at the LNG terminal site are described in section 4.6.2.2.
CO11-85	The draft EIS has failed to consider the cumulative economic effect of Bradwood on the fishing industry and communities dependent upon the fishing economy. The direct harm to fish will harm the fishing industry, as will the lack of access to traditional fishing areas.	Section 4.12 of the EIS describes the potential cumulative impacts from the project in relation to other past, present, and future projects. As discussed in section 4.12.4, because recreational users of the Columbia River have always had to account for industrial and commercial ship traffic, no significant additional cumulative impacts on these activities are likely.
CO11-86	The draft EIS fails to analyze the economic impact, including the cumulative economic harm due to the delay on the importers and exporters of goods, producers, and consumers.	See our response to PM2-19.
CO11-87	The draft EIS fails to consider that dredging will adversely affect the commercial and recreational fishing industry, both vital components of the Clatsop County and State economy. The 24-hour per day dredging will completely block access to the traditional fishing grounds at the head of the Clifton Channel, and may block Clifton Channel, for several months. The LNG tankers will block access to traditional fishing areas along the entire length of the river as well.	Although dredging would occur 24 hours per day, 7 days per week for a period of approximately 48 to 72 days, it is important to note that the dredge would be operating throughout the 46-acre dredged footprint during that time. Potential impacts on commercial and recreational fishing could occur due to dredging activities; however, it is not anticipated that impacts would be isolated on any area for the entire 48- to 72-day period during which dredging would occur.
CO11-88	The draft EIS must consider the advantage of the 35 full-time jobs and the short-term construction jobs versus the detriment to the existing industry in Clatsop County and the State. The draft EIS fails to consider the risk to the multiple industries and municipalities.	We do not believe operation of the proposed project would adversely affect other industries in the project area. Our discussion of potential socioeconomic impacts associated with the proposed project is included in section 4.8.
CO11-89	The LNG tankers and terminal will disrupt the tourism and real estate industries, and burden local communities.	As discussed in section 4.8.1.8, we believe the proposed project would not have a significant impact on tourism in the project area.
CO11-90	The draft EIS fails to consider that construction activities at the proposed Bradwood LNG terminal will substantially increase traffic and decrease safety on Clifton Road.	Potential impacts on Clifton Road and NorthernStar's proposed mitigation measures to reduce impacts are discussed in section 4.8.2.7. Clifton Road is now planned to be widened to 24 feet with 2-foot shoulders on each side.
CO11-91	No consideration was taken for other disenfranchised communities, especially senior citizens and the physically disabled. What percentage of impoverished and/or minority groups would be relevant for a consideration to be made on the impact on those communities?	As discussed in sections 4.8.1.9, 4.8.2.9, and 4.8.3.9, low-income and minority populations would not be disproportionately affected by the proposed project. Executive Order 12898 does not establish a specific threshold (percentage) of minority or low income populations for assessing environmental justice impacts.
CO11-92	Was public notice and documentation of this project provided for the Hispanic, non-English speaking, population?	We did not identify a need to publish notices in Spanish, because the project area does not contain a large Hispanic population, as noted in section 4.8 of the EIS.
CO11-93	How many condemnation actions are expected on both the proposed northern pipeline and on the Palomar pipeline? What is the projected total loss in property value that the proposed pipeline right of way would	Our discussion of condemnation and potential impacts on property values is included in section 4.8.3.3. Even when eminent domain is authorized, in practice it is rarely used. For example, a large natural gas pipeline currently

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Comment Number	Comment (Summary)	Response
	cause as a result of loss of currently allowed uses along the pipeline?	under construction in the Midwest crossed the property of 1,746 landowners. Eminent domain was exercised to acquire land rights to only nine parcels. See also the response to CO11-12.
CO11-94	<p>The draft EIS fails to include discussion of the project's conflict with federal, state, and local plans, policies and controls. The following need to be addressed:</p> <ul style="list-style-type: none"> <li>• Conflicts with County land use plans.</li> <li>• Conflicts between the Bradwood pipeline and Cowlitz County laws that protect natural resources, economics, and public safety.</li> <li>• Conflicts between the Bradwood project and Oregon law and policies, such as:               <ul style="list-style-type: none"> <li>○ the Statewide Planning goal 16,</li> <li>○ the noncompliance with Oregon's implementation of the CWA's waste water permitting program under CWA section 402</li> <li>○ the conflict with Oregon's obligation to certify a project as consistent with water quality standards under CWA section 401</li> <li>○ the conflict with Oregon's duty to evaluate whether a water appropriation should be granted by the Water Resources Department</li> <li>○ the conflict with Oregon's duty to protect the public interest when leasing state land</li> </ul> </li> <li>• Conflict with federal laws:               <ul style="list-style-type: none"> <li>○ Conflict with the CWA section 404 dredge and fill permit.</li> <li>○ Conflict with the Endangered Species Act of 1973</li> </ul> </li> </ul>	<p>Our discussion of the proposed project's consistency with local plans, policies, designations, and guidelines is included in sections 4.7.2.2 and 4.7.3.2. Because Clatsop County accepted NorthernStar's zoning changes, there is no longer a conflict with Oregon State Planning Goals at the LNG terminal. With regard to Cowlitz County, Washington, see our response to comment PM4-12. As discussed in section 1.3.11, the FERC encourages cooperation between applicants and state and local authorities, and we expect the project sponsors to submit applications for necessary permits. However, this does not mean that state and local agencies, through application of state and local laws, may prohibit or unreasonably delay the construction or operations of facilities approved by the Commission. Further, state and local permits must be consistent with the conditions of any authorization the Commission may issue. There are no identified conflicts with other federal laws, such as the CWA and the ESA. The COE has responsibility for reviewing the JPA and JARPA for consistency with section 404 of the CWA. As described in section 4.6.1.1, the FERC is responsible for complying with the ESA, and submitted a BA and EFH assessment to the FWS and NMFS that we are currently revising. We have recommended a condition in section 5.2 that NorthernStar may not start construction until the FERC has completed formal consultations with the NMFS and FWS.</p>
CO11-95	Further consideration of historic sites such as the LCNHT, Hunt Lumber Mill, historic shipwrecks and site 35CO16 should be made.	We and the Oregon SHPO agree the project would have no adverse effects on the LCNHT. As explained in section 4.9.1.1, it is highly unlikely that LNG marine traffic in the waterway would have any adverse impacts on shipwrecks that are listed or qualify for listing on the NHPA. As discussed in section 4.9.4, we have not yet completed compliance with the NHPA. We have recommended a condition that NorthernStar must provide the results of additional investigations, including data about the Hunt Lumber mill and site 35CO16, for our review and approval, before construction could begin,
CO11-96	Complete section 106 of the NHPA for the entire project prior to the final EIS being published.	It is not necessary that the FERC resolve issues related to the identification of historic properties and assessment of project effects prior to the issuance of our final EIS. It is standard FERC practice to complete compliance with the NHPA after an Order is issued, but before we allow construction to begin. This is because cultural resources inventories cannot be done on lands where access was previously denied until after an Order, when the company could use the power of eminent domain to acquire its pipeline right-of-way easement. Our recommended condition in section 4.9.4 ensures that the FERC will be able to

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Comment Number	Comment (Summary)	Response
		consult with the SHPO and review and approve additional cultural resources investigations and plans that would address potential project impacts on cultural resources.
CO11-97	The draft EIS fails to assess the impacts of imported natural gas with a Wobbe index higher than the domestic natural gas historically used in Oregon.	See our response to comment PM1-22.
CO11-98	The draft EIS fails to adequately assess the emissions of air pollutants, including greenhouse gases, from the project.	Section 4.10.1 includes information on the estimated emissions generated from the construction and operation of the project. Section 4.10.1 of the final EIS has been updated to clarify key assumptions used as the basis for the emissions estimates from the project and to include emissions of GHG.
CO11-99	The draft EIS fails to adequately assess air quality impacts resulting from the emissions associated with the proposed project.	See our response to comment SA4-11.
CO11-100	The draft EIS fails to adequately evaluate possible mitigation measures to be implemented to reduce air emissions generated from the project.	Section 4.10.1 includes a discussion of the project emission sources, regulatory requirements, and proposed mitigation measures to be implemented in order to reduce air emissions and minimize impacts.  See our response to comment SA1-87 for additional information.
CO11-101	The draft EIS does not include adequate discussions of the health effects for the air pollutants that would be emitted from the proposed project.	General information related to the health and environmental impacts of the air pollutants that would be emitted by the project during construction and operation, which are regulated by the EPA, ODE, and ODEQ, are widely available to the public. Information specifically related to the proposed project impacts is included in Section 4.10.1.
CO11-102	The draft EIS fails to consider the direct, indirect, and cumulative safety impacts that the project would have related to the LNG tankers, LNG terminal facility, and pipelines that would be associated with the project.	We believe that the safety impacts of the project, including the marine waterway, LNG terminal, and pipeline, have been adequately addressed in the final EIS and the WSR (Appendix G). Reliability and safety is discussed in section 4.11. Section 4.11.5 discusses safety impacts associated with LNG tankers, section 4.11.4 discusses safety impacts of the LNG terminal, and section 4.11.9 discusses safety impacts of the associated pipeline.
CO11-103	Has it been acknowledged that LNG sources that could be used to supply the Bradwood terminal may contain contaminant gas concentrations that exceed 15 percent of the total LNG?	Natural gas is pretreated before liquefaction to remove contaminants at the export terminal before it is shipped. See our response to PM1-22 and PM6-79.
CO11-104	The draft EIS fails to describe what the potential effects of a leak caused by brittle fracture could be and what the resulting effects would be on sensitive resources including humans and onshore structures.	Section 4.11.4 includes a discussion on thermal exclusion and vapor dispersion zones for the onshore facility. Thermal exclusion zones for the onshore LNG tanks are calculated based on 49 CFR 193 and NFPA59A, 2001 edition.  Section 4.11.5.3 discusses the hazards associated with a release of LNG from an LNG carrier for varying spill sizes and also includes a discussion on cascading damage due to brittle fracture. It also identifies the zones of concern, the communities located in the zones of concern, and what the potential effects associated with a spill would be in those zones of concern

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Comment Number	Comment (Summary)	Response
CO11-105	What would the vapor cloud dispersion distance be if wind speeds were 10 mph or other higher wind speeds that would result in a greater dispersion of a vapor cloud?	For the DEGADIS model, farther downwind vapor dispersion distances are produced at lower wind speeds. Increasing the wind speed also changes the stability class and will result in a shorter dispersion distance.
CO11-106	The draft EIS assumption that the outer tank wall would effectively contain LNG lacks a reasonable basis in fact.	As discussed in section 4.11.3, the LNG storage tanks would be full containment tanks. The inner tank would be constructed of 9 percent nickel steel and the outer tank would be constructed of pre-stressed concrete. Both of those materials are designed to withstand cryogenic temperatures and are not prone to brittle fractures.
CO11-107	If an LNG vapor fire ignited on a roofless LNG storage tank, as appears to be presumed in the draft EIS, how long would such a fire burn?	The fire duration would be dependent on a number of factors, including the amount of LNG inside the tank. A full LNG storage tank has enough fuel to potentially burn for up to 2 days, which is similar in total duration compared to oil tanks.
CO11-108	There is a failure to consider or disclose the flammable nature of insulating foam on LNG tankers.	As discussed in section 4.11.5.3, fire-induced damage to foam insulation which could lead to cascading damage was evaluated in the Sandia Report and, while possible under certain conditions, is not likely to involve more than two or three cargo tanks
CO11-109	What would the effects of a cascading fire event on a LNG tanker be from perspective of impacts to humans, private property, and infrastructure on shore? What would the effects of a cascading fire be on the type of 200,000 cubic meter tanker that would be used at Bradwood? How long would a cascading fire on such a tanker likely burn and what would the resulting on-shore effects be?	Section 4.11.5.3 discusses the hazards associated with a release of LNG from an LNG carrier for varying spill sizes and also includes a discussion on cascading damage due to brittle fracture. Cascading events are not expected to increase the overall fire hazard by more than 20 to 30 percent but would increase the expected fire duration by approximately 2 to 3 times according to Sandia. The Coast Guard has limited the size of arrivals until modeling is performed on the larger carriers.
CO11-110	Failure to evaluate an Emergency Response Plan and emergency response capabilities of local emergency responders. There are currently inadequate emergency response assets available to respond a serious event involving a LNG tanker.	See our responses to comments PM1-1 and PM1-15B. NorthernStar is currently in the process of developing its ERP and filed a draft ERP for the FERC's review on March 24, 2008.
CO11-111	The draft EIS fails to consider the cost to the local communities for emergency response and increasing the capabilities of emergency responders.	See our response to comment CO11-110. As discussed and recommended in section 4.11.6, the ERP must include a Cost Sharing Plan which must be approved by the FERC before any final approval to begin construction. If the needed resources are not available and properly funded, construction and operation of the project would not be approved by the FERC.
CO11-112	Failure to consider the effect of Astoria's extensive docks structure over the Columbia River in causing a potential explosion of gas vapors.	Section 4.11.1 discusses the hazards associated with LNG and section 4.11.5.3 discusses the hazards associated with a release of LNG from an LNG carrier for varying spill sizes. It also identifies the zones of concern, the communities located in the zones of concern, and what the potential effects associated with a spill would be in those zones of concern throughout the entire waterway.

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Comment Number	Comment (Summary)	Response
		including Astoria
CO11-113	Does the proposed site-specific location of the proposed facility make it any more vulnerable to intentional terrorist attacks that could be launched from a shoreline that in many locations is just a few hundred feet from the path of LNG tankers? As a part of this analysis, please discuss the justifications for security exclusion zones on either side of LNG tankers that are typically 1,500 feet.	Terrorist attacks were examined by the Coast Guard during their review. The Coast Guard has determined that the Columbia River would be safe for LNG marine traffic under the conditions described in its WSR. Based on their review, the Coast Guard's WSR establishes a 500-yard (1,500-foot) moving safety/security zone around the LNG carriers.
CO11-114	The draft EIS fails to address the risks of the Palomar pipeline.	See our response to comment CO11-11.
CO11-115	In the event of either an accidental or intentional breach of a LNG tanker, what would be the resulting damage with respect to loss of human life, injuries to humans, damage to private structures and infrastructures, along the tanker's path?	Section 4.11.5.3 discusses the hazards associated with a release of LNG from an LNG carrier for varying spill sizes. It also identifies the zones of concern, the communities located in the zones of concern, and what the potential effects associated with a spill would be in those zones of concern throughout the entire waterway.
CO11-116	The draft EIS significantly underestimates both the thermal radiation and vapor dispersion risks associated with the proposed terminal.	Section 4.11.4 includes thermal exclusion and vapor dispersion calculations which were done in accordance with 49 CFR 193 and NFPA 59A.
CO11-117	The draft EIS modeling of the LNG terminal risks also improperly assumes that should the integrity of the onshore LNG tanks, inlet, or outlet lines be compromised, that gaseous vapors from the spilled LNG would not mix with air thus reducing the vapor dispersion distance.	See our response to comment CO11-116.
CO11-118	It is a concern that due to the high pressure un-odorized gas pipelines, with a blast zone of over 1,400 feet, hundreds of homes, businesses, farms and other sensitive facilities would be at risk.	The safety of natural gas pipelines is addressed in section 4.11.9.
CO11-119	Why would the proposed gas line not be odorized? What would be the cost of adding odor to the line? How would the unodorized gas decrease detection of gas leaks along the Williams pipeline that the proposed northern pipeline would connect to?	See our response to comment PM5-81.
CO11-120	The draft EIS fails to analyze the potential risks of onshore leaks due to chemical composition of the natural gas from the proposed project.	See our response to comment PM1-22. Pipeline safety is addressed in section 4.11.9.
CO11-121	The draft EIS failed to analyze the cumulative effects of the Bradwood dredging, taking into account the channel deepening, increased ship traffic from both the channel deepening and the LNG tankers, the increase erosion from both projects, increased wave action, dredge disposal, and geomorphic and hydraulic changes.	Section 4.12 on cumulative effects does discuss the COE channel deepening project. Based on the COE's EIS, the channel deepening project is not expected to result in increased ship traffic. Dredging for the channel deepening project in the area of the LNG terminal would be completed before construction would begin on the Bradwood project. We are continuing to study the issue of shoreline erosion and will further discuss impacts in the BA and EFH Assessment.
CO11-122	What are the direct, indirect, and cumulative effects of increased industrialization that would be encouraged by the siting of one or more LNG terminals in the Lower Columbia River? Please include impacts to	Section 4.12 on cumulative effects discusses the potential for multiple LNG import terminals located along the lower Columbia River. However, it is purely speculation that several LNG terminals would lead to any more industrial development in the region than can be related to the mills at Longview and

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# Companies and Organizations 11

Due to the length of the Columbia Riverkeeper comment letter (comment letter CO11), we have summarized the issues raised and include them in the following table along with our responses. A copy of the complete letter follows the response table.

Comment Number	Comment (Summary)	Response
	air, water, fish, wildlife, humans, traffic, noise, lights and other impacts.	Wauna or the facilities at the Port Westward Industrial Area.
CO11-123	The draft EIS fails to assess the cumulative impact of destroying critical habitat on salmon, and on the economy and ecology of the estuary and the Columbia River Basin.	Section 4.12 on cumulative effects does discuss impacts on aquatic resources, including salmon. All federally regulated projects would need to obtain permits from the COE if they impact wetlands, and would have to comply with the ESA. The COE, NMFS, and FWS would require mitigation to compensate for wetland loss, and lessen impacts on federally-listed threatened and endangered species and their critical habitats. Those mitigation measures may result in habitat improvements for salmon and the estuary.
CO11-124	The draft EIS failed to analysis the increase in development pressures on the lower Columbia River.	See our response to CO11-122.
CO11-125	The draft EIS completely fails to consider the effects that massively increasing the gas supply in Oregon, California, and Washington and the west coast generally would have on incentives for conservation, efficiency, and renewable development.	Increased efficiency and conservation is discussed in section 3.1.1.2. Renewable energy resources are discussed in section 3.1.1.3. As explained in section 1.1, bringing in new sources of natural gas by importing LNG would diversity the energy portfolio of the Pacific Northwest, meet future demands, and may work to stabilize natural gas and electric prices. It would not necessarily reduce the incentive to conserve or develop additional renewable resources. The goals mandated by Oregon's Renewable Energy Standard would not be diminished. See our response to comment CO11-18.
CO11-126	The draft EIS failed to analyze the indirect effect of LNG creating additional gas-fueled power plants, which will decrease the demand for renewable energy, thereby hindering efforts to combat global warming and hindering the economic opportunities that renewable energy has brought to the Pacific Northwest, such as investments in wind, wave, and solar energy.	As mentioned in section 1.1, even without imported LNG on the West Coast, there has been a trend for increasing use of natural gas to fuel electric power plants. This trend would continue, with or without LNG, because natural gas has less air emissions than other fossil fuels, such as oil or coal. Therefore, providing more supplies of natural gas by importing LNG may result in environmental benefits, by helping to reduce GHG and global warming in the future if new or retrofitted power plants used natural gas instead of oil or coal. As discussed in section 3.1.1.3, it is not currently possible for renewable resources to produce the level of energy equivalent to the Bradwood Landing Project. As discussed in sections 1.1 and 3.1.1 of the EIS, the denial of the LNG project may hinder economic opportunities for the Pacific Northwest. However, it is beyond the scope of the EIS to address indirect effects the Bradwood Landing Project may have on creating additional gas-fired power plants, since details are unknown, including the number or location of such speculative plants.
CO11-127	Specific findings on the potential impacts of the project on: physical substrate; water circulation, fluctuation, and salinity; turbidity; contaminants; aquatic ecosystems and organisms; disposal sites' cumulative effects on the aquatic ecosystems; and secondary effects on the aquatic ecosystems need to be provided. The draft EIS fails to assess adequately the tremendous impacts on human environment.	Section 4.12 of the EIS describes the potential cumulative impacts from the project in relation to other past, present, and future projects. The known impacts that are described individually for these various topics in the EIS are not expected to result in significant cumulative impacts. Therefore, we believe that our analysis of cumulative impacts as it relates to these topics is adequate.
CO11-128	The analysis of projects in the Lower Columbia River by CRK's Brett VandenHeuvel should be reviewed and its contents considered and discussed in the context of cumulative impacts on air quality, energy use,	Mr. VandenHeuvel's analysis is available for viewing by the public on the FERC's Internet web page at <a href="http://www.ferc.gov">www.ferc.gov</a> , through the eLibrary link, selecting "General Search," entering the docket number minus the last three digits (i.e.

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# Companies and Organizations 11

Due to the length of the Columbia Riverkeeper comment letter (comment letter CO11), we have summarized the issues raised and include them in the following table along with our responses. A copy of the complete letter follows the response table.

Comment Number	Comment (Summary)	Response
	GHG emissions and their related impacts, including human health and environmental impacts.	CP06-365) and putting in the proper date range.
CO11-129	The draft EIS fails to include a cumulative impacts analysis of the proposed Palomar Pipeline.	The Palomar Pipeline is included in our cumulative impacts analysis in section 4.12.

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Columbia Riverkeeper – Portland Office  
 917 SW Oak Street, Suite 414  
 Portland, OR 97205  
 Phone: (503) 224-3240  
 www.columbiariverkeeper.org

December 21, 2007

Kimberly D. Bose, Secretary  
 Federal Energy Regulatory Commission  
 888 First Street, N.E., Room 1A  
 Washington, DC 20426

**RE: Comments on Draft Environmental Impact Statement, Bradwood Landing Project, FERC/EIS-0214D, Docket Nos. CP06-365-000, CP06-366-000**

Ms. Bose,

We submit these comments on the Draft Environmental Impact Statement ("DEIS") Bradwood Landing Project ("Bradwood"), FERC/EIS-0214D, Docket Nos. CP06-365-000, CP06-366-000, on behalf of the following organizations: Columbia Riverkeeper, Columbia River Business Association, Rivervision, Wabkiakum Friends of the River, Landowners and Citizens for a Safe Community, Oregon Chapter Sierra Club, Willapa Hills Audubon Society, Oregon Citizens Against the Pipeline, Friends of Living Oregon Waters, Coalition, Northwest Environmental Defense Center, Willamette Riverkeeper, Rosemere Neighborhood Association, Audubon Society of Portland, Oregon Council Trout Unlimited, Native Fish Society, Citizens for a Clean Columbia Wenatchee, Columbia River Fishermen's Protective Union, Northwest Guides and Anglers, Oregon Wild, and Energy Options (collectively, "the Coalition"). The Coalition includes a broad, local and regional spectrum of business, environmental, safety, and property interests. Each organization has members who would be harmed by LNG terminal.

**FERC must circulate a new DEIS**

We request that FERC issue a supplemental DEIS for public comment because the current DEIS is wholly inadequate. The DEIS contains major factual errors, fails to address substantial changes to the project, fails to address reasonable alternatives, ignores the Palomares Pipeline as a connected action, and fails to evaluate significant economic, social, and environmental consequences. These errors cannot be correct in the final EIS. FERC's regulations require FERC to supplement the inadequate DEIS, and circulate the supplement draft for public comment. 40 C.F.R. § 1502.9(c).

**NEPA requirements**

NEPA "is our basic national charter for protection of the environment." *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1216 (9th Cir. 1998), quoting 40 C.F.R. § 1500.1(a). "NEPA was passed by Congress to protect the environment by requiring that federal agencies carefully weigh environmental considerations and consider potential alternatives to the proposed action before the government launches any major federal action." *Lands Council v.*

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*Ponell*, 395 F.3d 1019, 1026 (9th Cir. 2005). The purpose of NEPA is to ensure "that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts; it also guarantees that the relevant information will be made available to the larger [public] audience that may also play a role in both the decisionmaking process and implementation of that decision." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989).

The Council on Environmental Quality ("CEQ") has promulgated regulations that bind federal agencies implementing NEPA. *Sierra Club v. U.S. Forest Serv.*, 843 F.2d 1190, 1193 (9th Cir. 1988). "The procedures prescribed both in NEPA and the implementing regulations are to be strictly interpreted 'to the fullest extent possible' in accord with the policies embodied in the Act." *Id.* (citing *California v. Block*, 690 F.2d 753, 769 (9th Cir. 1982)).

Two primary purposes of the DEIS are: 1) to ensure that the Federal agency implementing an action undergoes a thorough and objective investigation of the likely impacts of the action to the environment, and 2) to disclose to the public and encourage public scrutiny of any action likely to affect the environment before such action is executed. 40 C.F.R. § 1500.1(b) (2006). Adequate public disclosure by the EIS requires a full and accurate disclosure of all likely environmental impacts. *Baltimore Gas and Electric Company v. NRDC*, 462 U.S. 87 (1983). In satisfying the NEPA requirements for an EIS, a Federal agency must include the purpose and need for the action, analyze direct and indirect environmental and economic impacts of the action and any reasonable alternatives to the proposed action, and evaluate the effectiveness of anticipated mitigation measures. Additionally, a consideration of the cumulative impacts of all reasonably foreseeable actions must be included for a full analysis of direct and indirect environmental and economic impacts. 42 U.S.C. § 4332.

**Full and Accurate Disclosure**

FERC has continually failed to disclose a full and accurate description of the project to the public. Bradwood has submitted contradictory information in its applications to other local, state, and federal agencies, and the inability of FERC to address these concerns in the DEIS problematic. FERC can not make a full and accurate disclosure to the public until Bradwood clarifies the true scope and goals of the project and submits consistent application materials to all permitting agencies.

The inconsistent information submitted by Bradwood at various stages of the FERC process precludes adequate participation by the public. Today, the Bradwood LNG project ("project")<sup>1</sup> proposal dramatically differs from the project evaluated in the DEIS. In addition to precluding public review in contravention of the requirements of NEPA, the inconsistent information submitted by Bradwood prevents FERC from producing a valid final EIS. The everchanging proposal and the differing impact analyses also raises questions about the veracity of the information submitted by Bradwood. Bradwood should not be allowed to submit alternate plans for the Bradwood LNG project with various local, state, and federal agencies and FERC

<sup>1</sup> As used throughout these comments, "project" includes all aspects of the LNG importation, including but not limited to ocean transport, river transport, terminal construction and operation, pipeline and construction and operation.

should abstain from further evaluation or decision making concerning the project until these uncertainties are resolved. To comply with NEPA, FERC must publish for public comments a supplemental EIS that describes the current project proposal prior to the final EIS. FERC cannot proceed to the final EIS because the project has substantially changed since the DEIS was published.

NEPA grants the public a right to review the current project, not a dramatically different project, which has changed after the publication of the DEIS. Without consistent information, the public cannot evaluate and effectively comment on the project proposed by Bradwood. Due process requires the ability to **effectively** participate, not just submit comments on a former project design. FERC also requires current information to fulfill the NEPA requirements of a thorough investigation of all the direct and indirect environmental and economic impacts likely to occur.

In addition to basing the DEIS on the inconsistent information submitted by Bradwood, FERC has failed to meet the full and accurate disclosure requirements of NEPA by not including the environmental and economic impacts of the whole project. In the DEIS, FERC must analyze the full scope of the project, including connected actions that are closely related to the project. 40 C.F.R. § 1502.4(a). In determining what actions to include in a single EIS, the CEQ regards actions as connected when they "[a]utomatically trigger other actions which may require environmental impact statements," "[c]annot or will not proceed unless other actions are taken previously or simultaneously," or "[a]re interdependent parts of a larger action and depend on the larger action for their justification." *Id.* § 1508.25(a). FERC has failed to assess the impacts of the proposed Palomar Pipeline Project ("Palomar"), which is discussed in detail below, in the Bradwood Landing DEIS, a portion of which will not proceed unless the Bradwood LNG Project is successfully completed. Because a portion of the Palomar Pipeline will not happen unless the Bradwood LNG Project is completed, FERC must include the environmental and economic impacts of that project in the DEIS.

#### Number of LNG Storage Tanks

Bradwood has presented inconsistent information in various regulatory contexts concerning the number of LNG storage tanks proposed. In applications submitted to Clatsop County, the State of Oregon, and the Army Corps of Engineers ("Corps"), Bradwood admits to pursuing a Bradwood LNG terminal designed for three storage tanks. Specifically, Bradwood states "[t]he terminal is designed for three tanks with a nominal storage capacity of 160,000 m<sup>3</sup>, for a total nominal LNG storage capacity of 480,000 m<sup>3</sup>" in application materials submitted to Clatsop County, OR.<sup>2</sup> Yet, the DEIS states that the project will have two LNG storage tanks. DEIS at ES-2; 2-20 ("LNG unloaded from the ships would be stored in two 160,000-m<sup>3</sup> storage tanks).

Bradwood is designing the facility for three storage tanks. In fact, Figure 2.1.3-1 in the DEIS clearly shows the LNG terminal is designed for a third tank. Additionally, FERC acknowledges the terminal will have a potential to deliver 1.3 bcf/d, which would likely require a

<sup>2</sup> In Bradwood Landing LLC Narrative in Support of Applications for Local Approval of the Bradwood Landing LNG Terminal and Associated Facilities at 9.

third tank. DEIS at 1-1. A third tank will substantially change the safety, environmental, and economic impacts of the project, and FERC should take this into account in evaluating the project. FERC's failure to address the third tanks is a major oversight.

A three tank design will increase the overall LNG storage capacity of the terminal from the 320,000 m<sup>3</sup> contemplated in the DEIS to an actual 480,000 m<sup>3</sup>. The increase in storage of large volumes of LNG changes the safety considerations involved with the project. Not only is there an increased chance of an accident, natural disaster, or equipment failure leading to a breaching of a tank as a result of there being one additional tank, the larger amount of flammable gas may enhance catastrophic events, changing blast radius dynamics and endangering even more people, vegetation, and wildlife in the area.

Construction of an additional tank will also add to the noise, light, and water pollution of the Bradwood LNG project, both in the short-term and the long-term. Short-term construction activities for a third tank will require more noise producing activities, increased opportunities for polluted storm water runoff in to the Columbia River, and increased light pollution for security and construction activities. In the long-term, additional SCV units will be necessary with a third LNG tank, leading to more air pollution and water pollution through discharge of low pH, chlorinated, high temperature, and toxic water into the Columbia River, endangering aquatic animals and vegetation. Furthermore, the visual aesthetics will be fundamentally changed, with three large tanks blocking views and degrading the beauty of the location to an even further extent, in addition to increased lighting for security purposes.

Another long-term aspect of an increased storage capacity of the terminal caused by a three tank design not evaluated by FERC is an increase in ship traffic. The DEIS states that 125 ships will visit the site per year with varying LNG carrying capacities, but an increase of storage capacity due to the terminal design of three tanks instead of two will require more ships. Increasing the number of ships visiting the site will have substantial impacts upon the environment, economy, and safety of the region. Increasing ship traffic to more than 125 vessels per year will cause environmental harm through increasing shoreline erosion, decreasing water quality by re-suspending sediments due to wake turbulence, and harming aquatic life through vessel strikes, ballast intakes, and other harmful ship effects such as stranding. Economic harm will also result from an increase in ship traffic because other vessels must yield to the tankers to ensure the safety zone requirements are met. This will cause considerably more disruption to commercial fishing and recreation on the lower Columbia River, wasting valuable time of commercial fishermen or driving valuable business away from recreational areas. Finally, increased LNG ship traffic will amplify the safety concerns of the project. More ships will enhance the chances of a catastrophic accident or event by increasing the likelihood for vessel collisions, underwater obstacle strikes, terrorist attacks, equipment failure, and various other dangers.

FERC must assess these environmental, economic, and safety issues pertaining to a three tank design in the EIS. According to materials submitted with other applications, Bradwood is in fact actively seeking to build a facility designed for three tanks and an output of 1.5 billion cubic feet per day ("bcfd"). Although FERC acknowledges Bradwood may seek to expand the facilities in the future, and notes that any such expansion would require further applications and a

supplemental EIS for approval, FERC should address a possible third tank now because Bradwood has made clear that it intends to construct the third tanks and has, in fact, submitted regulatory applications that contain the third tank.

At the least, FERC should require Bradwood to clarify its goal and objectives for the project and suspend further consideration until confusion over the discrepancies is dispelled. Even if Bradwood does not plan to install a third tank in the initial phase of construction, FERC should still address the third tank in its cumulative effects analysis in the EIS because it is reasonably foreseeable that Bradwood will install a third tank given the design and their actions of submitting application materials describing a third tank. Furthermore, the mitigation plan on file for the Bradwood LNG project is insufficient to support the current project as described by FERC, not to mention a three tank design and increased ship traffic. Bradwood should be required by FERC to submit an updated and detailed mitigation plan to account for the full scope of the project so that it may be evaluated properly in the EIS.

#### Size of the Ships

Not only are there discrepancies regarding the number of tanks to be used in the Bradwood LNG project, but application materials submitted by Bradwood and the information used in the DEIS also disagree about the size of the LNG ships that will transport LNG to the proposed Bradwood terminal. The DEIS at 2-3 states that ships ranging in size from 100,000 to 200,000 m<sup>3</sup> will transport LNG to the terminal. Contrary to the DEIS, application materials submitted to Clatsop County, State of Oregon, and the Army Corp of Engineers suggest a ship size up to 220,000 m<sup>3</sup>. For instance, application materials submitted to Clatsop county state that "[i]n order to accommodate the full range of LNG carriers that will serve the terminal, the berth and a contiguous turning basin are designed for LNG carriers with a capacity ranging from 100,000 to 220,000 cubic meters (m<sup>3</sup>)."<sup>3</sup> Therefore, contrary to the assumed ship sizes evaluated in the DEIS, Bradwood is seeking to design the facility for the use of ships up to 220,000 m<sup>3</sup>.

A number of impacts that the DEIS failed to address will occur as a result of the use of larger ships. Larger ships will increase wake and draft disturbance, erosion impacts, the likelihood of vessel strikes and collisions, likelihood of shoaling, and the amount of water withdrawn from the river to fill ballast tanks. Safety issues also arise because an extra 20,000 m<sup>3</sup> of LNG would increase the blast radius if a catastrophic event occurred. Additionally, the Bradwood LNG terminal is being designed based on receiving these larger ships. Could the berth design and dredging activities be scaled back to help mitigate the impacts of the project on the environment if smaller ships only ranging up to 200,000 m<sup>3</sup> are used? A berth design and larger turning basin for larger ships are unnecessary unless Bradwood does in fact intend to receive the larger ships at the terminal. If smaller ships than 220,000 m<sup>3</sup> are used, will more ship traffic be necessary to meet the needs of the terminal? FERC must address these issues in the DEIS. The DEIS should evaluate the environmental and economic impacts of using ships up to 220,000 m<sup>3</sup> in size because Bradwood is actively seeking a berth and turning basin design for these larger ships based on application materials submitted to other local, state, and federal agencies. Furthermore, FERC should evaluate the impacts of increased maintenance dredging in

<sup>3</sup> In Bradwood Landing LLC Narrative in Support of Applications for Local Approval of the Bradwood Landing LNG Terminal and Associated Facilities at 6.

the DEIS, because larger ships will require more maintenance dredging to avoid shoaling or striking underwater obstacles.

#### Pipeline Projects

The DEIS fails to take into account the Palomar Gas Transmission Project ("Palomar") pipeline, which is dependent upon the completion of Bradwood and, therefore, FERC fails to analyze and disclose the full scope of the Bradwood project. NEPA requires that actions "which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement." 40 C.F.R. 1502.4(a). An EIS is required to consider actions that are "interdependent parts of a larger action and depend on the larger action for their justification." *Id.* § 1508.25(a)(1). The test the Ninth Circuit has used to determine if an action is interdependent with a proposed agency action is the "but for" causation test. *Sierra Club v. Marsh*, 816 F.2d 1376, 1387 (9<sup>th</sup> Cir. 1987). Under this test, an action is interdependent upon the proposed agency action if but for the proposed action the other action would not occur. *Id.*

Palomar is a joint venture of NW Natural and TransCanada and is designed to diversify the natural gas market in the Western United States. The proposed Palomar Project is a project interdependent upon the Bradwood LNG Project. Although the Palomar claims that the eastern portion of the Palomar Project may proceed regardless of whether the Bradwood LNG Project is completed, the western half of the proposed Palomar Project would not occur but for the Bradwood LNG Project. In fact, Greg Kantor, president and chief operating officer for NW Natural, has stated that the Palomar "project is being designed so that, if an LNG terminal is constructed on the Columbia River, the Palomar pipeline can be extended to serve it." This illustrates that the Palomar project is dependent upon the building of an LNG terminal such as the proposed Bradwood terminal on the Columbia River. Furthermore, Bradwood and FERC have not demonstrated a market in Oregon and the Pacific Northwest for another 1.3-1.5 bcf/d of natural gas.

Bradwood will likely need the Palomar Project for the Bradwood to be economically viable since the Palomar Project will allow Bradwood to tap into other markets in the Western United States. Therefore, the Palomar Project is an interdependent action with the proposed Bradwood Project. The Palomar Project is also a reasonably foreseeable action, not an action that is purely speculative. In fact, as of October 29, 2007, the Palomar pipeline has been deemed sufficiently foreseeable that FERC has issued a notice of intent to produce an EIS for the project.

Given that NW Natural is Bradwood's agent for building the pipeline for the Bradwood LNG Project, it is likely that NW Natural and Bradwood had planned from the beginning of designing the Bradwood Project for a connection to the Palomar Project. The fact that FERC is allowing Bradwood and NW Natural to stagger the two projects as if they are not interdependent is unacceptable. It is true that there have been plans for years to build the Palomar pipeline segment leading from TransCanada's GTN pipeline system to somewhere south of Molalla in Clackamas County. However, it is also true that the second segment of the proposed Palomar Project was not designed until recently, specifically after Bradwood designed the Bradwood LNG Project. How could there have been plans for the western segment of the Palomar Project before the Bradwood Project when there was no Bradwood LNG terminal to which a connection

could be made? Bradwood and NW Natural should not be allowed to separate a pipeline project clearly connected with the Bradwood Project into another project just to avoid the analysis of additional environmental impacts for the Bradwood Project in this EIS.

Because the Palomar Project is connected to and dependent upon the completion of the Bradwood LNG terminal, FERC should analyze the environmental and economic impacts of the segment of the Palomar Project leading to the proposed Bradwood LNG terminal in this DEIS. The pipeline segment at issue is proposed to be 102.5 miles long leading from the Molalla Lateral interconnect to the Bradwood Landing pipeline. This proposed 102.5 mile long 36-inch natural gas pipeline fundamentally changes the scope of the project. The pipeline will cross miles of wetlands and sensitive habitats, not to mention crossing private property and disrupting landowner's uses of their own properties. Many landowners will lose the right to use their lands for economic benefit because of the easements associated with the proposed Palomar Pipeline. Construction of the pipeline will lead to large amounts of timber harvesting through forested areas, destroying bird nesting areas and causing fragmentation of critical habitats for a variety of species. Many threatened or endangered plant species are also located in the area and construction activities will destroy many of these plants. Additionally, construction through wetlands will cause pollution to the streams through increased sedimentation, temperature increases, and introduction of pollutants such as gasoline and oil. Many of these streams are considered critical habitat for a variety of fish and construction activities would put these fish at greater jeopardy.

Noise, air, and light pollution will also result from construction activities, operation, and maintenance of the Palomar pipeline, further exacerbating the already substantial environmental impact of the Bradwood LNG Project. FERC should take all these factors associated with the Palomar Pipeline under consideration in the DEIS and not allow a project clearly associated with the Bradwood LNG Project to be staggered for analysis in a different EIS. The environmental impacts of the Bradwood LNG Project must be considered as a whole, which includes assessment of at least the western segment of the Palomar pipeline leading to the proposed Bradwood LNG terminal. Any omission of the impacts of the Palomar pipeline would be a failure on the part of FERC to fully and accurately disclose the full scope of the Bradwood LNG Project.

Due to the DEIS's failure to adequately explain the currently proposed project and failure to adequately assess obvious impacts and connected actions (e.g. Palomar Pipeline, tanker characteristics), FERC must prepare and circulate a revised draft. 40 C.F.R. § 1502.9(a). In addition, FERC "shall prepare supplements to either the draft or final [EIS] if: (i) the agency makes substantial changes in the proposed action that are relevant to environmental concerns; or (ii) there are significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts." 40 C.F.R. § 1502.9(c). These comments provide multiple examples of changes in the proposal and significant new information that requires FERC to supplement the DEIS.

**FERC does not provide an adequate analysis of alternatives**

### Overview of Alternatives Analysis

A critical component of the FERC's EIS process is its alternatives analysis. NEPA mandates that an agency "shall to the fullest extent possible: Use the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment." 40 C.F.R. §1500.2(e). The agency must also: "Study, develop, and describe appropriate alternatives to the recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses available resources as provided by section 102(2)(E) of ... 40 C.F.R. §1501.2(c)."

In order to issue the permit, the FERC has the burden of demonstrating that reasonable alternatives—including alternative sites—have been considered thoroughly. This section will demonstrate that FERC's alternative analysis does not even come close to evaluating a reasonable range of alternatives. In fact, there are multiple alternatives to satisfy the basic project purpose without disturbing special aquatic sites.

The purpose of Bradwood is to provide natural gas to the western markets. As such, there are a myriad of alternatives to accomplish this purpose. The primary flaw with FERC's alternatives arguments is that FERC claims the terminal must be in the Columbia River to serve customers in Oregon and Washington. The true destination of the vast majority of this gas is California. Therefore, the Columbia River location is not necessary. This opens up multiple reasonable alternatives, including siting an LNG terminal in California closer to the end users. In addition, energy conservation and efficiency is a preferable practicable alternative that FERC dismisses without justification. Offshore LNG terminals are also practicable alternatives. Furthermore, multiple design changes at the Bradwood site itself offers less harmful practicable alternatives.

The FERC does not provide sufficient reasoning or detail to justify its dismissal of many design and project alternatives that could have a less adverse impact on the aquatic ecosystem. In particular, there is little consideration of the relative costs, technologies, and logistics in the alternatives disregarded by the EIS. Many alternatives exist in the Western energy market that could provide cleaner, safer, more affordable energy without the enormous negative impact to the Lower Columbia River. Bradwood has not met its burden of overcoming the presumption that practicable alternatives exist.

The FERC also mischaracterizes the overall project purposes. The scale of the project alone clearly indicates that the proposed terminal will serve a West Coast-wide energy market. Bradwood's likely connection to the proposed Palomar pipeline, which connects Bradwood to the California market, indicates that the purpose of the project is to serve a region-wide demand, including California. Bradwood attempts to obfuscate this broader project purpose in order to avoid discussion of the most obvious alternative – siting the project in closer proximity to its target market in California.

There is no proven "need" for the project in the Pacific Northwest. The alternatives analysis rests, in part, on the assumption that LNG is a vital resource for the future of the Pacific NW. Yet, the analysis provides no impartial information showing need in the Pacific NW that matches the enormous scale of the Bradwood proposal. This overarching problem renders the

alternatives analysis highly suspect, and any range of alternatives must be evaluated in a West Coast-wide context, and one that fully acknowledges the potential of the proposed Palomar pipeline to connect the Bradwood Project to regional markets.

The FERC has failed to undertake an adequate analysis of alternatives because of an unreasonably narrow definition of the purpose and need of the project which FERC then uses to dismiss reasonable alternatives. The DEIS states, "The purpose of the Bradwood Landing Project is to provide a new source of natural gas to the Pacific Northwest through importation of LNG" (DEIS, 1-3). The purpose of the project should be more broadly stated in terms of supplying the region with natural gas, an analysis for which FERC would include detailed consideration of non-LNG alternatives.

FERC further describes key objectives as supplying industrial and generation facilities in the Lower Columbia, supplying Mist directly with natural gas, and providing gas supply to the Pacific NW region via its interconnect with Williams NW pipeline (DEIS, 1-3). FERC presumes that failure to meet these objectives through importation of LNG will result in the objectives not being met, that no North American gas alternatives can fill these needs through existing infrastructure. However, these primary project objectives do not require a project of the size and scope of the Bradwood LNG terminal, and multiple pipelines already supply these gas users from existing infrastructure and supplies. The main proposed conduit of this gas to the Pacific NW market, the Williams NW pipeline system, cannot currently accommodate the huge quantities of gas that Bradwood seeks to import.

Industrial users and electricity generation in the Lower Columbia, by Bradwood's own estimates, are only likely to use 100 mme/d on an average day<sup>4</sup>. ODOE questions even this assumption, noting that operators of natural gas plants in the area are not planning to absorb LNG, currently.<sup>5</sup> Williams pipeline company has indicated that it does not have capacity to absorb all of Bradwood's gas, and that Bradwood will likely have to rely on the Bradwood pipeline in the future.

FERC does not justify the enormous size and impact of its project, and thus does not demonstrate that more moderate developments (gas storage, conservation, efficiency measures) are not practicable alternatives to meet the modest growth in Pacific NW gas demand. Oregon Department of Energy ("ODOE") recently commented, in its draft comments on the FERC DEIS, "The DEIS provides no independent assessment of the demand for LNG to justify the need for the proposed project."<sup>6</sup> ODOE's comment highlights widespread skepticism about FERC's characterization of the purpose and need for its project.

Furthermore, FERC relies heavily on data from the Northwest Gas Association ("NWGA"). The NWGA's members include NW Natural gas, a partner and likely future owner of the Bradwood pipeline and proponent of the connected Palomar project. The NWGA data cannot be considered unbiased, as preliminary comments on the DEIS of the Oregon Department of Energy have noted: "The [demand] analysis is based entirely on NWGA forecasts. No

<sup>4</sup> Joint Aquatic Resources Permit Application, Attachment H, October 2006.

<sup>5</sup> ODOE, Dec. 2007. Preliminary State Agency DEIS comments, at 64.

<sup>6</sup> Id.

independent assessment of demand. No consideration of demand side reductions."<sup>7</sup> Other State agencies have raised similar concerns with the FERC DEIS – a document whose alternatives analysis is more extensive than the Alternatives analysis in the Army Corps application but is still deficient.

NOAA has also added its own reservations about the purpose and need of the project, raising the following questions regarding whether the alternatives analysis is artificially constrained in order to justify a high-impact project: "As the stated objective is providing the Pacific Northwest with another natural gas source, it would appear additional data from the region is warranted."<sup>8</sup> Given broad skepticism about the need for the proposal, the no action alternative may result in the natural gas needs of the Pacific Northwest and California being met and should constitute a practicable alternative. FERC gives very little consideration to the potential for no action.

While the project configuration and pipeline routing are purportedly designed to match the needs of Lower Columbia industrial and electricity generation users, some of those users do not appear to be planning for LNG. For example, comments of ODOE indicate that Port Westward is not factoring LNG into its gas supply needs. PGE, which owns generating facilities there, is not necessarily going to buy large quantities of LNG:

Delivery of gas to the PGE power plants at Port Westward is not a compelling reason to select the preferred pipeline route over alternatives. In the Oregon EFSC review of the Port Westward power plant, PGE did not assume that LNG would be available. PGE also did not assume the availability of LNG in its integrated resource plan review before the Oregon Public Utility Commission.<sup>9</sup>

The Bradwood project is clearly designed to meet its expectation of West Coast-wide energy demands – not those of the Pacific Northwest. FERC's assertion that key project objectives involve delivery of gas to Mist and Columbia River industrial/generation users is severely undermined by the fact that less than 1/10 of the project would currently be likely to go to these users.<sup>10</sup> The quantity of gas proposed for import by Bradwood (1.3 bcf/d) more than doubles Oregon's average daily natural gas use.<sup>11</sup>

The enormous size of the project shows that a major economic driver for the project is California gas demand, rather than Oregon's or Washington's. California consumes as much gas as the rest of the West combined<sup>12</sup> (see below) and will likely receive most of Bradwood's gas, based on the recently proposed Palomar pipeline proposal (see attached maps). The Bradwood project not only seeks a connection to California's market via Palomar, but it also likely requires

<sup>7</sup> ODOE, Dec. 2007. Preliminary State Agency DEIS comments, at 62.

<sup>8</sup> NOAA comments on FERC DEIS, December 17, 2007.

<sup>9</sup> ODOE, Dec. 2007. Preliminary State Agency DEIS comments, at 64.

<sup>10</sup> Bradwood Landing 404 Application Attachment H, October 2006.

<sup>11</sup> Energy Information Administration, Natural Gas Summary Statistics, Oregon 2001-2006.

<sup>12</sup> EIA Natural Gas Use Summary Data, Dec. 2005. <http://eia.gov>. Quote from Loretta Lynch, former Chair of CA PUC under Gray Davis during Portland lecture on March 4 2007.

additional pipeline capacity aside from the proposed Bradwood pipeline through Cowlitz County due to the capacity limitations on that pipeline (ICF International study for WA EFSEC).<sup>13</sup>



It is simply not credible for FERC to claim that its project will serve the Pacific NW alone. The Daily Astorian's interview with a Williams Pipeline representative demonstrates that the Williams Northwest Pipeline, which FERC claims will transport the majority of its gas, does not have room for Bradwood's gas. Williams recognized that the Palomar pipeline, which would take gas to California, is necessary for Bradwood.

Williams Northwest Pipeline spokeswoman Michele Swaner said her company doesn't have room for all the gas Bradwood plans to import to its Bradwood facility. 'It does make sense that they signed up on Palomar,' she said. 'Physically, we're capable of receiving it, but it would take the place ... of all the other gas supplies flowing in that system both north and south. We have long-term agreements in place. ... We're unlikely to disrupt the relationship we already have with our customers right now.' Even with the projected declines in supply from Canada and the Rocky Mountains, she said, there's not enough demand for gas in Oregon and Washington to absorb the full volume from Bradwood. But she said there is demand for that volume in California.<sup>14</sup>

<sup>13</sup> ICF International. Nov. 2007.

<sup>14</sup> "Who Knows Where the Gas Will Go?" Cassandra Proffitt. *The Daily Astorian*. Nov 27, 2007.

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Exhibit 2.1: Major Pipelines in the Pacific Northwest



Bradwood admits that it plans to use the proposed Palomar pipeline to deliver significant quantities of gas to potential customers in California, according to its S-1 filing submitted to the Securities and Exchange Commission.

In addition to the Bradwood Pipeline application, we have recently submitted a request for service to TransCanada and NW Natural for their open season under which they would construct, own and operate a pipeline that would connect the Bradwood terminal to Williams' Northwest pipeline at Molalla and TransCanada's GTN Pipeline near Madras. This will provide Bradwood and/or other shippers with gas transportation service from the LNG terminal to the pipeline systems of both the Northwest Pipeline Company and TransCanada's GTN Pipeline, **which**

can deliver approximately 2.0 Bcf/d into Northern California at the Malin, Oregon interconnect point.<sup>15</sup>

Bradwood's SEC filing also touts Bradwood Landing's "convenient access" to the large "Northern and Southern California" gas markets in addition to referencing the smaller Northwest markets (SEC S-1 filing at 2). The SEC filing, submitted to investors, tells a completely different story than the 404 application or the DEIS, submitted to regulators. The SEC filing demonstrates that Bradwood's true intention is to serve California markets. Bradwood's attempt to hide this fact in its FERC application and the failure of the DEIS to consider Bradwood's California connection via Palomar severely undermines FERC's alternative analysis. Based on the true project purpose of serving gas to California, as admitted by Bradwood, the FERC should require Bradwood to submit a new alternative analysis to sufficiently assess the reasonable alternatives of this purpose. The FERC has the burden of assessing all reasonable alternatives. CEQ regulations state, at 40 CFR 1502.14: "(Alternatives shall) rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." Bradwood's likely use of the Palomar project – a pipeline that will likely send out the majority of Bradwood's gas on an average day in the West Coast energy market – should prompt FERC to assess West Coast-wide energy alternatives to LNG. The DEIS does not undertake a suitable analysis for this purpose.

Bradwood should be considered amidst a wide range of alternatives in the West Coast energy market – including conservation, efficiency, renewable energy, North American natural gas, and other LNG sites. All of these alternatives have potentially less severe impacts to the sensitive aquatic ecosystems in which they might occur. The unprecedented and severe impacts of the LNG proposal at Bradwood pose a huge risk to the aquatic environment, and the alternatives analysis is cursory and omits consideration of key alternatives. The FERC dismisses many of these alternatives based on the false assumption that they will not fulfill key project objectives that focus on Oregon and Washington.

The WA State Pipeline Capacity study, however, concludes that no LNG terminal will be viable in the Pacific NW without a pipeline connection to California:

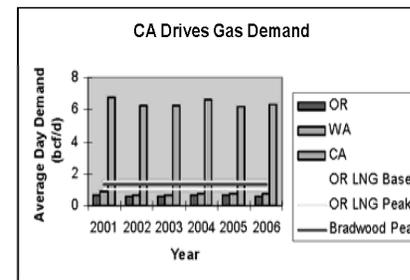
Local load in the Pacific Northwest is too variable and not large enough to be economic for a LNG terminal. To site a terminal at a size that would be economic, at least 1 Bcf per day to start with, **access to Northern Californian markets would be necessary.**" (emphasis added).<sup>16</sup>

As noted in the pipeline capacity study (see figure above) and in the recent Daily Astorian article, the Williams pipeline is not capable of accommodating Bradwood's supply without vacating all of its current contracts for gas – a highly unlikely scenario. The pipeline currently operates near capacity, and long-term supply contracts render the current proposed

<sup>15</sup> Bradwood 12/15/06 S-1 Registration filing with SEC, page 54 (emphasis added)

<sup>16</sup> ICF International. Nov. 2007. Review of Pipeline Utility Corridor Capacity and Distribution for Petroleum Fuels, Natural Gas, and Biofuels in SW Washington. Submitted to WA State EFSEC. at 69.

action potentially not viable. The alternatives analysis clearly should not have assumed that space will be available in the Williams system to absorb up to 1.3 bcf/d from Bradwood. Bradwood admits in its SEC filings that it seeks to use the Palomar pipeline to access California's gas market – and the use of the Palomar pipeline may be necessary for the project to even operate near capacity. Clearly, the Bradwood project must be considered in light of numerous alternatives throughout the West Coast due to Bradwood's stated intention of serving California and other West Coast markets in addition to the Pacific Northwest. The high unlikelihood of Bradwood's project operating as described (largely serving Williams NW pipeline) undermines the credibility of the current alternatives analysis, and certainly does not overcome the presumption that alternatives are available.



(Source: EIA. State Natural Gas Summary Data, 2006.)

Ultimately, the FERC must evaluate whether there are preferable alternatives to the Bradwood proposal in areas located closer to the largest target California market. The DEIS critiques potential LNG terminal locations south of the Columbia River for the length of their pipelines, saying that long pipelines render other LNG sites in the Pacific NW not practicable. FERC argues that Bradwood's proposed 36-mile pipeline is the least harmful. However, given the agreement between Palomar and Bradwood to deliver gas to the California energy market via a new 220-mile pipeline that cuts a swath across Oregon rivers, forests, and farms, FERC should acknowledge and evaluate potential alternatives that do not require extensive harm to resources in the Columbia River and all across Western Oregon. As FERC has repeatedly noted, the West Coast natural gas grid is interconnected, and FERC should evaluate whether alternatives to LNG, and whether other LNG sites, might accommodate future demands on the Western natural gas grid.

The Palomar Gas Transmission project (PGT) has also indicated in its own statements that the projects are intimately connected. Recent articles and statements in the FERC scoping hearings for the Palomar project indicate that the Western segment of the pipeline (or at least a significant portion of it) would only be constructed if the Bradwood project is approved. According to Chief Operating officer Gregg Kantor of NW Natural in a recent McMinnville News-Register article, "This project is being designed so that, if an LNG terminal is constructed

on the Columbia River, the Palomar pipeline can be extended to serve it.<sup>17</sup> Mr. Sipes, representative of FERC, also indicated that the two projects were closely related during scoping hearings for the Palomar project. The FERC is asserting that the projects are “stand-alone”, yet Mr. Sipes and Palomar project representatives have plainly stated that all or a portion of the Western segment of the Palomar project depend on the approval of the Bradwood project.<sup>18</sup>

In addition, the FERC defines its project purpose too narrowly, and its alternatives evaluation incorrectly presumes that it is necessary to increase gas supply only through importing LNG, and ultimately only by importing gas into the Columbia River. If the purpose is properly defined as delivering clean, affordable energy into the West Coast market, many other alternatives are available – some of which, including continued or increased reliance on Rockies gas could fulfill all the project purposes. FERC persistently excludes many alternatives from detailed analysis because “of their distance to the target market to be served”, yet the primary target market for Bradwood’s gas is clearly California. Oregon PUC analyst, Ken Zimmerman, stated, “So far, the only people that have shown any interest in contracting with these LNG guys are in California.”<sup>19</sup> Bradwood also acknowledged publicly in recent Clatsop County land use hearings that it already has an agreement to use the Palomar pipeline in the future – an agreement that has been described in Bradwood’s S-1 filing with the Securities and Exchange Commission in December 2006.

**FERC does not adequately evaluate alternatives in conservation, efficiency, and renewable energy throughout the West Coast**

The Bradwood analysis also fails to accurately assess non-LNG alternatives, such as conservation, efficiency, and renewable energy. In fact, the FERC alternatives analysis fails to acknowledge renewable energy and greenhouse gas emission laws that have recently been passed in Oregon, Washington, and California. These laws require a greater percentage of electricity generation to come from renewable sources, and the FERC alternatives analysis rests heavily on NWGA’s assumption that gas-fired generation will drastically increase. Because LNG is 25 percent more polluting than domestic natural gas in its lifecycle greenhouse gas emissions, FERC cannot assume that LNG has a place in an increasingly carbon-limited energy market.<sup>20</sup>

Because avoiding the construction of the Bradwood LNG terminal, Bradwood pipeline, and Palomar pipeline would prevent severe damage to the aquatic ecosystem of the Lower Columbia, FERC should give more serious consideration to the impact of increasing reliance on renewable energy on the future of natural gas-fired electricity. The NW Power and Conservation

<sup>17</sup> “Stage is Set For Big Pipeline Race.” David Bates. *McMinnville News-Register*. Aug. 7, 2007.  
<sup>18</sup> Transcripts of FERC scoping hearings for Palomar Gas Transmission Project. Statements made by Mr. Doug Sipes during meetings on Nov. 12 and 13 in Maupin and Molalla, Oregon, respectively.  
<sup>19</sup> “Pipeline Battle Hinges on Need, Livability.” Ted Sickinger. *The Oregonian*. August 21, 2007. Ken Zimmerman quoted as energy analyst for the Oregon Public Utilities Commission.  
<sup>20</sup> Jaramillo et al. 2007. Comparative Life-Cycle Air Emissions of Coal, Domestic Natural Gas, LNG, and SNG for Electricity Generation. *Environ. Sci. Technol.*, 41 (17), 6290-6296.  
 see also Supporting Calculations document and application of Jaramillo study assumptions to a West Coast LNG facility in Powers 2007 study entitled *Smart Energy 2020*.  
 Also see Heede, Richard. May 2006. LNG Supply Chain Greenhouse Gas Emissions for Cabrillo Deepwater Port: Natural Gas From Australia to California. <http://www.ednet.org/ProgramsPages/LNGrptplusMay06.pdf>

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Council concluded that wind power, conservation and efficiency are capable of meeting load growth and that existing natural gas supplies.<sup>21</sup> Wind power, alone, has the potential to bring online and additional 5000 MW of generating capacity West of the Continental divide, according to NWPCC’s report.<sup>22</sup> The FERC does not fully evaluate the severe environmental and economic costs of Bradwood’s project, and does not attempt to weigh the No Action alternative with readily available alternatives described in the Fifth Power Plan and elsewhere as required under NEPA. NEPA requires that reasonable alternatives be weighed in a logical manner with clear, reasoned criteria used to compare the different alternatives.

Oregon’s Department of Environmental Quality (DEQ) questions whether the impacts involved with Bradwood are necessary and without alternatives in renewable energy and conservation: “Decades of maintaining LNG facilities in Oregon to supply natural gas to California might not be justified, especially given Oregon’s policy to reduce reliance on non-renewable energy sources and the West Coast Governors’ goal to explore new renewable energy options on the coasts.”<sup>23</sup> Oregon’s Department of Land, Conservation and Development agrees: “There should be a rigorous analysis of alternatives and more consideration of conservation and renewable energy.”<sup>24</sup>

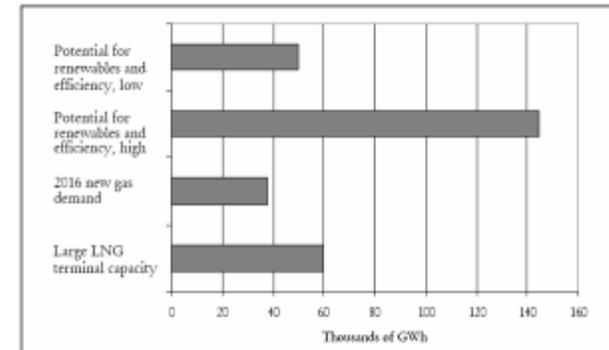


Figure 1. Energy Efficiency and Renewable Energy Potential vs. Natural Gas Demand

The Community Environmental Council in California has concluded that the need future LNG imports can be precluded economically by even a low estimate of energy efficiency

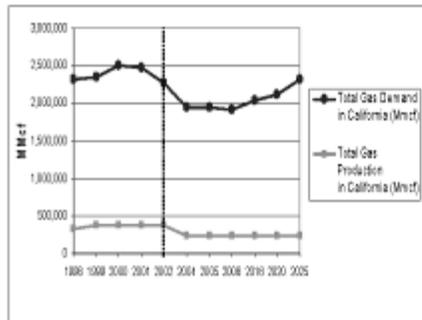
<sup>21</sup> NW Power and Conservation Council. Fifth Power Plan. 2006. see Chapter 5, Generating Resources.  
<sup>22</sup> *Id.*, at 5-24.  
<sup>23</sup> Preliminary Comments of DEQ, Oregon State Agencies on DEIS. Nov. 2007. at 9.  
<sup>24</sup> Preliminary Comments of DLCD, Oregon State Agencies on DEIS. Nov. 2007. at 21.

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potential (see above)<sup>25</sup>. Oregon Department of Energy has similarly expressed skepticism about the real need for the Bradwood LNG terminal, citing new renewable portfolio standards in the State of Oregon as a factor that could reduce demand for fossil fuel-powered electricity. Commenting on the DEIS, which was issued after the passage of the 2007 Renewable Portfolio Standard (25 percent by 2025), ODOE noted the following information gap in FERC's need analysis: "The Analysis does not consider the impact of Renewable Portfolio Standards (RPS) adopted by the 2007 legislature."<sup>26</sup>

The Oregon Public Utilities Commission has identified energy efficiency and conservation as major goals for evaluating future energy policy. Additionally, the California Energy Commission has concluded that gas demand in California is not likely to reach 2000 demand levels for the foreseeable future (see graph below).<sup>27</sup> The NWGA presents, in its base case, that Oregon will not reach 2001 usage levels until 2011. Because the Bradwood project is intimately linked with California gas demand, and Oregon is actively moving towards more limited use of fossil fuels, conservation and efficiency are practicable alternatives that have less adverse impact and should be evaluated throughout the West Coast.

In the NW region, the Fifth Power plan concludes that supplies are available to meet gas-fired generation supplies for the foreseeable future. The remainder of future load growth can reasonably be addressed through conservation, efficiency, and renewable energy. Indeed, the passage of a law requiring 25 percent renewable generation by 2025 in Oregon may preclude utilities ability to greatly expand their proportional use of natural gas, limiting the growth in the fossil fuel electricity generation sector.



Source: California Energy Commission, Dave Maul

<sup>25</sup> Hart et al. 2006. *Does California Need LNG?* Community Environmental Council.

<sup>26</sup> Preliminary Comments of ODOE, Oregon State Agencies on DEIS. Nov. 2007. at 62.

<sup>27</sup> Source: California Energy Commission, Dave Maul. Taken from "The Case Against LNG" presentation given by former CA PUC Chair Loretta Lynch in Portland, March 2007.

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FERC offers this cursory conclusion in its alternatives analysis, "It is also conceivable that increasing energy efficiency and use of renewable sources of energy could reduce the projected future demand for natural gas" (DEIS, at 3-7). As noted above, projected future natural gas demand is not necessarily as robust as NWGA indicates, and ODOE and others have identified a lack of independent analysis of the need for natural gas. The DEIS does not provide analysis to evaluate the likelihood of natural gas demand being limited by conservation, efficiency, and renewables. A report produced by the American Council for an Energy Efficient Economy indicates that, by 2010, Oregon can limit its natural gas use by 5 percent, compared to base case assumptions. Looking ahead, natural gas demand could be limited by 8 percent by 2015 and 12 percent by 2020.<sup>28</sup>

These potential reductions in projected growth could severely undermine the projected 8 percent growth suggested by the NWGA by 2011. The FERC should evaluate independent estimates of future need rather than simply regurgitating information put forward by project proponents. Particularly when NWGA information appears to be contradicted by other projections, the FERC has a responsibility to look at a reasonable range of information. FERC even cites the NWGA's estimate that gas shortfalls might occur by the winter of 2006-2007 (DEIS, 1-4). This scenario did not occur, and the NWGA continues to paint a dire gas supply scenario to justify the Bradwood project.

The FERC does not offer supporting information to dismiss the potential for alternatives to limit growth in natural gas demand, yet the DEIS concludes, "neither conservation measures nor renewable energy sources are expected to replace the need for additional future natural gas supplies in the Pacific Northwest" (DEIS, at 3-7). FERC's confidence that increasing gas demand will necessitate LNG import in the Northwest is clearly not shared by Oregon Department of Energy. It also falsely concludes that independent regional energy forecasts conclude that increasing gas supply and gas-fired generation are necessary for meeting future demand. The NW Power and Conservation Council clearly indicate that wind power is a growing and viable alternative for meeting growth in generation capacity.<sup>29</sup> As alternatives to fossil fuels increase in renewable energy, energy efficiency, and conservation, natural gas prices may be relieved of some of the strain and vulnerability to speculation and manipulation that has driven recent high natural gas prices.<sup>30</sup> As Oregon State agencies have suggested, FERC must evaluate a reasonable range of alternatives including alternatives to LNG such as renewable energy, conservation, and efficiency.

ODOE addresses FERC's estimate of future wind energy directly in its comments on the FERC DEIS. The alternatives analysis aggrandizes the need for natural gas-fired generation by diminishing the current and future capacity of Washington and Oregon to generate wind-powered electricity. ODOE comments, "The DEIS understates wind capacity, operational and under construction, in Oregon and does not mention Washington at all. The DEIS cites the 2005 ODOE biennial energy plan and states that Oregon has a total capacity of 259 MW wind, with

<sup>28</sup> Elliot, R. Neil and Anna Shipley. April 2005. *Impacts of Energy Efficiency And Renewable Energy on Natural Gas Markets.*

<sup>29</sup> NW Power and Conservation Council. 2005. *Fifth Power Plan.*

<sup>30</sup> Elliot, R. Neil and Anna Shipley. April 2005. *Impacts of Energy Efficiency And Renewable Energy on Natural Gas Markets.* American Council for an Energy Efficient Economy.

other projects planned for a total of 400 MW.” ODOE concludes that the FERC’s alternatives analysis “does not use current data for operating and planned wind generation. Information compiled by ODOE’s Renewables division suggests over 500 MW of operating renewable generation, and over 3000 MW either under construction or in various stages of permitting. This does not even include Washington.”<sup>21</sup>

Reference is made to the discussion of wind power as an alternative energy source found on page 3-5 and 3-6 of the DEIS.<sup>22</sup> While it is acknowledged that wind power represents only a portion of the total Pacific Northwest energy portfolio, and requires load shunting from other sources of energy, the dismissive presentation of wind power in the DEIS is a) incorrect, b) is predicated on outdated information from seemingly a single source, and c) does not address the Pacific Northwest as a whole. A far more balanced picture is found in more contemporary information from the intergovernmental Northwest Power and Conservation Council [NWPPCC]. Noted in the Northwest Power and Conservation Council document “*The Role of Renewable Sources in the Fifth Power Plan*” dated 5 October 2006 at page 6 of the report under the heading: “CURRENT RENEWABLE RESOURCE DEVELOPMENT ACTIVITY”:

Over 2600 megawatts of generating capacity of all resource types will have been placed in service in the Northwest between adoption of the 5th Plan in December 2004 and the end of 2008. About 800 megawatts is operating, 960 megawatts under construction and 880 megawatts currently scheduled for completion by the end of 2008 (Figure 2). *About 1720 megawatts (65 percent) of the total are renewable energy resources. Nearly all of this (over 99 percent) is wind capacity.*” (emphasis in italics added).<sup>23</sup>

As shown above, the 400MW, wind power figure noted in the DEIS is incorrect. Additionally, while the assertion on page 3-4 of the DEIS that most new electrical generation is from natural gas fired sources was true in 2003, this assertion has been rendered moot by the recent accelerated development of wind powered generation. The following note appeared in the Introduction to latest NWPPCC Biennial Monitoring Report on the Fifth Power Plan dated January 5, 2007: “The Plan found that the region had a surplus of generating capability and that the need for new generation from coal or natural gas likely would not occur until after 2012, after the 5-year action plan period.” And in the Summary:

High energy prices and concerns about potential climate-change policy have also led to aggressive development of wind power in the Pacific Northwest in the two years since the Council adopted the Fifth Power Plan. New generation capacity and slow demand growth have increased the electrical supply surplus in the region, which further delays the need for new generating capability.<sup>24</sup>

<sup>21</sup> ODOE Preliminary Comments on Bradwood DEIS, Nov. 2007, at 63-64.

<sup>22</sup> See DEIS comments of R. Duncan Makenzie, Dec. 17, 2007.

<sup>23</sup> NWPPCC, Fifth Power Plan Monitoring Report, January 2007, and NWPPCC Report entitled *The Role of Renewable Resources in the Fifth Power Plan*.

<sup>24</sup> Id.

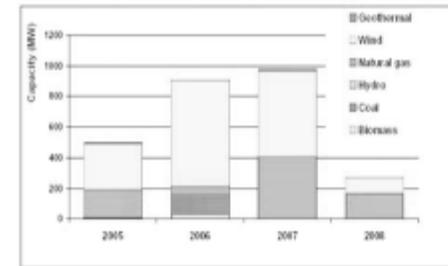


Figure 2: Northwest resource development 2005 - 2008

Therefore, the renewable numbers used by FERC are simply incorrect. The FERC must use the best available information to make its decisions, and should not dismiss non-LNG alternatives such as wind based on incorrect estimates of these resources.

With ODOE expressing skepticism that gas-fired generators in the Lower Columbia will use this gas, it is important to evaluate whether LNG is even economic compared with renewable alternatives. The price of LNG will be a key factor in determining how, and if, the fuel is used once it is imported. ODOE concludes that industrial use of natural gas is projected to decline by 4 percent, and that gas-fired generation may grow to meet demands – yet both of these factors depend at least somewhat on price. As noted above, natural gas prices may from North American sources depend on the success of conservation, efficiency, and renewable energy programs and development. The American Council for an Energy Efficient Economy concludes that “significant price reductions are possible by relieving demand” through a variety of efficiency, conservation, and renewable programs.<sup>25</sup> Their report specifically cites Oregon’s Renewable Portfolio Standard as a potential method for relaxing future growth in demand for electricity from natural gas-fired generation. Hence, comparison of LNG and North American gas costs should take Oregon’s RPS and other similar programs in Washington and California into account. The comparison may render LNG even more expensive when compared to LNG.

Furthermore, according to many published reports, current pricing is more reflective of speculation than market fundamentals.

Costs are way below current prices. For the most expensive domestic production, deep water Gulf of Mexico, the full-cycle replacement costs may be as high as \$3.25-3.50/MMBtu, the report says. Imported LNG falls near that range also at \$2.75-3.75. Other North American full-cycle production costs are: overall Gulf of Mexico \$2.75-3.00/MMBtu; onshore

<sup>25</sup> Elliot, R. Neal and Anna Shipley, April 2005, *Impacts of Energy Efficiency And Renewable Energy on Natural Gas Markets*

Gulf Coast \$2.50-2.75; Canadian \$2.25-2.75; and Rockies \$2.00-2.25 . . .

<sup>36</sup>

The above statement and EIA data show that LNG is not likely to depress prices below current levels. In fact, conservation, efficiency, and renewable alternatives are economically viable alternatives. The DEIS alternatives analysis does not compare costs or provide a reasonable projection of its own future gas supply costs. When combined with Bradwood's huge negative impact to the aquatic environment, it is evident that FERC has erroneously made the presumption that energy efficiency, conservation, and renewable energy are practicable alternatives to the project as a whole, making the no action alternative both viable and environmentally preferable.

**FERC fails to adequately evaluate reasonable alternatives to the project in Rockies and Canadian gas supplies**

The project configuration description in the DEIS is incomplete, and the project description should include consideration of the Palomar pipeline project, the Western half of which clearly depends on Bradwood's LNG terminal being approved. Under NEPA, the projects are connected actions – but for the Bradwood LNG terminal, the Western half of the Palomar pipeline (or some significant portion of it) would not be constructed.<sup>37</sup> The Palomar pipeline is not a surprising outgrowth of the Bradwood project. For several years members of the public have noted that the Williams pipeline system currently lacks available capacity to take on an additional 1.3 bcf/d. FERC's three-fold description of the project objectives (delivery to industrial/electricity users, Mist, and Williams) cumulatively do not come close to the capacity of the project as a whole. Again, the WA EFSEC study completed by ICF International shows that the region cannot economically absorb the huge amount of gas that Bradwood intends to import:

Each of the proposed terminals has an associated pipeline project. Local load in the Pacific Northwest is too variable and not large enough to be economic for a LNG terminal. To site a terminal at a size that would be economic, at least 1 Bcf per day to start with, access to Northern Californian markets would be necessary.<sup>38</sup>

FERC's alternative analysis, then, should evaluate methods of meeting regional gas demand in the Pacific Northwest and California because project objectives may be readily achievable through North American sources of natural gas with existing pipeline infrastructure. The ICF International Study completed for WA EFSEC concludes that pipeline capacity is adequate to meet needs of gas users in SW Washington and Northern Oregon, areas of focus for

<sup>36</sup> Report by James R. Choukas-Bradley, a principal with the firm Miller, Balis & O'Neill, and Natural Gas Intelligence, February 18, 2005. *Analysts Assail Hyped Gas Market, See Prices Falling*. See attached RACE coalition comments to Clatsop County and regarding the Cabrillo offshore LNG facility.

<sup>37</sup> Gregg Kantor statement. Palomar Gas Transmission Press Release. Aug. 6, 2007. See also Transcripts of FERC hearings for Scoping on the Palomar Gas Transmission project held November 12-15, 2007.

<sup>38</sup> ICF International. Nov. 2007. Review of Pipeline Utility Corridor Capacity and Distribution for Petroleum Fuels, Natural Gas, and Biofuels in SW Washington. Submitted to WA State EFSEC. at 69.

project objectives.<sup>39</sup> Secondly, FERC must evaluate alternative methods of meeting gas demand on a region-wide basis, including Rockies supplies, because the bulk of the gas is likely to go to California to meet that State's energy needs. There are multiple West Coast-wide alternatives that should be considered as reasonable, and for which the DEIS provides no or very cursory analysis.

Domestic Natural Gas Is a Viable Alternative

Northern Star, on its website, claims that "Despite record levels of drilling for natural gas in North America, production in the US and Canada is struggling to keep up with consumption."<sup>40</sup> The FERC DEIS characterizes U.S. and Canadian gas supplies as in decline, as well. However, this projection ignores that fact that the Department of Energy (DOE) estimates that there are decades of natural gas supply remaining in North America. To quote the DOE,

At current rates of consumption, the Nation has at least 60 years worth of natural gas supplies that are recoverable with current technology. Moreover, as our knowledge of resource characteristics and the potential of new technology increases, estimates of the size of the resource base grow.<sup>41</sup>

Natural gas demand has actually decreased nationwide since the DOE report was issued. A glaring omission in any of Bradwood's materials or the FERC DEIS is the lack of detailed analysis of increasing supplies from the Rocky Mountains as a viable alternative to the importation of LNG. Page 3-10 provides a very cursory consideration of other pipeline possibilities, citing the Palomar pipeline as a possible conduit for domestic gas into the Oregon market. Realistically, the Palomar project would be used for the opposite purpose – to import large quantities of LNG via the Columbia River into the Western market. The other project discussed, Kinder Morgan's Rockies express, is cited as a potential drain on Rockies gas supply to the Pacific region. The Rockies Express pipeline, according a presentation given by ICF International regarding the development of their pipeline capacity study, will have the opposite effect than that suggested in the DEIS. By relieving competition pressure from the Midwest for Canadian gas, the project would likely increase the availability of that gas supply while not effectively reducing the amount of Rockies gas also available to the Pacific NW.

FERC must more thoroughly evaluate Rockies gas as an alternative to LNG. No detailed rationale is given comparing the Rockies in price or environmental impact to LNG importation in Oregon. According to the DOE, there are almost 7,000 trillion cubic feet (Tcf) of natural gas in the Rocky Mountains. As their report details, more than 300 Tcf of gas-in-place is currently technically recoverable, though several different estimates done by organizations such as the National Petroleum Council and the EIA demonstrate that the recoverable rates are increasing, and the potential is great.<sup>42</sup> By way of comparison, the states of Idaho, Oregon and Washington collectively consumed approximately 570 Billion cubic feet per year of natural gas in 2005.<sup>43</sup>

<sup>39</sup> *Id.*

<sup>40</sup> [http://www.bradwoodlending.com/affordable\\_energy.htm](http://www.bradwoodlending.com/affordable_energy.htm)

<sup>41</sup> U.S. DOE, "Natural Gas Fundamentals: From Resource to Market," DOE/FE-0457, June 2003, at 4.

<sup>42</sup> U.S. DOE, *Rocky Mountain State Natural Gas - Resource Potential and Prevalence to Expanded Production*, DOE/FE-0460, September 2003, at 5.

<sup>43</sup> From EIA database: [http://onto.eia.doe.gov/draw/nging\\_cons\\_sum\\_6cu\\_gus\\_m.htm](http://onto.eia.doe.gov/draw/nging_cons_sum_6cu_gus_m.htm)

Annual production from Rocky Mountain States has risen from 2.3 Tcf in 1990 to over 3.5 Tcf in 2001. According to the DOE,

*Assuming ongoing investment in expanding the geologic knowledge base and technology progress, upward trends in resource assessment and recovery are expected to continue...The National Petroleum Institute projects technically recoverable tight-gas sands resources in the Rocky Mountain States to grow from 105 Tcf in 1998, to 137 Tcf in 2010, and to 151 Tcf in 2015.<sup>44</sup>*

“Tight sands” is one of several classifications of natural gas deposits in the Rockies.

The DOE report goes on to describe one of the most serious barriers facing natural gas producers in the Rocky Mountain States: lack of access to markets. The report states, “Severe pipeline constraints have contributed to two decades of depressed natural gas prices in the Rocky Mountain States. In recent years, price volatility, in large part due to limited pipeline infrastructure and market access, has discouraged investments in natural gas production in the region.”<sup>45</sup>

There is, however, a high-capacity gas pipeline currently under construction, called “Rockies Express Pipeline,” being built by Sempra Energy, parent company of SoCalGas, and Kinder Morgan Pipeline Company. This pipeline, over 1,600 miles long, will run east to terminate in Clarington, Ohio. It will deliver up to 1,500 MMcf per day of domestic natural gas to customers throughout the Midwest. This pipeline goes in the opposite direction of utility customers in the Pacific Northwest. The distance between the major energy market of Portland, Oregon and the Wyoming gas fields is approximately 800 miles, about half the distance from these same Wyoming gas fields to Clarington, Ohio.<sup>46</sup> It would appear, then, that delivery of Rockies gas to the West Coast could also be an economic means of meeting regional energy needs.

Not surprisingly, new pipeline capacity from the Rockies to the West Coast are now proposed in the form of the recently announced Bronco and Ruby gas pipelines. These projects clearly provide an alternative to LNG on the West Coast that the FERC should evaluate. The price of gas traded at Henry Hub on July 6, 2007, which is the benchmark for domestic natural gas pricing, was \$6.14 per MMBTU. The price for natural gas traded at the Opal, Wyoming hub on the same day was \$3.54 per MMBTU.<sup>47</sup> The typical spread between the Henry Hub and Opal spot prices is more on the order of \$2 to \$3 per MMBTU. The price is low at Opal due to the current lack of pipeline access to markets.<sup>48</sup> Three new gas pipeline projects are now proposed to carry gas from the Rockies gas basin into the Western U.S. Two of them – the Ruby and

<sup>44</sup> U.S. DOE, *Rocky Mountain States Natural Gas - Resource Potential and Prerequisites to Expanded Production*, DOE/FE-0460, September 2003, at 5.

<sup>45</sup> *Id.* at 3.

<sup>46</sup> [http://www.kindermorgan.com/business/gas\\_pipelines/rockies\\_express/](http://www.kindermorgan.com/business/gas_pipelines/rockies_express/)

<sup>47</sup> [http://intelligencepress.com/features/intex/gas/intex\\_gas\\_point.emb?pointcode=ICERMTOPAL](http://intelligencepress.com/features/intex/gas/intex_gas_point.emb?pointcode=ICERMTOPAL)

<sup>48</sup> Wyoming Pipeline Authority, fact sheet on need to expand natural gas pipeline export capacity from Wyoming: <http://www.wyopipeline.com/mission/GasOnGas.pdf>

Bronco pipeline projects – exceed 1 bcfd in capacity and would directly access the Malin, OR, interconnect with TransCanada’s GTN system as well as California pipelines.

Statements from the Ruby and Bronco Gas Pipeline proponent indicate that their projects provide an alternative response to the FERC’s characterization of West Coast market needs. Jim Cleary, spokesperson for the Ruby Pipeline, said, “Ruby will provide natural gas users in northern California, Nevada, and the Pacific Northwest with competitively priced natural gas from the nation’s most important growth supply region.” The Ruby project will have a capacity of 1.2 bcfd and can be expanded to 2 bcfd.<sup>49</sup> A representative of Spectra Energy, proposing the Bronco gas pipeline, characterized their project in similar terms: “With the continued demand for clean-burning natural gas to fuel growth in the Pacific Northwest and California markets, the Bronco Pipeline represents an important new outlet for Rockies production to reach these key markets and builds on our long-standing service to this region through our Western Canadian facilities.”<sup>50</sup>

The influx of a large quantity of Rockies gas into the West Coast must be considered as an alternative to LNG, and would likely result in less competition for Canadian natural gas. Because Rockies gas is the cheapest North American source and significantly cheaper than LNG, and because Bradwood’s proposal requires the large, destructive Palomar pipeline to be viable, the alternatives analysis must evaluate these new proposals as reasonable and potentially environmentally preferable proposals.

Increasing natural gas supplies from the Rockies should clearly be evaluated as a cost-effective and reliable project alternative to importing LNG. The EIA regional natural gas production trends shown in the map below indicate robust supply growth in the Rockies, and steady production in other key major production regions around the country through 2025.

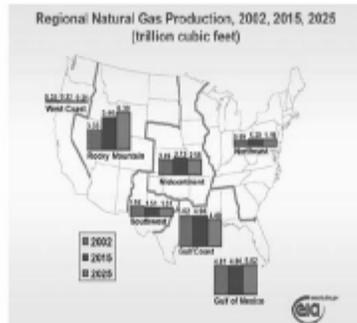
<sup>49</sup> El Paso Corporation Announces Rockies Pipeline Project.” Press Release, Dec. 3, 2007.

<http://online.wsj.com/public/article/PR-CO-20071203-904496.html?mod=cnews>

<sup>50</sup> “Spectra Energy Proposes New Pipeline to Serve Western United States.” News Release, Nov. 2007.

<http://investors.spectraenergy.com/phoenix.zhtml?c=204494&q=NewsArticle&i=1071510>

## Regional U.S. Natural Gas Production Trends, 2002, 2015, 2025<sup>51</sup>



### Canada Is Likely to Maintain or Increase Natural Gas Exports

According to the Bradwood website, "Canada's reserves are also dwindling and the Canadian Energy Research Institute predicts that production from the giant deposits in western Canada will stay at current levels only until 2010 and then begin an inevitable slow decline." The FERC alternatives analysis paints a similarly dire picture of the future of Canadian gas exports, arguing in Chapter 1 that Canadian gas supply forecasts show a decline in Canadian exports. Page 3-8 of the DEIS projects a steep decline in Canadian exports to the U.S., from 3.3 tcf in 2005 to 1.2 tcf in 2030. Yet, FERC's analysis does not evaluate a range of projections – several of which do not describe a decline in exports as severe as suggested in the DEIS.

Similar assertions also appear in California Energy Commission, California Public Utilities Commission and EIA data, which state that natural gas imports from Canada will decline 45 percent over the next 15 years.<sup>52</sup> The agencies are basing this assertion on Figure 77, "Net U.S. imports of natural gas by source, 1990-2030," in the EIA's 2007 Annual Energy Outlook, which shows a 45% decline in Canadian exports to the U.S. by 2020. Figure 77 shows Canadian exports in slight decline in the 2005-2015 period, followed by a much steeper decline in the 2015-2020 period. The steeper decline in the 2015-2020 period accounts for most of the overall 45% decline in the 2005-2020 period.

It appears that the EIA is taking the "worst case" Canadian National Energy Board (NEB) supply-demand forecast scenario and adopting it as the only Canadian forecast. NEB forecasts include multiple supply-demand scenarios. The 2003 forecast looked at two scenarios, one ("Supply Push") where exports gradually decrease through 2015 and then go into a much steeper

<sup>51</sup> Dawn Van Wagener, EIA, *Domestic Natural Gas Supply: A Large Resource Base Does Not Guarantee Low Long-Term Prices*, presentation given at NEMS/AEO Conference, March 23, 2004, at 18.

<sup>52</sup> R. Myers, H. Morris, *California's Need for LNG Supplies*, CPUC memo, December 12, 2006, at 3.

export decline curve, and the second ("Techno-Vert") where natural gas exports increase through 2015 and return to 2005 levels in 2025.

The NEB is currently working on an update to the 2003 *Canadian Gas Supply, 1990-2025* document that will be published in 2007. The update will include three scenarios:

- 1) "Fortified Islands,"
- 2) Sustainable Economic, Environmental, and Energy – "EEE", and
- 3) "Continuing Trend."<sup>53</sup>

The term "Fortified Islands" means Canada puts more emphasis on developing its own natural gas resources and reducing internal demand, and less emphasis on imports to satisfy energy needs. The EEE scenario assumes abundant cheap LNG is available and development of domestic resources is de-emphasized in favor of imports. The "Continuing Trend" is a business-as-usual scenario that assumes no national commitment to increasing domestic natural gas production and reducing domestic demand. The NEB "Fortified Islands" scenario matches well with the Techno-Vert scenario included in the 2003 report.<sup>54</sup>

In this scenario Canadian exports increase from approximately 8,000 MMcf/d in 2005 to 10,000 MMcf/d in 2015 and then return to 8,000 MMcf/d in 2025. This scenario starkly contrasts with the DEIS assumptions, and FERC should evaluate this alternate projection of Canadian gas exports in evaluating the need and potential alternatives for the project. Continued reliance on Canadian gas apparently may be a reasonable alternative to satisfy at least a significant portion of the projected shortfall described by the DEIS.

It is reasonable to assume that the "Fortified Islands" scenario is more likely to occur than a scenario that presumes cheap and abundant LNG will cause Canada to put less emphasis on developing its own natural gas resources. LNG is neither cheap nor abundant.<sup>55</sup> Supply uncertainty and the willingness of major Far East LNG consumers such as Japan, Korea, and China to link the price they pay for LNG to the price of oil make it highly unlikely that "cheap" LNG will ever be available on the West Coast of Canada or the U.S. The likely high price and constrained supply of LNG in the Pacific Rim market will lead Canada to continue to develop its own reserves, potentially leading to an export scenario more like the one we describe—from 8000 mmcf/d to 10,000 mmcf/d and back to 8000 mmcf/d by 2025.

The Washington State Energy Facility Siting Council recently commissioned a study in which ICF International concluded that adequate supply and pipeline capacity exists in the Pacific NW for the reasonably foreseeable future, even in the absence of LNG. In fact, the study highlights increasing Rockies gas reserves as the cheapest source of gas to the West Coast region. Not surprisingly, three recent pipeline proposals now plan to increase the pipeline linkage between the West Coast and Rockies gas producers (Ruby, Bronco, and Kern River

<sup>53</sup> Telephone communication between Bill Powers of RACE and K. Martin Canadian NEB natural gas specialist, April 3, 2007.

<sup>54</sup> Id.

<sup>55</sup> J. Jensen, *Progress Report on Worldwide LNG Trade*, presented at CEC Staff Workshop on the Inputs, Assumptions, and Issues for the Natural Gas Assessment Report, March 26, 2007.

expansion). The "System Alternatives" section unreasonably narrows its focus to LNG import possibilities – excluding already planned expansions of these new Rockies imports.

Increased supplies of Rockies gas to the West Coast (whether in California or Oregon) will relieve pressure on Canadian gas, allowing more gas into the Williams system which is largely dependent on Canadian gas. Because pipeline capacity between the Pacific NW and the Rockies is constrained, these new pipelines are not likely to increase starve the Pacific NW of Rockies gas. Essentially, there is enough for both markets, and increasing access from the Pacific to Rockies gas is very likely to relieve pressure on Canadian gas. Additionally, the Rockies Express Pipeline, which will deliver Rockies gas to the Midwest, may also relieve pressure on Canadian gas supplies according to the WA EFSEC pipeline capacity study.<sup>56</sup> Taken together, the FERC alternatives analysis currently fails to evaluate other potential, proposed influxes of natural gas into the West Coast pipeline system. Hence, the "System Alternatives" analysis is deficient, which only briefly evaluated alternatives and stated without substantial analysis that "modifications or additions (to existing pipelines) would result in environmental impacts that could be less than, similar to, or greater than those associated with construction of the proposed project" (DEIS, at 3-7). Ultimately, the DEIS does not offer a clear comparison of the potential alternatives, including the relative environmental impacts of the different projects and their potential, for instance, for negative impacts to threatened and endangered wildlife and fisheries species.

Due to the tremendous impact on the aquatic ecosystem for Bradwood, the FERC has not met its burden under NEPA in demonstrating that reasonable alternatives have been considered that would avoid many of the negative impacts on the aquatic ecosystem. There are numerous alternatives to the Bradwood Project, all of which have potentially less intensive aquatic ecosystem impacts. There are practicable alternatives in configurations of the terminal, pipeline developments, other LNG import sites, and overall methods of meeting regional energy demands.

#### **Other reasonable alternatives are preferable to the Bradwood site**

The FERC dismisses many practicable alternatives for LNG import sites on the grounds that they are too distant from the "target market", which FERC apparently defines as the Lower Columbia River. Given the enormous size of the project and the statement from ICF International indicating that LNG projects in Oregon are not economically viable without connections to Northern California, FERC's characterization of the target market is unreasonably narrow. The likely movement of the gas via the Palomar pipeline to California and the unproven need for a huge quantity of natural gas in the Lower Columbia River impugn FERC's blanket assertion that other LNG sites are too distant. Indeed, even in Bradwood's own alternatives analysis for its 404 application to the Army Corps, it indicates that only 100 mmcf/d would typically be used in the Lower Columbia area by electricity and industrial users.<sup>57</sup> The cursory

<sup>56</sup> ICF International. Nov. 2007. Review of Pipeline Utility Corridor Capacity and Distribution for Petroleum Fuels, Natural Gas, and Biofuels in SW Washington. Submitted to WA State EFSEC.

<sup>57</sup> Bradwood Landing 404 Alternatives Analysis submitted with Joint Aquatic Resources Permit Application. October 2006. Attachment H, at 3.

analysis offered in regard to other sites fails to evaluate key differences and potential advantages between sites.

Other LNG sites exist on the West Coast that could potentially provide natural gas sources to California and other markets including the Lower Columbia industrial and electricity generation natural gas users. FERC dismisses many planned and developed facilities as unable to meet its project purposes because of their distance to the "target" Pacific NW market. The FERC rules out California alternatives, saying "the California LNG import terminal proposals... could not meet the objectives of the Bradwood Landing project to supply the states of Oregon and Washington with new sources of natural gas." This statement from FERC is inaccurate, both because it implies that the central purpose of the Bradwood project is to supply the Pacific NW with gas (when ICF International has indicated that serving California is the primary driver for any LNG terminal), and because it fails to evaluate how a possible influx of natural gas elsewhere into the Western gas grid will allow Canadian and domestic sources of gas to be more available to the Pacific NW.

The West Coast energy grid is interconnected and so dismissing a California terminal is a poor basis for disqualifying other LNG sites. The FERC must evaluate the regional impact of each of these sites, including Semptra's Costa Azul facility – which FERC only barely acknowledges although it will come online soon and have an enormous potential impact on gas supplies in the Pacific region. Because LNG facilities are so large, they will impact a large geographic range of any region they occupy. The West Coast, as a whole, uses approximately 9 bcfd. Any LNG terminals that supply a significant percentage of that total could potentially relieve pressure on traditional gas sources, as well, leaving more traditional gas resources for the Pacific NW.

The DEIS states that other LNG import terminals are not considered further in this analysis because gas from this southern location cannot economically be transported to the Pacific Northwest, but it does not evaluate the regional import of LNG imports into California from Mexico. Furthermore, because Bradwood is planning to deliver a large proportion of its gas to California, the alternatives analysis should include potential LNG development sites in Northern California, in particular. There were multiple proposals for LNG terminals in Northern California, including Vallejo and Humboldt Bay. Indeed, FERC suggested to another LNG facility in Oregon (Jordan Cove) that it should defend why it is not locating its facility closer to its target market. The same criticism could be directed at Bradwood, who has an agreement to potentially use the Palomar pipeline in the future. FERC must evaluate alternatives that include siting the facility in the market capable of accommodating 1.3 bcfd. In siting the facility closer to its true target market in California, Bradwood would likely avoid large pipeline construction and disturbance to the Columbia River. The FERC cites shorter pipeline routes as a reason to dismiss other projects in the Pacific Northwest, but it does not apply the same criteria to its own study and its use of the Palomar pipeline to connect to California.

FERC dismisses the offshore LNG terminal design alternatives based largely on cost considerations. FERC and Bradwood, in other documents, argue that some of these designs require specifically designed tankers, yet the analysis fails to mention that tankers for its own facility will have to be specifically retrofitted to accept filtered ballast water from a screened

intake system.<sup>58</sup> Cost appears to be the dominant consideration in excluding offshore design alternatives, despite the fact that Bradwood has its own offshore proposal and that several others are proposed for the West Coast. Offshore facilities greatly diminish the public safety risk involved with LNG shipping – a factor that FERC does not weigh heavily in its alternatives analysis. NOAA has criticized FERC for disregarding offshore designs:

The DEIS indicates rough sea and weather conditions off the coast of the Pacific Northwest preclude the siting of offshore terminals. To those not readily familiar with the circumstances that differentiate proposed or existing terminals or other similar structures located in harsh environmental conditions elsewhere (e.g., Calypso LNG terminal off the eastern coast of Florida, Troll Natural Gas Fields in the North Sea with depths of 1,100 feet), FERC should explain further why the placement of terminals offshore of Washington and Oregon are not feasible.<sup>59</sup>

FERC does not analyze the potential advantages that other sites may have over Bradwood – particularly offshore sites that do not require turning basin dredging. Because Bradwood's project involves severe disturbance of critical salmon habitat and a large-scale alteration of the Estuary, the alternatives analysis must weigh other potential LNG sites. Sites elsewhere in the Columbia River may not involve the same amount of dredging and disturbance in extremely sensitive habitats. The alternatives analysis paints all of the sites as similar in the extent of dredging. The analysis also states that Bradwood is preferable to Jordan Cove because that proposal's need for a lengthy pipeline – an advantage that obviously evaporates once we consider the Palomar project as part of Bradwood's proposal.

The DEIS alternatives analysis falsely asserts that key project objectives cannot be met through other means, particularly referring to the delivery of natural gas to Mist, to Williams Pipeline, and to Lower Columbia River industrial and electricity gas consumers. Not only can these demands potentially be satisfied through domestic sources of gas, but, as we have already noted, FERC has mischaracterized the project purposes to aggrandize the importance of these smaller goals that are achievable through other practicable alternatives. Because the site has regional significance if it is approved and built, FERC cannot screen out alternatives on the basis of the Bradwood facility being in closer proximity to facilities that may not even use LNG in the future according to ODOE.

Delivery of gas to the PGE power plants at Port Westward is not a compelling reason to select the preferred pipeline route over alternatives. In the Oregon EFSC review of the Port Westward power plant, PGE did not assume that LNG would be available. PGE also did not assume the availability of LNG in its integrated resource plan review before the Oregon Public Utility Commission.<sup>60</sup>

FERC cites other pipeline projects as being more damaging than Bradwood, but several of these pipeline and other system alternatives might require less dredge/fill activity than

<sup>58</sup> 404 Application from Bradwood Landing, October 2006, Attachment H.

<sup>59</sup> NOAA DEIS comments, at 2, Submitted Dec. 17, 2007.

<sup>60</sup> ODOE preliminary State Agency Comments on Bradwood DEIS, Nov. 2007, at 62.

Bradwood. FERC is also misleading in its description of the extent of its pipeline development, giving no acknowledgement of the added dredge/fill impact of the Palomar pipeline, which is clearly a connected action under NEPA guidelines. While other sites on the Columbia River may have longer pipelines, the Bradwood proposal is likely to result in the Palomar pipeline being extended to the Columbia River – adding 100 additional miles or more to the overall pipeline mileage that should be attributed to the Bradwood project.

FERC also characterizes this project as more distant than other alternative sites in Oregon from population centers. This description apparently only considers the terminal site itself – which incidentally is close to both Puget Island and the Washington community of Cathlamet. The Bradwood project also brings Warrenton and Astoria well within 1 mile of the LNG tankers in the shipping channel. Bradwood has significant disadvantages over other sites throughout the West Coast due to its selection of a site in the midst of the busy Columbia River shipping channel. The area between Puget Island and Bradwood is narrow, and the shipping channel is currently unable to accommodate an LNG vessel. Bradwood's 700,000 cubic yards of dredging and construction for its pipeline(s) constitute a massive alteration of the aquatic environment of the Lower Columbia.

FERC also fails to evaluate whether other sites are superior in avoiding sensitive habitats in construction and operation centers. The Bradwood proposal is extraordinary in its selection of a site in the midst of habitats of extreme importance to the Columbian White-tailed deer, habitat for threatened and endangered salmon, and numerous sensitive streams and wetlands for its project area. No other terminal poses the same degree of threats to migration and rearing habitat for juvenile salmonids and Columbia white-tailed deer, in particular. FERC points out that there are trade-offs with each site, but clearly the selection of the Bradwood site in the midst of critical habitat for ESA-listed fish and wildlife species represents potentially the worst alternative for compliance with the ESA on the West Coast.

NOAA has strongly criticized FERC's assessment of alternatives in LNG sites and project design. The criticism leveled at Bradwood and FERC in these statements also apply to the Corps alternatives analysis, which is even more cursory and inaccurate than the Alternatives analysis in the DEIS. NOAA concludes,

The duration and magnitude of impacts do not appear to have been fully considered in the alternatives analysis. Impacts that are permanent or chronic should be given significantly greater weight than temporary or short-term impacts. For example, in most instances when appropriate conservation measures are successfully implemented (e.g., HDD stream crossings), the impact of pipeline construction on aquatic systems can be avoided or be limited to temporary or short-term duration. In such instances the transitory nature of the impact likely limits the magnitude of the environmental effect. Conversely, impacts that are permanent (e.g., aquatic and wetland filling, sequestration of dredged sediment) or chronic (e.g., maintenance dredging, wake stranding of juvenile salmonids) are of considerable environmental concern and are more likely to have significant impacts on sensitive species. FERC needs to consider the

duration and magnitude of likely impacts when determining whether environmental advantages exist between alternatives.<sup>61</sup>

The Columbia River Estuary, as a whole, is a critical area for the survival of listed salmon and Columbia white-tailed deer populations; hence, it is crucial that FERC evaluate sites, not only in the Lower Columbia, but also throughout the West. It is also important that FERC not dismiss as not practicable alternatives which will serve the true project purpose of delivering LNG into the Western U.S. – including Oregon LNG, Tansy Point, Jordan Cove, and numerous potential sites in Northern California.

FERC fails to provide accurate information on why other sites are not practicable alternatives, in violation of its burden under NEPA. The alternatives are not evaluated in terms of their relative impacts on shipping, habitat, and public safety in a manner that clearly indicates advantages and disadvantages between them. FERC has not provided an analysis adequate to evaluate whether other alternatives might be environmentally preferable. NOAA's recent comments on the Bradwood project indicate that practicable alternatives may exist that have significantly less negative impacts on sensitive species, and that FERC failed to weigh the sensitivity of affected species in its alternatives analysis:

The sensitivity of a species or their habitat to change does not appear to have been factored into the alternatives analysis. An alternative that impacts only viable fish populations is preferable to one that impacts at-risk species. Similarly, an alternative that impacts few or no ESA-listed species is preferable to an alternative that impacts many ESA-listed species. FERC should analyze how, for example, endangered, threatened or sensitive species and their associated habitat could be impacted by each of the proposed alternatives. Moreover, NMFS believes that all of the alternatives should include measures to minimize and/or avoid impacts to threatened and endangered species and their critical habitat. This is consistent with the implementing regulations for NEPA, which state that both context and intensity must be considered when determining significance, and that the ESA-status of a species and their critical habitat are one consideration (40 CFR 1508.27). FERC needs to consider environmental impacts in terms of species and habitat sensitivity when evaluating project alternatives.<sup>62</sup>

**FERC does not adequately evaluate alternatives that would reduce impacts on the environment**

*FERC Fails to Analyze Reasonable Alternatives to Size and Design of the LNG Terminal*

FERC should have considered designing the terminal for a smaller footprint and smaller LNG vessels in greater detail. The FERC analysis makes the assumption that a smaller LNG terminal is not economically viable but does not provide data to justify ruling out smaller design alternatives. There is no justification anywhere in the DEIS for the size of the project: at 1.3 bcf/d, the Bradwood proposal will overwhelm the Pacific NW market and is not viable without access to regional markets. If Bradwood seeks to serve primarily Pacific NW markets, it should

<sup>61</sup> NOAA comment letter to FERC regarding Bradwood DEIS. Dec. 17, 2007. at 4

<sup>62</sup> *Id.*, at 4.

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have evaluated smaller design alternatives with more limited sendout capacity, smaller pipelines, and fewer and smaller tankers.

Due to the lack of consideration of smaller terminal alternatives, FERC does not demonstrate that there are no practicable alternatives to its terminal site design. Reducing the size of the terminal footprint as well as the area that requires dredging are methods of diminishing the impact on the aquatic ecosystem. The size of the terminal itself is a key factor that remains unresolved. FERC should have evaluated the project as a whole for a 3-tank design; clearly, a third tank is reasonably foreseeable. According to page 3-41 of the DEIS, "designing a project to allow for future expansion is a typical model for energy projects of this size and is necessary to make the project viable." Despite this indication that a third tank will be necessary, the DEIS only acknowledges two tanks as the proposed action, with the possibility of future expansion. As discussed elsewhere, and in the comments of Frans Eykel, Marjorie Castle and others, the number of tankers will increase with a three-tank design. Indeed, the Joint Aquatic Resources Permit Application and the Alternatives analysis for the 404 application submitted by Bradwood still describe a three-tank design. The FERC DEIS does not evaluate alternatives that preclude future expansion. Limiting the facility to two tanks is a condition of local proposed land use approval, and it may limit the amount of permanent and temporary negative impacts during construction and operation of the terminal.

The FERC narrowly considers methods of reducing the footprint of a terminal of the proposed size, but does not consider reducing or limiting the actual proposed size of the terminal. There is no factual evidence to support the conclusion that a smaller terminal would not be viable. The Pacific Northwest does not require an LNG terminal of even two tanks, yet FERC does not evaluate the possibility of reducing or limiting the capacity of its terminal in order to reduce its impact on the environment. A third storage tank, 260 feet in diameter and over 160 feet in height, increases the footprint of the area. FERC should evaluate site designs that do not involve the extensive wetland fill that will occur on the site. FERC claims that Bradwood has reduced the amount of wetland fill within its 1.3 bcf/d design, but it must consider whether a facility of smaller size and sendout capacity would require fewer impacts to the environment. Less gas storage would also decrease the number of tankers necessary each year, which would decrease adverse impacts. The FERC has failed to analyze how future expansion plans are increasing the footprint of the currently proposed facility (which will be constructed with a foundation for a third tank), and whether abandoning future expansion or reducing the number and size of tanks is a reasonable alternative. NOAA raises this question in its comments on the DEIS, as well:

The applicant submitted differing proposed actions to the local, state, and federal permitting agencies with regards to whether two or three tanks would be built. The DEIS states that the applicant has not committed to expanding the terminal, however if they wish to expand by way of a third tank, the terminal layout accounts for this. It remains unclear how storage capacity factors into the project's purpose and need, in addition to FERC's alternatives analysis as previously discussed. The applicant's own statements have indicated that storage capacity does not determine throughput (sendout) capacity.<sup>4</sup> Therefore, the need to accommodate and reserve space for a future third tank appears questionable

since the terminal is already designed to accommodate a peak sendout capacity of 1.3 billion cubic feet per day (bcfd). As such, the subject of whether the project footprint has been minimized to the greatest degree practicable remains in question. The FEIS should clarify this topic and provide supporting rationale on how the project footprint has been minimized, perhaps through modeling various operating scenarios.<sup>63</sup>

FERC discounts the possibility of developing a smaller terminal and/or limiting the facility to two tanks by stating that the project would not be economically viable if it were a smaller size. Yet, Bradwood now proposes a two-tank design in its application to FERC, leaving the potential for a third tank in the future. If FERC insists that a three-tank design is necessary for project viability, then certainly this a reasonably foreseeable future action and the entire DEIS should have reflected the ultimate, 3-tank design. The alternatives analysis does not provide adequate data to justify why a smaller site design is not practicable, particularly considering the relatively modest overall gas demand of Oregon and Washington (less than 1.5 bcfd, combined, on an average 2006 day).

FERC asserts that the forecasted demand and life cycle costs make it potentially necessary to expand the facilities to meet future demand, but it does not evaluate the potential benefits to the environment of substantially reducing the scale of the project. FERC has not provided adequate information to support its claim that the Pacific Northwest needs a facility on the scale of 1.3 bcfd, and Oregon Department of Energy and others have raised the problem of no proven need in comments on the FERC Draft EIS. Given the potentially huge range of future demand (FERC relies on the NWGA – a non-objective proponent of the natural gas industry), FERC must consider smaller site designs. The analysis should clearly indicate what environmental and economic benefits to the community might occur in a smaller design alternative as well as the costs to the applicant. NOAA has noted the inadequate nature of FERC's cost analysis in the Alternatives section of the DEIS:

It remains unclear what weight FERC gives to financial costs. In multiple instances FERC appears to dismiss alternatives due to financial considerations without fully evaluating environmental or public safety impacts. FERC should develop and implement a more transparent cost/benefit decision matrix in the alternatives analysis. Furthermore, any financial costs analysis should be comprehensive and include costs associated with each alternative in its entirety (e.g., increased shipping costs to river commerce due to traffic restrictions, impacts to fisheries, increased emergency response capacity).<sup>64</sup>

Oregon Department of State Lands has expressed similar concern with the lack of alternatives analyzed for the design layout of the facility based on the Draft EIS for Bradwood. DSL argues, "Alternative site designs and layouts with a smaller footprint are not discussed in adequate detail as to why the chosen alternative layout is the most practicable with least adverse effects."<sup>65</sup>

<sup>63</sup> NOAA DEIS comments, Dec. 17, 2007, at 4.

<sup>64</sup> NOAA DEIS comments, at 2.

<sup>65</sup> Oregon DSL Preliminary State Agency comments on DEIS, Nov. 2007, at 31.

In general, FERC does not demonstrate that its site design is necessary to meet the objectives of the project. Specifically, FERC must evaluate what size of facility it could practically build without extensive wetland/fill on the site. There are similar considerations for the sendout pipeline(s) as well. Additionally, the Bradwood project will impact areas of the aquatic environment that are not appropriately zoned for industrial development of this type. It is inappropriate for this application to proceed without a land use compatibility statement, in any case, but it is also crucial for a thorough alternatives analysis that Bradwood develop a site design that is consistent with current zoning regulations. Even if Bradwood achieves zoning consistency, these changes are likely to be contingent on only two tanks. FERC does not investigate a true minimal impact site design in its Alternatives analysis, but instead asserts without proper analysis that the project cannot be reduced in size. Most importantly, FERC should evaluate a site design that involves fewer (and potentially smaller) storage tanks and with reduced overall sendout capacity. We agree with the following NOAA comment on this issue, raised in its comments on a similar alternatives analysis for the project in the FERC DEIS:

It remains unclear what role site or capacity expansion plays in consideration of suitable alternatives to the proposed project. Section 3.1.6.2 discusses terminal expansion in terms of the proposed Bradwood Landing LNG terminal, but appears not to do the same for the alternatives. If expansion potential is a decision element, FERC should modify its selection criteria to clarify the weight given to expansion in the alternatives analysis. Furthermore, if expansion potential is not a siting consideration, there appears no reason that reserving space for a third tank at Bradwood Landing should be considered necessary to the proposed project and the facility footprint should be reduced accordingly.<sup>66</sup>

*FERC Fails to Address Alternatives for Gasification and Gas Quality Mitigation*

FERC's DEIS largely ignores two key issues that will greatly impact the quantity and nature of air emissions for the project. The method of gasification and the quality of gas imported to the site are two crucial factors that are poorly evaluated, and for which FERC does not consider reasonable alternatives. The FERC must consider alternatives that limit air emissions, and the current analysis fails to provide adequate analysis of impacts or the alternatives to the proposed project's emissions.

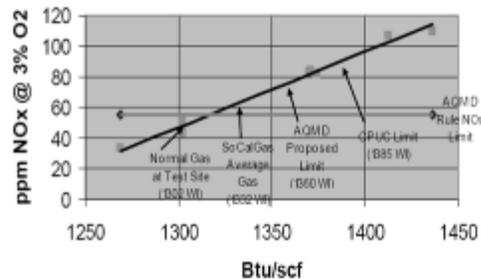
FERC essentially dismisses alternative gasification strategies. Most importantly, the DEIS concludes the ambient air vaporization is not a reasonable alternative for the Bradwood site due to frequent, cool weather. Yet, Oregon LNG in Warrenton has a similar climatic regime and now proposes to use ambient air vaporization technology. The DEIS must evaluate the relative environmental and economic costs of each technology – including energy usage, effluent (condensate), and air emissions. The DEIS' rationale for dismissal of ambient air vaporization is inadequate, and the DEIS should be amended to include more thorough discussion of this vaporization technique. Ambient air vaporization is less polluting, potentially, than submerged combustion vaporization. The DEIS does not provide an analysis of reasonable alternatives to the method of vaporization.

<sup>66</sup> NOAA comments on FERC DEIS, December 17, 2007, at 4.

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Additionally, FERC does not evaluate the issue of whether imported gas will comply with gas quality specifications in the Pacific Northwest. LNG often contains a higher proportion of non-methane constituents such as propane, ethane, and butane – all of which increase the heating value of the gas (see below). The FERC DEIS must evaluate an alternative that limits the impurities of imported gas by stripping non-methane constituents out of the LNG imports. This process is proposed for Jordan Cove LNG – a proposal which is likely to be seeking LNG supplies from the same Pacific Rim market as Bradwood. The FERC’s failure to evaluate terminal design alternatives that limit non-methane impurities in the LNG supply may result in significant increases in NOx and other emissions.

Because FERC has not identified the gas source, the public cannot ensure that gas quality specifications will be met by proposed incoming LNG supplies, and FERC must evaluate this issue in its alternatives analysis. The terminal design can be amended to remove impurities, and FERC provides no basis for excluding this alternative which has potentially significant environmental benefits for the air quality of the Lower Columbia River airshed and all of the markets targeted for LNG use. Currently, there is inadequate gas supply available for “mixing” gas to the Lower Columbia gas users that Bradwood seeks to supply. The DEIS should also evaluate alternatives to ensure that gas can be mixed with North American natural gas to bring LNG within an acceptable range of heating values (known as the Wobbe index).<sup>67</sup>



**FERC Inadequately Evaluates All Alternatives For Dredge Disposal:**

First, dredge disposal plans remain unclear, as Wahkiakum County has not agreed to have its sand pit used for the large quantity of dredge material involved in the project. The application must clarify the proposal before clearly evaluating alternatives to the proposal. There are discrepancies in dredging and dredge disposal plans between the FERC DEIS and the application to the Army Corps. The DEIS provides more discussion of potential dredge disposal alternatives, but this analysis does not appear to be included in the application to the Army Corps. It is difficult for the public, in general, to provide comment on this proposal when major discrepancies in the character and quality of information exist between federal applications.

<sup>67</sup> South Coast AQMD presentation, May 31, 2007, Slide 25 of 31.

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Additionally, the piping system described to cross the Columbia River shipping channel raises questions of safety and added disturbance if the dredge material pipe is disrupted by passing vessels. The Alternatives analysis should evaluate alternative methods of transporting dredged material and alternative disposal sites within the Columbia River.

Most importantly, the DEIS alternatives analysis does not evaluate a reasonable range of alternatives for either upland or in-water disposal. The analysis focuses on the proportion of disposal that should occur on land versus water, yet it does not include extensive site-by-site analysis of alternative dredge sites that have been evaluated and why the Wahkiakum County Sand Pit site and the Bradwood site will have the least impact on the aquatic environment. The analysis also does not appear to account for other dredge/fill activities in the area that could limit the availability of the Wahkiakum County Sand Pit site.

FERC indicates that disposal at these sites will have impacts on fish. FERC characterizes these impacts as “minimized” for beach nourishment alternatives without a clear, transparent discussion of avoidance and minimization for different possible disposal sites. NEPA requires that reasonable alternatives be considered and compared for their relative environmental impacts. The analysis that leads to this conclusion is cursory and does not involve in-depth consideration of dredge disposal sites in areas with less valuable fish habitat. FERC does not appear to consider sites further from the Bradwood site, but gives no detailed rationale as to why more distant dredge disposal in the Columbia or the ocean are too expensive.

There are practicable alternative disposal sites throughout the Estuary, ones that may also provide benefits to a “sediment-starved” Columbia River. FERC has failed to meet its burden in considering and thoroughly evaluating all of these practicable alternatives for dredge disposal. Oregon Department of DSL has also characterized FERC’s evaluation of dredge disposal alternatives as limited, and lacking evaluation of other practicable in-water disposal alternatives.<sup>68</sup>

**FERC Should Evaluate Alternative Limiting Ship Sizes and Turning Basin**

The FERC DEIS does not provide a significant or adequate analysis of turning basin design alternatives. In Section 3.1.9 of the EIS, on page 3-52, FERC simply dismisses the idea of limiting the terminal’s turning basin size: “... alternatives requiring less dredging would not be able to safely accommodate LNG ships. As such, we did not consider it feasible to reduce the volume or extent of dredging and still satisfy the objectives of the project at the proposed size.” Bradwood considers configuration of the dredge area in Section 5.1.4.2 of its alternatives analysis for its 404 application to the Corps, as well, a document that is referenced in the DEIS, and this section fails to demonstrate that the proposed dredging activity is the least damaging practicable alternative.

FERC’s blanket assumption that the facility must be constructed at the proposed size has resulted in the DEIS incorrectly dismissing alternatives that involve smaller tankers, a smaller turning basin, and less sendout capacity for the project as a whole. NEPA requires that all reasonable alternatives be considered, and FERC’s failure to evaluate alternatives that may

<sup>68</sup> Oregon DSL Preliminary State Agency comments on DEIS, Nov. 2007, at 31.

require a reduction in the project size and sendout clearly violates its obligation to provide the public with a thorough assessment of alternatives. The highly restricted range of alternatives evaluated and considered violates the very purpose of NEPA's alternative analysis requirement, to foster informed decision-making and full public involvement.

FERC does not thoroughly evaluate the potential for using smaller vessels to access the LNG site, potentially reducing the size of the terminal overall, and limiting the amount of area to be dredged. As we have discussed above, there are alternative LNG sites throughout the West Coast that do not require 700,000 cubic yards of dredging in critical salmon habitat, and FERC has failed to consider other sites in sufficient detail to show that its own site is the least damaging practicable alternative for delivering LNG into the West Coast market. NOAA also raises this concern, and notes that the alternatives are not balanced or compared with regard to impacts to threatened and endangered species and other important environmental and economic factors. FERC must evaluate alternatives that involve less dredging by using smaller LNG tankers, or it must provide clear reasoning why this is not a reasonable alternative.

There are a range of sizes of LNG vessels (from under 70,000 cubic meters to greater than 200,000 cubic meters). According to Bradwood's analysis for its 404 application, "A depth of -42 feet was determined necessary based on the need to provide clearance of the largest size LNG carrier draft with adequate connections to and from the carrier channel" (emphasis added).<sup>69</sup> The analysis should evaluate alternatives that accommodate smaller tankers; no rationale is offered in the DEIS or elsewhere as to why the turning basin must be designed to accommodate the largest tankers. Currently, the USCG is recommending a size limitation on incoming LNG tankers, and smaller vessels could result in a significant reduction in the area that needs to be dredged.<sup>70</sup> This would reduce the overall impacts of the project on the aquatic environment of the Columbia River. FERC should consider a similar condition and limitation on turning basin size and the amount to be dredged.

FERC characterizes the size of the turning basin as a conflict between safety and aquatic habitat impacts. Yet, the safety risks could be reduced by limiting LNG tankers size to the smallest LNG tankers available. FERC does not evaluate in any way the significant advantages to fish species that might occur from reducing the amount of dredging and the size of the turning basin. NEPA requires that alternatives be considered in detail, and FERC has failed to evaluate whether material benefits to fish and aquatic habitat exist from reducing the size of the Bradwood project. The DEIS does not provide an adequate basis for the US Army Corps of Engineers to evaluate the project's least environmentally damaging practicable alternative. Without detailed consideration of a proper range of project size and turning basin alternatives, the analysis is flawed and unreasonably narrow, in violation of NEPA.

The impact to multiple listed species of salmon has been characterized as significant and negative, both by FERC and NMFS. The disruption of benthic habitats, which generate migrating and rearing fish food supply, is also a potential serious impact. We address these impacts in greater detail elsewhere, but FERC should not assume that reducing dredge area will provide no benefits. In fact, differences in site design, according to NOAA and Oregon DEQ,

<sup>69</sup> Bradwood Landing Joint Aquatic Resources Application, Attachment H, October 2006.

<sup>70</sup> USCG Waterway Suitability Report for Bradwood LNG Terminal, March 2007.

may result in significant reduction of negative impacts to the environment (see those agencies comments). The safety of LNG tankers is a high priority, but the FERC incorrectly presumes that the only method of keeping LNG tankers safe is by having a large turning basin, when alternatives in tanker and project size are readily available.

FERC Must Consider Key Alternatives to Pipeline and Its Route.

The need for the project and the pipeline has been questioned by multiple agencies. Alternatives to the construction of the pipeline as a whole appear to have been ruled out by artificially narrowing the project purpose to serving Lower Columbia River industries. The DEIS provides no analysis of alternative methods of meeting those Lower Columbia River needs or consideration of the relative proportion of the project and its impacts that are justified based on the small likelihood of those industries using a large portion of the project's capacity. NOAA questions the overall approach that FERC has taken to its complete its analysis:

"Is the purpose to provide a new source of LNG to the Pacific Northwest? Is the purpose to provide a new source of LNG for Wauana Mill, NW Natural, PGE, and Williams Pipeline? The pipeline alternatives analysis would appear to indicate the latter is true, which greatly constrains the alternatives that meet the project purpose and appears to increase the environmental impacts of other alternatives as they try to service the same potential customers."<sup>71</sup>

Because the Bradwood project is clearly linked to the Palomar pipeline, it is difficult to assess alternatives to routes on the Bradwood pipeline through Cowlitz County without asking whether this route is altogether redundant. According to maps submitted by the Palomar Gas Transmission project to FERC, the Palomar pipeline plans to intersect with the Bradwood pipeline near Wauana. FERC should evaluate whether its proposed pipeline across the Columbia River and through Cowlitz County is necessary given Bradwood's stated intention of using the Palomar project in the future. The alternatives analysis does not provide any consideration of the relationship between the Palomar and Bradwood pipelines.

The Palomar pipeline would fulfill the true purpose of the project more effectively than the proposed Bradwood pipeline, which intends to supply 1.3 bcfd of gas to a pipeline system that cannot accommodate that enormous volume of gas. Williams Northwest Pipeline has indicated that it would have to cancel all current contracts for gas supply to its existing customers – a highly unlikely scenario – in order to accept the huge volume of gas Bradwood proposes to send out each day. Clearly, the Palomar pipeline represents the true conduit for Bradwood's gas to regional markets that can absorb it. Without the Palomar pipeline, the project is constrained to delivering gas to markets that are unable to economically accept it, according to the pipeline capacity study recently completed by ICF International on behalf of WA EFSEC. NOAA addresses the relationship between Palomar and the Bradwood project, and states that the two are clearly interdependent:

FERC's Notice of Intent for the Palomar Pipeline project (PF07-13) indicates the proposed pipeline would terminate at NorthernStar Energy LLC's Bradwood Landing pipeline near Wauana, Oregon. But for the construction of the Bradwood

<sup>71</sup> NOAA comment on FERC DEIS, at 4, Dec. 17, 2007.

Landing LNG import terminal, the Palomar project apparently would not be constructed as proposed (see DEIS 2.1.6). At a minimum, segment 2 of the Palomar project would appear interdependent on the Bradwood Landing LNG project. The 50 CFR 402.02, regulations which implement the ESA, define interrelated and interdependent effects. Interrelated actions are those that are "part of a larger action and depend on the larger action for their justification."<sup>72</sup> Interdependent actions are those that "have no independent utility apart from the action under consideration." Segment 1 would achieve connection to NW Natural's regional distribution system and provide another natural gas source to the Portland Metro area. Extension of the pipeline to Bradwood Landing would have no utility independent of the proposed action. Extension of a bidirectional pipeline to the Mist Storage Facility would provide indirect access to Bradwood Landing LNG via a proposed lateral pipeline from NorthernStar's pipeline to Mist. Implementation of segment 2 fundamentally alters the Palomar Pipeline's operations from a LNG source for the Portland Metro area to a West Coast distribution network for Bradwood Landing LNG. FERC should include anticipated impacts of segment 2 of the Palomar Pipeline project in the EIS.<sup>73</sup>

Because the Palomar project will likely be necessary, in any case, for the Bradwood project to viably deliver its gas to market, the alternatives analysis must evaluate whether Bradwood can forego its pipeline through Cowlitz County. This alternative is reasonable and would entirely avoid major negative impacts to aquatic habitats throughout Cowlitz County.<sup>73</sup> These impacts include the crossing many sensitive wetland areas and open trench pipeline construction across salmon-bearing streams.

FERC does not provide an adequate analysis of route alternatives on its proposed 35-mile pipeline route, either. FERC's description of route alternatives is cursory and does not provide adequate detail and evaluation of potential impacts to rivers, streams, and wetlands from construction and operation of the pipeline. FERC has also failed to evaluate constructing a smaller diameter pipeline, which might allow for more nuance in routing the pipeline around sensitive areas. The alternatives analysis does not include adequate discussion of so-called "minor" route variations within the proposed route. The "minor" variations have enormous potential to enhance or diminish the level of aquatic impacts along the pipeline route. The FERC's project description, in general, is vague and does not account for changes that have occurred – including a potential change in the HDD drill site on the Washington side of the Columbia River.<sup>74</sup>

As an example of FERC's failure to adequately address pipeline route alternatives, there are two areas which stand out among many deficiencies in the DEIS and highlight the inadequate range of alternatives considered. The project proposes to use an HDD in NS-1 to reduce "impacts on environmental resources" but completely fails to integrate consideration of the area immediately East of Bradwood as geologically unstable. Multiple state agencies have indicated

<sup>72</sup> NOAA DEIS Comments, at 5. Submitted 12-17-07.

<sup>73</sup> See Comments of Cowlitz County, prepared by Parametrix, regarding the DEIS. Also see comments of Sandra Davis, Marjorie Castle, and Gayle Kiser.

<sup>74</sup> See comments of Marjorie Castle on DEIS.

that the area is seismically active with multiple active landslides nearby, and the very first mile of the pipeline proposes to cross an active landslide area. Residents of Puget Island have repeatedly raised concerns about this portion of the pipeline, which crosses an area that only last winter slid, causing debris to fall on and block the railroad below. Additionally, in the 1960s a landslide caused a tsunami to move across the Columbia River, flooding part of Puget Island and causing one death. Richard Beck has submitted information corroborating this event, which FERC has dismissed saying that they can find "no evidence" of a landslide there.<sup>75</sup>

A second area of serious concern involves a crucial segment of the pipeline as it crosses the Columbia River. The routing for this part of the pipeline is highly sensitive and any adjustment cannot truthfully be characterized as "minor." Shifts by a few hundred yards in either direction will involve very different impacts, resources, and landowners than the proposed route. Unfortunately, the proposed routing of the directional drill is unclear, according to conversations held during the Clatsop County land use process.<sup>76</sup> Specifically, the alternatives analysis does not weigh the best available information when evaluating HDD routes across the Columbia River. In particular, geotechnical reports indicate that unstable geology and active landslides in this area should warrant a rerouting of this segment of the pipeline. The DEIS states, "impacts on natural resources are generally consistent between the two route segments" – a statement that contradicts the extremely sensitive geology of the area and information in Bradwood's resource reports. The Geohazard Report indicates that rerouting in this area may be necessary, and information in the Geological Hazards section of the DEIS (Page 4-19 Section 4.1.4.3, also see Geologic Hazards Table 4.1.4-3) shows significant hazards in this area. The alternatives analysis seems to indicate no difference in reasonable alternatives regarding environmental impacts, yet information submitted by URS Corporation and issues raised by both Cowlitz County and Oregon Department of Geology raise questions about the validity of these conclusions.

FERC should evaluate alternatives that minimize the use of open-trench construction methods in salmon-bearing streams. The alternatives analysis does not include adequate or specific information describing why HDD or other methods are not practicable in avoiding serious disturbance to habitat for ESA-listed salmon species. FERC does not demonstrate that it has routed its pipeline to avoid sensitive wetland areas. The alternatives analysis must include a detailed description of why the route was chosen and why no practicable alternatives exist to the construction methods and locations for the pipeline. The description of the route and waterbody and wetland crossings and why specific methods were chosen for each crossing, are almost entirely lacking in the Alternatives analysis. FERC does not justify why open-trench methods are necessary for certain areas, and an alternative involving no open trench cuts across streams with essential fish habitat and active runs for threatened and endangered species must be considered.

It is also important to note that information provided by the applicant to multiple federal agencies on this issue is inconsistent. Attachment H, Bradwood's alternatives analysis for its 404/401 applications, appears to provide inaccurate and contradictory information based on revised pipeline routing and crossings reflected in the Draft EIS. For example, dozens of sensitive wetland areas are impacted by the pipeline, and the project description in the

<sup>75</sup> See comments of Rick Beck on DEIS.

<sup>76</sup> See comments of Marjorie Castle on DEIS.

Alternatives analysis appears to be grossly inaccurate in its characterization of wetland impacts. "After all of the minor route adjustments and other avoidance and minimization measures are applied, the remaining unavoidable impacts to wetlands and other waters of the U.S. from the proposed route are small and scattered along the route" (BL Attachment H, at 44). This assertion is directly contradicted by the DEIS, which on pages 4-99 and 4-100 provides a table of wetland crossings. Areas to be permanently and temporarily altered by the pipeline amount to 97.9 total acres. The alternatives analysis provided to the Corps, and the current application to the Corps, does not reflect the current status of the project, and clearly the discrepancies between the project described in this application and the EIS are serious and make evaluation of the alternatives very difficult. The Corps cannot reasonably evaluate how to determine if the project proposed is the least environmentally damaging practicable alternative if applications include obviously contradictory information. The DEIS should clarify the role of the Army Corps in evaluating these impacts and how the public should understand a proposal with multiple, contradictory configurations depending on agency and application.

Regardless, dozens of salmon-bearing streams and sensitive wetlands will be crossed by the pipeline. FERC provides insufficient detail in describing how and why the proposed route was selected, and why there are no practicable alternatives exist to avoiding the dozens of acres of sensitive stream and wetland habitats that will be impacted by dredge/fill activities. The Alternatives analysis is both inaccurate and vague, and FERC has failed to evaluate practicable alternatives in the routing of the pipeline.

Specifically, there are numerous fish-bearing streams that Bradwood proposes to cross through open-trench methods, including Larson Slough, McLean Slough, Hammony Creek, Brock Creek, Coal Creek, and Clark Creek. The EIS finds that pipeline construction and operation will result in "substantial adverse effect on Pacific Coast salmon essential fish habitat" (DEIS, at 4-171). Again, FERC, the Army Corps and the public lack specific information to justify the conclusion that there are no practicable alternatives to its proposed routing. FERC must consider reasonable alternatives to the project as a whole, and to routing that damages fish-bearing streams.

FERC fails to offer a thorough description of either its chosen route or major route variations and the relative wetland/stream impacts of each. The alternatives analysis for the alternate routes (Southern Route, Railroad route) do not specifically describe possible reductions in impacts to threatened and endangered species and their habitats. Ultimately, the criteria for determining practicable alternatives are poorly developed in this alternatives analysis. NOAA has noted that the alternatives analysis for the DEIS "appears to dismiss alternatives due to financial considerations without fully evaluating environmental or public safety impacts." The NOAA comment letter continues by arguing that FERC and the applicant "should develop and implement a more transparent cost/benefit decision matrix in the alternatives analysis. Furthermore, any financial costs analysis should be comprehensive and include costs associated with each alternative in its entirety (e.g., increased shipping costs to river commerce due to traffic restrictions, impacts to fisheries, increased emergency response capacity)."<sup>77</sup> We strongly agree with these conclusions, and the cursory analysis provided by FERC clearly violates

<sup>77</sup> NOAA comment letter on FERC DEIS. December 17, 2007.

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standards requiring that all reasonable alternatives be evaluated in a logical, transparent fashion with regards to their costs, impacts, and technological feasibility.

### **FERC fails to adequately address alternatives with respect to tanker traffic for the Coast Guard's analysis**

In its analysis of alternatives, FERC does not properly weigh a reasonable range of alternatives for the USCG to consider in whether it permits the facility. FERC and the USCG should consider conditions that include limiting the number and size of tankers that visit the proposed LNG terminal at Bradwood. The alternatives analysis concludes that the no action alternative for the USCG – finding the waterway not suitable for LNG traffic – would fail to meet project objectives. However, as we argue above, there are readily available alternatives to the proposed LNG terminal to serve regional energy needs. FERC should not assume in the DEIS that project objectives cannot be met through continued or increased reliance on Rockies and Canadian supplies of natural gas as well as energy conservation, renewable resources, and energy efficiency.

The FERC should also evaluate project alternatives in light of SIGTTO regulations.<sup>78</sup> The LNG industry has a good safety track record in shipping LNG cargoes partially because it typically has high standards for site selection for LNG import terminals. The Bradwood LNG terminal fails to meet high international standards for an LNG import terminal in several respects – the channel width is excessively narrow, the berth is proposed to be parallel to the shipping channel on the outside bend of the shipping channel, and there exist significant natural navigational hazards (the Columbia River bar) to safe transit.<sup>79</sup> FERC and the USCG should evaluate all potential LNG sites with respect to their potential to disrupt shipping traffic and their potential for an accident. The comparison of site alternatives does not include a detailed analysis of this type as required by NEPA, and the USCG cannot rely on the cursory analysis provided in the DEIS to make its recommendation regarding the environmentally preferable alternative for the project.

By narrowing the DEIS consideration of river safety and traffic issues to a few conditions being considered by the USCG, FERC fails to consider the full range of alternatives to the project and falsely creates a dichotomy between the USCG issuing a LOR and project objectives not being approved. The "all or nothing" approach FERC uses to characterize project alternatives does a severe disservice to the public and to cooperating agencies in the Bradwood permitting process; alternatives to the project and to the project design – in ship size, ship frequency, project sendout capacity, and alternatives to LNG altogether – are readily available and have received cursory or no analysis from FERC.

### **Conclusion for Alternatives Analysis**

FERC has failed to consider key practicable alternatives to its project, to the design of the terminal and the turning basin, and to its proposed pipeline. There are numerous practicable

<sup>78</sup> SIGTTO, Society International of Gas Tanker and Terminal Operators. Site Selection and Design for LNG Ports and Jetties. August 2000.

<sup>79</sup> Id.

alternatives available for meeting West Coast energy needs. FERC dismisses non-LNG alternatives, while assuming that electricity generation from LNG-sourced gas will be a major driver for the project. There are many alternative methods of generating electricity that do not involve LNG importation. Energy conservation, renewable energy, and energy efficiency all present practicable alternatives to LNG throughout the West Coast. There are also practicable alternatives available for maintaining gas supplies to the Pacific Northwest and the West Coast, including increasing access to domestic supplies of natural gas. Alternative LNG sites – particularly sites closer to the target market in Northern California – must also be considered and are almost entirely omitted in the alternatives analysis. Finally, FERC has failed to assess reasonable and practicable site alternatives in the Pacific Northwest and to the design of its project that would significantly reduce the negative impacts of its project on the aquatic environment.

The Columbia River Estuary has been considered the “lynchpin” for recovery of ESA-listed salmon species. FERC provides cursory and inaccurate analysis of the impacts of its dredge/fill activities, and the Army corps must find that practicable alternatives exist to severely undermining the health of the Estuary, both in the Columbia River and in wetlands and rivers impacted by the terminal and pipeline. “An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.” 40 C.F.R. § 320.10(a)(2). The alternatives analysis fails to address many alternatives, and some alternatives are given such cursory consideration that it is impossible to realistically conclude that they are not practicable. This includes changes to terminal design, turning basin size and design, alternative LNG sites, and both major and minor route variations on the pipeline route.

Reasonable and practicable alternatives to the proposed action do exist and have been identified in earlier comments. The alternatives considered, however, were unreasonably narrow and not meaningful in regards to the purposes of NEPA. The highly restricted range of alternatives evaluated and considered violates the very purpose of NEPA’s alternative analysis requirement, to foster informed decision-making and full public involvement. 42 U.S.C. §101; 42 U.S.C. §102(2)(E); 40 C.F.R. §1508.9(b); Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349 (1989).

Indeed, NEPA’s regulations and Ninth Circuit caselaw require the agency to “[r]igorously explore and objectively evaluate all reasonable alternatives.” 40 C.F.R. § 1502.14(a); Citizens for a Better Henderson v. Hodel, 768 F.2d 1051, 1057 (9th Cir. 1985). The Ninth Circuit has consistently held that an agency’s failure to consider a reasonable alternative is fatal to an agency’s NEPA analysis. See e.g., Idaho Conserv. League v. Mumma, 956 F.2d 1508, 1519-20 (9th Cir. 1992) (“The existence of a viable, but unexamined alternative renders an environmental impact statement inadequate.”)

The minimal difference among the action alternatives is not consistent with NEPA’s requirement that a range of alternatives be considered especially when given the repeated public requests that alternative sites, alternative natural gas sources to LNG, and alternative energy options (renewables, conservation, efficiency) be fully considered. State of California v. Block, 690 F.2d 753 (9th Cir. 1982).

## FERC misrepresents purpose and need for the project.

### Purpose and Need Overview

FERC has vastly overstated the need for a LNG terminal in the Pacific Northwest, particularly Oregon, and misconstrues the real purpose of the Bradwood LNG Project. The purpose and need statement in an EIS is required by NEPA to justify why an agency action is necessary. 40 C.F.R. § 1502.13. The agency action at question here is the approval or disapproval of the Bradwood Landing Project by FERC. In its DEIS statement concerning the need of the Bradwood Landing Project, FERC fails to fully analyze the demand for natural gas in the future and fails to give adequate weight to non-conventional domestic supplies, conservation measures, and current storage capacities. Furthermore, the stated purpose for the project in the DEIS is imprecise because of a faulty assumption by FERC that natural gas imported as LNG to the proposed Bradwood Landing terminal, and distributed there from, will be used to supplement regional supplies, when in fact Bradwood’s purpose for the project is, at least in part, to tap into the California market and supplement California natural gas supplies.

In the purpose and need statement of the DEIS, FERC justifies the need for an approval of the project by citing energy use forecasts predicting increased future demands for natural gas, exacerbated by shrinking domestic and Canadian supplies to the region because of increasing demand elsewhere in the nation. DEIS at I-4. Therefore, according to the DEIS, international imports in the form of LNG are needed to meet demand and stabilize the market. *Id.* However, a variety of factors indicate that importation of LNG from foreign nations is unnecessary and is likely to destabilize both the supplies and prices for the region.

The demand for natural gas will likely not be as great as the DEIS purports. According to the Northwest Gas Association (NWGA), and acknowledged by FERC in the DEIS, the existing gas supplies and infrastructure will be sufficient to meet demand in the next few years.<sup>30</sup> Moreover, although NWGA predicts a shortfall for meeting peak demand conditions in 2010 using a high growth or base growth scenario, the predictions relied upon in the DEIS are based on suspect NWGA assumptions of an 8.1% growth rate for natural gas consumption in the Pacific Northwest through 2011 using its base growth scenario.<sup>31</sup> On the other hand, longer range forecasts based on reasonable assumptions reported by the Energy Information Administration (EIA) in its Annual Energy Outlook (AEO) predict less than an 8% increase for natural gas consumption in the region from 2005 to 2030.<sup>32</sup> FERC should evaluate the need for LNG imports based on the lower projected natural gas consumption estimated by the EIA since those numbers are objective governmental projections less likely to be biased, whereas the NWGA projections are from a group consisting of natural gas and pipeline companies seeking a profitable outlook. Additionally, FERC must evaluate the need for LNG based on an increased focus in the Pacific region on renewable energy, conservation, and energy efficiency – all energy options that are likely to reduce natural gas demand.

<sup>30</sup> Northwest Gas Association. 2006. 2006 Northwest Gas Outlook Update. Available online at <http://www.nwga.org/>. Accessed October 2007.

<sup>31</sup> *Id.*

<sup>32</sup> Energy Information Administration. 2007. Annual Energy Outlook 2007 with Projections to 2030. Report #: DOE/EIA-0383(2006). February.

There are also serious uncertainties in the projected growth of natural gas consumption regionally and nationally. In fact, the EIA AEO 2007 notes that forecasts for actual national natural gas consumption from 2005 to 2030 have consistently been scaled back over the past couple years due to a variety of factors including greater conservation measures and less predicted reliance on natural gas for electric energy generation. For example, EIA projections in 2006 estimated national natural gas consumption in 2030 to reach 26.8 trillion cubic feet (Tcf), while the 2007 projections are only for 26.1 Tcf of natural gas consumption in 2030.<sup>85</sup> The DEIS falsely asserts that "much of the demand growth in the NWGA forecast is driven by power generation." DEIS at 1-4. However, the NWGA also acknowledges a lower reliance on natural gas for electric energy generation, given the volatile gas prices and sufficiency of hydropower sources, leading them to lower their projected base growth consumption from over 9.3% to 8.1% through 2011.<sup>86</sup>

The Northwest Power and Conservation Council's Fifth Power plan indicates that gas prices will continue to limit gas-fired production.<sup>87</sup> These uncertainties regarding the projected consumption of natural gas, both in the short-term and long-term, indicate the growing effects alternative energy sources and conservation measures are having on the regional and national energy market. FERC should reanalyze the growth projections if used to analyze the need for LNG based on demand in the DEIS given its false information about natural gas powered electric production and the current and past trend for lowering natural gas consumption projections.

Yet another factor that FERC failed to properly analyze when determining the need for imported LNG is the forecasted increased production of domestic conventional and non-conventional natural gas. The NWGA admits that production from U.S. Rocky mountain sources is projected to increase by 2011.<sup>88</sup> Furthermore, the Alaskan North Slope, along with the Mackenzie River Delta in Canada, has enough proven resources to satisfy the whole U.S. natural gas demand for more than a decade.<sup>89</sup> Natural gas sources from Alaska are predicted to be up and running by 2017, and along with advances in technology for exploration and production, should be sufficient to meet North American demand for a substantial period. FERC properly states that domestic production of natural gas supplies are predicted by the EIA to increase substantially in the coming years as non-conventional sources of gas are tapped into. DEIS at 1-4. However, FERC essentially dismisses these non-conventional sources by implying it is possible that these resources will not be able to be successfully and economically explored and produced.<sup>90</sup> FERC should include a more thorough analysis of both these conventional and non-conventional sources of natural gas when determining the need for imports through the Bradwood LNG terminal into the region. We discuss alternative sources for natural gas in more detail in our discussion of alternatives to the Bradwood project, including gas supply sources in the Rockies and in Canada.

<sup>85</sup> Id.

<sup>86</sup> Northwest Gas Association, 2006, 2006 Northwest Gas Outlook Update. Available online at <http://www.nwga.org/>. Accessed October 2007.

<sup>87</sup> NW Power and Conservation Council, Fifth Power Plan, 2006, see Chapter 5, Generating Resources.

<sup>88</sup> Northwest Gas Association, 2006, 2006 Northwest Gas Outlook Update. Available online at <http://www.nwga.org/>. Accessed October 2007.

<sup>89</sup> Id.

<sup>90</sup> Id.

Increased competition for the resources that the Pacific Northwest relies upon for its natural gas demands is another justification relied upon by FERC for the need of a LNG import terminal at Bradwood Landing. FERC notes that Oregon relies 100% on imports of natural gas for consumption. DEIS at 1-4. However, as noted above, the domestic production is likely to increase over the next few years as new technology for exploration and production comes into play. These additional resources, along with conservation measures and alternative energy, should help alleviate, if not completely offset, the increased demand of the nation and, therefore, competition for Pacific Northwest resources.

FERC claims that the relatively low prices the Pacific Northwest has historically enjoyed will be threatened by competition for the resources the region relies upon, and implies that LNG imports will help stabilize the supply and price for the region. This is a blatantly false statement. Imports of LNG are notoriously unreliable because of uncertainties in the supply and demand of the global market. Indeed, there are currently not enough liquefaction facilities and the current liquefaction facilities are having supply shortages, leading to shortages of LNG in the face of increasing global demand.<sup>91</sup> Additionally, because of increasing oil prices, the global demand for natural gas is predicted to increase substantially leading to a global increase in LNG prices and a predicted lowering of the capacity utilization rates at domestic LNG terminals.<sup>92</sup> Clearly, LNG is currently not a reliable source of natural gas, nor will it be in the near future. If the region does in fact need a supplemental stable source of natural gas at steady prices, LNG is not the answer. Approval of the Bradwood LNG Project would have the opposite effect on natural gas supplies and prices in the region, leading to possible shortages and increased costs if LNG supplies are relied upon for future needs. FERC should reevaluate the purpose and need in light of these observations and better relate to the public the effects importing LNG will have on the regional supplies and prices, especially given the likely purpose of the project as discussed below.

The claims by Bradwood that the proposed Bradwood LNG Project is being designed to serve the needs of Oregon and the Pacific Northwest is obviously an exaggeration given the information above relating to the already saturated market in the Pacific Northwest. The Pacific Northwest market does not require more inputs of natural gas, especially from unstable foreign sources that will likely cause instability of supply and prices in the Pacific Northwest if relied upon for any supposed future need. The true market in the West is California, which consumes more natural gas than all other West Coast states combined.<sup>93</sup> Not only does California use more natural gas than any other state in the region, California is a rapidly growing market.<sup>94</sup> Regardless of how fast the market for natural gas is growing in California, proposals for LNG terminals in California have been met with very strong resistance due to environmental and safety concerns. To date, no proposed LNG terminal has been approved for California. It goes without saying that the closest alternative sites for LNG terminals are Mexico and Oregon. Proposals for new LNG terminals in Mexico have also been met with resistance because of

<sup>91</sup> Energy Information Administration, 2007, Annual Energy Outlook 2007 with Projections to 2030, Report #: DOE/EIA-0383(2006), February.

<sup>92</sup> Id.

<sup>93</sup> Id.

<sup>94</sup> Id.

environmental and safety concerns, as well as economic considerations. Therefore, a slew of proposed projects have been initiated for Oregon, the next best alternative for an LNG source for California markets. Obviously Oregon and the Pacific Northwest do not require additional natural gas inputs in the form of LNG to meet current or near future demands from one LNG terminal, not to mention the three to five terminals that are under consideration. FERC should seriously reconsider the purpose behind the proposed Bradwood LNG Project and accurately relay the true purpose to the public.

Bradwood and FERC claim that the designated market for the Bradwood LNG Project is Oregon and the Pacific Northwest. However, the justification for this stated purpose is not sufficiently strong to indicate that there is in fact a need and demand in the Pacific Northwest for LNG. The Oregon market can not absorb another 1.3 bcf/d of natural gas from the proposed Bradwood LNG terminal. The only economically viable market for the natural gas is California. The Palomar Project provides a clear conduit to California. Therefore, it goes without saying that the proposed Bradwood LNG terminal will have a viable California market to ship its natural gas to, a market with much higher demand and profit expectations than any other in the region. How can Bradwood honestly claim they are not seeking to serve the California market when that is the market most economically feasible for allocation of incoming natural gas from foreign LNG markets and when there are already plans to build a pipeline connecting the proposed terminal to interstate pipelines leading to California? FERC should undertake further analysis regarding the likely future market to be served by the project, taking the Palomar pipeline into account.

Alternatively, if current sources of natural gas to the Pacific Northwest are rerouted to serve the large and growing California market because of the additional inputs into Oregon via the proposed LNG terminals, Oregon and the Pacific Northwest will be substantially harmed. As mentioned above, foreign LNG markets are notoriously unreliable, and if Oregon and the Pacific Northwest are forced to rely on imports of LNG the supply and prices in the region are very likely to be adversely affected. Oregon should not have to bear the brunt of supply and price fluctuations, in addition to environmental, economic, and safety impacts, so that California may enjoy a steady and price stable supply of domestic gas. There are sufficient domestic and other gas sources other than foreign LNG to serve the whole West coast including California. It is unnecessary to subject Oregon to all the impacts of the proposed Bradwood LNG terminal. At the least, FERC should further evaluate the purpose behind the proposed Bradwood LNG Project and accurately relate to the public the potential impacts of the project.

#### **FERC defines purpose and need too narrowly**

The FERC has failed to undertake an adequate analysis of alternatives because of an unreasonably narrow definition of the purpose and need of the project which FERC then uses to dismiss reasonable alternatives. The DEIS states, "The purpose of the Bradwood Landing Project is to provide a new source of natural gas to the Pacific Northwest through importation of LNG" (DEIS, 1-3). The project objectives list key delivery points, and taken with the overall purpose of the project, this section of the DEIS reads more like a description of the project than an accurate characterization of the purpose and need. The purpose of the project should be more broadly stated in terms of supplying the region with energy. An analysis for a broader, more

accurate statement of the purpose for the project would lead FERC to include detailed consideration of non-LNG alternatives, other LNG sites, and alternatives to the proposed design of the project.

By narrowing the purpose statement to focus on LNG importation and, specifically, LNG importation on the Columbia River with the potential to deliver gas to Mist, Williams Pipeline, and Lower Columbia industrial and electricity generation users, the FERC has excessively narrowed the scope of its entire analysis. We have described in our comments on the Alternatives analysis how the narrow focus of the DEIS has resulted in reasonable alternatives not being given adequate consideration. FERC similarly errs in narrowing its consideration of the need to be served by the project, failing to justify assumptions regarding the future of natural gas demand and supply in the Pacific Northwest. Indeed, multiple state and federal agencies have questioned the need for the project as it is described, and ICF International concluded that supplies for natural gas were "abundant" for the foreseeable future from either the Rockies or Canadian supply basin: "Gas supply is expected to remain abundant well beyond the forecast period of 2025."<sup>53</sup>

FERC describes key objectives and included Lower Columbia River industries that cannot absorb a huge quantity of LNG as possible consumers. The primary project objectives do not require a project of the size and scope of the Bradwood LNG terminal, and multiple pipelines already supply these gas users from existing infrastructure and supplies.<sup>54</sup> The DEIS does not justify the need for the size of the project. At 1.3 bcf/d with the potential for expansion, the project will dwarf any future needed gas supplies. Yet, FERC excludes alternatives because they cannot be built to the size of the project desired by Bradwood. The purpose of the project should not be to build an LNG terminal of the enormous scale proposed, but rather it should be to deliver energy to the Western energy market.

FERC has routinely dismissed alternatives that involve reduction of the project size. Essentially, FERC has defined the project purpose and need so closely to the project description (even requiring sendout capacity of 1 bcf/d or greater with the possibility of expansion), the overall analysis suffers from a lack of regional perspective and even readily available alternatives in adjustments to project site, design, and size. The recently completed ICF International pipeline capacity study (submitted to Washington's EFSEC) indicates that the purpose and need description in the EIS is disingenuous, and that the purpose and need for the project would more accurately be defined as supplying natural gas to the Western energy market.<sup>55</sup>

#### **FERC falsely claims that project's primary purpose is to serve Oregon and Washington gas needs**

<sup>53</sup> ICF International. Nov. 2007. Review of Pipeline Utility Corridor Capacity and Distribution for Petroleum Fuels, Natural Gas, and Biofuels in SW Washington. Submitted to WA State EFSEC.

<sup>54</sup> ODOE, Dec. 2007. Preliminary State Agency DEIS comments.

<sup>55</sup> ICF International. Nov. 2007. Review of Pipeline Utility Corridor Capacity and Distribution for Petroleum Fuels, Natural Gas, and Biofuels in SW Washington. Submitted to WA State EFSEC. at 69

FERC makes broad assumptions regarding the need for LNG in the Pacific Northwest that are unsupported by unbiased evidence. FERC uses outdated data to argue that LNG is needed in the Pacific Northwest while ignoring growing renewable energy, conservation, and efficiency programs in the region. ODOE and other state agencies have asked that FERC consider the impact of renewable portfolio standards. With FERC projecting average growth of 2 percent a year in regional gas use, the impact of conservation and efficiency programs must be considered as a limiting factor. We discuss alternatives to LNG in greater detail in our comments on FERC's alternatives analysis, and FERC has failed to show that a need exists that cannot be satisfied through the no-action alternative.

FERC's need analysis aggrandizes future Pacific NW gas demand based on data from the Northwest Gas Association (NWGA), an industry group whose members include utilities that will be involved in the Bradwood project (NW Natural gas, for instance). ODOE concurs that the NWGA does not constitute an independent perspective on future natural gas demand.<sup>96</sup> The NWGA data cannot be considered unbiased, as preliminary comments on the DEIS of the Oregon Department of Energy have noted: "The [demand] analysis is based entirely on NWGA forecasts. No independent assessment of demand. No consideration of demand side reductions."<sup>97</sup> Other State agencies have raised similar concerns with the FERC, as well.

The markets and key industries to be served by the project, as described by the DEIS, are not adequate to support an LNG facility of Bradwood's size. Industrial users and electricity generation in the Lower Columbia, by Bradwood's own estimates, are only likely to use 100 mcmcf on an average day.<sup>98</sup> ODOE questions even this assumption, noting that operators of natural gas plants in the area are not planning to absorb LNG, currently.<sup>99</sup> Williams pipeline company has indicated that it does not have capacity to absorb all of Bradwood's gas, and that Bradwood will likely have to rely on the Bradwood pipeline in the future. These and other pitfalls in the needs analysis are illustrated by the comments of Oregon Department of Energy. Oregon Department of Energy recently commented, in its draft comments on the FERC DEIS, "The DEIS provides no independent assessment of the demand for LNG to justify the need for the proposed project."<sup>100</sup> ODOE's comment highlights widespread skepticism about Bradwood's characterization of the purpose and need for its project.

NOAA has also added its own reservations about the purpose and need of the project, raising the following questions regarding whether the alternatives analysis is artificially constrained in order to justify a high-impact project: "As the stated objective is providing the Pacific Northwest with another natural gas source, it would appear additional data from the region is warranted."<sup>101</sup> Given broad skepticism about the need for the proposal, the no action alternative may result in the natural gas needs of the Pacific Northwest and California being met and should constitute a practicable alternative. Bradwood gives very little consideration to the potential for no action.

<sup>96</sup> ODOE, Dec. 2007. Preliminary State Agency DEIS comments.

<sup>97</sup> ODOE, Dec. 2007. Preliminary State Agency DEIS comments, at 62.

<sup>98</sup> Joint Aquatic Resources Permit Application, Attachment H, October 2006.

<sup>99</sup> ODOE, Dec. 2007. Preliminary State Agency DEIS comments, page 64.

<sup>100</sup> *Id.*

<sup>101</sup> NOAA comments on FERC DEIS, December 17, 2007.

While the project configuration and pipeline routing are purportedly designed to match the needs of Lower Columbia industrial and electricity generation users, some of those users do not appear to be planning for LNG. For example, comments of ODOE indicate that Port Westward is not factoring LNG into its gas supply needs. PGE, which owns generating facilities there, is not necessarily going to buy large quantities of LNG:

Delivery of gas to the PGE power plants at Port Westward is not a compelling reason to select the preferred pipeline route over alternatives. In the Oregon EFSC review of the Port Westward power plant, PGE did not assume that LNG would be available. PGE also did not assume the availability of LNG in its integrated resource plan review before the Oregon Public Utility Commission.<sup>102</sup>

The Bradwood project is clearly designed to meet its expectation of West Coast-wide energy demands – not those of the Pacific Northwest. FERC's assertion that key project objectives involve delivery of gas to Mist and Columbia River industrial/generation users is severely undermined by the fact that less than 1/10 of the project would currently be likely to go to these users.<sup>103</sup> The quantity of gas proposed for import by Bradwood (1.3 bcf/d) more than doubles Oregon's average daily natural gas use.<sup>104</sup> This also renders it highly unlikely that a large proportion of the gas will be delivered into Oregon and Washington. The unlikelihood of the Pacific NW absorbing a majority of the gas is further illustrated by both the ICF International study and by Williams current long-term contracts for supplies on its Northwest pipeline system.

The enormous size of the project shows that a major economic driver for the project is California gas demand, rather than Oregon's or Washington's. California consumes as much gas as the rest of the West combined<sup>105</sup> and will likely receive most of Bradwood's gas, based on the recently proposed Palomar pipeline proposal (see attached maps). The Bradwood project not only seeks a connection to California's market via Palomar, but it also likely requires additional pipeline capacity aside from the proposed Bradwood pipeline through Cowlitz County due to the capacity limitations on that pipeline (ICF International study for WA EFSEC).<sup>106</sup> NOAA concurs that the Bradwood project and the Palomar project are interconnected, or at least the Western portion of the Palomar project appears to depend on the Bradwood project.

The Daily Astorian has reported the Williams Pipeline, by their own estimates, cannot absorb a significant quantity of Bradwood's proposed LNG supply. Furthermore, Bradwood admits that it plans to use the proposed Palomar pipeline to deliver significant quantities of gas to potential customers in California, according to its S-1 filing submitted to the Securities and Exchange Commission. Based on the true project purpose of serving gas to California, as admitted by Bradwood, the FERC should evaluate West Coast regional needs and alternatives for

<sup>102</sup> ODOE, Dec. 2007. Preliminary State Agency DEIS comments, at 64.

<sup>103</sup> Joint Aquatic Resources Permit Application, Attachment H, October 2006.

<sup>104</sup> Energy Information Administration, Natural Gas Summary Statistics, Oregon 2001-2006.

<sup>105</sup> EIA Natural Gas Use Summary Data, Dec. 2005. <http://eia.gov>. Quote from Loretta Lynch, former Chair of CA PUC under Gray Davis during Portland lecture on March 4 2007.

<sup>106</sup> ICF International, Nov. 2007.

meeting these needs. The WA State Pipeline Capacity study, however, concludes that no LNG terminal will be viable in the Pacific NW without a pipeline connection to California:

Local load in the Pacific Northwest is too variable and not large enough to be economic for a LNG terminal. To site a terminal at a size that would be economic, at least 1 Bcf per day to start with, *access to Northern Californian markets would be necessary.*<sup>107</sup> (emphasis added).

The pipeline capacity study and the recent Daily Astorian article show that the Williams pipeline is not capable of accommodating Bradwood's supply without vacating all of its current contracts for gas. The pipeline currently operates near capacity, and long-term supply contracts render the current proposed action potentially not viable.

FERC statements from staff evaluating the proposed Palomar project indicate that the Palomar and Bradwood projects are connected actions, and that the Palomar project may be the true recipient of the large proportion of Bradwood's gas that cannot be absorbed in the Williams system and Lower Columbia River industrial and electricity generation users. Mr. Doug Sipes, who conducted scoping hearings for Palomar in mid-November, 2007, stated,

The Bradwood LNG terminal and its proposed sendout pipelines are being analyzed in a separate environmental impact statement. The Bradwood meetings were being held out here last week that Paul Friedman from our office held. They were the draft environmental impact -- they were the comment meetings on the draft environmental impact statement. Although gas coming into the Bradwood LNG terminal may ultimately be shipped by Palomar, the terminal developers have stated that the Bradwood LNG terminal and its associated pipeline would be built regardless of whether Palomar is built or not. Also, Palomar would be built to serve Northwest Natural's supply reliability regardless of whether Bradwood LNG is built, *although it would probably not need to be built all the way up to Wauna.*<sup>108</sup> (emphasis added)

The above statements, particularly the statement regarding whether or not Palomar would be built to Wauna, indicate that the two projects are connected actions under NEPA. While Mr. Sipes indicates that he does not believe the projects to be connected, the configuration of the Palomar project will clearly depend on whether Bradwood is approved or not, with the entire Western portion of the Palomar project likely being dependent on the Bradwood proposal. NOAA also indicates its skepticism regarding the separateness of the two actions, "FERC should include anticipated impacts of segment 2 of the Palomar Pipeline project in the FEIS."<sup>109</sup>

<sup>107</sup> ICF International. Nov. 2007. Review of Pipeline Utility Corridor Capacity and Distribution for Petroleum Fuels, Natural Gas, and Biofuels in SW Washington. Submitted to WA State EFSEC. at 69.

<sup>108</sup> Doug Sipes. FERC staff for Palomar Gas Transmission project. 12 November 2007. Official FERC transcript, at 14-15.

<sup>109</sup> NOAA DEIS Comments, at 5. Submitted 12-17-07.

FERC must acknowledge that the true project purpose of the Bradwood proposal is significantly altered due to its relationship to the Palomar project. California, which uses vastly more gas than Oregon and Washington combined (see below), will receive significant quantities of gas from Bradwood via the Palomar project if both are built.<sup>110</sup> FERC must re-evaluate the purpose and need for the project in this regional, California-driven context. As noted above in our comments on the Alternatives analysis, both Palomar Gas Transmission project representatives (such as Gregg Kantor) and FERC representatives (Mr. Sipes, FERC transcripts for Palomar project) have made statements that support our conclusion that the need analysis for the project must include Californian demand, as it will likely be served from Bradwood via the Palomar pipeline.

The FERC defines its project purpose too narrowly. If the purpose is properly defined as delivering clean, affordable energy into the West Coast market, many other alternatives are available -- some of which, including continued or increased reliance on Rockies gas could fulfill all the project purposes. California gas needs are also a key factor to be considered in the needs analysis, as the project apparently intends to connect to California markets via the Palomar pipeline. Oregon PUC analyst, Ken Zimmerman, stated, "So far, the only people that have shown any interest in contracting with these LNG guys are in California."<sup>111</sup> Bradwood also acknowledged publicly in recent Clatsop County land use hearings that it already has an agreement to use the Palomar pipeline in the future -- an agreement that has been described in Bradwood's S-1 filing with the Securities and Exchange Commission in December 2006.

California gas needs should be evaluated as part of the DEIS needs analysis. More regional data is required to evaluate whether the project will serve a legitimate regional need (including California), and obviously alternatives must be considered on a regional scale if there is need for increased energy supply -- alternatives including energy efficiency, conservation, renewable energy, alternative natural gas supplies, and alternative LNG sites.

### FERC fails to accurately evaluate the need for LNG

FERC must evaluate the need for LNG on a national, state, and regional scale. The DEIS rests its need analysis largely on a national presumption of need for LNG imports, and is inadequate in its evaluation of the regional need for LNG imports. In our Alternatives section we discuss why natural gas supplies from the Rockies as well as renewable energy, conservation, and efficiency initiatives in the Pacific Northwest can provide alternatives to the proposed project. The DEIS does not discuss gas demand adequately for the major market driving the potential need for the project -- California. Because the project will likely serve California if built, the DEIS must evaluate whether the Bradwood project is justifiably serving a need in the Pacific market as a whole -- including California.

Yet, there is ample evidence to demonstrate that California, which drives the regional market for natural gas by using as much gas as the rest of the Western states combined, does not need LNG to meet its future energy requirements. As discussed in our alternatives section, there

<sup>110</sup> EIA Gas Summary data for OR, WA, CA. Annual Energy Outlook. 2006.

<sup>111</sup> "Pipeline Battle Hinges on Need, Livability." Ted Sickinger. *The Oregonian*. August 21, 2007. Ken Zimmerman quoted as energy analyst for the Oregon Public Utilities Commission.

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are many regional alternatives to LNG. Just as importantly, however, the projected demand for natural gas in the West Coast must be considered in light of growing conservation, renewable, and energy efficiency programs. There is enormous potential to limit the use of fossil fuels, and the State of Oregon recently passed legislation that may reduce growth in natural gas consumption to an almost negligible level from the baseline described by NWGA, according to a 2005 report completed by the American Council for an Energy Efficient Economy.<sup>112</sup> The report indicates that, by 2010, Oregon can limit its natural gas use by 5 percent, compared to base case assumptions. Looking ahead, natural gas demand could be limited by 8 percent by 2015 and 12 percent by 2020.<sup>113</sup> These gains in natural gas conservation and efficiency would offset most, if not all, of the growth projected by the NWGA. They offset all of the projected 8-9 percent of growth projected by the EIA for 2025. FERC must re-evaluate the need for the project, taking the impact of renewable energy, efficiency, and conservation of energy into account.

California demand reduction should also be considered in evaluating the need for LNG. The ICF International study recently completed for Washington EPSEC shows that no project in the Pacific Northwest is viable without also serving the California market, and FERC should have evaluated the need on a more regional basis, including California. Information from California indicates that there is enormous potential for renewable energy, energy efficiency, and conservation that precludes the need for LNG altogether. In 2006, the Santa Barbara Community Environmental Council (Council) prepared a report analyzing whether California needs LNG to meet its current and future projected energy demands.<sup>114</sup> According to the report, California can achieve its energy needs without importing LNG. In fact, the Council concluded that California can satisfy 133-381% of the State's additional natural gas demand through energy efficiency and renewable supplies.

The DEIS concludes, "neither conservation measures nor renewable energy sources are expected to replace the need for additional future natural gas supplies in the Pacific Northwest" (DEIS, at 3-7). FERC's confidence that increasing gas demand will necessitate LNG import in the Northwest is clearly not shared by Oregon Department of Energy. It also falsely concludes that independent regional energy forecasts conclude that increasing gas supply and gas-fired generation are necessary for meeting future demand. The NW Power and Conservation Council clearly indicate that wind power is a growing and viable alternative for meeting growth in generation capacity.<sup>115</sup> As alternatives to fossil fuels increase in renewable energy, energy efficiency, and conservation, natural gas prices may be relieved of some of the strain and vulnerability to speculation and manipulation that has driven recent high natural gas prices.<sup>116</sup>

On a national scale, the DEIS exaggerates the need for LNG tremendously while failing to evaluate a realistic projection of regional needs. According to the U.S. Department of Energy,

<sup>112</sup> Elliot, R Neal and Anna Shipley. April 2005. *Impacts of Energy Efficiency And Renewable Energy on Natural Gas Markets*. American Council for an Energy Efficient Economy. at 6.

<sup>113</sup> Elliot, R Neal and Anna Shipley. April 2005. *Impacts of Energy Efficiency And Renewable Energy on Natural Gas Markets*.

<sup>114</sup> Tam Hunt. 2006. *Does California Need LNG? Report for the Community Environmental Council*.

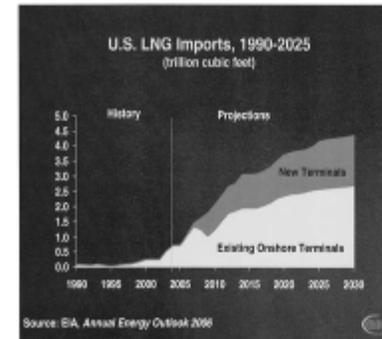
<sup>115</sup> NW Power and Conservation Council. 2005. *Fifth Power Plan Summary of Generation*.

<sup>116</sup> Elliot, R Neal and Anna Shipley. April 2005. *Impacts of Energy Efficiency And Renewable Energy on Natural Gas Markets*.

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the country has 60 years of natural gas supplies available to meet our needs.<sup>117</sup> Given that the alleged need for natural gas is the driving force for this Project and the reason that the range of alternatives has been so narrowly prescribed, this is a critical, threshold issue for the lead agencies to consider. If we don't need LNG, we don't need to accept the tremendous risks and impacts that would result from the proposed Project.

Future expansion of LNG terminals, according to US Department of Energy, may provide a substantial increase in LNG. Terminals under construction and expansion are already expected to greatly increase LNG import capacity in the case that the U.S. opted to use more of this foreign fossil fuel. There are over a dozen approved LNG terminals, and several under construction. Existing facilities will expand, and the EIA estimates that current onshore facilities will provide more LNG than those under construction. Hence, the need for LNG is extremely limited beyond those facilities currently existing or already being built. If, as the EIA indicates, the existing four onshore terminals will expand to import large quantities of LNG, then the remainder of future projected LNG demand can likely be met with as many or fewer terminals. FERC both overstates the need for LNG in the DEIS, and it fails to account for this basic fact – that currently producing LNG terminals and those under construction are likely to fulfill any future LNG needs for natural gas demands on a national scale. The gaps in FERC's analysis for the Pacific Northwest and the West Coast region, as a whole, exacerbate FERC's problems in demonstrating that the Bradwood project is needed.<sup>118</sup>



### FERC falsely concludes that LNG will be competitive in price

The FERC DEIS presumes that LNG will offer a new gas supply at a "competitive price." FERC does not provide evidence to support the conclusion that LNG is an economically reasonable source of gas supply for the region. Indeed, FERC has questioned

<sup>117</sup> U.S. Department of Energy, *Natural Gas Fundamentals: From Resource to Market* (2003).

<sup>118</sup> EIA. *Annual Energy Outlook*. 2006.

Bradwood's estimates of its supply in previous documents, but the DEIS does not provide adequate analysis to evaluate the potential negative economic impact of reliance on LNG in the future.

The price of LNG will be a key factor in determining how, and if, the fuel is used once it is imported. ODOE concludes that industrial use of natural gas is projected to decline by 4 percent, and that gas-fired generation may grow to meet demands – yet both of these factors depend at least somewhat on price. As noted above, natural gas prices may from North American sources depend on the success of conservation, efficiency, and renewable energy programs and development. The American Council for an Energy Efficient Economy concludes that “significant price reductions are possible by relieving demand” through a variety of efficiency, conservation, and renewable programs.<sup>119</sup> Their report specifically cites Oregon’s Renewable Portfolio Standard as a potential method for relaxing future growth in demand for electricity from natural gas-fired generation. Hence, comparison of LNG and North American gas costs should take Oregon’s RPS and other similar programs in Washington and California into account. The comparison may render LNG even more expensive when compared to LNG.

Furthermore, according to many published reports, current pricing is more reflective of speculation than market fundamentals. North American supply basins are capable of producing natural gas more cost-effectively than LNG:

Costs are way below current prices. For the most expensive domestic production, deep water Gulf of Mexico, the full-cycle replacement costs may be as high as \$3.25-3.50/MMBtu, the report says. Imported LNG falls near that range also at \$2.75-3.75. Other North American full-cycle production costs are: overall Gulf of Mexico \$2.75-3.00/MMBtu; onshore Gulf Coast \$2.50-2.75; Canadian \$2.25-2.75; and Rockies \$2.00-2.25 . . .

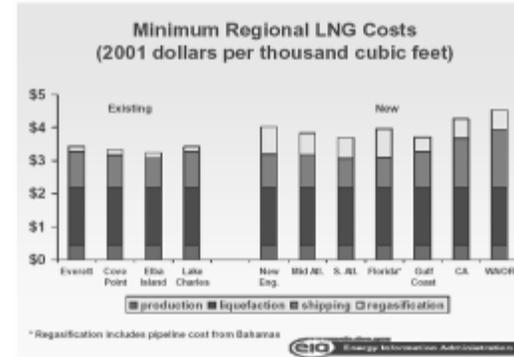
<sup>119</sup>

In contrast, EIA data show that LNG delivery to the Pacific NW is a relatively high-priced alternative for meeting natural gas demands<sup>120</sup>.

<sup>119</sup> Elliot, R Neal and Anna Shipley. April 2005. *Impacts of Energy Efficiency And Renewable Energy on Natural Gas Markets*

<sup>120</sup> Report by James R. Choukas-Bradley, a principal with the firm Miller, Bulis & O’Neill, and Natural Gas Intelligence, February 18, 2005. *Analysis Assail Hyped Gas Market, See Prices Falling*. See attached RACE coalition comments to Clatsop County and regarding the Cabrillo offshore LNG facility.

<sup>121</sup> Annual Energy Outlook. 2004. Taken from Loretta Lynch March 2007 presentation, “The Case Against LNG”



North American natural gas production costs and EIA data show that LNG is not likely to depress prices below current levels. In fact, conservation, efficiency, and renewable alternatives are economically viable alternatives to both, particularly LNG. The DEIS alternatives analysis does not compare costs or provide a reasonable projection of its own future gas supply costs. In contrast with supplies in North America, LNG is neither cheap nor abundant.<sup>122</sup> James Jensen presented his analysis of the global LNG trade, and concluded that the Pacific Rim LNG market will remain tight into the foreseeable future, and that LNG supplies are susceptible to the same geopolitical factors that create instability and volatility in oil pricing. Supply uncertainty and the willingness of major Far East LNG consumers such as Japan, Korea, and China to link the price they pay for LNG to the price of oil make it highly unlikely that “cheap” LNG will ever be available on the West Coast of Canada or the U.S.<sup>123</sup>

In addition, the track record for other LNG ports around the country provides evidence that such facilities do not operate full-time due to fluctuations in demand and price, as well as competition with foreign demand and market availability. According to a recent interview of Joseph Kelliher, former chairman of the Federal Energy Regulatory Commission,

“The most recent data I’ve seen suggests that [LNG facilities] were operating at less than 40 percent capacity.” When asked why, Mr. Kelliher replied, “It’s because we have to compete with foreign demand. LNG comes to this country either by long-term contract or in spot shipments. We’ve been losing out on a lot of spot shipments to Europe. If prices are higher elsewhere, that’s where the spot shipments are going to go. . . . LNG import facilities are operating at about 50 percent capacity worldwide. The world has twice the capacity to import LNG as it has to make LNG. That gives

<sup>122</sup> J. Jensen, *Progress Report on Worldwide LNG Trade*, presented at CEC Staff Workshop on the Inputs, Assumptions, and Issues for the Natural Gas Assessment Report, March 26, 2007.

<sup>123</sup> *Ibid.*

developers of the liquefaction facilities more choices when it comes to what markets they prefer to use.<sup>124</sup>

An Associated Press news article, entitled "Natural gas imports leave U.S. vulnerable," explains that "as America becomes a bigger player in the global natural gas trade, its vulnerability to faraway production snags and price gyrations will rise, as will its dependence on energy from the Middle East and other volatile regions."<sup>125</sup> This article, which reports on the fact that U.S. natural gas supplies "tightened in January because LNG originally scheduled for delivery at a terminal in Cove Point, Md., was redirected to Europe," points out that even long-term supply contracts can be affected by the global market. Matthew Simmons and other energy analysts continue to suggest that LNG is trading globally at the lower end of its potential price range.<sup>126</sup> EIA data also conclude that LNG prices may fail to compete in the future, with tightening global supplies in the Pacific Rim and other basins resulting from competition with Asian and other markets.<sup>127</sup>

To summarize, FERC cannot assume that LNG is providing a competitively priced source of natural gas. There are trends at the regional, national and global scale that may increase the gap between lower-priced North American supplies and likely high-priced LNG. In evaluating the purpose and need for the project, FERC must disclose the basis for its price assumptions, and FERC should evaluate the overall impact of potential gas price increases on the Western energy market.

#### The DEIS fails to consider connected actions

"The CEQ regulations require 'connected actions' 'to be considered together in a single EIS.'" *Save the Yaak Committee v. Block*, 840 F.2d 714, 719 (9th Cir. 1988), quoting *Thomas v. Peterson*, 753 F.2d 754, 758 (9th Cir. 1985). Connected actions (i) automatically trigger other actions which may require an EIS, (ii) cannot or will not proceed unless other actions are taken previously or simultaneously, or (iii) are independent parts of a larger action and depend on the larger actions for their justification. *Id.* 40 C.F.R. § 1508.25(a)(1).

The Ninth Circuit applies an "independent utility" test to determine whether actions are "connected" within the meaning of these CEQ regulations. *Native Ecosystems Council v. Dombeck*, at 894, citing *Wetlands Action Network*, 222 F.3d at 1118. "Where each of two projects would have taken place with or without the other, each has 'independent utility' and the two are not considered connected actions." *Id.*; see also *Morongo Band of Mission Indians v. FAA*, 161 F.3d 569, 580 (9th Cir. 1998). Where, however, a "close nexus" exists between two actions, such that one would not take place but for the other, the actions qualify as "connected" and must be analyzed in a single NEPA document. *Save the Yaak Committee*, 840 F.2d at 720. For example, the Ninth Circuit has repeatedly required the Forest Service to analyze timber sales and road reconstruction in a single NEPA document where the purpose of the road reconstruction "was to make the log hauling more efficient, productive, and safe," and nothing suggested that

<sup>124</sup> "Building up Gas," Martin Rosenberg, *EnergyBiz Magazine*, 2006.

<sup>125</sup> "Natural gas imports leave U.S. vulnerable," *Broad Press, Associated Press*, Feb. 12, 2006.

<sup>126</sup> Simmons Oil Monthly, *Macro Energy Outlook 2006*, at 19.

<sup>127</sup> EIA LNG Overview, 2004, LNG price projections.

"the road was reconstructed for any other reason." *Id.* Similarly, where a timber sale would not proceed without construction of a logging road, and the road would not be built but for the contemplated timber sales, the Ninth Circuit has determined that these actions are "inextricably intertwined" and must be analyzed in a single NEPA document as connected actions. *Thomas v. Peterson*, 753 F.2d at 759. Here, neither the Bradwood Terminal nor the 102.5 mile western section of the Palomar Pipeline have any "independent utility." Rather, the two projects are "inextricably intertwined" and failure to analyze them in a single EIS violates NEPA.

As discussed in great detail in the alternatives analysis above, the Bradwood Terminal would not be built without access to the California market provided by the proposed Palomar Pipeline. The natural gas market in Oregon and Washington simply cannot absorb such an increase in supply. Trying to skirt this issue, Bradwood redefines the "Northwest" to include much of the West coast and then analyzes the increased demand for natural gas in the region. However, this increased demand comes primarily, if not exclusively, from California; without access to that market, no reason would exist for building the Bradwood Terminal. The proposed Palomar Pipeline provides that necessary access and, therefore, the two proposed projects must be analyzed together in a single EIS.

Yet, the DEIS asserts that the Bradwood Landing Project is in no "way dependent upon Palomar" because:

Bradwood has proposed its own natural gas sendout pipeline, analyzed in this document, which would connect the Bradwood Landing LNG terminal with the interstate pipeline grid through an interconnection with Williams Northwest pipeline near Kelso, Washington.

DEIS 2-28. However, without access to the California market through the proposed Palomar pipeline, construction of the Bradwood Terminal would make little if any economic sense. Rather, the terminal depends on access to the California markets that the Palomar pipeline will provide and, therefore, the projects must be analyzed together in a single EIS.

The proposed Palomar Pipeline extension would not be built but for the Bradwood Terminal. In fact, the President and Chief Operating Officer of NW Natural, has stated that the Palomar "project is being designed so that, if an LNG terminal is constructed on the Columbia River, the Palomar Pipeline can be extended to serve it." Bradwood has requested such an extension:

[W]e have recently submitted a request for service to TransCanada and NW Natural . . . [to] construct, own and operate a pipeline that would connect the Bradwood terminal to Williams' Northwest pipeline at Molalla and TransCanada's GTN Pipeline near Madras. This will provide Bradwood and/or other shippers with gas transportation service from the LNG terminal to the pipeline systems of both the Northwest Pipeline Company and TransCanada's GTN Pipeline, which can deliver approximately 2.0 Bcf/d into Northern California at the Malin, Oregon interconnect point.

Bradwood 12/15/06 Registration filing with SEC, page 54. While the DEIS notes that the Palomar Project in its entirety "is not dependent upon the authorization or construction of the Bradwood Landing Project," DEIS, at 2-28, it is clear that the extension of the Palomar Pipeline to Bradwood will not be built if the Bradwood Terminal is not constructed.

The potential environmental impact of an extension of the Palomar Project would likely be significant. The pipeline would extend 220 miles from Bradwood to near Madras, Oregon, crossing wetlands and other sensitive habitats as well as the property of numerous landowners. DEIS, at 2-28. Construction through wetlands would likely cause pollution in streams from increased sedimentation and temperature, and deposition of gasoline and oil. Many of these streams are designated critical habitat for numerous species; these construction activities could lead to "take" of these species in violation of the ESA. The construction would also necessitate extensive timber cutting through habitat of a variety of plants and animals listed as threatened or endangered under the ESA, including the northern spotted owl and marbled murrelet. DEIS, at 3-10. Both construction and maintenance of the pipeline extension would result in noise, air, and light pollution. These extensive environmental impacts must be considered together with the environmental impacts of the Bradwood Terminal because neither the terminal nor the pipeline extension would be built but for the other.

As in *Thomas v. Peterson*, the Bradwood Terminal would not proceed without access to California markets and the Palomar pipeline would clearly not be constructed "but for" the Bradwood terminal. 753 F.2d at 758-59. Similarly, as in *Save the Yaak*, the purpose of the Palomar pipeline extension is to connect the Bradwood Terminal to the California market. No indication exists that NW Natural and TransCanada would build the pipeline for any other reason. 840 F.2d at 720. These "inextricably intertwined" projects must be analyzed together in a single EIS. *Thomas v. Peterson*, 753 at 758-59. Failure to do so violates NEPA. 40 C.F.R. § 1508.25(a)(1).

The DEIS dismisses the need to discuss the cumulative impacts of the Palomar Pipeline Project with the proposed terminal by merely asserting:

the current route proposed by Palomar travels south away from areas impacted by the Bradwood Landing Project [and] cumulative impacts associated with the Palomar Pipeline Project would be primarily limited to the area near that Bradwood Landing LNG terminal location.

DEIS, at 4-446; see also DEIS, at 4-454 ("The Palomar Pipeline project would contribute to visual impacts as a result of tree clearing along the right-of-way. The cumulative impacts would be limited to the LNG terminal area since the proposed Palomar Pipeline would progress south and away from the other Bradwood facilities"); DEIS, at 4-456 ("The Palomar Pipeline . . . would be located within the immediate vicinity of the proposed LNG terminal, however, only a small portion of the project would be in the vicinity of the Bradwood Landing LNG terminal. Therefore, potential cumulative impacts on traffic from construction would likely be temporary and short term"). This analysis overlooks the fact that the two projects lack "independent utility" and must be analyzed in a single NEPA document. *Native Ecosystems Council*, at 894, citing *Wetlands Action Network*, 222 F.3d at 1118. Therefore, the proper inquiry is not limited, as the

DEIS assumes, to potential cumulative impacts within the geographic vicinity of the terminal; rather, FERC must consider the potential impact of both the Bradwood Terminal and the Palomar Pipeline Extension as one project. *Id.*

### FERC Fails to Adequately Address the Environmental Impacts of the Project in the DEIS

One of the primary goals of NEPA is to recognize "the profound impact of man's activity on the interrelations of all components of the natural environment." 42 U.S.C. § 4331(a). The reason behind this goal is to ensure each person "enjoy a healthful environment. . . and to contribute to the preservation and enhancement of the environment." *Id.* § 4331(c). In this DEIS, FERC fails to meet the requirements of a thorough and accurate assessment of all the environmental impacts of the project.

It is difficult to conceive of a project with greater unacceptable impacts to an area of such high ecologic value. The Oregon Department of Environmental Quality stated that it "has not been asked to review a project with in-water and wetland impacts of this magnitude **in the history of the 401 Certification Program**."<sup>128</sup>

DEQ recognized the enormous impact on protected resources, stating that even if mitigation is successful:

**the project will still result in a permanent loss of 33 acres of wetland and 58 acres of in-stream areas, as well as temporal losses from an additional 98 acres of temporary wetland impacts.** Not only is this **contrary** to both the intent and requirements for mitigation to fulfill permit requirements under the Clean Water Act, but it is of additional significance under the recent EPA elevation of the Columbia River to a national priority.<sup>129</sup>

FERC must make specific findings on the potential impacts of the project on the impact to: physical substrate; water circulation, fluctuation, and salinity; turbidity; contaminants; aquatic ecosystems and organisms; disposal sites; cumulative effects on the aquatic ecosystems; and secondary effects on the aquatic ecosystems. The DEIS fails to assess adequately the tremendous impacts on human environment.

### Terminal Dredging

#### Physical and chemical impacts

#### Dredging will degrade flow and create a sediment trap

The DEIS failed to consider the impacts of the dredging on the Columbia River. The proposed 58-acre hole dredged to 43 feet will permanently modify the geomorphology of the river bed, which will affect flow and erosion. The large hole will be located at the head of Clifton channel. The hole will decrease the river's velocity both within Clifton Channel and the

<sup>128</sup> Oregon Draft State Agency Comments. Oregon DEQ, at 10

<sup>129</sup> Oregon Draft State Agency Comments. Oregon DEQ, at 8

mainstem of the Columbia. The decreased velocity will harm salmon by increasing the travel time for smolts traveling to the ocean.<sup>130</sup> Increased travel time for smolts is already a severe problem for the affected salmon populations.<sup>131</sup>

The decreased velocity will also impact the geomorphology and aquatic life both upstream and downstream of the 58-acre hole. DEQ noted that these upstream and downstream impacts of the geomorphic changes "have not been fully analyzed by the applicant." The potential upstream and downstream impacts of the 58-acre hole include "unacceptable levels of erosion (banks on either side and around multiple in-stream islands), introduction of toxics to the waterway, habitat loss, and wetland loss – all of which reduce water quality."<sup>132</sup>

While the hole will decrease velocity, it will increase flow into Clifton Channel. Increasing flow into a channel will decrease channel stability, thereby decreasing substrate stability and increasing erosion.<sup>133</sup> Not only will there be increased flow into the Clifton Channel, but this increased flow will likely cause erosion at the mouth of the channel leading to further deepening. Removing sediment and leaving a hole in a river can cause downstream erosion of the channel bed.<sup>134</sup> This further deepening of the channel will in turn result in greater flows into the Clifton Channel.

Downstream of the dredge hole, the velocity will increase, which will cause scouring and erosion of the channel bed and shorelines. The erosion will be further exacerbated because there will be a lack of sediments to replace the channel bed sediments removed because of erosion. The dredged hole will act as a huge sediment sink, permanently starving the downstream area of Clifton Channel of sediments. This increases erosion and harms aquatic life that depends on sediment for habitat and the associated nutrients. This lack of replacement sediments is permanent because the maintenance dredging will continually remove the captured sediment from the system. When extraction of sediments outpaces the amount of sediments being transported from upstream, there will be a net loss of sediments for the system.<sup>135</sup>

FERC has failed to independently assess the veracity of the models used by Bradwood to predict the impact of the dredging on hydrology. Therefore, the DEIS fails to assess or fully disclose the environmental impacts. DEQ raised concerns about the Bradwood's modeling, stating, "initial review of the modeling presented raises questions about the appropriateness of the models used (e.g. why a 2-D model was used rather than a 3-D model which is available),

<sup>130</sup> Rhodes, Summary of Review of FERC Biological Assessment and Essential Fish Habitat Assessment for Bradwood Landing LNG Terminal. Report to Columbia River Intertribal Fish Commission, at 5.

<sup>131</sup> *Id.*

<sup>132</sup> Oregon Draft State Agency Comments. Oregon DEQ, at 4.

<sup>133</sup> Mitchell, B., Lind, P. and Robson, B. 1999. Hypothesis of the ecological genetics of environmental flows in lowland rivers. In Rutherford, I. and Bartley R. (Eds) Proceedings, Second Australian Stream Management Conference, Vol 1, Adelaide, pp addendum

<sup>134</sup> Rutherford, I. and Budaluy, M. 1996. A Sand Management Strategy for the Glenelg River and its Tributaries, Western Victoria. A Report to the Department of Natural Resources and Environment, Victoria and Southern Rural Water. Cooperative research Centre for Catchment Hydrology.

<sup>135</sup> Erskine, W.D., Geary, P.M., Oullet, D.N. 1985. Potential impacts of sand and gravel extraction on the Hunter River, New South Wales. Australian Geographical Studies 23, at 71-86.

lack of a physical basis for models used, and their predictive abilities given average results and highly complex relationships between erosion, sediment transport and deposition."<sup>136</sup>

The DEIS stated that modeling activities conducted by Bradwood indicate "hydraulic characteristics of the Columbia River and its channels caused by the proposed project would generally be minor." DEIS at 4-40. FERC should not have relied completely on modeling to assess changes in sediment and stream flow characteristics because models have a tendency to produce inaccurate data when trying to characterize highly complex systems. Models are useful to predict possibilities and for learning how different factors interact in a system. However, models do not predict the truth, only possibilities, and FERC should have taken into account other studies and observations pertaining to changes in stream flow and sediment transport resulting from changes in stream morphology due to dredging.

The Columbia River system is highly complex system, and it is unlikely that a model could account for all the factors in the system. For instance, factors that affect stream flow in the Columbia River include river flows, tides, flooding, river slopes, channel cross-sectional geometry, sediment characteristics, bedforms, shoreline stability, and many more factors too numerous to list. Failure to include even one factor in a model could produce results that are completely wrong, although past trials have produced results that closely resemble the river system under specific conditions. Despite these problems, FERC failed to assess the veracity of the models used by Bradwood for modeling the Columbia River.

FERC must further analyze stream flow characteristics and sediment transport through research of the literature or require Bradwood to conduct further studies. FERC improperly bases its conclusion on the models used by Bradwood and fails to conduct the thorough and accurate analysis required by the CWA.

Changes in current pattern and flow can degrade environmental values. The DEIS failed to analyze the adverse impacts to the: location, structure, and dynamics of aquatic communities; shoreline and substrate erosion and deposition rates; the deposition of suspended particulates; the rate and extent of mixing of dissolved and suspended components of the water body; and water stratification." 40 C.F.R. § 230.23. Because of the very large scale of the Bradwood dredging in a vital area of the estuary, FERC must thoroughly analyze each of these adverse impacts.

In addition, the geomorphic modification due to dredging affects the normal water fluctuations. The DEIS failed to consider the impacts to the changes in salinity gradient, nutrient balance, and dissolved oxygen balance. The DEIS failed to consider how these changes will adversely affect communities of aquatic life, induce populations of nuisance organisms, modify habitat, reduce food supply, restrict movement of aquatic fauna, and change the adjacent upstream and downstream areas.

FERC must also address concerns raised by NMFS that are not adequately addressed by the DEIS. NMFS noted that dredging has the potential to cause: changes in the morphology and hydraulics of the Clifton Channel; alteration of sediment transport in the main navigation channel and impacts to downstream Tenasillahe Island and the Lewis and Clark National

<sup>136</sup> Draft State Agency Comments. Oregon DEQ, at 4.

Wildlife Refuge; change in water circulation in the dock area to adversely affect shallow water habitat; scour at the shoreline from altered depth contours and from vessel berthing and unberthing at the terminal' and turbidity from the dredge activity, including suspended solids concentrations, size and duration of the plume. The DEIS's analysis of these issues, if it occurred at all, is wholly inadequate, and does not satisfy NEPA's duty to consider the environmental impacts of the project.

The DEIS acknowledges that the dredging will have "an influence on flow and sediment transport within the main navigation channel." DEIS at 4-40. Yet, it fails to discuss the extent of the change and the affect on aquatic life. In addition, Bradwood's models of sediment transport relied on in the DEIS are based on the incorrect assumption of uniform deposition within the turning basin. FERC must analyze the impacts under physically realistic conditions in which deposition will be greatest adjacent to the navigation channel.

Bradwood's assumptions regarding maintenance dredging are also problematic. Bradwood predicts it will need to dredge every 2 to 4 years. However, maintenance dredging is required if the turning basin or channel fills in with 1 foot of sediment. This may happen much quicker than 2 to 4 years. For example, the models indicate that in just 10 days of high flood water, a half foot of deposition would occur. The DEIS fails to analyze whether the maintenance dredging is realistic, especially in light of the predicted increased flooding due to global warming.

Further, the DEIS fails to consider the stability of the dredge walls. Bradwood proposes that the sides of the dredged area would be cut to a 3 (horizontal) to 1 (vertical) slope. This slope is too steep for the instable Columbia River sediments. Slope failure will occur, which will cause additional turbidity, toxic sediment problems, and require more frequent maintenance dredging. FERC must investigate the appropriateness of the 3 to 1 slope specific to this location.

**Dredging will increase turbidity, temperature, and decrease dissolved oxygen**

The DEIS fails to consider adequately the impact of pollutants caused by dredging. Dredging associated with the proposed Bradwood LNG Project will increase the turbidity of the river and lead to higher water temperatures. Turbidity has a number of adverse effects on water quality, including reducing light for photosynthesis by algae and plants, increasing temperature, and decreasing dissolved oxygen levels. Increases in temperature as a result of turbidity are caused by the suspended particles absorbing more heat from sunlight and, therefore, increasing the temperature of the water around the particles. The DEIS fails to analyze how water temperature will be changed due to increases in turbidity, and how any changes in water temperature resulting from increased turbidity due to dredging activities will exacerbate the ODEQ 303(d) water quality-limited status of these waters. Also, as a result of turbidity and increased water temperatures, dissolved oxygen levels and light will be decreased harming aquatic biota including federally protected fish species. The DEIS also fails to disclose and consider that the dredging will violate water quality standards ("WQS") in Oregon and Washington.

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The potential turbidity increases and the impact to aquatic life are great due of the large size and long duration of the dredging. DEQ stated:

Dredging is proposed to occur **non-stop** (24 hours per day, 7 days per week) for 2-3 months. No other proposal for dredging in the Columbia has operated 24-hours per day, 7 days per week for multiple months. Impacts to **13 listed salmonid species/ESUs, sturgeon** . . . , resident aquatic organisms (mammals, fish, amphibians and reptiles, invertebrates, sediment dwellers), and terrestrial species are not fully identified or known based on non-stop action over this duration, as it is unprecedented. **Potentially debilitating impacts to these species include noise, continuous light, suspension of sediment, turbidity, loss of salmonid habitat** and ability to rest or avoid predation, and potential attractant for sturgeon to a dangerous construction zone.

Oregon Preliminary Comments at 11. The DEIS fails to consider adequately any of this impacts described by DEQ.

Consultant Jonathan Rhodes noted that dredging will significantly increase turbidity, which will have negative effects on salmonids by impairing their ability to feed and by causing gill damage.<sup>137</sup> Elevated turbidity can also adversely affect benthic macroinvertebrates, upon which salmon and other organisms rely for food.<sup>138</sup> The long-term and constant nature of this dredging are particularly troubling and distinguish this project from smaller dredging operations that occur in the Columbia River. This controversial project requires close scrutiny. FERC must analyze and make findings on the size, scope, duration, and intensity of the dredging, and how each affects aquatic life.

The DEIS also suffers from factual errors, faulty analysis, and a simply lack of depth of understanding. The DEIS states that dredging will "result in a temporary increase in suspended solids in the water around the dredged area and the subsequent settling of the suspended particles, or sedimentation." DEIS at 4-69. In addition, the DEIS states that "[t]he maximum additional suspended solids concentration in the water column resulting from dredging activities would range from a high of 1 milligram per liter (mg/L) at the dredge site to less than 0.1 mg/L before reaching Tenasillahe Island." DEIS at 4-41. FERC provides no justification for these assumptions. Are they from modeling and, if so, what assumptions were used? FERC gives no basis to evaluate these numbers. Model predictions for turbidity "are often highly inaccurate."<sup>139</sup> The DEIS does not provide any information on the accuracy of models, despite the widely known belief of the inaccuracies of turbidity modeling.

In addition, the DEIS asserts that there will only be 0.5 percent spillage of sediments during dredging, but again fails to qualify how it reached that number. DEIS at 4-69. In fact, research has revealed that problems leading to increased turbidity can arise using cutterhead

<sup>137</sup> Rhodes, Summary of Review of FERC Biological Assessment and Essential Fish Habitat Assessment for Bradwood Landing LNG Terminal. Report to Columbia River Intertribal Fish Commission

<sup>138</sup> Id.

<sup>139</sup> Id at 6.

dredges when dredging hard-packed sand<sup>140</sup> The DEIS notes that “[t]he results of grain size analyses indicated that the sediments in the proposed dredging area generally consist of sands.” DEIS at 4-33. But, the DEIS also states that sampling zones in the proposed dredging areas include “dense gravel layers, wood, and densely packed sands.” DEIS at 4-32. The DEIS concluded that dredging activities will lead to minor turbidity impacts, but it failed to properly analyze the impact of diverse substrates. The hydraulic cutterhead dredging equipment may encounter difficulties that may lead to further turbidity and pollution due to gravel, wood, and densely packed sand. The DEIS fails to evaluate how the cutterhead dredging equipment will operate under these conditions. FERC should require Bradwood to propose a plan to deal with difficulties encountered during dredging.

Although some specially designed hydraulic cutterhead dredges may reach 0.5 percent spillage, the DEIS fails to disclose what kind of cutterhead dredge will be used by Bradwood for dredging. This is vitally important information for the public to assess the veracity of these statements because without knowing what type of cutterhead dredge will be used, the public can not begin to evaluate what kind of sedimentation will be caused by Bradwood’s dredging activities. Furthermore, any modeling conducted on behalf of Bradwood is suspect until justification is given for using a 0.5 percent spillage rate. All cutterhead dredges are not the same. Studies indicate that conventional cutterhead dredging “can liberate considerable amounts of turbidity and associated contaminants to overlying water.”<sup>141</sup> Additionally, selection of the proper cutterhead for the type of sediment, in addition to correct rotational speed and hydraulic suction, to obtain reduced suspension rates of sediments is rarely achieved. (Herbich 2000). Therefore, knowing not just the type of cutterhead dredge used but the anticipated methods of using the dredging equipment are important factors that must be disclosed for the public to properly analyze the effects of dredging at the proposed Bradwood LNG Project. FERC must make specific findings on the types of dredging equipment in order to fully analyze the impacts dredging will have on turbidity and overall pollution.

DEQ recognized that Bradwood’s proposed dredge equipment may be inadequate:

All dredging is proposed to be accomplished via hydraulic suction. However, 12 of 31 cores planned for sediment sampling to depth (-43 ft) hit refusal before reaching proposed depth. The contractor’s assumption was that obstructions were caused by dense gravel layers, wood and densely packed sand comprising an identified layer of consolidated sediments. No information is offered as to the ability of the proposed hydraulic equipment to penetrate the consolidated materials. Procedures proposed by FERC for removing obstructions in channel deepening include using a clam shell bucket and blasting. Both of these methods may result in significantly deeper disturbance and greater impact to remove erratic materials. Further analysis and justification is required for such contingency measures.

<sup>140</sup> Kato, H., Y. Segai, Y. Takei and T. Harada. 2000. Development of Dredging Method for Hard-Packed Sand. Underwater Technology. In Proceedings of the 2000 International Symposium on Underwater Technology, pages 508-512, Tokyo, Japan.

<sup>141</sup> Cooke, G.D., E.B. Welch, S.A. Peterson and P.R. Newirth. 2005. Restoration and Management of Lakes and Reservoirs, 3 ed. CRC Press, New York, NY, 616 pages.

Oregon Preliminary Comments at 5.

FERC, therefore, must analyze the turbidity caused by the various types of dredges that may be utilized, including clam shell dredge and blasting. These dredge methods will produce significantly more turbidity.

In addition, the DEIS failed to consider adequately the impacts of maintenance dredging. Maintenance dredging will result in further degradation of water quality through repeated resuspension of sediments. The DEIS asserts that maintenance dredging will occur about every 2 to 4 years and Bradwood estimates they will dredge approximately 80,000 cubic yards of sediment during each maintenance cycle. DEIS 4-76. However, the DEIS fails to inform the public how Bradwood calculated the maintenance dredging frequencies and amounts. Furthermore, the large variation in frequency shows a substantial uncertainty in the calculations. If dredging must be conducted every 2 years as opposed to 4, there will be twice as much disturbance and twice as much dredged material removed, leading to higher turbidity impacts upon the river. A great number of complex factors are associated with how often dredging will be needed, including whether over-dredging will be allowed initially and sediment transport processes of the dynamic Columbia River. FERC must reanalyze maintenance dredging and provide a more thorough analysis on how often dredging activities will be conducted and how much dredging material will be removed. Without this information the public and FERC can not possibly evaluate the impact maintenance dredging will have on water quality and the effects on organisms in the river.

The DEIS also fails to analyze what will be done with any possibly contaminated water from dredging activities. Hydraulic cutterhead dredging techniques require a lot of water to be sucked up with the solid sediments. If Bradwood encounters a contaminated area when dredging, how will they dispose of the contaminated sediment and water associated with the contaminated sediments? Worse, how will they know that the sediment is contaminated?

Release of such contaminated water back into the river after mixing with contaminated sediments can be highly toxic to aquatic life. Additionally, release of the contaminated water onto land can contaminate ground water resources or run back into the river. Bradwood proposes that “all or most of the dredge water will percolate into the sandy soil at the site.” DEIS at 2-40. First, there is no analysis of the volume of water discharged by the hydraulic dredge and the permeability of the soil to absorb this volume. Second, there is no analysis of the run-off of water into the Columbia River if only “most” of the water is absorbed. Third, there is no analysis on the effect of toxic or other contamination percolating into the soils, and potentially reaching the groundwater or being discharged back into the river via surface or subsurface flows. Last, there is no analysis of the contamination of the soil on site and the associated effects on plants and animals. The DEIS fails to analyze each of these issues and FERC has failed to require Bradwood to produce a plan to deal with contaminated sediments and water from dredging activities before approving the project. FERC cannot produce a final EIS without such a plan.

The DEIS also failed to analyze how Bradwood's long-term dredging will increase water temperature in the Columbia River near the dredging. Dredging increases temperature because the suspended particles absorb more heat from sunlight. In response to channel deepening dredging on the Columbia River, DEQ stated, "this project is expected to result in an increase in surface water temperatures during the low flow time of year both during dredging and flowlane disposal as a result of increased turbidity. . . . Temperature contributions are particularly problematic given the water quality limited listing for temperature in the lower Columbia River."<sup>142</sup>

The DEIS also failed to analyze adequately how dredging will decrease dissolved oxygen near the site because dredging increases the oxygen demand by disturbing sediments. In response to the proposed channel deepening dredging on the Columbia River, DEQ stated, "this project is expected to exert an oxygen demand both during dredging and flowlane disposal."<sup>143</sup> Similarly, Bradwood will exert an oxygen demand during and after initial dredging and maintenance dredging. The oxygen demand will increase when Bradwood dredges through organic matter, uses alternative dredging methods, such as blasting and clam shell dredges. The oxygen demand will also increase due to shoreline erosion caused by the hydraulic and geomorphic changes in the river. Like temperature, the Columbia River is water quality limited for dissolved oxygen so no increase in oxygen demand is acceptable.

All of the physical and chemical changes discussed above are exacerbated by the large-scale channel deepening in the lower Columbia River, which the DEIS fails to consider at all. The channel deepening alone will have detrimental impacts on the physical and chemical characteristics of the lower Columbia River. The DEIS failed to analyze the cumulative effects of the Bradwood dredging, taking into account the channel deepening, increased ship traffic from both the channel deepening and LNG tankers, the increase erosion from both projects, increased wave action, and geomorphic and hydraulic changes.

#### **Dredging will introduce toxic pollutants from bed and shoreline sediments**

The DEIS fails to assess how aquatic life in the estuary will be harmed by the resuspension of contaminated sediments into the water column. This harm will be especially acute adjacent to or in the dredging area. Sediments in rivers are often implicated for their tendency to store large amount of contaminants, which may turn into a significant source of contamination to aquatic and terrestrial organisms if disturbed.<sup>144</sup> This is a particularly serious problem in the Columbia River estuary. FERC must examine all available data, including data generated from the channel deepening, to determine potential contaminants. FERC must also conduct a site-specific analysis at Bradwood, as well as all of the upstream and downstream areas where hydraulic and geomorphic modifications may mobilize sediments. The DEIS fails

<sup>142</sup> Letter from DEQ to Colonel Butler, ACOE, September 29, 2000 at 2.

<sup>143</sup> Letter from DEQ to Colonel Butler, ACOE, September 29, 2000 at 2.

<sup>144</sup> Landrum, P. F. and J. A. Robbins. 1990. Bioavailability of sediment associated contaminants: A review and simulation model. *Sediments: Chemistry and Toxicity of In-Place Pollutants*. R. Baudo, J. P. Giesy and H. Muntau, Eds. Lewis Publishers, Chelsea, MI. Chapter 8, pp. 237-263.

entirely to assess the complete impact of contaminants on salmon, macroinvertebrates, and other aquatic life.

The DEIS claims that no contamination in the proposed dredging area would adversely affect water quality based on studies conducted by Bradwood. DEIS at 4-39. However, based on the information given in the DEIS, the sampling methods were flawed and were not representative of the potential contamination in the area. Furthermore, FERC was unable to address the negative impacts to aquatic organisms that are associated with the presence of phytosterols in the DEIS. FERC must reevaluate the sampling procedures and require Bradwood to conduct a more accurate and thorough sampling process. The DEIS also failed to obtain information on the effects phytosterols may have on aquatic organisms in order to more accurately assess the danger of dredging activities to the ecosystem.

The study conducted by Bradwood and used by FERC for analysis of contamination in the sediments in the DEIS has a flawed design and was not able to accurately represent whether sediments in the area are contaminated. According to Bradwood's own Sampling and Analysis Plan ("SAP"), the sampling approach used to test sediments in the dredge area for contamination was a "biased sampling approach." Bradwood, and the company they hired to conduct the sampling, claimed that such an approach has the benefit of concentrating on areas where greater volumes of sediment are to be dredged. This is a fundamentally flawed approach, as bias is a prejudice that all truly scientific methods seek to avoid. Picking and choosing where to sample is not an acceptable method to obtain reliable data on whether sediments in the dredge area are contaminated. A truly random sampling approach would have yielded much more reliable results. Granted, transects may be used to concentrate on specific areas of interest. However, the SAP and the DEIS make no mention of any random sampling techniques to be used along the transects to choose sampling locations. The use of the biased sampling approach fails to analyze the toxic contaminants and fails to inform the public of the environmental risks.

Not only are the results flawed because they depend on some biased sampling location selection method, but the DEIS does not present any statistical analyses to justify how such a sampling scheme could possibly represent whether the sediments in the dredge area are uncontaminated. FERC cannot rely on such questionable scientific methods.

How did Bradwood reach the conclusion that five core locations within seven horizontally delineated areas were sufficient to represent contamination of the whole dredging area? Furthermore, why did Bradwood think that areas with the thickest deposits of proposed dredge material would be inherently more reliable in testing for contamination in the dredge material than other areas? Even a random sampling technique has problems associated with missing "hot spots," as discussed below, but the sampling technique used by Bradwood does not even approach the statistical and methodological reliability of a random sampling technique and is, therefore, practically meaningless. These blatant oversights indicate the lack of depth of analysis that FERC and Bradwood have conducted in evaluating possible contamination in the dredge area. Based on these sampling techniques, the public can not make any meaningful evaluation of whether contaminated sediments are present in the dredging area. FERC must review the sampling location techniques used by Bradwood and require a more thorough and reliable examination of contamination in the dredge area sediments.

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Not only were there problems associated with a biased sampling approach, but there were also problems associated with the methods of actual collection and analyzing of the samples collected. FERC states that there were a number of partial refusals at various locations throughout the sampling area. DEIS at 4-32. The company hired by Bradwood to conduct the sampling then omitted those samples with partial refusals from compositing and analysis in the laboratory. *Id.* However, NMFS required Bradwood to go back and sample at least 7 of the 12 sites where partial refusals occurred. *Id.* Why didn't FERC require Bradwood to collect samples at all 12 sites where partial refusals occurred? Not only does the lack of these samples further degrade the reliability of an already flawed sampling regime, but it completely ignores the possibility of contamination in those locations. Just because there were partial core refusals in those locations does not mean Bradwood will not dredge those locations to their full depth as required by the plans. The DEIS failed to analyze contamination at the partial core refusals. Contamination may be concentrated in these areas due to accumulation in organic matter or different types of sediments. If FERC will not require a more reliable sampling and analysis scheme as discussed above, at the very least these sampling locations must be included to analyze for possible contamination.

After NMFS requested additional laboratory analyses on some of the previously taken samples, FERC found that these samples had been "inadvertently discarded by laboratory staff." DEIS at 4-32. In order to rectify the situation, Bradwood collected "replacement samples" from the "same seven core locations" in February 2007. *Id.* The DEIS fails to give enough information regarding these replacement samples. It goes without saying that a laboratory that discards unanalyzed samples after such a short period of time shows an alarming lack of competency. The DEIS fails to support with evidence its contention that the dredging contamination will not significantly affect aquatic resources.

The problem of missing samples is further compounded by Bradwood retrieving samples from the "same seven core locations." Either FERC has not adequately explained the retrieval of replacement samples, or Bradwood actually did carelessly sample from the same exact locations. Sampling from the same locations to where the original samples were taken would not represent contamination in the surrounding areas because the sampling location would likely have been filled back in with new sediments that filled the hole where the last core was taken. Even if Bradwood did not use the same exact core location, care should have been taken to ensure a retrieval of replacement samples from undisturbed sites, especially if very near to the original coring sites. The original core could have moved sediments around and destroyed the integrity of the surrounding sediments. Therefore, FERC should require Bradwood to collect new samples that are more likely to represent the sediments in the dredged area.

Compositing multiple core samples can also cause a serious problem with measurements of contamination in sediments. FERC states in the DEIS that material from specific strata were composited together by same area to yield a total of 18 sediment samples. DEIS at 4-30. Although this method helps save time by reducing the amount of samples to be analyzed, in addition to arguably representing an average of the area, more reliable data on the contamination of sediments can be achieved by analyzing each sample separately. Compositing samples together by strata may cause dilution of any contaminants found in one sampling location. For

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instance, a sampling location may have high levels of dioxins, but when mixed with sediments from another core may reach levels below the threshold levels required to be reported as toxic to humans or aquatic species. This phenomenon represents the "hot spot" theory, where contamination may be localized in small areas. Bradwood's practice of compositing samples together essentially ignores the possible existence of "hot spots," where high levels of contamination may be present. When disturbed by the dredging, these hotspots may adversely affect aquatic life. Therefore, compositing samples by strata from the same area is not a reliable method to test for contamination.

In addition, compositing samples only works to get an average contamination for an area when the ratio of the number of samples to the area of sampling is relatively high. In Bradwood's study, large sampling areas were used with relatively few samples. Additionally, many areas had partial refusals and samples were omitted from laboratory analysis, thus further destroying the integrity of the compositing method. Bradwood should not be allowed to conduct a very cursory examination of contamination in the dredge sediments. Costs may be higher if each sample is analyzed individually, but the reliability of the data is worth the cost when the safety of this fragile ecosystem is at stake.

Not only does compositing multiple core samples cause problems such as missing "hot spots," but using large vertical sections, or strata, to delineate samples can also cause problems. The DEIS states that three strata were considered for each sample: 1) the top 4 feet, 2) the region from 4 feet to 10 feet, and 3) the material from 10 feet to project depth. DEIS at 4-30. What justification did Bradwood give for using such depths to delineate between samples? These cross-sections of the cores seem too large to accurately represent whether contamination is present in the soil. For example, if there is a contamination "hot spot" in only a few inches of sediment near the top of the core, the contamination is diluted when mixed with the sediment from the rest of the stratum, especially when multiple samples are composited as Bradwood did in this study. Therefore, using such large strata may not accurately represent the presence of contaminants at certain vertical layers of the sediment in the proposed dredging zone. FERC should require a more thorough analysis of the sediments based on these observations and require Bradwood to use smaller strata for sampling procedures. Based on the available sample data, that Corps cannot demonstrate that dredging will not unacceptably harm aquatic life.

FERC should require Bradwood to not only redo sampling as discussed above, but analyze individual samples with out compositing. As the data presented in the DEIS stands, the public can not meaningfully evaluate the contamination levels because of these flaws in the sampling techniques. Other studies funded by the Lower Columbia River Bi-State Commission and conducted by Tetra Tech, Inc. indicate high levels of contamination in the vicinity of the proposed Bradwood LNG Project.<sup>145</sup> The data from these studies has been submitted to FERC on previous occasions but has been virtually ignored. Data from these studies show contamination in the area based on tissue stacks of various aquatic organisms, including resident and migratory fish. These studies have the advantage over the inadequate sampling techniques carried out by Bradwood because they more fully represent contamination levels in sediments and the water column around the Bradwood Landing area. This fish tissue study was conducted by a true scientific method with little to no bias in sampling, as opposed to the methods used by

<sup>145</sup> Bi-State Commission, Lower Columbia River Contaminant Ecology, April 1996.

Bradwood. In addition, the fish tissue sampling techniques takes into account "hot spot" areas of contamination because they are in effect sampling the contamination levels of all sediments in the area, as opposed to picking and choosing which sediments to test. Moreover, fish tissue studies take into account bioaccumulation, which is an important factor to consider when determining the health of the ecosystem and possible detrimental impacts of the system due to dredging activities. The DEIS fails to analyze or disclose the fish tissue data from the Bi-State Commission studies. This data is critical to understand future impacts to the system from the proposed dredging. Also, given the observations above concerning the inadequacy of the sampling and analysis methods used by Bradwood, and given the Bi-State Commission data clearly showing contamination in the area, FERC should require Bradwood to conduct a more thorough and accurate sampling and analysis of the dredge area.

The DEIS indicates that phytosterols were found in the proposed dredge sediments but fails to analyze the effects phytosterols will have upon aquatic organisms if the phytosterols are released from dredge material. DEIS at 4-38. As the DEIS points out, phytosterols "may have reproductive effects and be responsible for some types of reproductive dysfunction observed in fish ..." *Id.* The DEIS further acknowledges the uncertainties regarding how the observed levels of phytosterols found in the sediment might affect fish, but also attempts to reduce concern about phytosterols by simply relating them to TOC levels found in the proposed dredge materials and noting the limited potential for mobilization of phytosterols based on this relationship. *Id.* This characterization is an oversimplification of the possible hazards to fish and other aquatic species from possible exposure to phytosterols from dredging activities. The DEIS fails to explain how phytosterols enter the food chain nor the bioaccumulation effects of these chemicals. FERC admittedly does not fully understand the toxicity of phytosterols. Not only are FERC's statements in the DEIS suspect due to the lack of knowledge concerning the effects of this chemical, but the public can not properly evaluate the dredging activities as a result of this lack of knowledge.

In addition, the DEIS failed to consider that the Bradwood dredging may degrade water quality conditions by introducing, resuspending, or making bioavailable the additional pollutants. DEQ noted that the geomorphic and hydraulic changes in the river due to dredging may cause erosion that introduces new toxic materials from the banks. DEQ stated:

Although in-stream sediments proposed for removal have been tested for contaminants, bank materials which may be eroded inadvertently have not been tested. No information is provided as to the historical and current pesticide and fertilizer applications in areas potentially susceptible to erosion and which have been exposed to agricultural or silvicultural practices. Inadequate analysis of bank stability during dynamic adjustment of the river to dredging could introduce bioavailable toxics to the water column and sediments that were previously tied up in upland material. Precaution in this regard is particularly important as data is scarce and implications are just beginning to be studied through the initiatives of EPA's and DEQ's toxics reduction goals in the high priority Columbia River system.

Oregon Preliminary Comments at 11.

FERC must address these concerns. FERC must thoroughly analyze any possible input of sediments from the shorelines that may contain toxic contamination. It is highly likely that the former industrial site at Bradwood is contaminated, and adjacent sites may also contain contamination from upstream sources. DEQ specifically notes that dredging could cause bank failure of the contaminated soils at Bradwood. DEQ stated:

Additionally, stability of the former log pond at various stages of fill has not been analyzed with regard to dynamic changes to the river induced by dredging at the berth/burning basin and for channel deepening. Side slope sloughing in-stream caused by dredging could result in bank failure, which may release dredged sediment to fill the former log pond. The DEIS needs to thoroughly evaluate and address the impacts to the stream and habitat from a sudden release of up to 300,000 cy of sediment under this potential scenario.

Oregon Preliminary Comments at 11.

FERC must analyze the impact of hydraulic and geomorphic changes due to dredging, which causes erosion and introduces toxic materials from the shorelines. FERC cannot rely on FERC's analysis because, as noted by DEQ, FERC did not analyze this potentially serious impact.

The dredge samples also demonstrate that the Bradwood area contains heavy metals in concentrations toxic to fish and other aquatic life. FERC fails to analyze the cumulative effects of the metals, including the additive and synergistic effect of the combination of metals, on aquatic life. Bradwood's dredging samples detected arsenic, chromium, copper, lead, nickel, and zinc, along with mercury and selenium. The chromium exceeded the reference levels, which indicates high chromium levels that may be harmful to aquatic life. While the other metals were, according to FERC, "within the range of nearby background levels," DEIS at 4-34, this does not mean that the toxic metal levels in the sediments are safe for aquatic life. First, the reference levels may also be unsafe. FERC does not explain the purity of the reference locations so the relative comparisons do not mean anything. Second, because these metals are acutely toxic, small variations can have a strong adverse effect. Therefore, FERC must analyze the metal concentrations in the sediments and assess how the toxic pollutants will affect aquatic life once the sediments are disturbed by dredging, maintenance dredging, and the long-term disruption of flow patterns. FERC should note that the metal concentrations in the sediments exceed the water quality criteria for each pollutant. The DEIS fails to inform the public about the toxic pollutants in the sediment.

Additional pollutants also raise concerns which are not analyzed in the DEIS. For example, excess total organic carbon may degrade water quality. Dredge samples showed a value of total organic carbon up to 0.78 percent, compared to reference sites of 0.05 percent. In addition, total volatile solids samples of up to 1.61 % were twice as high as the value of reference sites.

FERC must also analyze the affect of the organic compounds made available by dredging on aquatic life. Bradwood has identified samples containing PAHs and phthalates above reference levels. Due to the former industrial activity at the site and the upstream industries, the site may also contain PCBs, pesticides, dioxin and furans, sulfides, and ammonia. FERC fails to analyze whether the dredging will introduce any of these pollutants into the water column or the biota.

NMFS raised concerns about the presence of guaiacols, retene, and resin acids due to the site's history as a lumber mill. Several of these compounds do not have a screening level. FERC must analyze and make findings on whether the dredging of sediments containing these compounds may adversely affect aquatic life. If FERC is unsure of the data or the toxicity levels to fish, FERC must make these uncertainties clear and fully disclose all potential impacts. See 40 C.F.R § 1502.22

**Biological impacts**

**Dredging will cause loss of habitat**

Bradwood's dredging acres will result in the permanent destruction of at least 58 acres of prime salmon habitat. A portion of the dredged area is critical shallow water habitat. The area adjacent to Bradwood is widely recognized as vital fish habitat. The Columbia River is considered the "lynchpin" of salmon recovery.

The Bradwood Biological Assessment stated:

The Lower Columbia Estuary has been identified as a **critical area for restoration** (Johnson et al., 2003, Bottom et al., 2005). **Restoring diverse, complex, and interconnected wetland habitat would increase productivity and availability of shallow-water habitat, and expand transition areas for juvenile salmon** (Lott, 2004). Additionally, it is believed that improvements to estuarine habitat would result in significant population increases (Kareiva et al., 2001, Bottom et al., 2005) ... Juvenile salmon occur in the estuary all year, as different species, size classes, and life history types continually move downstream and enter tidal waters from upstream (Bottom et al., 2005). **Reconnection of isolated high-quality fish habitats is a high priority to restoration strategies for the watershed and for fisheries restoration projects generally** (Roni et al., 2002). Restoring the tidal estuarine habitat of the lower Columbia River is a priority in many conservation plans for the area including the Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan (2004), Lower Columbia River Estuary Program Comprehensive Conservation and Management Plan (1991), and recovery plans for salmon ESUs occurring within the lower Columbia River (NMFS, 2006f).

Biological Assessment at 6-2.

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The proposed dredging is the antithesis of salmon recovery and restoring estuarine habitats, as described in every local, state, and federal management plan. Quite simply, we cannot recover threatened salmon while simultaneously permitting this huge dredging project. Bradwood is a prime example of an unacceptable project due to its size, scope, and location in critical salmon habitat. The DEIS fails to discuss how the dredging and the project overall will affect salmon recovery. Thus, FERC violates 40 C.F.R § 1502.16(c) by failing to discuss possible conflicts between the project and the objectives of federal, state, local and tribal conservation policies for this site and the estuary.

The project will destroy habitat for 13 ESUs of Columbia River and Snake River salmon that are listed as threatened under the ESA, in addition to multiple other non-listed salmon and other species that rely on the estuary for rearing and migration. Each fish species likely passes directly through the proposed site. The DEIS fails to adequately consider the impact to the millions of individuals of salmon, sturgeon, lamprey, and other resident species that utilize this area as habitat at various times in their lifecycles.

FERC must evaluate the impact of the dredging and the project overall on estuary and fish health. FERC cannot rely on the insufficient DEIS in this regard. Despite its bulk, the DEIS fails to include any new field data regarding the impacts on salmon. The DEIS fails to include background information on fish migratory and behavior. FERC cannot assess the impact of this project if it does not present basic data on the aquatic resources present and how these organisms utilize the region. The DEIS also fails to assess the how the aquatic life, including salmonids, will be affected by the dredging and associated habitat changes. Assessing the impacts is a common scientific practice under readily available methods. It is shocking that the FEIS presented no data whatsoever on salmon migration, rearing, or spawning use of Clifton Channel, Hunt Creek, the adjacent mainstem, Puget Island, Tenasillahe Island, or other affected areas. FERC cannot evaluate the impact on salmon, or issue this site certification, without collecting site specific data and analysis on salmon.

Compounding the problem of dredging at this location is the fact that the Bradwood area is listed as designated critical habitat for threatened salmon species. This habitat must be protected. Yet, if FERC approves this permit, the destruction of critical shallow water habitat "will be certain, permanent, and immediate."<sup>146</sup> The DEIS fails to assess the cumulative impact of destroying critical habitat on salmon, and on the economy and ecology of the estuary and the Columbia River Basin. The DEIS focuses on mitigation, but fails to discuss adequately less harmful alternative that eliminate or minimize the impacts.

**Dredging will introduce pollutants**

As discussed above, the dredging will harm aquatic life by introducing multiple pollutants contained in the dredge sediments and on the shorelines. FERC must evaluate the effect of each pollutant, alone and synergistically, on the health of salmonid and other aquatic life. The adverse effects of excess temperature, turbidity, oxygen demand, chromium, and silver and other toxic pollutants is well known. The dredging will increase each of these pollutants,

<sup>146</sup> Rhodes, Summary of Review of FERC Biological Assessment and Essential Fish Habitat Assessment for Bradwood Landing LNG Terminal. Report to Columbia River Intertribal Fish Commission, at5.

which will harm aquatic life. In addition, FERC must understand the effect of multiple each toxic, organic and traditional pollutant associated with dredging and erosion near Bradwood. The DEIS failed to collect adequate data. Other than a few questionable sediment cores (discussed above), the DEIS presents no data on the contaminant levels, and absolutely no data on the impact to fish. Because the adverse effects on fish is a major impact, the DEIS should have contained significant coverage of this issue.

Surprisingly, FERC did not analyze the tissue sample studies in this region that show high concentrations of toxic pollutants in fish tissue. The bi-state commission concluded that tissue samples were a more reliable measure of the pollution problem in the vicinity of Bradwood, and study of these tissues indicated significant chemical contamination problems in the Bradwood area. Disturbance of the area is likely to exacerbate the problem. Additionally, studies indicate that sediments prone to contamination should not be disturbed, and that the Bradwood site (which is close to the study area for LCREP, the Julia Butler Hansen Wildlife Refuge) should raise more serious concerns about the potential for release of bioaccumulative chemical contamination. Ultimately, the DEIS fails to examine how potential bioaccumulation will impact key wildlife species such as osprey, peregrine falcons, bald eagles, cormorants, river otters, and other predators. FERC must assess these impacts.

#### **Dredging will decrease the velocity of the river in Clifton Channel**

In addition, as discussed in detail above, the dredging will harm salmon and other aquatic life by reducing river velocity due to the modified hydraulic and geomorphic regime. The decreased velocity will slow the out migration time of smolts on the way to the ocean. FERC must analyze the cumulative impacts of this harm to salmon and whether alternatives exist to minimize the harm.

#### **Dredging light, noise and vibrations will harm species**

The intensity of Bradwood's dredging is unprecedented in the Columbia River. DEQ stated:

Dredging is proposed to occur **non-stop** (24 hours per day, 7 days per week) for 2-3 months. No other proposal for dredging in the Columbia has operated 24-hours per day, 7 days per week for multiple months. . . . **Potentially debilitating impacts to these [aquatic] species include noise, continuous light, suspension of sediment, turbidity, loss of salmonid habitat** and ability to rest or avoid predation, and potential attractant for sturgeon to a dangerous construction zone.

Oregon Preliminary Comments at 11 (emphasis added).

The DEIS fails to analyze adequately the effect of this barrage of noise, light, and vibration on salmonids and other resident species. The DEIS acknowledges that sound pressure levels produced during dredging activities could affect some fish, marine mammals, and other aquatic organisms, but also notes the paucity of information on the effects of exposure to underwater sound on most aquatic organisms. DEIS 4-135. Furthermore, the DEIS states the

range of sound levels from dredging activities can be quite variable and attempts to dismiss the adverse impacts to aquatic organisms by citing studies (Richardson et al. 1995; Hanson et al., 2003) that purport sound ranges from dredging generally range from 112 to 160 dB, which is unlikely to cause physiological harm. *Id.* This analysis is completely insufficient to address the possible impacts to aquatic organisms from sound produced during dredging activities. If the sound levels are highly variable, as the DEIS points out, the sounds can reach levels higher than those listed by the studies above and may in fact cause physiological harm to organisms. The DEIS must consider the effects of this harm.

Furthermore, FERC admits there is a lack of information about the effects of sound levels to aquatic organisms, especially fish. What are the effects on aquatic organisms from long duration exposures to different levels of sound? This is important to know because Bradwood admits dredging activities may last up to 72 days and be conducted 24 hours a day, 7 days a week. FERC must require Bradwood to conduct further studies on how the fish and other aquatic organisms specifically found in the area to be dredged will be impacted by increased sound levels and the effects of long duration exposure to those sound levels during dredging. The DEIS fails to assess the impact on individuals and the cumulative effects on populations and aquatic communities due to dredging disturbance.

The DEIS also fails to analyze the effect of light pollution during dredging activities. Numerous studies show light can affect a variety of aquatic organisms and may attract or repel such organisms. According to the DEIS, dredging activities will be conducted 24 hours a day and 7 days a week. DEIS at 391. The DEIS does not indicate whether lighting will be used on the dredging ships during times of darkness. If so, lighting impacts to aquatic species during dredging activities should be analyzed by FERC. Possible adverse impacts caused by lights during dredging activity could be attraction of fish or aquatic organisms to the dredging area, causing harm either by increased sound levels, turbidity levels, or the possibility of harm from contact with the cutter head dredging equipment. FERC should analyze the effects any lighting during dredging activities will have on aquatic organisms so that FERC and the public may fully evaluate the impacts of dredging activities.

#### **Dredging will entrain salmonids**

The DEIS fails to analyze the impact of entrainment of salmon and fails to consider dredging alternatives. The proposed hydraulic cutterhead dredge method will entrain juvenile fish, including threatened salmonids, as well as benthic organisms critical to salmon diets. The DEIS stated, "hydraulic dredging has the potential to capture small fish and aquatic invertebrates in the flow of water and entrain them along with dredge materials being suctioned." DEIS at 3-52. These suctioned dredge materials and the fish will be deposited on shore, where the fish will asphyxiate if they survive the transport through the suction hose. With mechanical dredging, which Bradwood does not plan to use, "fish would be less likely to be entrained with the dredged materials compared to hydraulic dredging." DEIS at 3-53. Bradwood chose hydraulic dredging because it is not as cost effective as hydraulic dredging. The DEIS failed to analyze the alternative methods of dredging or alternative means to mitigation harm to fish.

FERC must analyze the impacts of fish entrainment due to dredging. FERC must consider the fact that the fish killed will include salmonids listed as threatened under the federal ESA and the Oregon ESA. In analyzing the impact to salmon and aquatic life, FERC must consider that cumulative impacts on aquatic life, including the impacts from dredging, terminal construction and operation, pipeline construction and operation, as well as the impact of the channel deepening dredging.

### Dredge material disposal will harm aquatic life

Not only will the actual dredging of the berth and ship maneuvering areas have a substantial impact on the environment, but the disposal of the 700,000 cubic yards of dredge spoils will also cause problems. According to the DEIS, Bradwood plans on placing between 350,000 and 400,000 cubic yards of dredge material at the LNG terminal site. DEIS at 4-70. The remaining 300,000 to 350,000 cubic yards of proposed dredge material will be disposed of at the Wahkiakum County Sand Pit site. DEIS at 4-71. Yet, the DEIS fails to analyze the impact of this substantial dredge disposal, and fails to consider the cumulative impact of this dredge disposal with the dredge disposal from the channel deepening dredging.

Disposal of dredge material at the terminal site will result in pollution to the Columbia River. Bradwood proposes to construct a perimeter berm to form a basin into which dredge materials will be placed. Filling this constructed basin with dredge materials will not only destroy the log pond, which is critical habitat for federally protected salmon, but may also result in polluted water runoff in to the Columbia River. The DEIS fails to analyze the impact of this pollution.

Hydraulic cutter head dredging requires large amounts of water to be sucked up along with the dredged sediments. The water taken up can often be in excess of the sediment removed depending on the type of cutter head dredge used. During this process, the water will mix with any contaminated sediments that may be present, resulting in pollution of the water. The DEIS claims that the infiltration capacity of the soils will be sufficient for the water to percolate into the ground before running off into the River. DEIS at 4-70. However, the DEIS fails to support these statements with any references to calculations or other scientific evidence, in violation of 40 C.F.R. § 1502.1, which requires that all statements be supported by evidence. The DEIS simply states the expectation that the water will infiltrate at a rate sufficient to accommodate the water deposited from the dredge spoils, without analyzing how much water will be included in the dredge spoils and calculating how much will infiltrate. *Id.*

Even if the dredge spoil water does sufficiently percolate into the ground, there is a good possibility the water will still run into the river by transport through the ground. However, the soil at the site will likely be compacted due to construction activities such as building the berm around the basin where the dredge materials will be placed. This soil compaction will invariably lower the infiltration rates of the soil, resulting in increased runoff. The DEIS fails to adequately address the amount of water to be deposited from dredge spoils and soil compaction due to construction activities in determining the amount of water that will not percolate into the ground. The total lack of analysis makes it impossible for FERC or the public to adequately analyze the possibilities of water runoff into the river from dredge materials. Therefore, FERC should

reevaluate how much water will be deposited with the dredge sediment and the infiltration rates of the soil, after possible compaction through construction activities, where the dredge materials will be deposited.

The DEIS proposes that any water that does not percolate into the ground will flow into the log pond where any suspended sediments will be settled out before the water percolates into the ground or is discharged to the river through an overflow structure. *Id.* As a result, any contaminated water collected with the dredged materials and deposited in the basin may still pollute the River. The DEIS acknowledges that water may be continually present in the log pond, further reducing its capacity. *Id.* Bradwood proposes to prevent any overflows of the berm by installing an overflow structure that will release "clarified water" back into the river. DEIS at 4-71. The DEIS does not discuss the pollutant content of the "clarified water." The "clarified water" will contain pollutants, which must be described. Also, retention in the log pond does not insure any dissolved pollutants are removed from the water. FERC should analyze the possibility of dissolved pollutants from dredge spoils being released back into the river through the overflow structure. Water allowed to collect in the log pond and discharged back into the river will also likely have increased in temperature. The DEIS fails to analyze the impact of a new source of temperature pollution when the Columbia River is already water quality limited (303(d)-listed) for temperature.

The Wahkiakum County Sand Pit does not have the capacity to accommodate the dredge materials over the life of the Bradwood LNG Project. The DEIS completely fails to analyze the capacity of Wahkiakum County Sand Pit site. The DEIS has not shown that the site will be able to accommodate all the dredge materials from initial dredging as well as future maintenance dredging. NMFS has continually voiced concerns over the capacity of Wahkiakum County Sand Pit site to hold the initial 300,000 to 350,000 cubic yards of dredge spoil as well as dredge spoils from maintenance dredging. FERC must assess the ability of the Sand Pit to accommodate this large amount of spoils and how this will impact water quality.

Additionally, Bradwood has failed to obtain approval for disposal of all dredge materials at Wahkiakum County Sand Pit. If Bradwood can not obtain approval for disposal at the Wahkiakum County Sand Pit, where will the dredge materials be placed? The Corps may wish to use the Wahkiakum County Sand Pit for disposal of materials from future maintenance dredging of the main channel. The DEIS fails to consider the reduction of dredge material disposal site due to Bradwood's dredging.

The DEIS fails also fails to take into account the capacity of the Wahkiakum County Sand Pit site for disposal of dredge materials over the 40-year life period of the project. According to calculations conducted by NMFS, the Wahkiakum County Sand Pit site only has capacity for a range of years between 12 and 29 years. Therefore, the Wahkiakum County Sand Pit site will not be sufficient to accommodate disposal of dredge materials over the life of the project. FERC must determine whether a sufficient location for the disposal of dredge materials is found, and the environmental and economic impacts of using such a site. The DEIS is insufficient for not containing this information.

FERC must also consider the distribution of dredge materials along the shoreline of Puget

Island from the Sand Pit. The DEIS acknowledges that a specific model has not been conducted to assess any increased turbidity levels associated with the distribution of dredge materials on the beaches of Puget Island. DEIS at 4-71. FERC attempts to alleviate this lack of analysis by simply saying the water quality impacts would be temporary and minor based on the grain size of the sediments in the dredge material. DEIS at 4-72. However, the shores of Puget Island are subject to constant erosion from wind, tides, and ship wakes. Placing large amounts of structurally unstable and possibly contaminated dredge sediments will likely increase the rate of erosion and, consequently, the amount of turbidity and pollution in the waters of the river off of Puget Island, causing harmful effects to fish located in the area. The DEIS provides no adequate basis for concluding turbidity increases will be "minor," in addition to completely ignoring possible contamination of the water column from contaminated sediments. Additionally, constant erosion of large amounts of material may last over a substantial period of time and will be anything but "temporary." FERC must conduct actual analysis of any expected turbidity and pollution increases and adverse biological conditions resulting from placement of dredge materials on the beaches of Puget Island and not rely on simple "expectations" based on general observations.

**Economic and human use impacts**

The DEIS fails to consider that dredging will adversely affect the commercial and recreational fishing industry, both vital components of the Clatsop County and State economy. In Oregon, Washington, and Idaho, 3,600 people earn their livelihood from salmon and steelhead fishing for a personal income of \$109 million. The recreational fishing industry is worth millions more. The continued success of these industries depends on the recovery of healthy populations of fish and continued access to the traditional fishing areas. Bradwood's dredging will adversely affect both of these requirements.

First, the dredging will degrade vital fish habitat, which will reduce health of the fisheries. The commercial salmon fishery is already severely limited due to dwindling populations. Bradwood's permanent destruction of key salmon habitat will further degrade the fishery, and, in turn, degrade the opportunities for commercial and recreational fishing, as well as tribal fishing rights throughout the Columbia River Basin.

In addition, the 24-hour per day dredging will completely block access to the traditional fishing grounds at the head of Clifton Channel, and may block Clifton Channel, for several months. This will seriously degrade commercial and recreational fishing and violate the public trust. The DEIS fails to analyze this impact on the public interest.

**Terminal Fill**

The DEIS fails to assess the impact of permanently filling at least 14 acres of estuarine and freshwater wetlands at the terminal site. The fill will modify the physical characteristics by replacing wetlands with sand and then concrete. The fill may contain toxic sediment, which will leech into surrounding wetlands or into the river. The fill will decrease the filtering capacity of the wetlands, which will lead to increased run-off, turbidity, and water temperature. The FEIS

failed to assess the cumulative effect of this action on the hydrology, water quality, and aquatic resources in this area.

The biological impacts of the fill are severe. We have already lost 80% of the lower Columbia River's wetlands. In this degraded state, every remaining acre is important. The Bradwood location contains an impressive array of healthy wetlands that have returned to healthy habitat in the 50 years since the former mill closed. Bradwood dismisses the habitat value of former log pond, but this area is not a pond at all. It is now a healthy backchannel habitat, connected to the Columbia River, that is utilized as crucial shallow water habitat by threatened salmonids. The DEIS fails to assess the impact of destroying the log pond habitat, considering the historical destruction of wetlands in the estuary.

The log pond is designated critical habitat for 13 species of salmonids and is a valuable rearing habitat for these species. Bradwood proposes to mitigate the filling of the log pond through a Fish Salvage Plan, which would result in the "capture, record, release of as many salmonids as possible." DEIS at 4-212. Unfortunately, no matter how careful Bradwood is in implementing the Plan, some fish will invariably not survive the process or will be harmed. The ESA forbids the taking of any protected species by private or federal entities. If Bradwood is allowed to fill the log pond, it will result in the unavoidable taking of a federally protected species in direct violation of the ESA. Additionally, filling of the log pond will be destruction of critical habitat for a federally protected species, therefore jeopardizing the continued existence of 13 ESA-listed species.

In addition, the estuarine wetlands provide a nursery for young salmon and other aquatic life. The combination of losing shallow water habitat from dredging and losing shallow water habitat from filling wetlands is a devastating hit to the estuary ecosystem. The EIS must analyze the habitat loss of the dredge and fill cumulatively.

The wetland fill will also degrade habitat utilized by birds, amphibians, mammals, and invertebrates. For example, bald eagles utilize the Bradwood site for perching and hunting.<sup>147</sup> On one visit, a biologist recorded six different individual eagles perching at the Bradwood site and the mouth of Hunt Creek, and hunting over the wetlands and river. *Id.*

Bradwood states that it will mitigate the impacts to the species affected by destruction of critical habitat through their Mitigation Plan. The DEIS fails to provide enough details of the Mitigation Plan to assess its value. The DEIS is deficient for relying on an incomplete plan, and failing to assess the final plan.

The Mitigation Plan will be insufficient to mitigate the adverse impacts of filling the log pond. The filling of the log pond and its resulting destruction will be certain, permanent, and imminent. In contrast, the measures to be implemented in the Mitigation Plan and the effectiveness of such measures are highly uncertain. Furthermore, even if the measures of the Mitigation Plan are successfully implemented, the benefits from the measures may accrue slowly while the endangered or threatened species are put in further jeopardy by a lack of critical habitat. FERC should take these factors under consideration and provide a more thorough

<sup>147</sup> Cascade Avian Consulting at 1 (attached).

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analysis in the EIS concerning the effectiveness of the Mitigation Plan.

### Terminal construction and operation

Terminal construction and operation will have long-term adverse effects on the lower Columbia River ecosystem, economy and safety of the residents.

### The terminal construction and operation will degrade the ecosystem

#### Construction Activities at the Proposed Terminal Site Will Disturb or Contribute to Contaminated Soils and Increase Sedimentation and Pollutant Transport into the River through Storm Water Runoff.

Approximately 70 acres are proposed to be disturbed by the construction of the LNG terminal. DEIS at 4-27. Construction activities at the terminal will have multiple long and short term adverse effects on the environment, including the disturbance of contaminated soils, water pollution from storm water runoff during construction, removal of vegetation, increased air pollution, substantial noise and light pollution, and the use of large quantities of water for hydrostatic testing of the tank and pipelines. The DEIS fails to analyze these impacts adequately, as discussed below.

The DEIS acknowledges that there are potentially contaminated soils present at the proposed terminal site. DEIS at 4-28. In fact, the DEIS states that “the Environmental Site Assessment did identify several Recognized Environmental Concerns (REC) on the property, including two gasoline underground storage tanks (UST), an area where a former train/maintenance shop building was located, asbestos containing cement board, solid waste disposal and burn areas, and the potential presence of polychlorinated biphenyls (PCB) and dioxins in dredged sand deposited at the site.” *Id.* However, the DEIS also notes that the assessment only inspected known contaminated sites, and did not conduct any soil testing for contaminants at other locations. *Id.* It is alarming that FERC acknowledges the potential for contaminated soils at the proposed terminal site, yet does not require any further testing of the soils to ensure contaminated soils are identified and properly handled during construction. The DEIS does state that FERC is requiring Bradwood to develop a Contaminated Materials Management Plan (CMMP) before construction ensues, but only requires the identification and management of contaminants if any are encountered during construction. DEIS at 4-29. These precautions are inadequate to ensure the safety of the environment as well as the construction workers at the site. FERC should require Bradwood to conduct soil contaminant testing in areas likely to be disturbed during construction by clearing, grading, or excavation activities before any construction ensues. If these precautions are not taken, the possibility for soil contaminants uncovered during construction to adversely impact aquatic and terrestrial habitats will be unnecessarily high. Therefore, without soil testing for contaminants prior to construction, FERC and the public can not evaluate the possible environmental impacts from construction activities.

The DEIS fails to analyze the adverse environmental impacts to the river due to construction activities at the proposed terminal site. These impacts will occur through increased

erosion and sedimentation processes. In fact, construction activities often result in runoff that can increase total suspended solids to levels near 3000 mg/L (Barrett and Molina, 2000), a level harmful to many aquatic organisms. The potential for soil contaminants to be transported into the river due to storm water runoff is also greatly increased during construction activities. Construction activities will result in soil compaction and increases in impermeable surfaces, therefore creating a much greater potential for runoff into the river. Therefore, any possible contaminants spilled during construction activities will likely runoff into the river unless proper measures are taken. The DEIS states that Bradwood will attempt to mitigate these impacts through the use of its terminal Erosion Sediment Control (“ESC”) Plan. DEIS at 4-29. However, the DEIS does not assess the environmental impact of construction when the ESC is employed. In addition, the detention ponds in the ESC for storm water runoff do not eliminate impacts to aquatic habitats.<sup>148</sup> The DEIS also fails to discuss construction alternatives that will eliminate or minimize adverse effects. There are multiple techniques and theories on management construction sites and stormwater pollution, but the DEIS fails to discuss any alternatives.

The ESC Plan fails to disclose specific information for adequate evaluation of the mitigation designs and procedures to be used mitigating these environmental impacts. FERC and the public can not possibly evaluate the effectiveness of any mitigation plans proposed by Bradwood without the specifics of the plans. Simply stating that BMPs will be used is insufficient for evaluation of mitigation measures specific to this site. For instance, when describing measures to be taken during “Phase 1” of construction, the ESC Plan simply states that “[s]tructural BMPs to be implemented as part of Phase 1 construction activities include perimeter controls (silt fencing, secondary perimeter controls for sensitive areas, and shrubbery), construction access, safety fencing, revegetation and vegetation maintenance, runoff discharge and disposal facilities, wheel wash, instream sediment management, and sand bag barriers.” Terminal ESCP at 5-5. This listing of BMPs to be used is inadequate for a proper analysis of the probative value of the proposed sediment control measures.

In an attempt to provide some detail, Bradwood refers the reader of the Terminal ESC Plan to see the figures and lists of BMPs attached to the plan for the specifics of BMP measures to be used during certain construction activities. However these figures and lists do not adequately explain the aspects of the BMPs to be used at this site. For example, Bradwood lists the BMP for preservation of existing vegetation/ buffer strips, but fails to explain the detailed measures to be taken given the specifics of the site. Details of the measures Bradwood should include are the size of the buffer strips and the types of vegetation to be planted for buffer strips. Bradwood should be able to, and in fact be required to, disclose the specifics of the BMPs to be used based on current designs and local requirements. The description of a general BMP without site specific considerations is worthless to the public, and FERC, for proper evaluation of the measures to be used for mitigation of environmental impacts caused by construction activities.

FERC further asserts that a lack of specificity in the design of some aspects of the terminal site is a valid reason for not producing a detailed sediment control plan for certain aspects of the project. *Id.* If FERC is not sure of the design or preventative measures to be taken to mitigate environmental impacts, then the DEIS is by definition deficient because it cannot

<sup>148</sup> Booth, D.B., D. Hartley, and R. Jackson. 2002. Forest cover, impervious-surface area, and mitigation of stormwater impacts. *J. Am. Water Resour. Assoc.*, 38:835-845.

evaluate the effects of the ESC. FERC must require Bradwood to produce a more specific Terminal ESC plan and provide a more thorough analysis. Furthermore, FERC should thoroughly evaluate the possibilities of increased sedimentation and contaminant transport into the Columbia River through storm water runoff as a result of the construction activities.

The DEIS lacks adequate detail regarding the water quality and habitat impacts of the improvements to Bradwood Road and other roads. DEIS at 2-31, 2-41. Specifically, Bradwood fails to assess how much of an increase in impervious surfaces will result from road improvements, and how surface flow runoff will be affected from said road improvements. Increased storm water runoff resulting from greater areas of impervious surfaces from road construction will possibly increase pollution into Hunt Creek and Columbia River. These forms of pollution could be increased sedimentation due to the increased surface flow runoff, or debris and hydrocarbons such as oil washed from the road surfaces during storm events. FERC should evaluate the effects of greater impervious areas and changes in storm water drainage dynamics resulting from road widening and construction, and also evaluate the potential from increased pollutants entering Hunt Creek or Columbia River from resulting increased storm water runoff.

The DEIS fails to adequately evaluate the potential for releasing contaminants from the soil during road construction. According to the DEIS, Bradwood plans on widening Bradwood Road. DEIS at 4-344. Elsewhere in the DEIS, the area along Bradwood Road is designated as a REC, with possible soil contamination from solid waste disposal and burn areas. DEIS at 4-292. How does Bradwood plan on handling possible soil contaminants encountered during road improvements on Bradwood Road? The DEIS currently does not address this issue, which is of concern since road construction activities along with storm water runoff could release these contaminants and carry them to adjacent water bodies. FERC should require Bradwood to provide a plan on dealing with any soil contaminants encountered during road construction activities and analyze the possible environmental effects from the release of any such contaminants.

Bradwood proposes to replace the Hunt Creek Bridge, but the DEIS fails to adequately address the environmental impacts of the bridge replacement, including the bridge design and the potential for uncured concrete to be washed into Hunt Creek. As NMFS notes in their letter regarding the BA for the project, Bradwood has not adequately informed the agencies on how they propose to keep uncured concrete from entering Hunt Creek. Bradwood also fails to demonstrate how rainfall that comes in contact with uncured concrete during construction will be kept from discharging into Hunt Creek, and what controls they will employ to ensure concrete does not enter Hunt Creek. Additionally, the bridge design proposed by Bradwood shows a slope on the bridge with a curb to direct water runoff. Bradwood does not address the issue of how the bridge will keep storm water runoff from entering Hunt Creek while vehicles cross the bridge. Vehicles will displace rain water as they pass over the bridge, and the lack of a curb on the upslope of the bridge may allow for storm water runoff to flow directly into Hunt Creek. Storm water runoff from the bridge flowing directly into Hunt Creek is a problem because it will contain contaminants and sediments. FERC should address these issues with bridge construction and design as relates to the potential for polluted storm water runoff.

In addition, the DEIS does not adequately analyze the environmental impacts of the proposed railroad realignment. NFMS expressed concern that Bradwood did not discuss what kind of treated wood will be used for the new railroad ties. If the railroad ties are treated with chemicals such as creosote, ammoniacal copper zinc arsenate, or chromated copper arsenate, the potential for soil contamination is highly likely. Furthermore, the DEIS did not evaluate how any contamination from the railroad ties will move through the soil.

#### **The removal of vegetation will affect the ecosystem**

The DEIS fails to consider that construction activities, including terminal construction, replacement of Hunt Creek Bridge, power line construction, relocation of the railroad tracks, and temporary parking lot construction, will destroy acres of vegetation. The DEIS recognizes that construction activities at the proposed LNG terminal would have a substantial impact "on riparian forest and scrub-shrub communities due to their high productivity, species diversity, and contribution to both aquatic and upland ecosystem function (Knutson and Naef, 1997)." DEIS at 4-110. However, the DEIS fails to adequately analyze the full scope of vegetation removal, the effects of vegetation removal on surrounding habitats, and the problems associated with re-vegetating areas in the vicinity of the project site.

First, the DEIS fails to adequately analyze the quantity and type of vegetation to be destroyed as a result of construction activities at and around the proposed terminal site. For instance, the DEIS explains that in response to concerns raised by NFMS, Bradwood hired biologists to count cottonwood trees at the proposed terminal site. DEIS at 4-110. However, only cottonwood trees over 20 feet in height were included in the count of cottonwood trees at the site and the rest were considered riparian scrub shrub vegetation. *Id.* FERC gives no basis why a 20 foot height was used as the limit for cottonwood trees to be counted. Using an arbitrary height of 20 feet with no basis or justification is unacceptable for a valid survey.

FERC is also not clear regarding the amount of vegetation that will be removed due to road improvements or the construction of temporary roads. The terminal ESC Plan submitted by Bradwood mentions possible road improvements to Bradwood Road and Cliften Road as well as construction of temporary roads. The DEIS states "Bradwood would widen Bradwood Road to 24 feet by clearing and grading the area directly adjacent to the existing road." DEIS at 4-344. Also, Bradwood may make improvements to Cliften Road "consist[ing] of widening the roadway by 2 to 3 feet at selected locations based on available area." DEIS at 2-41. The DEIS fails to analyze how much vegetation is to be removed as a result of these construction activities and what kind of mitigation measures Bradwood proposes to conduct.

FERC also fails to consider the direct and indirect effects of vegetation removal during various aspects of construction. Adverse impacts on aquatic habitats through the removal of shoreline vegetation is well documented and, as the DEIS confirms, can lead to increased sedimentation and temperatures in waters adjacent to areas cleared of vegetation. DEIS at 4-140. However, FERC only attributes increases in water temperature to indirect effects such as increased solar radiation of the land, and the subsequent heating of runoff water running into water bodies. *Id.* Direct solar radiation to the Columbia River and Hunt Creek will also be increased due to the removal of shade produced by vegetation. The Columbia River is already

water quality limited due to high temperatures. Any subsequent increases in temperature due to the removal of vegetation during construction will further endanger federally listed species in the Columbia River and Hunt Creek through adversely affecting critical habitat and EFH for these species. As the DEIS states, increased temperatures can lead to decreased salmonid productivity and the possibility of other species out competing salmonids. DEIS at 4-140, 4-141. FERC cannot allow the further degradation of critical habitat of federally listed aquatic species by Bradwood's proposed construction activities and must further analyze the effects removal of vegetation will have on the temperatures of the Columbia River and Hunt Creek in the EIS.

Removal of vegetation near the shorelines of the Columbia River and Hunt Creek during construction activities will also adversely affect aquatic species by removing a source of food. It is well established by numerous studies that riparian vegetation provides a valuable food source for fish, especially juveniles.<sup>149</sup> The food source is the result of invertebrates in the detritus, understory, and canopy of riparian vegetation. Many of these invertebrates find their way into the water and are subsequently eaten by fish. Clearing vegetation along the shore of the Columbia River and Hunt Creek will destroy this habitat for invertebrates, thus destroying a valuable food source for fish along the stretches of these water bodies. The DEIS ignores these impacts completely. The analysis of food source impacts due to removal of vegetation conducted in the DEIS is limited to possible increases in food in the form microorganisms and aquatic invertebrates in the water due to increased temperatures. DEIS at 4-140. However, FERC notes that any increase in food due to increased water temperature will be limited to the summer and be offset by increased fish loss due to loss of cover. *Id.*

Any increases in food by increased production of microorganisms and aquatic invertebrates will further be offset by losses of invertebrates along the shoreline due to the removal of vegetation. FERC should consider the impacts to fish and other aquatic organisms resulting from the removal of a valuable food source, in the form of invertebrates, through the destruction of terrestrial vegetation along the shores of the Columbia River and Hunt Creek, in the DEIS.

The DEIS completely fails to analyze the potential of fragmentation on terrestrial organisms that migrate through the region. Removal of vegetation, such as along the proposed power line corridor and around the proposed terminal, can result in a barrier to wildlife movement and cause a severance of connectivity between ecosystems.<sup>150</sup> Such fragmentation can exacerbate extinction pressures on animals because small populations are split off from each other, increasing the chances of adverse conditions completely eliminating a population.<sup>151</sup> Therefore, removal of vegetation during construction around the proposed terminal and along the power line may cause fragmentation that can harm animals such as the endangered Columbia white-tailed deer. This is a permanent effect that the DEIS essentially ignores. Although, according to the DEIS, Bradwood has contemplated installing a corridor for animal movement

<sup>149</sup> Wigfli, M.S. 1997. Terrestrial invertebrates as salmonid prey and nitrogen sources in streams: contrasting old-growth and young-growth riparian forests in southeastern Alaska, USA. *Canadian Journal of Fisheries and Aquatic Sciences*, 54: 1259-1269.

<sup>150</sup> Rosenfield, R. N., C. M. Morasky, J. Bielefeldt and W. L. Loope. 1992. Forest fragmentation and island biogeography: a summary and bibliography. National Park Service Technical Report NPS/NRUW/NKTR-92/08

<sup>151</sup> Soulé, M. E., editor. 1987. *Viable populations for conservation*. Cambridge University Press, Cambridge, United Kingdom.

around the terminal fence, DEIS at 4-158, such measures would not be practical or possible for the barrier introduced as a result of construction of the power line. FERC should analyze habitat fragmentation due to the removal of vegetation and construction activities around the proposed terminal and power line, and should further analyze the possible adverse effects to animals such as the endangered Columbia white-tailed deer from fragmentation.

Bradwood asserts that it is committed to mitigating the adverse effects of the project and providing a net benefit to the ecosystem. However, not only are the mitigation plans vague and incomplete, mitigation measures carried out by Bradwood will not mitigate the immediate adverse impacts caused by the destruction of vegetation around the proposed terminal site. For example, the DEIS states that it will attempt to replace trees removed during construction in a 5:1 ratio. DEIS at 4-141. Nevertheless, the DEIS fails to take into account the difficulty of establishing some species of trees that will be removed during construction. As discussed above, Bradwood will remove hundreds of cottonwood trees around the terminal site and along Hunt Creek. These cottonwood trees are notoriously hard to re-establish because of their phreatophytic nature that requires precise soil conditions for successful establishment.<sup>152</sup> Furthermore, seedlings and small trees replanted are very susceptible to grazing by various animals, making it even more difficult to re-establish trees. The preliminary mitigation plan by Bradwood does not adequately assess the possible mortality rates of trees that Bradwood will attempt to re-establish, and the measures Bradwood will take to ensure high survival rates. Additionally, neither the DEIS nor the mitigation plan adequately provide assurances that these trees will be protected during their early life stages from herbivory. FERC must include more detail in the plan for revegetation in the vicinity of the proposed terminal.

#### Construction Activities Degrade the Air

The DEIS fails to consider the temporary increases in air pollution resulting from construction activities. Numerous activities conducted during construction of the proposed Bradwood LNG terminal will cause increases in air pollutant levels in the region. These activities include anything from increases in vehicle traffic to and from the site to the burning of vegetation removed during clearing of the site. Also, construction equipment, including dredge ships, and vehicles transporting construction supplies will add to the emissions. FERC states in the DEIS that "[i]mpacts associated with construction vehicles are difficult to estimate based on the time and space variant characteristics of the emissions." DEIS at 4-383. After making this statement, FERC then concludes that emissions are not likely to exceed NAAQS. *Id.* This level of analysis is insufficient to address the environmental impacts from construction emissions. The DEIS shows that certain emission (NO<sub>x</sub> and VOCs) will raise regional emissions by more than 10% during construction, a substantial increase. *Id.* If regional emissions are raised by more than 10% in some instances, the local effect may be sufficient to cause some respiratory distress in humans or animals. The DEIS ignores these important impacts.

Additional sources of increased air pollutant emissions may originate from burning vegetation removed from the site. According to documentation submitted by Bradwood, such as

<sup>152</sup> Steinberg, P. D. (2001). *Populus balsamifera* spp. *trichocarpa*. Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). 2005.

the terminal ESC Plan, vegetation cleared from the site may be disposed of by being burned. The DEIS does not discuss this source of pollution.

### Construction Activities Will Cause Noise and Light Pollution.

The DEIS fails to consider that noise and light levels during construction of the proposed Bradwood LNG terminal will reach levels that could be a nuisance to humans and cause harm to animals. Noise will originate from a variety of sources during construction, including increased vehicle and railway traffic, engine driven construction equipment, pile driving, and blasting activities. The impacts from these sources of noise are either inadequately addressed by FERC or the mitigation measures to be used are not sufficiently clear or effective to prevent nuisance or harm to humans and animals in the affected region. In addition, light from construction activities and the overall terminal lighting plan can adversely affect animal behavior. FERC does not adequately assess the possible impacts of construction and terminal lighting.

The noise impacts underwater from various construction activities could produce substantial harm to animals. The DEIS notes that threshold levels for salmonids and pinnipeds will not likely be exceeded due to blasting, DEIS at 4-148, however acknowledges that the behavior of pinnipeds may be altered. Nothing is mentioned in the DEIS concerning the behavioral modifications to salmonids in the area and, for that matter, any other organisms present in the affected vicinity. FERC should more thoroughly evaluate and report the possible consequences the noise from blasting will have on not just the physiological but also the perceptual and behavioral well being of all animals in the vicinity.

In addition to blasting and dredging, pile driving will have a substantial adverse impact upon underwater organisms. FERC has provided a number of proposed mitigation measures to alleviate some of the harm of pile driving, DEIS at 4-137, 4-138, 4-139, but nonetheless has failed to analyze the harm that will occur to organisms in the vicinity, especially pinnipeds and salmonids. FERC relies entirely on the mitigation measures, but misses the fundamental purpose of NEPA to assess environmental harm. First, even if all the mitigation measures proposed by Bradwood work, the threshold level for physiological harm for salmonids of 180 dB re: 1  $\mu$ Pa will not be met within approximately 33 feet of the pile driving. DEIS at 4-138. Furthermore, even with the mitigation measures the noise levels will still exceed the behavioral impact levels of 150 dB re: 1  $\mu$ Pa more than a mile away. *Id.* Given that the pile driving is estimated to last for approximately 4 months, many endangered fish and other animals could be killed, or at the very least harmed, by this activity. The DEIS fails to discuss the fact that this project will violate the threshold harm limits for salmon.

Bradwood's proposed mitigation may not even work to reduce underwater noise. The DEIS notes that there is the possibility the bubble curtains proposed to be used by Bradwood may not have their full intended mitigating effect, *Id.*, and NMFS has echoed concerns about the efficacy of bubble curtains in their May 11, 2007 letter to FERC. The DEIS recommends that Bradwood file a contingency plan if the bubble curtains do not work as intended before pile driving commences. DEIS at 4-139. Yet, the DEIS failed to assess whether a contingent plan is likely to be effective and what effects are expected from alternative plans.

As for the safety of pinniped species, Bradwood proposes to incorporate a safety, buffer, and impact zone. DEIS at 4-247, 4-248. As the DEIS pointed out though, Bradwood originally only proposed such measures for the Stellar Sea Lion. DEIS at 4-139. Additionally, the monitoring for the presence of pinnipeds within these zones is inadequately addressed by DEIS. The DEIS fails to discuss conditions under which more than one monitor could be used, under what conditions (i.e. bad weather) monitoring activities will be sufficiently doubtful to stop pile driving, and the methods Bradwood will use to monitor small and elusive marine mammals, such as harbor seals.

The DEIS also fails to consider that noise impacts from construction activities may disturb various birds, including the Bald Eagle, and other animals, like the Columbian white-tailed deer, and cause them to avoid the areas impacted. According to the FERC, these impacts will be temporary and the Columbian white-tailed deer, for instance, is likely to become acclimated to the noise. DEIS 4-250. But, the construction will last three years, and the noise will continue after the construction ends. FERC offers no evidence that the impact is temporary. In addition, avoiding traditional habitat may cause these animals to travel to less healthy habitat, thus increasing the danger to these animals.

Finally, the FERC recognizes that artificial lighting can have adverse effects on wildlife in the areas surrounding the proposed LNG terminal. DEIS 4-157. However, the NMFS in their May 11, 2007 letter notes, and DEIS confirms, that Bradwood has not submitted a detailed final lighting plan for either construction or terminal operations. DEIS at 4-147. The DEIS, therefore, is deficient because it does not contain a final lighting plan. FERC must analyze the impact of light on aquatic and terrestrial species.

### The Removal of Large Quantities of Water for Hydrostatic Testing Will Harm to the Environment.

The DEIS fails to analyze that Bradwood will remove large volumes of water from the Columbia River to test the reliability of numerous pipes and tanks during construction of the proposed terminal. DEIS at 4-72. Bradwood proposes to appropriate water directly from the Columbia River using pumps with fish screens on the intake valves. DEIS 4-144. These fish screens will not prevent all fish impingement or entrainment. In the May 11 letter, NMFS pointed out that the fish screen design proposed by Bradwood will likely be insufficient for proper functionality.

Water will be discharged back into the river after use for hydrostatic testing of the LNG tanks, the pipeline, and the fire suppression system. DEIS at 4-72, 4-77, 4-86. The procedures for dechlorination (if chlorine is initially added to kill bacteria) described in the DEIS are vague and insufficient to evaluate the efficacy of the procedure proposed. Additionally, Bradwood claims it will test the water for any contaminants, but fails to explain what contaminants it will test for. Will water temperature also be tested prior to discharge of the tank hydrostatic testing water?

The DEIS claims that any scale and sediments in the water from the pipeline hydrostatic testing will be filtered out by straw bales, but provides no basis for the accuracy of this

statement. DEIS at 4-86. Although Bradwood states that it does not anticipate contaminants, construction is far from a sanitary business, and contaminants could inadvertently be present within the fire suppression system or pipeline.

#### **Increased Ship Traffic Will Adversely Impact the Environment.**

One hundred twenty five LNG tankers will serve Bradwood each year. This number will greatly increase if Bradwood installs a planned third storage tank. The DEIS fails to analyze the from ship traffic, including vessel strikes, wake stranding, increased noise, entrainment and impingement of fish during ballast filling, and shoreline erosion.

#### **Increased Ship Traffic Will Result in Vessel Strikes and Wake Stranding of Fish, Mammals, and Sea Turtles In and Around the Columbia River Estuary.**

The LNG terminal will increase the number of deep draft vessels by 25%. This is a substantial increase of the largest ships with the largest wakes. FERC fails to analyze the ecosystem impacts of a 25% increase in deep draft ship traffic. The deep draft vessels are of greatest concern because of large wakes, increased vessel strikes, and sediment resuspension.

The DEIS does not provide a description of the routes the LNG vessels will travel to and from the proposed LNG terminal. Without detailed submissions of the possible routes LNG vessels will take on their way to the proposed Bradwood LNG terminal, the number and types of vessel strikes is extremely difficult to assess. NMFS raised concerns about LNG tankers striking whale, pinnipeds, and sea turtles.

The DEIS fails to consider that wake stranding of juvenile salmon is common in the lower estuary, and fails to consider the impacts due to increased ship traffic. Wake stranding will increase greatly due to the additional deep draft ships. Further, turning of the LNG tankers with high thrust tugs will increase wake stranding and disorientation of salmon. Bradwood argues that because ship wakes may increase due to speed, and because the Pearson et al. (2006) study indicated that 62% of the vessels causing wake stranding were traveling faster than 12 knots, then LNG ships that will not likely exceed 12 knots will not likely cause fish stranding. DEIS at 4-123. However, this statement does not take into account the size of the ships, which also substantially affects the size of the wake. LNG ships will be some of the largest vessels navigating the Lower Columbia River and the wakes of these large vessels can be much larger than even small vessels traveling at high speeds because of the amount of water displacement. Additionally, the DEIS has notes that “[t]he wakes produced by an LNG ship are only slightly larger than those of the large vessels currently using the Columbia River.” DEIS at 4-109. Therefore, to insinuate that because LNG ships traveling to the proposed terminal will only be going approximately 12 knots, without taking into account vessel size, then the LNG ships will not likely produce wakes large enough to strand fish is absolutely groundless. As the NMFS May 11, 2007 letter fittingly affirms, Bradwood’s “anecdotal analysis is inadequate” concerning juvenile fish wake stranding.

#### **Increased Noise from LNG Ship Traffic Will Harm to the Environment.**

The DEIS fails to consider that the noise emitted from LNG ships is above the NMFS’s noise threshold for physical harm to fish. LNG ships are considered cargo vessels and “[c]argo vessels are known to emit high levels of low frequency sound (6.8 to 7.7 hertz (Hz) at 181 to 190 dB, re: 1  $\mu$ Pa) capable of traveling long distances (Richardson et al., 1995).” DEIS at 4-224. As mentioned above, “[t]he NMFS’ current noise thresholds for fish are a peak pressure of 180 dB re: 1  $\mu$ Pa for physical harm and an impulse pressure, or root mean square (rms), of 150 dBrms re: 1  $\mu$ Pa for behavioral disruption (NMFS, 2007a).” DEIS at 4-137. As the DEIS notes, noise from LNG vessels can have some adverse effects on whale behavior. DEIS at 4-244. However, FERC fails to address the adverse effects underwater engine noise from LNG vessels will have on salmonids and other aquatic species.

#### **Removal of Engine Cooling and Ballast Water for LNG Vessels Will Cause Harm to Salmonids.**

The DEIS fails to consider that the removal of water from the Columbia River for use in the cooling of engines and filling ballast tanks for LNG vessels will cause harm to salmonids through entrainment and impingement. The screens proposed to be used by Bradwood for water intake have been criticized by NMFS. DEIS at 4-145. Bradwood proposes to design the screens to minimize entrainment and impingement of fish and construct a system capable of supplying filtered water to the LNG ships for engine cooling and ballast using such screens. *Id.* For this system to work, the LNG ships docking at the proposed Bradwood LNG terminal must undergo significant retrofits. According to Bradwood, incentives will be offered to ships to retrofit. *Id.* However, offering incentives does not ensure that ships will in fact be properly equipped for using Bradwood’s system, and therefore does not ensure the minimization of entrainment and impingement of fish. The DEIS fails to consider the impacts if the retrofits do not occur or are not effective. The DEIS fails also to consider alternative solutions to the ballast water problem.

In addition, the ballast flow volume calculations in the DEIS are questionable. The required ballasting flow volume rate is approximately 1.5 X the maximum usual output of the circulating pump for cooling water to the condenser aboard the ship. The flow rate is more than 2.5 X the usual flow rate for port operations. Bradwood proposes to have the ballast water go through the cooling system prior to entry into the ballast water piping. How will flow be controlled? In the DEIS, FERC states that each vessel will need 20 to 50 million gallons of ballast water and cooling water. If 50 million gallons are needed for any vessel, it will require a flow rate of 10,521 m<sup>3</sup>/hr. FERC and the public cannot assess the impacts to aquatic resources, the technical viability of the proposed system, or the practicable alternatives because even the basic piping diagram is classified as CEII.

#### **Increased LNG Ship Traffic Will Cause Shoreline Erosion.**

The DEIS fails to consider that increased LNG ship traffic will cause shoreline erosion because of the large wakes these ships produce during transport. Both the adverse impacts of shoreline erosion and suspended sediments have been discussed above. The DEIS simply states

that “LNG marine traffic should not result in wakes causing significant shoreline erosion compared to existing ship traffic because LNG ship speed and size would be similar to existing deep-draft vessels currently using the Columbia River.” DEIS at 4-357. This utterly fails to consider that Bradwood will increase the deep draft vessels by 25%, which will cause more significant erosion.

The DEIS goes on to further state the existing causes of shoreline erosion and the characteristics that cause wakes from ships. DEIS at 4-450. The DEIS comments that ship speed is the most important factor determining wake size, DEIS at 4-5, 4-450, but contradicts itself by reporting “[a]n analysis undertaken for the COE concluded that the size of ship-produced waves in the Columbia River depends on the blockage ratio, which is the ratio of the cross-sectional area of the ship to that of the channel (COE, 2003).” DEIS at 4-5. The COE study clearly indicates ship size is the primary factor in wave size and FERC’s reliance on ship speed as the “most important” factor determining wake size seems to be little more than an attempt to lessen the actual severity of the wakes LNG ships will cause. The large size of the LNG tankers and the 25% increase in deep draft tankers will cause significantly more erosion, which will harm aquatic life.

**The Draft EIS Fails to Adequately Address Air Quality**

The DEIS does not adequately analyze or evaluate the direct, indirect or cumulative air quality impacts that could occur as a result of the Bradwood LNG project. Thus, the DEIS fails to comply with NEPA. Under NEPA, FERC has obligations to assess and report the cumulative impacts of expected emissions from the Bradwood LNG project on air quality. Moreover, the DEIS fails to comply with NEPA because it fails to specify mitigation for air quality impacts.

The proposed facility will be a large industrial source of air pollution on the Columbia River. The LNG carriers, associated support vessels, and terminal sources will emit large amounts of particulate matter (PM), including fine particles (PM10 and PM2.5), nitrogen oxides (NOx), carbon monoxide(CO), sulfur dioxide (SO<sub>2</sub>), volatile organic compounds (VOCs), and hazardous air pollutants (HAPs). See Resource Report 9. Many of the individual emissions units combust fossil fuels, and therefore emit carbon dioxide (CO<sub>2</sub>).

These pollutants have serious, long-term and short-term impacts on public health and the human environment. As the U.S. Environmental Protection Agency (“EPA”) recently explained with regard to pollution from large ocean going vessels:

The health and environmental effects associated with these emissions are a classic example of a negative externality (an activity that imposes uncompensated costs on others). With a negative externality, an activity’s social cost (the cost borne by society imposed as a result of the activity taking place) exceeds its private cost (the cost to those directly engaged in the activity). In this case, emissions from Category 3 marine engines impose public health and environmental costs on society. However, these added costs to society are not reflected in the costs of those using these engines and equipment. The market system itself cannot correct this

negative externality because firms in the market are rewarded for minimizing their operating costs, including the costs of pollution control.<sup>153</sup>

The public must bear the cost of this externality through an increased incidence of serious public health problems including premature death, cardiovascular diseases, and respiratory ailments. *Id.* at 11. In addition, many of the LNG carrier ships will be diesel propelled, and diesel exhaust has been classified as a likely carcinogen by EPA since 2002 – even at environmental exposure levels.<sup>154</sup> *Id.*

The DEIS fails to adequately address impacts on human health and the environment from the air pollution associated with the Bradwood Landing project. The Air Quality and Noise section of the DEIS (Section 4.10) does not contain any information on the public health and welfare effects of the air pollution associated with the likely pollutants from the project. Instead, the EIS implies that compliance with the National Ambient Air Quality Standards (“NAAQS”) and state ambient air quality standards ensures that there are no impacts on human health from the air emissions – that is, the DEIS fails to discuss human health impacts of air emissions at all. Compliance with the NAAQS is not an appropriate surrogate for a full and accurate analysis of air pollution impacts in the EIS, however, for at least two reasons. First, the ambient air quality standards are not protective of public health because the NAAQS are out of date and do not represent an ambient concentration under which no health or welfare effects will be experienced. Second, the DEIS’ analyses of the project’s emissions and the dispersion of those emissions are seriously flawed.

**AMBIENT AIR QUALITY STANDARDS ARE NOT A REPLACEMENT FOR AN ADEQUATE DESCRIPTION AND ANALYSIS OF HEALTH AND WELFARE IMPACTS FROM THE PROJECT’S AIR EMISSIONS.**

The DEIS does not discuss health and welfare impacts related to the project’s emissions. The DEIS seems to depend on modeled compliance with the NAAQS and state ambient air quality standards to demonstrate that the project does not have significant impacts on air quality, and thus human health and welfare. See DEIS at 4-383-84. The DEIS states that “[t]he NAAQS were set at levels the EPA believed were necessary to protect human health (primary standards) and human welfare (secondary standards).” DEIS at 4-367. In many cases, however, EPA has not satisfied its mandatory duty to review thoroughly and update as necessary the air quality criteria and NAAQS for air pollutants every five years. 42 U.S.C. § 7409(d)(1). Moreover, the NAAQS do not represent a level of pollution under which no health or welfare effects will be experienced, however. Thus, the DEIS cannot depend on compliance with the NAAQS or state ambient air quality standards for a sufficient analysis of impacts on the human environment.

For example, EPA has not reviewed the NAAQS for CO for over 13 years. EPA first set primary and secondary CO NAAQS in 1971 at 9 ppm over an 8 hour averaging time and 35 ppm

<sup>153</sup> U.S. EPA, *Advance Notice of Proposed Rulemaking: Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder 10* (signed Nov. 29, 2007) (attached as Exhibit).

<sup>154</sup> The DEIS contains no discussion of diesel exhaust occupational exposure or human/environmental health impacts of diesel exhaust.

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over a 1 hour averaging time. 36 Fed. Reg. 8186 (April 30, 1971). The primary NAAQS itself has never been revised from the initial level, though the secondary NAAQS was revoked in 1985. 50 Fed. Reg. 37,484 (Sept. 13, 1985). The last time EPA published a review of the CO NAAQS and a decision on whether to revise the CO NAAQS in the Federal Register was 1994. 59 Fed. Reg. 38906 (August 1, 1994). Thus, EPA has not satisfied its mandatory duty to review and decide whether to revise the CO NAAQS every five years, and the DEIS should not depend on compliance with an outdated NAAQS to demonstrate a lack of impacts on the human environment.

Similarly, the last time EPA completed a review to update the air quality criteria for NOx and the NAAQS for NO2 was in 1996. 61 Fed. Reg. 52,852 (Oct. 8, 1996). The 1996 review culminated in EPA's decision to retain the then-existing primary and secondary NO2 NAAQS, each an annual arithmetic mean of 0.053 parts per million (ppm). 61 Fed. Reg. 52,852. This review relied extensively on a 1993 air quality criteria document for NOx and a 1995 EPA staff paper that reviewed and integrated the research findings compiled in the earlier document. 61 Fed. Reg. 52,853. Even assuming the 1996 review was adequate, EPA has failed to satisfy the Clean Air Act's requirements, and a review of the NOx air quality criteria and the NO2 NAAQS is seven years overdue.

For SO2, the story is the same. The current NAAQS for SO2 has not changed since 1971 (though minor technical changes to the SO2 NAAQS were made in 1996). EPA's most recent consideration of the efficacy of the existing NAAQS for SO2 proceeded in two stages. In 1993, EPA elected to retain the existing secondary SO2 NAAQS, and in 1996 EPA came to the same conclusion regarding the existing primary NAAQS. See 58 Fed. Reg. 21,351 (Apr. 21, 1993) (retaining existing secondary SO2 NAAQS); 61 Fed. Reg. 25,566 (May 22, 1996) (retaining existing primary SO2 NAAQS). EPA's 1996 decision to retain the existing primary NAAQS for SO2 was challenged, and upon concluding that EPA had not adequately explained its rationale for retaining the existing primary SO2 NAAQS the District of Columbia Circuit Court remanded the decision to EPA. *American Lung Assn. v. EPA*, 134 F.3d 388 (D.C. Cir. 1998). Although it has now been over nine years since this remand, EPA has neither provided a new justification for its 1996 decision to retain the existing primary SO2 NAAQS nor completed a new cycle of review of those standards. Thus, the DEIS' reliance on the SO2 NAAQS to establish an acceptable level of air pollution impacts is unacceptable.

Even if the NAAQS were reviewed every five years, as required by the Clean Air Act, EPA sometimes sets NAAQS at levels that do not ensure that air pollution will not cause death and disease in the human population. For example, in the most recent review of the fine particulate matter health based ambient air quality, EPA was unable to discern a threshold level of pollution under which the death and disease associated with fine particles would not occur. 71 Fed. Reg. 2620, 2635 (Jan. 17, 2006). Studies reviewed by EPA revealed a linear or almost linear relationship between diseases like cancer and the amount of fine particulate matter in the ambient air. *Id.* Put simply, the more fine particulate matter emitted into our air, the more death and disease. Thus, the NAAQS, which allow a certain concentration of fine particle pollution in the air, does not ensure that public health impacts are eliminated, or even minimized. In fact, the NAAQS for fine particles and ozone are not set at the levels indicated as adequately protective by the Clean Air Scientific Advisory Committee ("CASAC") and the Children's

Health Protection Advisory Committee ("CHPAC"), EPA's own scientific advisors. See Letter from Dr. Rogene Henderson, Chair, CASAC, to Stephen L. Johnson, Administrator, U.S. EPA, re: CASAC's Peer Review of the Agency's 2<sup>nd</sup> Draft Ozone Staff Paper, EPA-CASAC-07-001 (Oct. 24, 2006); Letter from Dr. Melanie Marty, Chair, CHPAC, to Stephen L. Johnson, Administrator, U.S. EPA, re: Proposed NAAQS for Particulate Matter (March 3, 2006). Because the NAAQS are not set at levels that prevent all human health and environmental impacts from the air pollutants that the project will emit, the DEIS must adequately discuss the health and welfare impacts associated with the pollution. Because it contains no discussion of human or environmental impacts of air pollution, the DEIS is inadequate.

In addition, there are no ambient air quality standards for hazardous air pollutants, many of which potentially or probably cause cancer. The DEIS contains no discussion of the human health and environmental impacts of the hazardous air pollutants that will be emitted as a result of the project. Therefore, the DEIS is inadequate.

In short, simply pointing to ambient air quality standards as surrogates for determining impacts on public health and welfare is not sufficient under NEPA. FERC must take a hard look at the health and welfare effects. In so doing, FERC must describe the impacts to be expected from the pollution that the project will emit into our air.

#### HEALTH IMPACTS OF BRADWOOD LNG'S AIR EMISSIONS

As stated above, the proposed project will emit large amounts of PM, PM10, PM2.5, CO, NOx, SO2, VOCs, and HAPs. See Resource Report 9. The DEIS is utterly devoid of any discussion of the health effects of these pollutants. Some discussion of the health impacts that FERC should consider follows, though this discussion is provided only to demonstrate the lack of any health and welfare information included in the DEIS, not to replace the agency's own analysis of health and welfare impacts.

#### Health Impacts of Particulate Pollution

Particulate pollution, also known as soot, has a variety of serious adverse health effects including premature death, heart attacks, strokes, birth defects and asthma attacks. Particulate pollution has also been linked to Sudden Infant Death Syndrome and low birth weight. The elderly, children, and those with respiratory disease are the most affected by particulate pollution. Particulate matter consists of small particles and liquid droplets that can be inhaled deep into the lungs and cause serious health effects. U.S. EPA. Air Quality Criteria for Particulate Matter (October 2004), Vol. 1, EPA 600/P-99/002aF-bF (both volumes available at <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=87903>). PM can cause a variety of health problems include respiratory difficulties and illness, decreased lung function, aggravated asthma, chronic bronchitis, irregular heartbeat, heart attacks, and premature death in people with heart or lung disease. U.S. EPA, Health and Environment, Particulate Matter, <http://www.epa.gov/air/particlepollution/health.html> (last visited Dec. 2, 2007). In addition, exposure to even low levels of fine particles has been linked to low birth weight. Michelle Bell, *et al.*, "Ambient Air Pollution and Low Birth Weight in Connecticut and Massachusetts," *Environmental Health Perspectives*, Vol. 115(7); 1118-1124 (July 2007) (this study also found

that exposure to nitrogen dioxide and carbon monoxide put children at increased risk for low birth weight). The impacts of particulate matter pollution on birth weight may be disproportionately borne by minority populations. *Id.*

#### Health Impacts of Sulfur Dioxide Pollution

Since the 1980's, courts have recognized that SO<sub>2</sub> pollution is "a medically recognized threat to human health" and that "high levels of pollution sustained for periods of days can kill." *Ohio Power Co. v. US EPA*, 729 F.2d 1096, 1097, 1098 (6th Cir. 1984). In addition, long-term exposure to SO<sub>2</sub> produces significant health effects, including "[a]cute respiratory infections in children, chronic respiratory diseases in adults, and decreased levels of ventilatory lung function in both children and adults." 729 F.2d at 1098. Like particulate matter, SO<sub>2</sub> aggravates respiratory illnesses. SO<sub>2</sub> is a lung irritant and can cause breathing difficulties, respiratory illness, and aggravation of existing heart disease. U.S. EPA, Health and Environmental Impacts of SO<sub>2</sub>, <http://www.epa.gov/air/urbanair/so2/hlth1.html> (last visited Dec. 2, 2007). SO<sub>2</sub> reacts with other chemicals in the air to form sulfate particles that are associated with increased respiratory impairment and disease, difficulty in breathing, and premature death. *Id.* SO<sub>2</sub> is also a precursor chemical to fine particulate matter. 70 Fed. Reg. at 25,162. In addition, when sulfur dioxide emitted from industrial sources reacts with other elements in the atmosphere, it forms sulfates, sulfuric acid mist and other chemical derivatives that tend to stay airborne for days and affect areas at great distances downwind.

#### Health Impacts of Nitrogen Oxide Pollution

Nitrogen oxides ("NOx") are highly reactive gases emitted primarily from the combustion of fossil fuels in mobile and stationary sources. 70 Fed. Reg. 8880, 8888 (Feb. 23, 2005). NOx can cause respiratory problems such as asthma attacks, respiratory tract symptoms, bronchitis, and decreased lung function. Committee on Environmental Health, American Academy of Pediatrics, *Ambient Air Pollution: Health Hazards to Children*, 114 PEDIATRICS 1699, 1701 (Dec. 2004). Nitrogen oxides are among the main ingredients of ground-level ozone, or smog, which can trigger serious respiratory problems.

#### Health Impacts of Ground Level Ozone (Smog)

Although ozone ("O<sub>3</sub>") serves a beneficial atmospheric purpose when located in the stratosphere ten to thirty miles above the earth's surface, ground-level ozone is a harmful pollutant. *Proposed Rule to Implement the 8-Hour ozone standard*, 68 Fed. Reg. 32802, 32804 (June 2, 2003). Ground-level ozone is created by a chemical reaction between NOx and volatile organic compounds in the presence of sunlight. *Id.* According to EPA, short-term ozone exposure "can irritate the respiratory system, causing coughing, throat irritation, and chest pain ... reduce lung function and make it more difficult to breathe deeply." 70 Fed. Reg. 25162, 25169 (May 12, 2005). Exposure to ambient ozone also exacerbates asthma, causing increased asthma attacks, and increases hospital admissions and emergency room visits due to respiratory problems. *Id.* Longer-term exposure can lead to permanent and irreversible decreases in lung function. *Id.* Sadly, active children are one of the groups at the highest risk from ozone exposure. *Id.* Courts have recognized that ozone is very harmful to human health. See e.g. *1000 Friends of*

*Maryland v. Browner*, 265 F.3d 216, 220, n2 (4th Cir. 2001).

#### Health Impacts of Carbon Monoxide Pollution

CO is a colorless, odorless gas emitted primarily through the incomplete combustion of fossil fuels in mobile and stationary sources. U.S. EPA, *Air Quality Criteria for Carbon Monoxide*, EPA 600/P-99/001F, at 3-1 - 3-6 (2000) [hereinafter CO 2000 AQCD]. CO is deadly to humans and other animals at high levels. At lower levels, CO has serious adverse effects on human health. Exposure to CO results in cardiovascular system problems, central nervous system problems and developmental toxicity effects. CO 2000 AQCD, Chapter 6. These effects are generally related to reduced levels of oxygen in the blood caused by CO's reaction with hemoglobin. These reduced oxygen levels result in tissue hypoxia. *Id.* at 5-22. According to EPA, CO may affect human health in other ways as well. *Id.*

For instance, exposure to CO has been linked to adverse effects on the cardiovascular and nervous systems of both adults and developing children, including exacerbation of heart disease, contributing to low birth weight, and increasing the daily frequency of respiratory illness. *Id.* at 6-1. Effects are most prevalent in the elderly, small children, fetuses, pregnant women, and people with anemia or pulmonary and heart disease. *Id.* at 4-3.

Significant new information has been published about CO's impact on fetuses since the CO 2000 AQCD. Since 2000, at least three studies have confirmed that CO exposure is linked to low birth weight. At least one study of children in the urban northeastern United States indicates a correlation between low birth weight and elevated ambient CO during each trimester. Mildred Maisonet, *et al.*, "Relation Between Ambient Air Pollution and Low Birth Weight in the Northeastern United States," *Environmental Health Perspectives* Vol. 109, Supp. 3, pp. 351-356, 353 (June 2001). The Maisonet study identified an increased risk of low birth weight at ambient CO levels greater than 1.46 ppm, a threshold level significantly lower than studies identified by EPA in the 2000 CO air quality criteria review. *Id.* at 355. Another study of children born in California during 1975-1987 noted a correlation between decreased birth weight and CO exposure in the first trimester. Muhammad T. Salam, *et al.*, "Birth Outcomes and Prenatal Exposure to Ozone, Carbon Monoxide and Particulate Matter: Results from the Children's Health Study," 113 *Environmental Health Perspectives* 1638, 1641 (Nov. 2005). That study noted that a correlation between low birth weight and exposure to CO is plausible because of the effect of CO on maternal hemoglobin (reducing oxygen available to fetal circulation) and direct effects on fetal hemoglobin - which has a greater affinity for binding CO than adult hemoglobin. *Id.* at 1642. This study also described a correlation between low birth weight and CO exposure at ambient levels greater than 1.4 ppm. *Id.* at 1643. A study of air pollution impacts on fetuses in Seoul, South Korea, found an increase of carbon monoxide concentrations during the first trimester was a risk factor for low birth weight in full term infants. Eun-Hee Ha, *et al.*, "Is Air Pollution a Risk Factor for Low Birth Weight in Seoul?" *Epidemiology* at 643-48 (Nov. 2001). The current National Ambient Air Quality Standards (NAAQS) of 9 ppm over 8 hours and 35 ppm over 1 hour does not protect pregnant mothers and fetuses from these adverse effects.

#### Health Impacts of Hazardous Air Pollutants

Hazardous air pollutants (“HAPs”) are those pollutants suspected or known to cause serious health effects or adverse environmental effects. Although Congress initially established the list of known HAPs to be regulated under the Clean Air Act, EPA must “periodically review the list” and add pollutants which

present, or may present, through inhalation of other routes of exposure, a threat of adverse human health effects (including, but not limited to, substances which are known to be, or may reasonably be anticipated to be, carcinogenic, mutagenic, teratogenic, neurotoxic, which cause reproductive dysfunction, or which are acutely or chronically toxic) or adverse environmental effects whether through ambient concentrations, bioaccumulation, deposition, or otherwise[.]

42 U.S.C. § 7412(b)(2). Exposure to HAPs can occur through inhalation, consumption of contaminated food products, consumption of livestock that consumed contaminated plants, consumption of plants that grew in contaminated soil, drinking contaminated water, or dermal contact with contaminated soil, dust or water. U.S. EPA, About Air Toxics, <http://www.epa.gov/ttn/atw/allabout.html> (last visited Dec. 2, 2007). Potential human effects include cancer, damage to the immune system, and other neurological, reproductive, developmental and respiratory problems. *Id.*

#### ENVIRONMENTAL IMPACTS OF BRADWOOD LNG’S AIR EMISSIONS

In addition to health impacts, the criteria pollutant and hazardous air pollutant emissions associated with this project will have impacts on the human environment that have not been sufficiently analyzed in the DEIS. Many of the individual emissions units combust fossil fuels, and therefore emit carbon dioxide (CO<sub>2</sub>).

##### Environmental Impacts of Particulate Pollution

Particulate pollution is linked with environmental damage such as reduced visibility (haze), altered nutrient balances in waters and soils, acid rain, and various other negative impacts on ecosystems. For a comprehensive review of particle pollution impacts on the environment, see U.S. EPA, Air Quality Criteria for Particulate Matter (October 2004), Vol. 1, at 4-1-4-230 EPA 600/P-99/002aF-bF (both volumes available at <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=87903>). Fine particles are the major cause of reduced visibility – including in national parks and scenic areas. See *Introduction to Visibility*, Section 4, William Malm, National Park Service and Colorado State Institute for Research on the Atmosphere (May 1999).

##### Environmental Impacts of Sulfur Dioxide Pollution

SO<sub>2</sub> emissions contribute to impaired visibility in scenic areas and acid deposition (acid rain), which damages building materials and has deleterious impacts on plants and fish. U.S. EPA, *Latest Findings on National Air Quality, 2002 Status and Trends Summary* 12 (2002) available at <[http://www.epa.gov/air/airtrends/aqtrnd02/2002\\_airtrends\\_final.pdf](http://www.epa.gov/air/airtrends/aqtrnd02/2002_airtrends_final.pdf)> (hereinafter

2002 Air Trends). SO<sub>2</sub> also contributes to acid rain, and sulfate particles are the major cause of haze throughout the country, even in our national parks.

##### Environmental Impacts of Nitrogen Oxide Pollution

Much like SO<sub>2</sub>, nitrogen oxides also contribute to acid rain, diminish water quality, and impair visibility. NOx emissions directly result in nitrogen deposition in the aquatic and terrestrial ecosystem. See 70 Fed. Reg. 8892 (Feb. 23, 2005). Elevated soil nitrogen levels exacerbate the effects of acid deposition. *Id.* at 8893. Elevated nitrogen levels in water contribute to eutrophication, which depletes dissolved oxygen and can lead to “dead zones” in water bodies. EPA has stated that “airborne releases of NOx are the largest source of nitrogen pollution in certain water bodies, such as the Chesapeake Bay.” 2002 Air Trends, at 2, 6. NOx emissions also exacerbate atmospheric ozone depletion, and some nitrogen oxides are greenhouse gases.

##### Environmental Impacts of Ground Level Ozone

Ozone causes damage to vegetation and wildlife. 70 Fed. Reg. 25162, 25169. EPA acknowledges that ozone and its precursor pollutants can travel hundreds of miles from their sources. 2002 Air Trends, at 8.

##### Environmental Impacts of Carbon Monoxide

Animals exposed to CO experience similar effects to those experienced by humans. CO also has indirect effects on the atmosphere that the EPA even admits may contribute to or exacerbate global warming. U.S. EPA, *Greenhouse Gases and Global Warming Potential Values: Excerpt from the Inventory of U.S. Greenhouse Emissions and Sinks: 1990-2000*, EPA 430-R-02-003, at 4 (April 2002). CO reacts with hydroxyl (OH) radicals, which serve a mitigation role by decreasing the lifetimes of strong greenhouse gases like methane and assisting in destroying ground level ozone. *Id.* at 7. CO’s reactions with hydroxyl radicals decrease their availability to mitigate the effects of strong greenhouse gases and decrease ground level ozone. Moreover, CO in the atmosphere is eventually oxidized to Carbon Dioxide (CO<sub>2</sub>), which directly contributes to climate change and global warming of the Earth’s surface. *Id.* at 6 (quoting the Intergovernmental Panel on Climate Change, *Climate Change 1995: The Science of Climate Change* (J.T. Houghton *et al.* eds., Cambridge U. Press 1996)).

##### Environmental Impacts of Carbon Dioxide

Heat-trapping gases, including CO<sub>2</sub>, that cause global climate change come largely from burning fossil fuels. The proposed project features ocean-going vessels and industrial sized combustion equipment that will burn fossil fuels. Thus, the DEIS must consider the potential of the project to exacerbate global climate change. Global climate changes are already occurring. These include increased frequency and intensity of storms, and more frequent and severe heat waves, droughts and floods. In addition, the glaciers are rapidly retreating, and Cascade snowpack is melting earlier and faster each spring. These changes in the water cycle, along with other global climate changes, threaten crops, salmon, recreation, fishing, and water supplies. Global climate change also affects the reproductive success, range, and diet of vulnerable

species. Both the Intergovernmental Panel on Climate Change (IPCC) and the National Research Council (NRC) have developed extensive data and information on climate change that should be considered when discussing and analyzing the impacts of the proposed project. See IPCC, *Climate Change 2001: Impacts, Adaptation and Vulnerability* (2001), available at [http://www.grida.no/climate/ipcc\\_tar/wg2/index.htm](http://www.grida.no/climate/ipcc_tar/wg2/index.htm); IPCC, *Climate Change 2007: The Synthesis Report* (2007), available at <http://www.ipcc.ch>; NRC, *Climate Change Science: An Analysis of Some Key Questions*, (2001) available at <http://books.nap.edu/html/climatechange/>.

**THE DEIS FAILS TO PROPERLY QUANTIFY POTENTIAL EMISSIONS FROM THE PROPOSED PROJECT.**

The DEIS must provide a quantitative assessment of the effects on the environment and public health from the maximum emissions that the project will generate. The DEIS provides a table of “Estimated Air Emission from the LNG Ships, Tugs and Security Vessels.” DEIS at 4-370. The DEIS also provides a table of “Operating Air Emissions Summary for Proposed LNG Terminal.” DEIS at 4-374. The DEIS also includes a table of “Estimated Total and Peak Daily Construction Vehicle Tailpipe Emissions for LNG Terminal.” DEIS at 4-383. The DEIS also includes a table of “Estimated Total and Peak Daily Construction Vehicle Tailpipe Emissions for Pipeline.” DEIS at 4-386. For a number of reasons, the potential emissions calculated and relied upon by FERC understate emissions. Thus, FERC has not taken the requisite hard look at the environmental impacts of air emissions because the applicant has not appropriately quantified emissions.

The type of ship to be used and the potential pollution control equipment the ships might employ is not disclosed in the EIS or any other publicly available documents. See DEIS at 2-1 – 2-2. FERC based its estimate of air emissions from LNG ships on the applicant’s expectation of the number of “typical” LNG ships that will visit the terminal each year (125 ships.) DEIS at 2-3. Moreover, FERC based its estimate on emission factors from EPA documents. Many ocean-going LNG carriers exist. Thus, the emissions estimates should be based on actual source testing. The emissions estimates included in Resource Report 9 do not estimate the maximum emissions from the proposed project, and therefore do not provide the requisite hard look at air impacts.

The DEIS analysis must be based on the maximum air pollution emissions possible under the physical and operational design of the facility. That means that the maximum number of ships and the worst-case (that is, most polluting) ships must be considered, unless otherwise limited as to number or type by a permit, a law, or the physical or operational design of the facility. Because it is based on typical or expected conditions, rather than maximum emissions, the DEIS significantly understates emissions from LNG ships and support vessels.

For fugitive emissions from valves, seals, and lines (Table 9-A-11), the Resource Report upon which the DEIS is based does not indicate the source of the emissions factors.

**THE DEIS FAILS TO INCLUDE APPROPRIATE EMISSIONS DISPERSION MODELING.**

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The modeling analyses submitted by NorthernStar are flawed in several respects, primarily with regard to the validity of the model for this application, characteristics of the source, and background data. Adequate modeling was not performed to demonstrate compliance with the NAAQS, state ambient air quality standards, PSD increments, and Class I area air quality related values from all of the sources of air emissions that will be employed in constructing and operating the LNG terminal. Moreover, the modeling completed, even if it meets the requirements of the Clean Air Act, does not provide sufficient information about the dispersion and impacts of air pollutants associated with the project on public health and welfare values for FERC to draw a reasonable conclusion about air quality impacts.

The DEIS claims that “[u]sing an EPA-approved dispersion model, impacts of criteria pollutants from the LNG carriers plus the preliminary modeled impacts from the LNG terminal, competing sources, and background concentrations were added together and compared to the applicable federal NAAQS and Prevention of Significant Deterioration (PSD) Increments.” DEIS at 4-370. For the results and methodology of this dispersion modeling, the DEIS refers to a March 22, 2007, Air Quality Modeling Report to the ODEQ. DEIS at 4-378.

There are several issues with these statements in the DEIS. First, the applicant has never completed dispersion modeling for impacts of criteria pollutants from LNG carrier emissions. The applicant modeled the emissions impacts from LNG carriers while hotelling at the terminal, but the applicant never modeled emissions calculated in the Air and Noise Quality Resource Report submitted to FERC. The calculated emissions included LNG carrier emissions from entry into US waters to hotelling at the terminal and on to exiting US waters, and assist tug emissions. See FERC Section 3 Application, Resource Report 9, Tables 9-A-13 – 9-A-19. The only LNG carrier emissions impacts modeled by the Applicant were for hotelling. Thus, the statement that the applicant modeled “impacts of criteria pollutants from LNG carriers. . .” is simply not true.

Second, because the applicant never modeled the impacts of emissions from LNG carriers and assist tugs, FERC cannot draw a rational conclusion about the effects of the project on the human environment, including impacts on PSD increment, Federal Class I areas, and other resources. FERC simply lacks information necessary to quantify and/or analyze the effects of the project on air quality values. Moreover, impacts from LNG carriers should be evaluated using an offshore model, OCD. See 40 C.F.R. Part 51, Appendix W.

Third, the modeling completed by the applicant did not model all relevant pollutants. Again, the DEIS claims that NorthernStar used an EPA-approved dispersion model to model the impacts of criteria pollutants from the LNG carriers and terminal, but this is simply not true. The March 2007 ACDP application indicates that NorthernStar modeled CO and NOx emissions from terminal stationary sources, and did not model SO<sub>2</sub>, VOC, particulate matter (PM), PM<sub>10</sub>, or PM<sub>2.5</sub>. ACDP App. at 6-1. NorthernStar modeled only the emissions of CO and NOx from the Submerged Combustion Vaporizers, Emergency Diesel Generator, and Diesel Firewater Pump. See ACDP App. at 6-3, Table 6-2. Thus, impacts of all criteria pollutants were not modeled. Importantly, the applicant completed no modeling of PM<sub>2.5</sub> impacts. See FERC Section 3 Application, Resource Report 9, Attachment 9A-4. Modeling of PM<sub>10</sub> impacts is not

an appropriate surrogate for PM2.5 impacts because PM2.5 dispersion is generally much further than PM10.

FERC should have considered PM2.5 modeling results because there is no significant impact level for PM2.5, thus the SIL is zero. 40 C.F.R. § 52.21(b)(23)(ii); 40 C.F.R. § 51.166(b)(23)(ii). In the absence of a designated significance level, the SIL is zero for regulated pollutants. Thus, any impact exceeds the SIL and requires further modeling. Moreover, dispersion of PM2.5 is significantly different than dispersion of PM10.

Fourth, the model used was not appropriate and likely understated emissions impacts. NorthernStar employed the AERMOD program, version 07026, with PRIME downwash algorithms. DEIS 4-378; ACDP App. At 6-2. AERMOD is a steady state dispersion model with a boundary layer. It is possible for a steady state dispersion model with a boundary level to predict that a source will inject pollutants above the boundary layer and the computer assumes the pollution is lost. The other EPA "Preferred/Recommended" dispersion model, CALPUFF, does not "lose" pollution like that. Thus, even in near field applications, CALPUFF is a more reliable modeling program. CALPUFF is a non-steady-state puff dispersion model, and is appropriate for long-range transport and complex terrain. See 40 C.F.R. Part 51, Appendix W; EPA Technology Transfer Network Support Center for Regulatory Atmospheric Modeling (SCRAM) <http://www.epa.gov/scramp001/dispersionindex.htm>.

Fifth, FERC should not accept modeling using AERMOD to accurately reflect impacts on Class I areas more than 50 km away from the proposed project. Here, the applicant used impacts at 50 km in the direction of the Class I area to judge impacts inside the Class I areas. AERMOD is only applicable to a distance of 50 km. ACDP Application, App. B at 21. Thus, the applicant should have used, and FERC should have reviewed, CALPUFF modeling results to quantify and describe impacts to Class I areas and the Columbia River Gorge.

**THE DEIS FAILS TO DISCLOSE, DISCUSS OR CONSIDER ANY AIR EMISSIONS CONTROL TECHNOLOGIES APPLICABLE TO THE BRANDWOOD LANDING LNG PROJECT.**

Control technologies exist that are applicable to the types of equipment proposed for Bradwood Landing, and for the LNG ships and other vessels. For instance, engine-based and add-on control technologies are available to control NOx from ocean-going vessels. See U.S. EPA, *Advance Notice of Proposed Rulemaking: Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder*, Chapter 6 (signed Nov. 29, 2007) (attached as Exhibit X). In addition, control technologies are available to control particulate matter and SOx emissions from ocean-going vessels. *Id.* The SCVs are essentially industrial boilers, control technologies for which have been in use for decades. Moreover, the DEIS failed to consider use of a flare to control fugitive VOC and HAP emissions. This failure to disclose that air pollution control technologies exist that could be used to minimize impacts, even if rejected, renders the DEIS inadequate.

**The EIS does not adequately consider the adverse effects of nitrogen emissions**

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While the DEIS admits that nitrogen gas would be emitted during normal operations of the terminal facility there is not an adequate discussion of the impacts of increased nitrogen releases on either air quality or potential effects of nitrogen deposition around the project site or regionally that could contribute to increased nutrient levels in the Columbia River and its tributaries. This should be specifically discussed and considered in the EIS.

**The DEIS needs to evaluate the impacts that would result from increased gas combustion that the proposed project and related projects would stimulate in the Lower Columbia River**

Importing 1.3 bcf/day or more into the Lower Columbia River could create a significant incentive for the development of gas generating facilities in or around the proposed LNG terminals. This impact would only be increased should both the Oregon LNG and Bradwood terminals be approved and constructed. Similarly, the importation of large quantities of gas would similarly act as an incentive for gas intensive industries to locate along the Columbia River.

The combined presence of water from the Columbia River, an industrial land base, and a major influx of LNG derived gas would create significantly increased development pressures on the lower Columbia River that were ignored entirely in the EIS.

**Question:** How would the siting of an LNG terminal, or even two, in the Lower Columbia act to stimulate or encourage the development of electrical power generating facilities and other energy intensive industries? Please specifically consider the existing and potential transmission capacity to California as well as California's electrical demand. Similar evaluations should be made for Oregon, Washington and surrounding states that could create a demand for Oregon-produced electricity based on new gas supplies provided via the planned LNG terminals.

**Question:** What are the direct, indirect and cumulative effects of increased industrialization that would be encouraged by the siting of one or more LNG terminals in the Lower Columbia River. Please include impacts to air, water, fish, wildlife, humans, traffic, noise, lights and other impacts.

Concerns about the real potential for this increased industrialization is supported by the recent development of both PGE's Port Westward power plant (see attached article on Port Westward) and the development of the Mint Farm electrical generating plant in Longview (see attached article on Mint Farm). The attached analysis of projects in the lower Columbia River by CRK's Brett VandenHeuvel should be reviewed and its contents considered and discussed in the context of cumulative impacts on air quality, energy use, GHG emissions and their related impacts, including human health and environmental impacts.

The EIS should evaluate and consider the fact that the largest new gas-fired electrical generating plants in the Northwest have been planned for the Lower Columbia River and discuss how this reflects the areas likely increased attractiveness in the event the proposed LNG terminals are in fact sited.

**Greenhouse Gas Emissions**

The impacts of global climate change represent what is likely the single most significant threat facing the planet today. That human combustion of fossil fuels is the leading cause of climate change is now beyond serious dispute. This is clearly described in the Intergovernmental Panel on Climate Change Fourth Assessment report, *Climate Change 2007: Synthesis report*, which is attached here. The extremely broad yet locally and globally significant impacts of climate change effects include: flooding; drought; heavier precipitation and storm events; more frequent heat waves; fires; heat stress; vegetation changes; sea level rise; rapid snow and ice melt; increased intensity of hurricanes; retreating glaciers and potentially significant impacts on virtually every aquatic and terrestrial species on Earth.<sup>155</sup> In popular literature, *Time Magazine's* cover story (attached) clearly places the threats of global warming among the most serious issue facing humans today.

The DEIS fails to properly evaluate the projects direct, indirect and cumulative effects that would result from the greenhouse gas (GHG) emissions that the project would cause. The proposed project would cause significant increases in GHG emissions as a result of both carbon and methane emissions related to the proposed facility. Contrary to the assertions of project proponents, LNG is not a "clean" fuel source. In fact, LNG is a fossil fuel and intensifies the pollution and global warming impacts of natural gas due to the need to liquefy, transport, and regasify the gas prior to bringing it to market. The EIS should evaluate the total lifecycle GHG emissions that would be associated with the project. This includes the GHG impacts from gas drilling, transport to liquefaction facility, liquefaction, transport, regasification, transfer through proposed pipelines and ultimate combustion.

This evaluation should specifically consider the increased lifecycle GHG impacts of LNG when compared to domestic or Canadian gas supplies. As supported in the attached studies from Heede, Jaramillo and Powers, the lifecycle GHG impacts from LNG are significantly greater than the impacts of domestic natural gas and this factor needs to be openly disclosed to the public and evaluated by decision makers. These studies support that the lifecycle GHG impacts of LNG are 30 to 40% greater than the GHG impacts of domestic natural gas and this was not evaluated or disclosed in the DEIS. While NorthernStar has admitted increased GHG emissions on the order of 20% this underestimates the actual GHG costs of LNG when compared to domestic or Canadian NG.

<sup>155</sup> Karl, T.R., *supra*; Levin, K., *supra*, citing Emanuel, K., *Increasing Destructiveness of Tropical Cyclones Over the Past 30 Years* (Nature, vol. 436, August 4, 2005); P.J. Webster, et al., *Changes in Tropical Cyclone Number, Duration, and Intensity in a Warming Environment* (Science, vol. 309, September 16, 2005); NASA Earth Observatory, *Record Low for June Arctic Sea Ice* (June 2005 at earthobservatory.nasa.gov/Newsroom/NewImages/images.php3?img\_id=16978); A.J. Cook et al., *Retreating Glacier Fronts on the Antarctic Peninsula Over the Past Half-Century* (Science, vol. 308, April 22, 2005); R.B. Alley et al., *Ice-Sheet and Sea-Level Changes* (Science, vol. 310, October 21, 2005); E.D. Domack, et al., *Stability of the Larsen B Ice Shelf on the Antarctic Peninsula During the Holocene Epoch* (Nature, vol. 436, August 4, 2005); F.S. Chapin III, et al., *Role of Land Surface Changes in Arctic Summer Warming* (Science, vol. 310, October 28, 2005); M. Hopkin, *Amazon Hit by Worst Drought for 40 Years; Warning: Atlantic Linked to Both US Hurricanes and Rainforest Drought* (Nature, October 11, 2005); T.T. Stewart, et al., *Changes Toward Earlier Streamflow Timing Across Western North America* (Journal of Climate, vol. 18, April 2005).

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The EIS should also consider the effect of increased CO2 content of the imported LNG when compared to domestic/Canadian gas. This was not considered in the EIS and the most likely sources of LNG for the Bradwood terminal should be considered for the CO2 content of its gas, as well as, the content of other contaminant gases that are present in addition to the methane.

As a part of this analysis the EIS should consider the increased air pollution and related global warming impacts that would be caused due to a higher Wobbe index of the imported gas. The higher Wobbe index of LNG imported gas will lead to higher air pollution levels of NOx and other contaminants when the gas is burned and create significant impacts on a wide variety of gas users. How this would affect air quality from all gas combustion scenarios in Oregon, Washington and California needs to be specifically analyzed in the EIS. The impacts of LNG imports on increasing the Wobbe index of NG is supported in the attached documents including the Report on the Joint Workshop on Natural Gas Quality Standards, Feb. 17-18, 2005, California PUC, CA Energy Commission, April 4, 2005 and South Coast AQMD, Reducing Air Pollution, GHG Emissions, and Petroleum Dependence May 31, 2007 2nd AB32 ETAAC Meeting as well as numerous documents on the issue that are already in PERC's possession. All documents in PERC's possession relating to the impacts of increased Wobbe index should be considered and disclosed in the EIS and the record for this project.

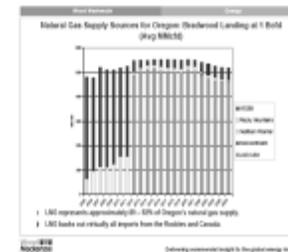
Question: What would the total lifecycle GHG emissions from the proposed project be?

Question: How would this affect total GHG emissions from Oregon, Washington, and California?

**Question:** Even assuming Oregon's use of gas did not increase if the Bradwood facility started importing 1.3 bcf/day, how would the increased GHG emissions from LNG affect Oregon's overall GHG emissions? This analysis should consider a scenario that NorthernStar has claimed would occur under even a 1 bcf/day import scenario where virtually all of Oregon's natural gas would come from LNG as shown in the diagram to the right taken from the Wood Mackenzie report which NorthernStar contracted for.

**Question:** How would the project affect GHG emissions for both California and Washington under scenarios that assumed the projections in the Wood Mackenzie report were accurate? How would GHG emissions be affected based on PERC's own projections of how the project would affect the source of gas being used by all west coast states?

**Question:** How would the effects of imported gas with a higher Wobbe index be on Oregon especially under any gas use scenario, but especially including a scenario where upwards



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of 92% of Oregon's gas supply would be from LNG as projected by Bradwood? What would the likely Wobbe index of imported LNG gas be and how would a high Wobbe index affect end users?

**Question:** How would a high Wobbe Index gas affect gas emissions in residential, commercial, industrial and electrical generating scenarios? How would indoor air quality in residential and commercial uses be affected and what would the effects on sensitive populations, such as children and asthmatics be? How would these increased emissions affect Class I airsheds, airsheds that are in non-attainment or close to non-attainment for the pollutants at issue, and important airsheds, such as the Columbia River Gorge where air quality is already significantly impaired?

The subject of climate change and greenhouse gas emissions is a significant omission in the EIS that must be addressed because of the global and local effects of global warming. In the context of the Columbia River Basin, the projected effects of global warming have been considered in the document entitled "Climate Change Impacts on Columbia River Basin Fish and Wildlife" which was produced by the Independent Scientific Advisory Board in 2007. This attached document should be the starting point for evaluating the effects that the increased GHG emissions would contribute to in the Columbia River Basin. Given the significant direct impacts that this project would have on species within the Basin that are already being impacted by global warming the need to carefully evaluate how this project would affect the Columbia Basin ecosystem is particularly important. The EIS, however, needs to evaluate and consider how the GHG impacts of this project would affect, both directly and cumulatively, the natural resources and human population of Oregon, the west coast United States, the United States and global environmental resources.

As a starting point the EIS needs to evaluate what the existing and projected impacts from global warming are and then consider how these impacts would be increased or exacerbated as a result of the increased GHG emissions from the proposed project.

**Question:** What would the cumulative, direct and indirect impacts of GHG emissions from the project be in the Columbia River Basin, Oregon, west coast U.S. and the United States? To what extent would the project exacerbate global warming over the life of the project?

**Question:** How is global warming likely to affect salmon species in the Columbia River basin, their habitat, and the hydrologic cycle (rainfall, snowmelt, glacial melt, timing of snow and rain, drought, water temperature, etc.)? How would increased GHG emissions from the project cumulatively affect salmon and other aquatic resources that are being impacted by global warming.

**Question:** How are terrestrial species in the Columbia Basin being affected by global warming and what are the projected impacts to these species, such as Columbia white tail deer? How would the proposed project cumulatively increase impacts to these species?

The GHG impacts of natural gas production, distribution and use has been described in the attached U.S. EPA's 2007 "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 -

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2005." This document identifies the significant contribution that natural gas production and combustion plays in the United States overall GHG emissions and should be considered as a part of evaluating the overall impacts of this project.

**Question:** How do the GHG emissions associated with the proposed project compare to GHG emissions from existing gas use in Oregon, California and Washington and how would the proposed project increase these emissions.

**Question:** Because FERC has not prepared any programmatic EIS that considers the cumulative effect of its approval and support for new LNG import terminals across the county, FERC must evaluate as a part of the current EIS the cumulative effects of the LNG projects it has approved, as well as, the projects it anticipates it may approve in the near future. How many LNG projects has FERC approved in the last ten years, how many applications for new project does FERC have? What would be the total GHG emissions that result from these projects including the lifecycle GHG emissions that would result specifically from the increased GHG impacts of LNG when compared to domestic, Canadian or Mexican gas?

The attached report by Rick Heede of Climate Mitigation Services that quantifies greenhouse gas emissions from the Cabrillo Port LNG terminal that has been proposed for California provides valuable information regarding the impacts of LNG import terminals on GHG emission and the information contained in this report should be evaluated, disclosed and relied on by FERC in evaluating the impacts of the proposed project.

Gas liquefaction will result in greenhouse gas emissions from refrigeration compressors, other plant electricity demands, acid gas venting, flaring, methane venting, and minor amounts of nitrous oxide emissions. Shipping LNG from its source to Oregon emits greenhouse gases as a result of converting propulsion fuel into carbon dioxide and methane. Operation of the LNG terminal, results in emissions during the transfer of the LNG to the terminal, fluel consumption for tenders and tug boats and crew boats, vaporization, and electricity to power the facilities. Methane emissions will occur from incomplete combustion of fluel and fugitive releases. Construction activities will add to these emissions. Finally, combustion of natural gas by consumers causes significant greenhouse gas emissions.

According to Mr. Heede's analysis, the supply chain emissions for the Cabrillo Port project will range between 23,564,431 and 26,728,883 U.S. tons per year and a similar analysis based on the specifics of the Bradwood Landing project should be prepared.

Because methane is 20 times as powerful of a GHG than carbon, the EIS should specifically evaluate the total methane releases that will result from this project, again looking at the entire lifecycle of impacts that relate to this project from production to shipping to end use combustion.

**Question:** How much methane would be released into the atmosphere and local environment as a result of the proposed project? Values should consider the total life cycle impacts of LNG including fugitive releases during drilling, transport, combustion and distribution.

All of the GHC impacts should consider the cumulative effects of other proposed fossil fuel projects that are proposed in the region. For example, the GHG impacts from the proposed coal plants in Kalama and Port Westward should be evaluated, as should the impacts from the LNG projects planned for Warrenton (Oregon LNG) and Coos Bay (planned by PGE). The effects of the PGE's newly constructed gas powered electrical generating plant (Port Westward facility-see attached article from Portland Business Journal) should be evaluated in addition to other major GHG emitters such as the Wauna mill and industrial gas generating facilities planned for Longview (Mint Farm) and other industrial GHG emissions in the Lower Columbia River basin. Please review the attached summary of Lower Columbia River projects by CRK's Brett VandenHeuvel.

**Question:** What would the cumulative lifecycle GHG emissions be should the Coos Bay, Oregon LNG and Bradwood projects be constructed? What would the cumulative impacts be if two of these projects were built?

**Question:** What effect would increased gas supplies have on existing contracts for domestic/Canadian gas with lower lifecycle GHG that Oregon is currently using from the Rockies and Canada?

#### **Increased use of fossil fuels and impacts on conservation, increased efficiency, and renewables**

The DEIS completely fails to consider the effects that massively increasing the gas supply in Oregon, California and Washington and the west coast generally would have on incentives for conservation, efficiency and renewable development. Assuming that Bradwood's claim that the imported gas was actually intended for the Oregon and Washington market was accurate, the proposed project would more than double current gas use in Oregon. See attached EIA documents reflecting current gas use in Oregon, Washington and California. The impacts of such a significant increase in gas supply were ignored in the EIS. There is little question that flooding the Oregon and Washington markets with LNG derived gas would undermine the incentives for conservation which are triggered by supply limitations.

**Question:** How would significantly increased gas supplies in Oregon/Washington decrease incentives for conservation, efficiency and renewables?

The EIS projects that significantly increasing gas supplies would not have any measurable impacts on gas use or undermining incentives for conservation is without merit. Assuming that NorthernStar's claims that LNG would be price competitive with NG was true, the influx of a large new LNG supply would create significant pressure to weaken Oregon's recently adopted renewable energy standard to allow for greater gas combustion.

**Question:** How would the proposed project be consistent with Oregon's renewable energy standard and how could it increase political pressure to weaken the standard to allow for greater combustion of gas? The EIS should specifically address how the proposed project would be consistent with Oregon's goal of significantly decreasing its reliance on foreign fossil fuels?

**Question:** What independent evidence is there of the need for gas in Oregon? How does this compare to California and elsewhere? Where would the gas that is planned for import to Oregon go? Would the project proponent have any actual control over where the gas went? Specifically, even if the project proponent wanted to isn't it true that they could not prevent California from becoming a lead consumer of the gas which Oregon would bear the impacts of importing? As discussed elsewhere, FERC needs to clearly assess whether there is a need for additional natural gas supply in Oregon since such a determination is fundamental for determining whether the project would have the effect of stimulating increased gas usage above an existing need. Relying on the over stated projections of the NW Gas Association, whose leading members stand to profit from the proposed projects in the Lower Columbia River again reflects that FERC appears to see itself as more of a project booster than a guardian of the public trust which is charged with ensuring compliance with existing state and federal laws.

#### **Geologic Hazards**

The DEIS must analyze all the hazards associated with the facility. The geologic hazards at Bradwood may lead to human safety for workers and the public and ecological damage.

The DEIS fails to consider that impacts of siting a high risk gas terminal and pipeline in a high risk geologic area. There are clearly practicable alternatives that are less hazardous and will have less adverse impacts on aquatic resources that the DEIS failed to consider. The Oregon Department of Geology and Mineral Industries, who are the experts most familiar with Oregon's geology, stated:

High risk [site] because of the combination of a proposed hazardous facility and the high (severe) geologic hazards. The site has very poor foundation soils, is in a high seismic hazard area, and potentially subject to other severe geologic hazards.

Oregon Preliminary Comments at 23 (parenthetical term "severe" in original).

The poor foundation soils consist of recent dredging fill and very thick Columbia River alluvial deposits. The DEIS fails to consider that the construction of a large industrial site containing extremely heavy LNG storage tanks on top of loose, unconsolidated soils is dangerous. The facility would be constructed on an astounding 190 feet of unconsolidated soils, sand, silts, and clays. Bradwood proposes to add another 10 feet of fill to bring the industrial site above the 100-year floodplain. It is unlikely that Bradwood will be able to anchor its tanks or other components into bedrock due to the thick alluvial deposits. If Bradwood does reach bedrock, the bedrock itself is unstable and unsuitable for anchoring. The soils could fail due to the weight of the facility, landslide, tsunami, seismic event, seiche, and increased pore pressure due to high water. A failure resulting in the release of LNG could have catastrophic effects humans and aquatic resources.

DOGAMI also stated that Bradwood is a high risk site because it is in a high seismic hazard area. The United States Geologic Survey also classifies the Bradwood area as a "High"

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hazard area for earthquake potential. FERC must evaluate the earthquake risk, the consequences of an earthquake, and the impact on the public interest.

The DEIS seeks to downplay the geologic hazard of this area and suggest that "design criteria" could mitigate the effects of ground shaking. DEIS at 4-11. But, FERC fails to include any support for this statement except for the vague statement that final engineering designs, which have not been submitted, will mitigate hazards. DEIS 4-12. FERC cannot rely on vague, future designs that have not been submitted. The high seismic danger of this project weighs strongly against the public interest.

The Bradwood site also suffers from extreme landslide and rock fall hazards, which could cause significant damage or breach of the LNG storage tanks. FERC stated that "the separation distance between the cliffs and the nearest LNG storage tank is about 250 feet, greater than likely rock fall runout distances." DEIS 4-9. This is a highly questionable statement because rockfall are known to travel much further than 250 feet. FERC offers no citation or scientific support for its conclusions.

FERC does not even mention the hazard of debris flows in the DEIS, even though debris flows or landslides are common in this area. So common, in fact, that "Landslide Debris" is listed as a stratigraphic unit in pipeline section of the DEIS. A recent example of a landslide occurred west of Clatskanie on December 10, 2007. This large slide caused a leak in a Northwest Natural natural gas line, destroyed homes and closed Highway 30 for nearly a week. This landslide had a far greater runout than 250 feet.<sup>156</sup>

DOGAMI states that the DEIS is incorrect in multiple important conclusions. FERC should defer to DOGAMI's local expertise in Oregon geology. DOGAMI made the following comments regarding the geological analysis in the DEIS:

A hazardous facility proposed at the site and the site is potentially subject to severe geologic hazards. No mention of technical peer review of the submitted detailed geotechnical and seismic reports to ensure technical competency. Reference to or completion of technical peer review of the detailed geotechnical and seismic reports. An independent (non-government agency) technical peer review should be performed on the detailed geotechnical and seismic reports to ensure technical competency. Review should be done by qualified and licensed geologists and engineers.

Erroneous technical statements raise overall concerns about the qualifications of the applicant with respect to technical issues. No reference to detailed geotechnical and seismic reports (URS reports) on some very complicated geotechnical issues (specific examples are given below). Also erroneous statements which do not match the URS reports. Reference to detailed geotechnical and seismic reports (URS reports) on some very complicated geotechnical issues. Adequate integration of technical issues into the DEIS. A technical review of the DEIS by URS and relevant consultants to ensure adequate integration of technical analyses and results.

<sup>156</sup> See Oregonian, "Mudslide" December 12, 2007.

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The site has very poor foundation soils, is in a high seismic hazard area, and potentially subject to other severe geologic hazards. The role of the geotechnical and geologic hazard information and project members appear to be inadequate. The geotechnical and geologic hazard information has not been fully considered in the DEIS. Effectively integrate geotechnical/geologic hazard project members into the design, construction, inspection and operations so that the site's severe geologic hazards are mitigated adequately.

Discussion of vertical deformation rates appear to only consider long-term rates (hundreds of thousands of years) based on geologic studies. Contemporary vertical deformation rates may be different. Evaluation of contemporary deformation rates. The DEIS should differentiate between long-term and short-term (contemporary) uplift rates at the site and evaluate the potential for earthquake-related subsidence at the site.

Erosion features do not form deposits. Example of global item #2. Erroneous technical statement. Such erroneous technical statements raise overall concerns about the qualifications of the applicant with respect to technical and public safety issues. A technical review of the DEIS by URS and relevant consultants to ensure adequate integration of technical analyses and results.

Since significant dredging is proposed, shoreline erosion may not be the only geologic hazard affected or influenced along the waterway. Does not consider other hazards such as slope stability. Scientific data to support the statement. Increase in depth of channel may cause slope instability along with shoreline erosion. Detailed study or evaluation by a qualified and licensed geologist or engineer. Evaluate potential slope stability due to increase channel depth.

This statement is unsubstantiated and may be inaccurate. May not consider geologic processes and hazards such as river course migration and slope stability. Scientific data to support the statement. Analysis is missing. Increase in depth of channel may cause slope instability along with shoreline erosion. Detailed study or evaluation by a qualified and licensed geologist or engineer. Evaluate historic current shoreline stability (including potential slope stability). Evaluate shoreline with proposed facilities and channel modifications.

DEIS reports that LNG tanker wave heights would be "slightly larger" than other smaller, but similar sized tankers and does not report on the resulting erosion potential from this generalized wave height. Does not report how big the resulting waves will be and the erosion potential from these waves. Scientific data to support the statement. Detailed study or evaluation by a qualified and licensed geologist or engineer. Study that provides specifics about the boat wakes generated by the vessels, their impact at the shore (which is currently vague as it stands). Also baseline study and monitoring at the site.

Since it is difficult to determine before hand, some sort of baseline study and monitoring program should be implemented. Does not propose an idea to solve and/or determine the potential impacts. Proposed solution. Baseline study and monitoring.

Since there is a hazardous facility proposed at the site, reclamation should be performed to adequate standards for this type of facility. DEIS proposes standard reclamation. Reclamation should be performed with the proposed hazardous facility in mind. Reclamation should be performed with the proposed hazardous facility in mind. Propose reclamation not to standard regulations, but to levels so that a hazardous facility can operate without influence in any way from the reclaimed area.

Significant landslide hazards like debris flow impact, should be evaluated in detail by a qualified licensed geologist or engineer. No reference to a detailed study or evaluation by a qualified geologist or engineer. Scientific data to support the statement. Detailed study or evaluation by a qualified licensed geologist or engineer. Modeling to show debris flow won't impact the site.

Significant landslide hazards like rock fall impact, should be evaluated in detail by a qualified geologist or engineer. No reference to a detailed study or evaluation by a qualified geologist or engineer. Scientific data to support the statement. Detailed study or evaluation by a qualified licensed geologist or engineer. Modeling to show rock fall won't impact the site.

This is not a map of known faults. It is simply a copy of the USGS fault and fold map, which identifies only certain types of faults. Example of global item #2. Detailed geotechnical evaluation for pipeline indicates that the pipeline will cross 4 mapped faults. These 4 faults are not shown on the map. Such erroneous technical statements raise overall concerns about the qualification of the applicant with respect to technical and public safety issues. A technical review of the DEIS by URS and relevant consultants to ensure adequate integration of technical analyses and results. Show ALL faults on the map or indicate map is not complete.

Ground motions are not expressed in terms of "acceleration due to gravity" as stated in the DEIS. Example of global item #2. Ground motions are not expressed in terms of "acceleration due to gravity." Erroneous technical statement. Ground motion maps are usually expressed in term of "percent of gravity." Such erroneous technical statements raise overall concerns about the qualifications of the applicant with respect to technical and public safety issues. A technical review of the DEIS by URS and relevant consultants to ensure adequate integration of technical analyses and results.

What about earthquakes between 8.0 and 8.5? Why only earthquakes occurring on the CSZ? Text is not substantiated. I don't see any references to magnitudes of earthquakes for OBE and SSE in the URS reports. FERC's draft seismic design guidelines on OBE (section 5.2) are based on probabilistic ground motions (not maximum earthquakes). Magnitudes between 8.0 and 8.5 and earthquakes not on the CSZ. Approach is not documented. Evaluate OBE-SSE between 8.0 and 8.5 earthquakes not on CSZ. Substantiate approach. A technical review of the DEIS by URS and relevant consultants to ensure adequate integration of technical analyses and results. Provide consistent statements based on URS analyses.

The susceptibility, severity, extent and risk of lateral spreading was not discussed. The global stability of the site was not discussed with respect to lateral spreading, including the extent inland, the potentially impacted area, and the associated risks. The site requires safety and stability from damaging permanent ground deformation from lateral spreading. Discuss the global stability of the site with respect to permanent ground deformation from lateral spreading including severity, extent and risk. Discuss mitigation measures that specifically address lateral spreading risks.

Additional parts of the support facility should be considered for ground improvements against liquefaction in addition to the tanks. Support facilities are important and deep foundations should be considered as well. Potential deep foundations under support facilities. Evaluate and state why no deep foundations under support facilities or add.

The proposed facility should be evaluated on a site-specific basis. Regional maps developed over 10 years ago are cited. Site should be re-evaluated on a size-specific basis and include recent scientific data. Site-specific evaluation. New modeling.

Conclusions like impacts to the site from locally derived tsunamis should be from qualified professionals. No reference to a detailed study or evaluation by a qualified geologist or engineer. Scientific data to support the statement. Detailed study of evaluation by a qualified geologist or engineer. Modeling to assess local tsunami impact to the site. Should include detailed landslide map of the area and dynamic slope stability analysis.

This does not consider that the FEMA maps maybe out of date and/or simply incorrect because they are based on old topographic data. Also does not consider potential dam break. FEMA maps maybe out of date and/or incorrect. Does not consider dam break and subsequent inundation/flooding levels. Scientific data to support the use of old FEMA maps. Missing dam break completely. Evaluate old FEMA maps and evaluate dam break.

URS report (Dec 2005) indicates "softer compressible soils" and significant settlement. DEIS does not consider regional seismic induced subsidence. No reference to URS report of subsidence and settlement. Inconsistent statement to URS report. A technical review of DEIS by URS and relevant consultants to ensure adequate integration of technical analyses and results. Provide consistent statements based on URS analyses. Also consider settlement monitoring during operation.

Pipeline report indicates significant landslides adjacent to the site. No reference to a detailed study or evaluation by a geologist or engineer. Scientific data to support the statement. Detailed study or evaluation by a qualified geologist or engineer to support statement.

How was this landslide determined to have "lack of recent activity"? No reference to a detailed study or evaluation by a qualified geologist or engineer. Scientific data to

support statement. Inclinometers or some type of monitoring to determine it is not currently moving.

This statement and the sentence after are inaccurate. Also inconsistent to the references referred. DEIS states that future Mt. St. Helens eruptions will be reduced because of the explosion in 1980 thereby precluding lahars over the design lifetime of the pipeline. Scientific data to support the statement. Detailed study or review by a qualified geologist of engineer to support statement.

Oregon Preliminary Comments at 24-28.

As shown by these comments, the geology section of the DEIS is inadequate and inaccurate. DOGAMI's questioning of the FERC's scientific competence makes FERC look very bad and calls into question the entire DEIS. DOGAMI's analysis is also relevant to the practicable alternative analysis because any geologic event has the potential for great damage to the LNG terminal, which will adversely affect aquatic resources. FERC failed to analyze alternatives in terms of better geologic settings.

In addition, the DEIS failed to analyze the alternative pipeline routes. As stated in a letter from Dan McShane, the proposed pipeline route crosses landslide hazard areas and areas containing bauxite soils that are difficult to revegetate.<sup>17</sup> The DEIS must consider the cumulative impacts of this route and consider alternatives.

#### a. The project will harm fish and wildlife

The DEIS fails to adequately analyze the impact to fish and their habitat, including the 13 threatened ESUs of salmonids, non-listed salmonids, green and white sturgeon, eulachon, shad, striped bass, starry flounder, three spine sticklebacks, pea mouth, Pacific and river lampreys, marine fish (including tomcod, surfperch, rockfish, sanddabs, smelt, English sole, Pacific staghorn sculpin) and crab. The DEIS also fails to analyze adequately the impact to terrestrial wildlife and their habitat, including each species listed in DEIS Table 4.5.1-2.

The DEIS fails to analyze the project's harm to Essential Fish Habitat for salmon, groundfish, coastal pelagic species, and highly migratory species.

In addition, the DEIS fails to analyze adequately the impact on protect wildlife habitat in the Julia Butler Hansen Wildlife Refuge, Lewis and Clark Wildlife Refuge, and Fort Stevens State Park.

Specifically problematic, the analysis for the Columbian White-tailed deer fails to account for fragmentation of habitats between population pockets in the Estuary. The overall population is more stable if there is some degree of mobility from more stable to less stable populations. The relatively large, stable population in the Julia Butler Hansen Wildlife Refuge acts as a source for Columbian White-tailed deer to other areas. The fragmentation of habitat is not mitigated by one area of mitigation at Peterson Point, and it does not appear that mitigation

<sup>17</sup> Letter to FERC from Dan McShane, Licensed Engineering Geologist.

will occur along the pipeline route, which impacts hundreds of acres of Columbian White-tailed deer habitat.

#### The project will harm marine mammals and sea turtles

The DEIS fails to consider that The LNG terminal and the tankers will harm marine mammals due to habitat destruction and vessel strikes. NMFS described the presence of marine mammals, as follows.

The following non-ESA-listed marine mammals are likely to be present in the immediate project vicinity during construction or seasonally abundant in the near or off shore approaches to the Columbia River:

California sea lion (*Zalophus californianus*) – U.S. Stock. Peak abundance in the Columbia River estuary from late fall through spring, mainly absent during the summer breeding season.

Harbor seal (*Phoca vitulina*) – Oregon/Washington Coastal Waters Stock. Common in the Columbia River estuary year round, resting areas (haulouts) documented within five miles of construction site. Peak in winter months and move upriver. Decrease in spring. Seals pup at Desdemona Sands and use haul-out sites up to RM 45. Spring smelt run is important prey resource. In May, after the run is over the counts decline to about 1/3 of winter counts. Adult female dive time recorded in excess of 17 minutes (Bowen *et al.* 1999)

Gray whale (*Eschrichtius robustus*) – Eastern North Pacific Stock. Abundant passing the Columbia River mouth in late fall (south bound) and spring (north bound), feeding animals may be present outside of the migratory periods.

NMFS BA comments at 23.

In addition, multiple ESA-listed mammals and turtles are also present, including: green leatherback, loggerhead and olive ridley sea turtles; blue, fin, humpback, north pacific right, sei, killer, and sperm whales; and Steller sea lion. Each of these ESA-listed species, as well as the non-ESA-listed species, will be adversely affected by the proposed project. The DEIS fails to consider the harm to these species. This is particularly problematic because NMFS has not completed consultation yet, so FERC is blindly proceeding with the EIS.

The DEIS fails to consider that the 25 % increase in deep draft vessels due to the LNG terminal will increase the risk of vessel strikes of marine mammals and turtles. The NMFS' unpublished data compiled indicates 9 vessel strikes were either reported in the Region or detected during necropsy by the NW Marine Mammal Stranding Network between January 2002 and January 2007. Fin whales (6) were encountered most frequently, with individual strikes reported for blue, sei and humpback whales. Seven of the strikes were reported from Washington and two from Oregon, during the four year period (start of 2002 through start of 2007). The closest strikes to the proposed action area involved a fin whale that came into the Port of Portland on the bow of a vessel in September 2002, and a blue whale that was reported struck and killed off Tillamook, Oregon, in January 2007. Far more actual strikes occur than are reported. FERC must assess the impact of these strikes to individuals and populations. FERC

must fully understand the tanker route to the Columbia Bar and the tanker routes in the Exclusive Economic Zone.

### The project will introduce and increase invasive species

Bradwood will introduce or allow the proliferation of invasive species to the Columbia River, the terminal site, and the pipeline route. First, ships from foreign ports will transport exotic species on multiple surfaces and in water releases from ballast or engine cooling water. These species may harm the aquatic ecosystem. Second, the removal of vegetation, and long-term disturbances, at the site will allow the introduction and proliferation of exotic species, which will harm native ecosystems and may require herbicides and pesticides to manage. Third, a large swath of clearing and ground disturbance across Oregon and Washington for the pipeline will create an ideal site for exotic species to thrive and harm native ecosystems, forestland, and farmland.

### LNG terminal operation harms the local and state economy

FERC fails to consider the economic impacts of Bradwood. The DEIS cannot simply repeat the applicant's position that the 35 full-time jobs and increased tax base automatically makes this facility economically advantageous. The DEIS must consider the advantage of the 35 full-time jobs and the short-term construction jobs versus the detriment to the existing industry in Clatsop County and the State.<sup>158</sup> The DEIS fails to consider the tremendous risk to multiple industries and municipalities.

### The LNG tankers and terminal will disrupt the fishing industry

A moving tanker will have a minimum safety/security zone of 500 yards. Therefore, during the tanker approach and docking, the southern access to Clifton Channel will be shut off. In addition, there will be a minimum 200-yard security zone around docked tankers. This will impair access to traditional fishing grounds offshore of Bradwood and impair use of productive drift lines. Further, simply the threat of delay or unknown security problems may force fishermen off the traditional fishing grounds at Bradwood and Clifton. The size of the exclusion zones are subject to increase at any time, which would have serious consequences on fishing access. The DEIS fails to consider these impacts.

In addition, the LNG tankers will block access to traditional fishing areas along the entire length of the river. Each time a tanker enters the river, commercial and recreational fishermen will have to leave traditional fishing areas. Gillnetters in the estuary will need to haul in nets. The hugely popular Buoy 10 salmon fishing location will be disrupted when tankers arrive because boats within 500 yards of the shipping channel must clear the area. During peak fishing season, even a slight delay is significant.<sup>159</sup> ODFW stated:

<sup>158</sup> See Gustanski, J. Preliminary Assessment of Economic Impact from the Propose Bradwood LNG Terminal

<sup>159</sup> In commenting on the proposed LNG terminal in Warrenton, local salmon and crab fishermen stated that an hour delay during peak season may cost them \$1000.

*"The moving 500-yard safety and security zone around 125 LNG ships per year (2 – 3 per week) as they move up the Columbia River will be very disruptive to commercial and recreational fishing boats."* State Comments at 54.

The DEIS fails to evaluate adequately the impact of the LNG tankers on the commercial and recreational fishing industry and fishing access. The DEIS states: "[t]he Columbia River is also visited<sup>160</sup> by commercial and recreational fishing boats. An estimated 1,500 fishing boats use the Lower Columbia River in a year." DEIS 2-12. According to ODFW, over 46,000 commercial and recreational fishing boats use the Columbia River estuary each year for fishing and transit to the ocean. State Comments at 56 (from table titled, Estimated average monthly boat count by fishery in the Columbia River downstream of the Astoria-Megler Bridge). FERC's highly inaccurate data on the use of the river renders the impact analysis in the DEIS useless.

Each of these 46,000 boats will have to avoid the 500 yard safety zone around LNG tankers. This will cause delay and headaches in the extremely short and regulated commercial fishing season, and frustrate recreational anglers. Due to heavily regulated fishing seasons, missing just one drift could cost thousands of dollars. Further, LNG tankers and fishing boats will both want to cross the notoriously dangerous Columbia River bar at favorable tides. Because the LNG tankers would have priority, fishing boats are left with more risky crossings.

### The LNG tankers and terminal will disrupt the shipping industry

In addition to fishing boats, the 500 yard safety exclusion zones apply to all other ships. Thus, container ships bound for the Port of Portland or Port of Vancouver, must avoid the LNG tankers. Any delay in shipping caused by the LNG tankers will cause significant economic harm. The DEIS fails to analyze the economic impact, including the cumulative economic harm due to the delay on the importers and exporters of goods, producers, and consumers. In addition, FERC must consider the impact of delay cause ports to lose clients, and the cumulative impact of reduced shipping jobs and income. In addition, the DEIS fails to analyze the cumulative effects of impact to the shipping industry due to LNG accident, terrorist attacks, or threatened terrorist attacks.

### The LNG tankers and terminal will disrupt the tourism and real estate industries, and burden local communities

Economically, the proposed terminal and accompanying carriers will cause economic harm inhibiting the flow of boat traffic, diminishing the tourism appeal of the area, and negatively impacting the housing market.<sup>161</sup> In addition to these delays faced by tourist vessels, LNG would diminish tourism in the area in general, a \$352 million industry for Clatsop County. Economic Impacts Assessment at 10 (See also Don West, *Letter to Clatsop County Planning*

<sup>160</sup> Commercial fishermen, some from 5<sup>th</sup> generation families of fishermen, do not "visit" the Columbia River, but live in river towns, depend on the river for their livelihood, and spend much of the lives on the river.

<sup>161</sup> See Gustanski, J. Preliminary Assessment of Economic Impact from the Propose Bradwood LNG Terminal

*Commission*, June 15, 2007) (“Don West Letter”). As put by Don West, President of the Astoria Lodging Association and Vice President of the Columbia River Business Alliance, “LNG . . . carries with it a connotation of being unsafe.” Don West Letter. In an industry where “[p]erception is reality,” “tourism as an economic generator depends on a positive perception of the area.” *Id.* Thus, “[m]ilitarizing the mouth of the Columbia to protect LNG shipping from terrorists” would change tourists’ perception of the area for the worse, thereby leading to decreased tourism, decreased jobs, and a decreased taxable base for the County. *Id.* Additionally, property values of areas near Bradwood landing or anywhere along the LNG tanker pathway would experience a considerable decrease, due to factors such as the diminished aesthetic appeal of the area as well as the ongoing subjection to the blast zone of the LNG carriers.<sup>162</sup> Also associated with the risks inherent in LNG are increased insurance costs. The DEIS fails to consider these costs.

In addition, the DEIS fails to consider that the LNG terminal will require significant investments by local communities, including costs related to emergency response costs and the increasing the capabilities of emergency responders. See comments by Clatsop County and Cowlitz County, PBSJ Report to Clatsop County.

Furthermore, Bradwood has not provided protection against abandoning the site, the consequences of which would fall on the taxpayers. Oregon’s DOE stated:

*[Oregon] rules require a detailed engineering estimate of site retirement cost, and a surety to provide adequate funds. Without the study and the surety, FERC has no basis for the statement that future abandonment can meet applicable regulations. In fact, there is no protection against the licensee declaring bankruptcy and abandoning the site.* Department of Energy, at 63.

As DEQ summarized:

*“The proposed Bradwood Landing project would place additional burdens on coastal communities related to emergency response costs and measures, declining fishing and recreation industries, and unknown safety concerns due to geologic instability and proximity to rising river waters due to global warming.”* Oregon Preliminary Comments at 9.

**The LNG terminal and tankers will disrupt recreation and recreation-based businesses**

The DEIS fails to consider the impacts to recreation in the estuary. In addition to recreational fishing, the estuary is a popular location for kayaking, boating, bird watching, botany, plant collection, hiking, aesthetic enjoyment, drawing, and picnicking. The DEIS fails entirely to assess the impacts on these activities. A large industrial site will disrupt the enjoyment of the estuary and will preclude some recreational activities. The recreational impact is especially large because the tankers will travel the length of the river from the mouth to Bradwood, passing by the City of Astoria and popular waterfront recreation areas along the way.

<sup>162</sup> *Id.* at 11.

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The impacts are compounded because LNG transport is a dangerous activity that many people will avoid.

In addition, a significant portion of the Clatsop County economy is based upon recreational businesses.<sup>163</sup> In addition to the tourism industry discussed above, Clatsop County has kayaking, boat rentals, gear stores, outdoor clubs, supply stores, gas stations, and hotels that benefit from locals and visitors recreating on the Columbia River. The DEIS fails to assess the impact of the LNG terminal and tankers on local businesses.

**Construction Activities Will Disrupt Local Use of Clifton Road.**

The DEIS fails to consider that construction activities at the proposed Bradwood LNG terminal will substantially increase traffic and decrease safety on Clifton Road. Clifton Road is already a dangerous road to traverse, with numerous sharp turns and narrow paved surface. If construction of the Bradwood LNG terminal and related facilities is allowed to proceed, the use of Clifton Road will become even more perilous to local residents using the road to get to and from Clifton. Bradwood proposes to cycle traffic one-way through the 2.5 mile affected portion of Clifton Road. DEIS at 4-345. This would be both inconvenient and unsafe to local residents and construction workers because of the estimated average 10 minute wait times for vehicles at the one-way section of road. This may delay emergency vehicle access.

The DEIS suggests that the increased traffic due to construction is an acceptable impact because of the temporary nature of the construction, but the construction activities will last for 3 years, DEIS at 4.344, a substantial period of time to disrupt local resident’s commute to and from Clifton. Additionally, Bradwood has failed to propose sufficient safety measures for the 2.5 mile stretch of Clifton Road. *Id.*

**The DEIS grossly fails to evaluate the direct, indirect and cumulative impacts of the proposed project on public safety**

The DEIS glosses over and ignores the serious safety treats of the proposed project and reads more like a public relations document for the project developer than the type of unbiased evaluation that the public has a right to expect from FERC. The DEIS fails to consider the direct, indirect and cumulative safety impacts that the project would have related to the LNG tankers, LNG terminal facility, and LNG pipelines that would be associated with the project. The project’s safety threats are significantly exacerbated because of its site-specific location 38 miles up the Columbia’s narrow river channel, but this fact is essentially ignored in the EIS. The EIS should specifically disclose the relative safety threats associated with this inland proposed port compared to other proposed LNG terminals that are offshore or on the coast.

**Question:** Does the proposed site-specific location of the proposed facility make it any more vulnerable to intentional terrorist attacks that could be launched from a shoreline that in many locations is just a few hundred feet from the path of LNG tankers? As a part of this analysis please discuss the justifications for security exclusion zones on either side of LNG tankers that

<sup>163</sup> See Gustanski, J. Preliminary Assessment of Economic Impact from the Propose Bradwood LNG Terminal

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are typically 1,500 feet. Since it would be geographically impossible to actually provide these buffers on tankers traveling to the Bradwood site how would this factor increase the overall risk of an attack on an LNG tanker? This risk should be compared to risks at other proposed LNG sites on the west coast where the safety security zone would not be rendered meaningless as a result of encroaching shoreline.

The safety risks of the proposed project can be broken down into the risks associated with LNG tankers, the LNG terminals and the LNG pipelines associated with the proposed facility.

#### LNG tanker risks

LNG tankers carrying 30 millions gallons or more of LNG present a significant safety threat to those who live, work and recreate along the lower Columbia River. LNG tankers contain an extremely large amount of energy and an LNG release due to either accidental or intentional (terrorist) acts could cause a fire of unbelievable proportions. Sandia National Labs has projected that an intentional breach of an LNG tanker that spilled just 10% of an LNG tankers load could produce a vapor cloud that could affect a 1.5 mile radius from a given tanker. The attached map shows the vapor cloud overlay map for Astoria and the Paget Island that would result from LNG tanker traffic associated with the proposed project.

The Government Accountability Office, however, has indicated that the risk projections in the Sandia Report are likely underestimates since they ignore the potential for the type of cascading fire on an LNG tanker that would likely occur if one LNG tank ignited and therefore spared additional ignitions of adjacent tanks. The GAO has called for additional study of this threat and this risk needs to be directly considered in the EIS given dramatically larger risks associated with a cascading fire and how it would affect the vapor cloud and thermal exclusion zones around an LNG tanker. The significant risks of LNG accidents are further supported by the attached report by Dr. Jerry Havens on the general safety threats related to LNG.

The DEIS appears to tacitly acknowledge the threats of a cascading fire but without any explanation explains that it is "not likely to involve more than two or three cargo tanks." DEIS at 4-426. The DEIS does not explain why if a one tank fire was hot enough to cause a rupture in an adjacent tank that the combined fire from two tanks would not be sufficient to rupture a third tank and so on until all tanks on a given tanker were ruptured and ignited. The DEIS appears to dismiss the increased effects of a cascading fire while at the same time suggesting that such an event could cause up to a 30% increase in the fire hazard distance and a longer fire duration. DEIS at 4-426.

Despite acknowledging that a cascading event could result in a longer fire duration, the DEIS makes no evaluation of how long of a fire duration such an event may cause. This is significant given that the damage that a given fire may cause correlates directly with the length of time a given target is subjected to a given heat intensity resulting from a fire. Whether considering the impacts on humans or structures the DEIS should have considered the effects of how a cascading fire would affect sensitive resources including humans, homes, businesses, forests along the shoreline and other combustible structures within the vapor cloud and thermal impact zones.

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**Question:** What would the effects of a cascading fire event on an LNG tanker be from the perspective of impacts to humans, private property and infrastructure on shore and what facts does FERC rely on to support its findings on this issue?

The DEIS's limited reference to potential thermal radiation hazard distances is also flawed since it only assumes a breach of one tank on a 140,000 cubic meter tanker. DEIS 4-426. The DEIS should have considered the effect of a breach on the 200,000 cubic meter tankers the proposed facility is being planned to accommodate and should not be limited to the unrealistic assumption that only one tank on a given tanker would breach. As is supported by the 2007 Government Accountability Office report on LNG tanker pool fires, the risk of a cascading fire is a genuine threat in the event of an LNG tanker fire. The unsupported dismissal of any real consideration of the effects of a cascading fire event on an LNG tanker is contrary to the requirements of NEPA and should be remedied in a subsequent EIS.

**Question:** What would the effects of a cascading fire be on the type of 200,000 cubic meter tankers that would used at Bradwood? How long would a cascading fire on such a tanker likely burn and what would the resulting on-shore effects be?

The DEIS also uses an assumed 4.5 mile per hour windspeed estimate to project its vapor dispersion calculations, but this may not represent the scenario which would result in the greatest dispersion distance.

**Question:** What would the vapor cloud dispersion distance be if windspeeds were 10 mph or other higher windspeed that would result in a greater dispersion of a vapor cloud?

The DEIS appears to try to justify its near complete failure to discuss or consider the potential effects of an LNG tanker accident (even for the vapor cloud dispersion effects that are described) by the fact that the Coast Guard has responsibility for the operational safety of the LNG tankers. EIS at 4-436. The DEIS is conflicting in its treatment of the potential terrorist threats facing LNG tankers. On one hand the DEIS admits that, "terrorism has become a very real concern for the facilities under the Commissions' jurisdiction," while at the same ignoring almost entirely what the effects of a potential terrorist attack may be. This has the effect of essentially removing any ability of the public or expert agencies to evaluate the potential effects that a terrorist attack could have were the proposed project approved. While we understand some limits on how the effects of a terrorist attack maybe described, the complete absence of any clear evaluation of what the effects of a tanker breach may be, whether accidental or intentional, undermines the most important function of NEPA and is not justified by any rational national security concerns.

**Question:** In the event of either an accidental or intentional breach of an LNG tanker what would be the resulting damage due to loss of human life, injuries to human, damage to private structures and infrastructure, along the tanker path? This should specifically include scenarios for the type of intentional tanker breach evaluated in the Sandia Labs report should such a breach occur off the shoreline of Astoria, as well as at the proposed terminal location.

**Question:** What would the vapor cloud and thermal impact zones be and how many people and structures would fall within these zones assuming that 200,000 cubic meter tankers are used at the Bradwood facility which is being specifically designed to support this size tanker? What would the economic impacts of this vapor cloud and thermal impact zone be in the event of a tanker breach?

*The DEIS provides only a cursory and vague evaluation of the risks of an LNG tanker fire, either from accidental or intentional causes. No clear evaluation is made of the actual impacts that would occur in the event of an LNG tanker breach on the Lower Columbia and this analysis should be provided in the FEIS.*

The DEIS fails to consider size of ships that are likely to use terminal

*The evaluation that the DEIS does provide is flawed since it unreasonably assumes that the LNG tankers would be 140,000 cubic meters, despite acknowledging that Bradwood tanker facility as currently designed has a capacity to accept ships up to 200,000 cubic meters. ES-L. The EIS should evaluate the effects of tankers, on both safety and other considerations, of tankers that are 200,000 cubic meters in size, as well as, the tankers that are currently being planned and constructed for use in the U.S. market that are 265,000 cubic meters in size or larger. See attached article from MarineLink.com.*

*(<http://www.marinelink.com/Story/Linde+Group+to+Supply+for+LNG+Tankers-207124.html>)*  
Additionally, Bradwood has proposed using tankers that were 200,000 cubic meters as a part of their permit application to the Army Corps of Engineers. Notice for Permit Application, U.S. Army Corps of Engineers, Oct. 18, 2007.

**Question:** What basis does FERC have for only considering 140,000 cubic meter tankers in the EIS when the proposed facility is intended to accommodate significantly larger ships and new LNG tankers under construction are significantly larger than the 140,000 cubic meters?

That the Coast Guard may require additional evaluations before allowing ships larger than 148,000 cubic meters to use the proposed terminal fails to release FERC from its obligation to evaluate the effects of the larger ships that the facility is actually being designed for. DEIS 4-427. Regardless of what the Coast Guard does, the effects of FERC's action in approving the proposed facility needs to be specifically considered in the DEIS prior to project approval and this evaluation cannot be delayed until after the project is constructed simply because the Coast Guard may require some vague and undefined additional analysis in the future. The use of larger tankers and three tanks at the facility is clearly reasonably foreseeable and must be considered by FERC per NEPA and its implementing regulations.

All impacts of these larger ships, from increased stranding of juvenile salmon to increased risks from an LNG tanker accident, should be considered in the final EIS.

*DEIS underestimates projected ship traffic*

The DEIS is also inherently flawed in that it only assumes ship traffic of 125 ships per year and a two tank terminal design despite the fact that the facility is being explicitly designed

to support three tanks. The foundation for a third tank is even being designed specifically into the project plans and the proposed pipeline is being sized for a 1.5 bcf/day sendout rate which would similarly support three tanks. Because a three tank design is reasonably foreseeable the DEIS must evaluate the increased tanker traffic that such a facility would allow and the DEIS's failure to do so seriously undermines its evaluation a broad spectrum of impacts relating from projected ship traffic. This includes the DEIS's evaluation of factors such as the impacts on non-LNG ship traffic, recreational use, impacts to salmon, air pollution impacts related to ships, and the risks of an LNG tanker accident to name a few.

FERC's willingness to evaluate the proposed project based on an intentionally minimized scale and scope instead of based on the size of the facility that is actually being designed is unreasonable and only emphasizes that FERC appears to see its role more as a promoter of the planned terminal than a neutral reviewer.

**Question:** Is it foreseeable that Bradwood will use three tanks because the Bradwood facility is being designed with a foundation for a third onshore LNG tank, with space for vaporizers and other equipment necessary to handle the LNG capacity a third tank would provide and with a pipeline that is sized to facilitate a third tank scenario?

*Failure to consider or disclose flammable nature of insulating foam on LNG tankers*

The DEIS fails to address the fact that a majority of LNG tankers use a flammable foam as insulation around on board LNG tanks that could significantly increase the risk of a cascading failure. The attached documents attached as "Collection of LNG tanker insulation risk does" directly support that the potential risks of a cascading fire resulting from insulation failure and/or ignition needs to be considered in the DEIS as an inherent safety weakness of LNG tankers. This needs to be evaluated in the EIS

**Question:** Does FERC acknowledge that the foam used in the majority of LNG tankers in use today is flammable? Please discuss the factual basis for any answer to this question. How would this design flaw increase the risk of a cascading fire and how does this consideration alter the DEIS's discussion of the likely vapor cloud impact distances that are discussed in the DEIS?

**Question:** How would the effects of a prolonged fire resulting from a cascading fire event on an LNG tanker increase the impacts of such an event on shore, particularly in the area of downtown Astoria and the terminal site including Puget Island?

*Failure to adequately consider the risks of the impacts that brittle fracture could have on LNG tanker or terminal facility*

While briefly acknowledging that brittle fracture is a possibility that could be caused by an LNG leak on an LNG tanker, the DEIS fails to describe what the potential effects of a leak caused by brittle fracture could be and what the resulting effects would be on sensitive resources including humans and on shore structures. The Lloyds Register study prepared for the proposed Boston harbor and referenced in the DEIS LNG terminal supports that the risks of brittle fracture are significant and should have been considered in the DEIS.

***Failure to evaluate an Emergency Response Plan and emergency response capabilities of local emergency responders***

The DEIS fails to discuss or describe the Emergency Response Plan (ERP) or the effects, impacts, or mitigating effects of such a plan because no such plan had been prepared at the time of the DEIS to the frustration of local fire districts and governments alike. This is only one of the numerous impacts from FERC's rush to issue the DEIS prior to being providing fundamental information about the project, its operations, and safety protocols. FERCs attempt to cover up for its lack of basic information by repeatedly making suggested "recommendations" to NorthernStar as to what it should do or prepare is no substitute for the type of actual review and analysis that NEPA requires. This information should have been prepared in the DEIS and FERC should re-issue a supplemental DEIS before proceeding to a final EIS so that the public, state and expert agencies can have a reasonable chance to evaluate the effects of the proposed project.

The DEIS fails to discuss in any detail how the local communities along the proposed LNG tanker route would be able to respond in the event of a tanker incident either accidental or intentional and should have done so. The EIS, for example, did not disclose the fact that there is no burn center in Clatsop County and that emergency response capabilities are wholly inadequate for responding to a potential LNG tanker breach or even a tanker grounding that threatened a tanker breach. Essentially, the EIS hides behind the assumption that because a breach of an LNG tanker is unlikely there is no need to plan for a realistic scenario that evaluates how the communities along the tanker route and terminal maybe affected by an LNG accident or tanker breach. This is inconsistent with the requirements of NEPA.

**Question:** Does FERC acknowledge that there are inadequate emergency response assets currently available to respond to a serious event involving an LNG tanker?

***Failure to evaluate effects of cost-sharing plan***

The DEIS ignores the potential fiscal impacts that a cost-sharing plan would have on local and state governments. The impacts that having to re-direct scarce resources away from essential public services to LNG security and emergency response protocols would have on local and state governments was also not considered. Despite the DEISs regurgitation of NorthernStar's unsubstantiated claims about the tax revenues that the proposed project would create there is no evaluation about whether the LNG related costs that local governments would have to share would exceed the projected tax revenues the project may create. The costs of local government's emergency response responsibilities could significantly exceed the tax revenues the project would create and this should be disclosed and discussed in the EIS.

***Failure to consider unconfined vapor cloud explosion***

While the DEIS generally dismissed the potential for an unconfined explosion in the event of an LNG tanker accident it ignores the fact that should non-methane gases account for 15% or greater of the LNG content then such an explosion is in fact possible.

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**Question:** Does FERC acknowledge that LNG sources that could be used to supply the Bradwood terminal may contain contaminate gas concentrations that exceed 15% of the total LNG? Does FERC acknowledge that the Coast Guard and others have recognized the potential for an explosion if non-methane gases exceed 15% of an LNG source? What would the effects of such an explosion be?

***Failure to consider effect of Astoria's extensive dock structure over the Columbia River in causing a potential explosion of gas vapors***

A significant amount of Astoria's shoreline is composed of extensive pier structures that extend out hundreds of feet over the water and contain numerous structures and businesses on top of these piers that create what is at least a partially confined environment where there would be a significantly increased risk of explosion in the event of an LNG leak. The DEIS completely fails to discuss let alone assess the potential effects of the unique shoreline environment that characterizes Astoria.

**Question:** Does FERC acknowledge that the unique pier and dock structure along Astoria's shoreline creates what is at least a partially contained environment that would pose an increased risk of an explosion caused by LNG vapor? What would the effects of such an explosion be on the structures and humans that occupy and use these structures?

**LNG terminal risks**

The LNG terminal similarly poses significant risks to the public and particularly those who live on Puget Island that make clear that the proposed project is not in the public interest. The risks include the thermal and vapor dispersion risks that could affect those using the Columbia River, as well as, areas such as Puget Island and Clifton. The DEIS significantly underestimates both the thermal radiation and vapor dispersion risks associated with the proposed terminal and this undermines the purpose and intent of NEPA. Additionally, the design considered in the DEIS is inconsistent with the design requirements of NFPA 59A and 49 CFR 193 and this should have been disclosed and evaluated in the DEIS.

As discussed above, the DEISs first failure is that it only considers the effect of a two tank facility despite the fact that a three tank facility is reasonably foreseeable and must be considered as a part of the current EIS. Additionally, the DEIS failed to consider that the facility is designed to handle LNG tankers with a 200,000 cubic meter capacity. This is important because although FERC failed to consider the potential for a terminal based fire to cause an ignition of LNG tanks on board a docked tanker it should have.

The DEIS is also inadequate because of a number of significant technical and legal failures related to its analysis of the safety risks associated with the LNG terminal. These failures are discussed in Dr. Jerry Havens comments on the project which we incorporate here by reference. DEIS failures to address the safety issues surrounding the LNG terminal at Bradwood include:

***Improper use of the DEGADIS model for estimating the facilities vapor dispersion zone***

The DEIS analysis of the Bradwood vapor dispersion zone relies on the improper use of the DEGADIS model. As discussed by Dr. Havens, one of the authors of the DEGADIS model, DEGADIS is not appropriate to use when attempting to calculate vapor dispersion rates from liquid impoundment sumps. Instead, as is supported by FERC's own regulations, the proper model to use when accounting for the effects of a containment berm is the FEM3A model. The improper use of the DEGADIS model undermines the accuracy of the analysis required by NEPA and constitutes a violation of application FERC regulations. This inconsistency with applicable law needs to be disclosed and considered under NEPA and its implementing regulations.

***Failure to use proper design spill criteria***

The vapor dispersion modeling contained in the DEIS was improperly based on a design spill from the 6-inch diameter recycle line attached to the unloading line rather than the 32" unloading line that would actually carry LNG from the tanker to the on shore tanks. Allowing NorthernStar to rely on a spill from its 6" line instead of a much more likely rupture of its 32" line is arbitrary and capricious and fails to reasonably evaluate the potential effects of the proposed project. While we believe that this is supported by the requirements by NFPA 59 A and 49 CFR 193 regardless of these design regulations an evaluation of the vapor dispersion impacts from a breach of the 32" transfer line is warranted under NEPA since the breach of the offloading line clearly a reasonably foreseeable impact of the proposed project.

The DEIS admits plainly that a spill from the transfer line would result in a 529,091 gallon leak after ten minutes. DEIS 4-414. While we support the fact that FERC staff plan to require a spill impoundment area that is sized to contain this size spill, this requirement does serve to support that this sized spill event is reasonable to plan for and evaluate in the EIS. Again, irrespective of design criteria requirements of NFPA 59 A and 49 CFR 193 NEPA's requirement to inform the public and decision makers about the potential effects of the proposed project require a clear evaluation of the vapor dispersion that would result from a breach of the transfer line. An evaluation of a 6" line breach is not a reasonable proxy for such evaluation and is inconsistent with how FERC has calculated design spills for other LNG terminals it has reviewed. See attached excerpts from Weaver Cove LNG terminal. We request that FERC specifically discuss and disclose how it has calculated design spills for vapor dispersion calculation in other proposed LNG facilities. The attached document prepared by Dr. Jerry Havens comparing vapor cloud exclusion zones as calculated by FERC for various LNG terminals further supports that FERC's determination of the proposed vapor cloud dispersion zone is arbitrary and capricious and inconsistent with NFPA 59 A and 49 CFR 193.

**Question:** What is the vapor dispersion zone when calculated using the FEM3 model and a design spill that was based on the 32" rupturing as opposed to merely the 6" line? How would this enlarged dispersion zones affect a LNG tanker that was docked in the event a transfer line breach and subsequent ignition? Could a breach of the transfer line cause brittle fracture impacts to a docked LNG tanker or could the subsequent ignition in such a release scenario result in

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damage to a docked tanker? How would this larger dispersion zone affect users of the Columbia River, the railroad tracks through the project site and other resources on and surrounding the project site? How would such an event affect the LNG storage tanks?

The fact that FERC released the DEIS without having NorthernStar's design calculations that supported that its trough feeding the impoundment pumps would handle a 10 minute transfer line spill is yet another sign that in FERC's rush to issue the DEIS it lacked basic information about the facility that is needed to characterize its impacts.

**Question:** What size design spills has FERC used to evaluate vapor dispersion and thermal radiation zones in its review of other LNG proposals, such as the Trunkline LNG terminal? How does the methodology FERC has used for other LNG terminals differ from the methodology it is applying to the current proposal for the purpose of identifying vapor dispersion and thermal radiation zones?

***The modeling used improperly assumes no air/methane mixture in any spill impoundment in the event of a breach of the onshore LNG tanks or inlet or outlet lines thereto***

The DEIS modeling of the LNG terminal risks also improperly assumes that should the integrity of the on shore LNG tanks or inlet or outlet lines thereto be compromised that gaseous vapors from the spilled LNG would not mix with air thus reducing the vapor dispersion distance. This assumption, however, is inconsistent with relevant field studies of the issue, such as the Gas Research Institute's Falcon Series Data Report on the 1987 LNG Vapor Barrier Verification Field Trials which is attached. It is also inconsistent with FERC's own acknowledgments in the Weavers Cove EIS. This flawed assumption is discussed in greater detail in the attached paper by Dr. Jerry Havens and Dr. Spicer entitled "Error in FERC environmental impact statement determinations of LNG vapor cloud exclusion zones: failure to account for air mixing in vapor impoundments."

**Question:** Does FERC acknowledge that it is not realistic to assume no mixing of air with gas vapors in modeling vapor dispersion distances? What is the proper vapor dispersion distance if the unrealistic assumption that there will not be a mixture of LNG vapors with air above a containment tank in the event of a tank breach?

***The DEIS assumption that outer tank wall would effectively contain LNG lacks a reasonable basis in fact***

The DEIS fails to properly consider or disclose the actual affects that an LNG vapor fire at the facility would have on Columbia River users adjacent to the facility or to residents of nearby Puget Island. The effects of vapor dispersion and a subsequent ignition based on realistic spill scenarios is similarly lacking. The DEIS, for example, presumes that in the event that the on shore storage tanks were compromised and that an LNG fire ignited on top of the LNG storage tanks that the out concrete tank shells themselves would not fail. Given the intense heat of an LNG fire, the intense cold of direct LNG contact with the concrete and the combination of the two extremes FERC should have very specific evidence to support an assumption that these outer tanks would not fail.

**Question:** If an LNG vapor fire ignited on a roofless LNG storage tank, as appears to be presumed in the DEIS, how long would such a fire burn? What evidence does FERC have to support that the concrete outer tank would not structurally fail in face of what could only be presumed to be many hours of exposure to intense heat? What would be the effect if the outer tank did fail? How would Puget Island be affected by either vapor dispersion? How would such a failure affect a docked LNG tanker and one what evidence is this evaluation based?

*Geologic risks at site were not adequately considered*

The geologic risks at the proposed site have not been fully or adequately considered or evaluated in the proposed EIS as is supported in comments submitted by the State of Oregon and others. The DEIS failed to adequately consider the risks of landslides at the site, the effects of earthquakes including the effects of liquefaction, the potential tsunami risks (both ocean caused and from a cross river landslide). The fact that the superficial analysis contained in the DEIS did not find any evidence, either through written reports or from photographic evaluation, of the landslide-triggered tsunami that did affect the area despite the clear records of this event in local newspapers highlights the need for a much more in-depth geologic evaluation of the risks posed by this high hazard site.

We believe that the concerns addressed by the State of Oregon DOGAMI in regards to inadequate geologic evaluation at the site need to be fully addressed in a supplemental DEIS.

While the DEIS notes the risks of liquefaction it wholly fails to reasonably describe the risks of liquefaction that would remain even after the loosely proposed and vaguely described mitigation measures. For example, while the proposed LNG tanks would be put on "deep" foundations, how would liquefaction affect the other key components of the facility such as the transfer pipes, dock, vaporizers etc.? As with so many other parts of this rushed DEIS any potential to even reasonably evaluate the effects of the proposed project is undermined by the lack of even final design specifications that would allow the public or other agencies to actually evaluate the geologic risks of the project and understand the likely effectiveness of mitigation measures. The DEIS states, for example, that "While the final engineering design for the LNG terminal would incorporate detailed seismic specifications and other measures to mitigate the impacts of seismic hazards." DEIS at 4-12. Deferring the design specifics of the facility, however, and the mitigation measures it may include is fundamentally at odds with NEPA and eliminates the ability of the public and others to understand and evaluate what the effects of the proposed mitigation measures may be and what the remaining impacts would be.

Similarly, throughout the DEIS the proposed mitigation measures lack a degree of specificity that would allow a reader to understand with any degree of certainty what the final effects of the proposed project would be. There is typically no detail about how the mitigation measures would be required and if they are not required what basis FERC relies on to assume that they would actually be implemented. FERC's "recommendations" to NorthernStar hardly constitute assurances that the suggested mitigation measures would be implemented.



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These recommendations on information that NorthernStar should provide such as "Details of the liquefaction mitigation methods, procedures, plan extent and verification methods..." are exactly the type of thing that FERC should have required be produced before the DEIS was released. In FERC's rush to issue the DEIS, however, it has undermined the public's ability to evaluate and comment on these specifics and as a result FERC needs to re-issue a supplemental DEIS that the public would have a chance to review and comment on.

The DEIS statement that the shoreline along the project site "appears to be moderately resistant to erosion" is without support or relevance since the shoreline has not been subject to the type of high intensity wave action that will result from the proposed port facility. The photos to the right shown an example of wave action on the lower Columbia River just up-river of the proposed project site that was generated from a ship far smaller than the proposed LNG tankers. These impacts are import, but largely ignored in the DEIS, in the context of both shoreline erosion as well as impacts on salmon stranding which is common as a result of ship wake. Again the DEIS's failure to consider the erosion related effects of the larger 200,000 cubic meter capacity ships that the terminal is being planned for undermines the accuracy of the EIS evaluation.

While the DEIS generally ignores or unrealistically downplays the impacts of wave action on erosion and salmon stranding outside the terminal area, its treatment of these issues inside the terminal area is similarly inadequate. It is wishful thinking, for example, to assume that "in general, tugboats would be operating within the proposed turning basin with their sterns directed away from the nearshore banks" and therefore would not impact shoreline erosion. This is plainly ridiculous as tugboats would clearly have to move around the site before, during and after the arrival of an LNG tanker and assuming that they would be pointed away from the shoreline is just another example where the EIS preparers intentionally blindfold themselves to the impacts of this project.

The DEIS notes that NorthernStar would deposit dredge material on the site to raise the final site elevation above the 100-year flood level. The DEIS, however, fails to consider how this dredge material would withstand the flood action of a 100 year flood and the risks to the whole site that would result from using highly erosive dredged fill for both the site foundation and for the earthen berm around the LNG storage tanks.

**Question:** How would the use of dredged spoils for what would essentially be the site foundation and for the containment berms affect the ability of the site to withstand high flood events, that are predicted to increase in coming decades with global warming, as well as other similar events ranging from liquefaction to tsunamis?

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**Question:** The DEIS provides not information about the effectiveness of vibrocompaction and no information about the effectiveness of the proposed deep foundations planned for the LNG storage tanks. What would the remaining geological risks be assuming even that these mitigation measures are used?

The geologic analysis used in the EIS assumed that only the upper 85 feet of the soils below the project site were likely to experience liquefaction, but the DEIS also admits that there is at least 100 feet of sand, silt and clay alluvium under the site, and there is every reason to believe this entire soil structure is likely to liquefy in the event of a large enough earthquake. What justification does FERC rely on in its assumption that soils deeper than 85 feet would not liquefy?

#### *Poor site selection for and LNG port*

The DEIS fails to discuss the fact that the proposed terminal location is a poor site for an LNG terminal for multiple reasons. The DEIS ignores that the fact that the project is likely one of the highest risk sites in the United States being currently proposed given its location 38 miles up a narrow river channel which would make the proposed safety and exclusion zone meaningless for much of the tanker trip up the river since the shoreline would be well within the 1500 foot exclusion zone along the sides of LNG tankers.

The DEIS also ignores the fact that the project is located on a curve in the river and would located barely one LNG tanker's length from the Columbia River shipping channel. This is inconsistent with SIGTTO standards for terminal location siting and this fact should be disclosed and evaluated in the DEIS. Site Selection and Design for LNG Ports and Jetties Information Paper No. 14.

The DEIS also fails to adequately consider the effects on shipping and other river users, such as commercial and sport fishermen and recreational boaters who heavily use the area in and around the project site.

#### **LNG pipelines**

The DEIS's evaluation of the safety threats of the proposed pipeline which would run through Columbia and Cowlitz Counties is wholly inadequate and reflects an extreme callousness towards the people who be affected by this misguided scheme to generate revenue for New York energy speculators. FERC's almost laughable decision to segment analysis of the Palomar pipeline similarly violates NEPA and its implementing regulations.

These high pressure un-odorized gas pipelines have a blast zone of over 1,400 feet and hundreds of homes, businesses, farms and other sensitive facilities would be placed within the blast zone if the proposed project is approved. The Palomar line would result in over 33,000 acres of new blast zone being created in Oregon and thousands of acres of blast zone would similarly be created along the Cowlitz County line.

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While the DEIS completely fails to address the risks of the Palomar line it does only slightly better in terms of the proposed line through Cowlitz County. While the DEIS does a cursory review that acknowledges that the line crosses over 31 "potential" landslide areas it admits that it lacks significant information about these areas thereby undermining any ability of the public or decision makers to actually evaluate the risks of the proposed project on pipeline integrity. A similarly limited review of earthquake faults undermines any reasonable evaluation of the risks of the proposed pipelines.

FERC's recommendation that NorthernStar should "conduct additional field mapping and subsurface investigations as needed to develop a Final Pipeline Design Geotechnical Report" is exactly the type of advice that FERC should have given before putting out a DEIS that was based on cursory reviews and a lack of the type of site-specific data that NEPA requires for agencies charged with taking a "hard-look" at the impacts of a given project. DEIS at 4-20.

The threats of the proposed pipelines would loom over every property and its owners that are along the pipeline regardless of whether an accident ever did occur and this impact on people's daily lives, as well as the reduced property values that would result, needs to be carefully considered. The EIS makes no mention of the impact that having a three foot diameter high pressure high volume pipeline running through your property would have on the psychological health of those who live along the pipeline. While the DEIS attempts to downplay any actual risk to landowners in the DEIS a revised DEIS should specifically evaluate the social effects of how the proposed project would affect landowners along the pipeline. This should include the serious social impacts of experiencing a condemnation proceeding. If FERC is going to recklessly wield its condemnation power for the benefit of a private for profit corporation than it should at least have the decency to acknowledge the serious impacts that this have on those it wishes to impose it on and the proper place for that evaluation is in the DEIS.

**Question:** How many condemnation actions does FERC expect on both the proposed northern pipeline and on the Palomar pipeline? What is the projected total loss in property value that the proposed pipeline right of way would cause a result of loss of currently allowed uses along the pipeline?

Additionally, the potential for a catastrophic accident along the pipeline route will and in some cases already has significantly lowered property values along the proposed route. This should be specifically considered by having a trained and qualified real estate appraiser familiar with the local real estate market make actual market determinations about how playing host to a massive un-odorized pipeline would decrease individual property values for residents and business owners along the pipeline route.

The DEIS also generally ignores the fact that the proposed gas pipelines will lack the most basic safety feature that has been used for gas safety for many decades: odorization.

**Question:** Why would the proposed gas line not be odorized? What would the costs of adding odor to the line be? How would the unodorized gas decrease detection of gas leaks along the Williams pipeline that the proposed northern pipeline would connect to? What could the effects of this lack of such a basic safety provision be?

The proposed northern pipeline appears to be a dummy pipeline that is potentially not actually even intended as a route through which gas from the Bradwood project would reach the market. The most obvious fact support this contention is that the Williams pipeline lacks the capacity for the 1.3 bcf/day of gas that the Bradwood terminal is planned for. Knows Where the Gas Will Go?" Cassandra Profita. The Daily Astorian. Nov 27, 2007. Instead, there are good reasons to believe that Palomar pipeline would send the Bradwood gas to market and that the northern line may be intended to transport gas to geologic formations underneath the hills in Cowlitz County for storage. Veneco and others are currently drilling exploratory wells looking for such storage areas in Cowlitz County, yet this was not disclosed in the DEIS and should be since such an action would be both a connected action and one that would have cumulative effects to the proposed project.

FERC should consider the collection of news articles and other documents related to the Palomar pipeline labeled as "Collection of Palomar pipeline docs" and then stop the proposed process until such time as a DEIS can be re-issued that considers the effects of the Palomar pipeline. FERC should also incorporate all documents, including maps and aerial photo overlays, that it has as a part of its file for the Palomar and Oregon LNG projects and include such documents in the record for the Bradwood terminal. This includes the attached transcripts from two of the Palomar scoping meetings which are attached as well as the transcripts from all additional Palomar scoping meetings.

**Question:** What does FERC know about the potential consideration to develop a gas storage site in Cowlitz County or anywhere in the surrounding area? How would this project be related to the proposed Bradwood project? How would this affect use and purpose of the northern pipeline route? What would the effects of this type of gas storage project be on humans, fish, wildlife, public safety and the broad range of sensitive resources that should be considered in a DEIS?

**Question:** On what basis can FERC accept the incredulous assertions of NorthernStar that it intends to use the northern pipeline route to send gas to the Williams line when the Williams line lacks capacity to accept the gas? What is the current maximum capacity of the Williams line and how much excess capacity in the line is there? Without adequate capacity in the Williams line how can FERC find that the northern pipeline route constitutes a viable distribution line for the gas? Does FERC acknowledge that the lack of capacity in the Williams lines supports the notion that the Palomar pipeline is a necessary part of the proposed project?

***The Revised DEIR Fails to Analyze the Potential Risks of Onshore Leaks due to Chemical Composition of the Natural Gas from the Proposed Project***

Between 2003 and 2005, Washington Gas, Inc., a natural gas distributor in the State of Maryland, experienced an unusually high number of dangerous gas leaks in certain areas of its suburban gas distribution network. Washington Gas contracted scientific analysis to determine the cause of the leaks. In a detailed report, the analysts concluded that the chemical composition of natural gas delivered by Washington Gas from the Cove Point LNG terminal to consumers in the high-leak areas contributed to degradation of seal quality in the gas pipeline network and the unusual number of gas leaks discovered

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among Washington Gas customers. FERC is in possession of this document from the proceedings on the Cove Point LNG terminal and should include it in the record for the instant project.

Several findings from the Washington Gas report pertain directly to the environmental impact review for the Bradwood project. The DEIS fails to include these considerations, despite the grave implications for the safety of potential consumers of Bradwood's vaporized LNG.

Among the important findings, the report states:

- *The process of natural gas liquefaction and re-vaporization results in a lower C5+ [gaseous hydrocarbons with molecular weight equal to or greater than pentane] content (mostly pentane and hexane) in the revaporized LNG than that of the pipeline [domestic] gas. The gases used in our experiments demonstrated this difference: concentrations of C5+ hydrocarbons were 1053 ppm in the Shenandoah pipeline gas versus 105 ppm in the Cove Point gas.*

- *The elastomer in the seals can adsorb and desorb pentane, hexane, and other higher hydrocarbons with molecular weight equal to or greater than pentane] content (mostly pentane and hexane) in the revaporized LNG than that of the pipeline [domestic] gas. The gases used in our experiments demonstrated this difference: concentrations of C5+ hydrocarbons were 1053 ppm in the Shenandoah pipeline gas versus 105 ppm in the Cove Point gas.*

- *The change to [Cove Point LNG] gas that has a lower concentration of pentane and higher molecular-weight (C5+) compounds, caused a slight shrinkage in some seals due to desorption of previously adsorbed C5+ compounds. 87*

According to Washington Gas officials, the low C5+ compound concentrations in the Cove Point LNG was "a key contributing factor" in the deterioration and leakage of more than 1,400 gas seals, requiring a \$144 million project to replace gas lines and equipment. Illustrating the danger of the leaks, a high energy explosion that razed a four bedroom Maryland home (fortunately, uninhabited) was implicated in the shrunken seal leaks. See Baltimore Sun, *Officials look for cause at Cove Point for leaks in Pr. George's houses; Dominion blames equipment.* July 8, 2005.

**Question:** How would the composition of the gas imported to Bradwood potentially affect seals and other gas line and gas combustion equipment used by gas customers and in the transport of LNG derived gas? What would the composition of the gas that would be imported to Bradwood likely be based on the most likely suppliers?

This issue and many others relating to inherent problems and risks associated with LNG are thoroughly addressed in comments on the Cabrillo Port LNG project that were prepared by the Santa Barbara Environmental Defense Center. We attach these comments here and incorporate the concerns, questions and issues raised in these comments into our own comments as such concerns apply to the Bradwood Project. If FERC is unable to easily obtain any of the documents referenced in the EDC's comments please contact us and we will provide these documents to you for inclusion in the record.

## Pipeline construction and operation

Along with the ecologic, economic and safety impacts of the tankers and terminal, Bradwood proposes to construct a 36-mile high-pressure natural gas pipeline, which would traverse multiple rivers and streams in Oregon and Washington. The pipeline requires a 100 to 120 foot construction easement, which will clear vegetation and disturb soils and natural resource industries (forestry, fishing, farming) in a long linear swath. This disturbance is permanent.

The physical, chemical, biological, and economic impacts of the pipeline are discussed below. These comments focus on the 36-mile pipeline proposed by Bradwood. However, as demonstrated in the alternatives analysis section, FERC must also consider the proposed Palomar pipeline, which is a necessary component of the Bradwood project. The Palomar pipeline is a 220-mile pipeline that will cross hundreds of streams and cause dramatic water quality issues. FERC must consider the impacts of the Palomar project and must require Bradwood to submit aquatic resource data on Palomar.

## Physical and chemical impacts

The DEIS fails to consider that the pipeline will adversely affect the physical and chemical characteristics of the project area.

Bradwood proposes a very large, high pressure pipeline in an area with highly unstable soils. An incredible 51% of the soils along the proposed pipeline route are designed "Highly Erodible Land" or "Potentially Highly Erodible Land." FERC must analyze the effect of these unstable and erodible soils on pipeline stability and safety. In addition, the ground disturbing activity will increase the erosion of these already highly erodible soils. Erosion is especially problematic at waterway crossings and steep slopes, both of which are common along the pipeline route. Pipeline construction and maintenance will increase the turbidity, temperature, and oxygen demand in each stream along its route.

Digging pipeline trenches and HDD bore sites on steep, unstable slopes will increase the landslide risk. The pipeline will pass through high landslide hazard areas. As stated above, landslides are so common in Cowlitz County, that "Landslide Debris" is a stratigraphic unit into which the pipeline trench will bore. In fact, recent landslides in Cowlitz County have severed natural gas lines and caused large fires. Just this month, a landslide west of Clatskanie, Oregon occurred approximately 1 mile from the proposed pipeline route.<sup>164</sup> This large landslide ruptured a smaller existing natural gas line. The DEIS does not adequately address the danger of clearly foreseeable landslides to the pipeline or the increase of landslide risk due to pipeline construction.

In addition, all of the geologic hazards discussed above regarding the terminal are applicable to the pipeline. The DEIS fails to consider the impact of the geologic hazards on the pipeline and alternative pipeline designs or routes that minimize environmental and social risks.

<sup>164</sup> See Oregonian, "Mudslide" December 12, 2007.

We attach and incorporate the comments of Dan McShane, registered geologist, on the DEIS. Based on his long history working in Cowlitz County and his experience with natural gas pipelines, Mr. McShane discusses multiple errors and omissions in the DEIS.

## Biological impacts

The DEIS fails to consider how the Bradwood pipeline will adversely affect biological resources. The primary impact will occur at stream crossings. First, riparian vegetation will be removed across a wide construction easement and permanently destroyed in the maintenance zone. The loss of riparian vegetation will decrease habitat for riparian mammals, amphibians, reptiles, birds, and macroinvertebrates. This will also destroy fish habitat that depends on healthy riparian areas for bank stability, shade, physical complexity, the input of coarse woody debris, and detritus from vegetation. In addition, removing riparian vegetation will increase water temperature by decreasing shade. The beneficial filtering and buffering by the riparian area will also be degraded. This destruction will decrease water quality and harm fish. DEQ stated, "There are 94 stream crossings and 24 wetland area crossings proposed to accommodate 30 miles of new pipeline. Associated with these disturbances to the streams and wetlands themselves, are **significant impacts to riparian and wetland vegetation**." Oregon Preliminary Comments at 12 (emphasis added).

Second, the pipeline construction will disturb soils, stream banks, and stream beds, which will harm aquatic life. Pipeline construction will necessarily involve heavy equipment in sensitive riparian habitat. The pipeline construction will remove and destroy topsoil adjacent to streams and remove the streambed substrate when trenching across the stream. Some of these sites are salmon spawning streams, so spawning gravels could be removed and harmed by the turbidity plume. The construction will generate tremendous turbidity and suspended solids and deliver sediments to downstream habitat, including downstream salmon habitat. Downstream sediment delivery will occur in habitat utilized by ESA-listed salmon and EFH. In some circumstances, bank hardening may be required, which will further degrade aquatic habitat. In addition, multiple roads will be created to access the pipeline route. The vehicles will compact and disturb soils. Further, Bradwood will construct multiple structures associated with the pipeline, which will disturb soil, vegetation, and water quality.

Third, the pipeline construction will disrupt fish passage by damming the streams during the trenching and pipeline placement. It is unclear how long fish passage would be interrupted. The mitigation of capturing and removing fish behind the dams is historically not effective, and will result in the take of threatened salmonids.

Fourth, any pipeline boring, including the multiple proposed HDD, risk frac out and the introduction of bentonite to the waterway. Bentonite smothers fish habitat and fouls streams. A recent pipeline through similar topography in southern Oregon experienced multiple problems with frac out and the introduction of drilling mud into the waterway. FERC must analyze the tremendous impact of the introduction of very large amounts of fine sediment on the Columbia River or salmon-bearing tributaries. The following photos show stream degradation from Coos County natural gas pipeline construction.



Fifth, the lateral pipelines and other associated features (including power lines) will impact water quality. FERC must consider the impact of lateral pipelines – the DEIS failed to assess these impacts. Sixth, the pipelines will result in habitat fragmentation in important riparian habitats and associated uplands. Seventh, the pipeline will adversely affect rare plants. As the USFWS noted, the surveys and impact assessments for checker mallow, water howelia, and other rare plants must extend to all areas that will be impacted by the permanent and temporary right of way for the Bradwood pipeline. Additionally, the DEIS does not incorporate an assessment of how potential serious failures in unstable slopes and erosion throughout the area will impact habitat of sensitive plant species along the pipeline.

#### Cumulative Impacts

40 C.F.R. § 1508.25 requires FERC to consider the cumulative impacts of the proposal. This includes the cumulative effects of conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, property ownership and the needs and welfare of the people. FERC's analysis, therefore, is not limited to the region directly adjacent to Bradwood. Nor is the review limited to short-term impacts, but it must consider the long term impacts on the estuary and the entire length of the pipeline. Further, EIS must analyze connected actions and similar actions, as defined in the regulations.

The DEIS fails to include a cumulative impacts analysis of proposed Palomar Pipeline, which, as explained in the alternative section above, is directly connected to the Bradwood LNG terminal. Because detailed Palomar Pipeline maps are not available to the public or FERC at this time, it is difficult to assess the impacts and impossible to say which practicable alternatives exist related to pipeline route. However, due to the massive size and scope of the Palomar Pipeline, the adverse environmental, social, and economic impacts are extreme. The DEIS fails to analyze the cumulative impact of the Bradwood terminal, along with the two proposed pipelines, will of which have a tremendous adverse impact on each of the factors listed above.

The DEIS does not even attempt to acknowledge important past, ongoing, and future actions that will continue to hamper recovery of sensitive wildlife, fish, and their habitats. The cumulative impacts analysis also omits the obvious impact that industrialization and hydropower development have had on the Columbia River – developments which harm the estuary and the Lower Columbia's critical salmon nursery. The Columbia River Channel deepening project, which will also occur in the immediate project area, will impact fisheries and should be incorporated into a consideration of how the Bradwood area will function as even more important migration and refuge habitat during and in the wake of this project.

As part of the cumulative effects analysis, FERC must also consider Bradwood's degradation of fish habitat in light of the already tenuous state of salmon, sturgeon and groundfish in the Pacific Northwest. First, the wetland and shallow water habitat in the Columbia River has been significantly degraded over the last century. The remaining habitat at Bradwood, therefore, takes on added importance. The Columbia River dams degrade water quality by increasing temperature, decreasing dissolved oxygen and flow, all of which harms salmon.<sup>165</sup> The dams also decrease the amount of habitat available to salmon. In addition, other upstream uses, such as pollution from agriculture, forestry, and industry contribute to salmonid population declines. In addition, the Columbia River channel deepening project is ongoing. This large dredging project will seriously degrade water quality directly adjacent to the Bradwood site, and all along the lower Columbia River. Threatened salmon and other species will be harmed by the pollutants, disruption, and loss of habitat due to channel deepening dredging. Further, fish hatcheries degrade the survival of protected, native salmon. Due to the dams, other upstream impacts, habitat loss in the estuary and current dredging, 13 ESUs of salmon are on the brink of extinction.<sup>166</sup> The Bradwood LNG terminal's impact on salmon must be evaluated in light of the cumulative ecological stress that salmon already face. The DEIS has failed to consider adequately these cumulative effects.

In addition, global warming is reducing snow pack and increasing temperatures, which will adversely affect water temperature and flows. FERC must consider each of these cumulative effects on salmon and other aquatic life, and wildlife. As part of this analysis, FERC must consider the indirect effects of increasing the fossil fuel supply in the Pacific Northwest, which will lead to greater carbon emissions and accelerate global warming. The DEIS also failed to analyze the indirect effect of LNG creating additional gas-fueled power plants, which will decrease the demand for renewable energy, thereby hindering efforts to combat global warming and hindering the economic opportunities that renewable energy has brought to the Pacific Northwest, such as investments in wind, wave, and solar energy.

In addition, the DEIS has failed to consider the cumulative economic effect of Bradwood on the fishing industry and communities dependent upon the fishing economy. The direct harm to fish will harm the fishing industry, as will the lack of access to traditional fishing areas.

#### Mitigation is inadequate

<sup>165</sup> Ninth Circuit FCRPS Opinion

<sup>166</sup> *Id.*

The proposed mitigation projects do not offset the tremendous damage that the LNG terminal and pipeline would cause. First, the mitigation violates the fundamental tenant of EPA wetland mitigation sequencing by failing to avoid adverse impacts. As described in these comments and by NMFS and Oregon, there are practicable alternatives to the Bradwood location with less adverse impact.

EPA describes the mitigation sequencing as follows:

In 1990, the Environmental Protection Agency (EPA) and the Department of Army entered into a Memorandum of Agreement (MOA) to clarify the type and level of mitigation required under Section 404 regulations. The agencies established a three-part process, known as mitigation sequencing to help guide mitigation decisions:

1. Avoid - Adverse impacts are to be avoided and no discharge shall be permitted if there is a practicable alternative with less adverse impact.
2. Minimize - If impacts cannot be avoided, appropriate and practicable steps to minimize adverse impacts must be taken.
3. Compensate - Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain.<sup>167</sup>

The MOA describes the requirement of the law:

**Avoidance.** Section 230.10(a) allows permit issuance for only the least environmentally damaging practicable alternative. The thrust of this section on alternatives is avoidance of impacts. Section 230.10(a) requires that **no discharge shall be permitted if there is a practicable alternative** to the proposed discharge which would have less adverse impact to the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. In addition, Section **230.10(a)(3) sets forth rebuttable presumptions** that 1) alternatives for non-water dependent activities that do not involve special aquatic sites are available and 2) alternatives that do not involve special aquatic sites have less adverse impact on the aquatic environment. **Compensatory mitigation may not be used as a method to reduce environmental impacts** in the evaluation of the least environmentally damaging practicable alternatives for the purposes of requirements under Section 230.10(a).<sup>168</sup>

Bradwood flips this sequence on its head by siting the terminal where it will have tremendous adverse impacts, but then attempting to mitigate those impacts. As the MAO states, compensatory mitigation may not be used as a method to reduce environmental impacts. The DEIS fails to raise the legal requirements of mitigation sequencing, fails to assess the adverse

<sup>167</sup> <http://www.epa.gov/owow/wetlands/pdf/CMitigation.pdf>.

<sup>168</sup> Memorandum Of Agreement Between The Department of the Army and The Environmental Protection Agency, 1990 (emphasis added).

effects of Bradwood's proposal to operate out of sequence, and fails to assess alternative design, operation and mitigation options that have less impacts.

Second, even if Bradwood had properly avoiding adverse impacts, the mitigation does not adequately compensate for the damage. The destruction of 58 acres of prime estuarine salmon habitat is irreplaceable. In addition, adequate mitigation must replace habitat values with "in-kind" and "in-place" habitat. The MAO states:

Generally, in-kind compensatory mitigation is preferable to out-of-kind. There is continued uncertainty regarding the success of wetland creation or other habitat development. Therefore, in determining the nature and extent of habitat development of this type, careful consideration should be given to its likelihood of success.<sup>169</sup>

Here, much of the proposed mitigation is not "in-kind" or "in-place", as NMFS noted in its May 11 letter. The construction and operation of the terminal will cause immediate, severe, deleterious impacts to salmon, critical habitat, and essential fish habitat. Bradwood asserts that salmon habitat will receive a net benefit from the project, but provides no scientific basis for this questionable statement. Bradwood has understated the extent and severity of impacts that will need to be mitigated, and so the analysis of how mitigation will offset these problems is thus inherently flawed. Most importantly, the mitigation measures put forth by Bradwood do not necessarily offset the types of habitat being destroyed by dredging, filling the log pond, and damaging wetlands, streams, and riparian areas at the terminal and along the alignment of the pipeline. NMFS has raised these issues as well as the problem that the effects of the mitigation will take hold at best several years after damage occurs along the pipeline and at the site. The DEIS must describe more thoroughly how proposed mitigation efforts will address this problem during construction and early operation of the terminal and pipeline.

Specifically, the DEIS does not adequately describe how it is mitigating impacts of dredging. The Svensen Island mitigation site is being used to offset the filling of the log pond and other tidal wetlands on the site. Lower Svensen Island and Hunt Creek do not represent a significant creation of new habitat, while dredging will directly degrade 58 acres of habitat (pg. 9-2). While Bradwood intends to improve and/or maintain habitat at its mitigation sites, they fails to show how this restoration will directly result in a positive gain in salmon habitat lost from the area dredged in the Columbia River and the filled log pond, an acreage which exceeds the amount of new habitat created at Svensen Island. The mitigation efforts are, by themselves, inadequate, but they also occur out of step with the impacts of the project itself, which are severe. The mitigation efforts for creating new habitat are downstream, and the mitigation plan is unclear as to the timeline for when new created habitat will provide offsetting benefits for damage done at the site. The mitigation plan does not demonstrate how habitat of similar importance and function will be created in other areas to account for the in-stream habitat, in particular. In addition, Bradwood fails to mitigate damage from the pipeline. The mitigation site at Delameter Creek is decided as inappropriate for mitigation of the pipeline impacts. Despite all of these shortcomings, the DEIS does not analyze the inadequacies of the mitigation plan or

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analyze the impacts to aquatic resources under the plan. The DEIS also fails to analyze alternatives to mitigation and alternative mitigation plans.

Expert agencies have roundly criticize the Bradwood mitigation plan. ODFW summed up the problem concisely: *“Significant fish habitat will be lost and mitigation is not adequate.”* Oregon Preliminary Comments at 4.

NMFS stated:

The mitigation plan included in the DEIS appears **inadequate and incomplete**. The preferred alternative **does not contain any mitigation for several adverse impacts on NMFS’ trust resources, including listed species under the ESA**. Sediment sequestration and wake stranding of juvenile salmonids are areas of particular concern. Where mitigation is proposed at Svensen Island, the description of the action has changed and is inadequate for assessment of beneficial effects to NMFS’ trust resources that are impacted by the proposed project. For example, not all of the island is currently within the applicant’s ownership or subject to the applicant’s right to make modifications. . . . In addition, FERC needs to clearly articulate how the benefits provided at Svensen Island for salmonids adequately compensate for the decrease in habitat and habitat quality 14 river miles upstream and for on-going operational impacts that affect the viability of the affected populations. Furthermore, because the terminal would be operated for 40 years, a monitoring and adaptive management plan needs to be developed by the applicant, in consultation with NMFS that assures continued benefit to the target species over the lifetime of the project, and beyond if the affected habitat is not restored.

NMFS DEIS comments at 3-4.

When the state and federal agencies in charge of salmon both expressly state that the mitigation is inadequate, FERC must carefully assess the efficacy of the plan.

Bradwood’s claims that this project will enhance salmon habitat are completely unfounded. The agencies state that the proposed mitigation plan will not compensate for the dramatic loss of habitat. In fact, the agencies note that Bradwood’s proposed mitigation sites are already healthy habitat:

**“All mitigation proposed** would preserve and enhance existing areas **which already provide functional water quality and habitat benefits.**” Oregon Preliminary Comments at 12 (DEQ).

“If the Hunt Creek/Clifton Channel [mitigation] site is just going to be preserved, but already functioning, how are the waters impacts being mitigated for?” Oregon Preliminary Comments at 34 (Department of Land Conservation and Development)

“Although the targeted areas may function better if mitigation actions are successful, **the project will still result in a permanent loss of 33 acres of wetland and 58 acres of in-stream areas, as well as temporal losses from an additional 98 acres of temporary wetland impacts.** Not only is this **contrary** to both the intent and requirements for mitigation to fulfill permit requirements under the Clean Water Act, but it is of additional significance under the recent EPA elevation of the Columbia River to a national priority.” Oregon Preliminary Comments at 8.

In addition, Bradwood has touted its Salmon Enhancement Initiative (“SEI”) to the agencies and the public, but few have been impressed. Descriptions of SEI activities are far too vague to add mitigation value to Bradwood’s project. ODFW stated, “Bradwood has proposed to implement a Salmon Enhancement Initiative that would be entirely voluntary . . . . Because the plan is voluntary and not regulatory, questions persist about it. [There are] **no details about specific projects** so it is extremely difficult to assess benefits or project impacts.” Oregon Preliminary Comments at 55. The DEIS does not adequately describe the nature and effectiveness of the SEI, or alternatives to the SEI, such as requiring that the voluntary money be a mandatory component of compensatory mitigation.

Furthermore, the benefits and funding for the SEI depend on the ability of Bradwood to operate the LNG terminal consistently for 35 years. With persistent uncertainty in the global and Pacific Rim LNG markets, the Bradwood proposal cannot be expected to operate consistently and without interruption in funding for 35 years.

The DEIS proposes that Bradwood will employ noxious weed control as a form of mitigation. But, the DEIS does not adequately describe how controlling noxious weeds will directly benefit salmon and offset the type of impacts the project will have at the site, where terminal construction and dredging will destroy dozens of acres of critical habitat. Furthermore, as NMFS has noted, the methods of noxious weed control are important. If Bradwood intends to use chemical control measures, the impacts of these control measures must be assessed on salmon that may use the restored areas. The DEIS fails to analyze the efficacy of noxious weed control as mitigation, the extent of the control, the positive and negative attributes, and alternative means of control. In addition, the DEIS fails to discuss the proposed mitigation for construction, stormwater, and operational mitigation.

**The proposed project will adversely affect water quality for the Columbia River and contribute to violations of Oregon’s and Washington’s Water Quality Standards.**

The DEIS fails to consider the impact on water quality and the fact the proposed dredging, filling, and pipeline construction will cause violations of both Oregon’s and Washington’s numeric and narrative water quality standards, including harming designated uses.

**Bradwood will cause or contribute to violations of Oregon’s water quality standards**

FERC must assess whether the project will conflict with state policies. 40 C.F.R. § 1502.16(c). Here, the DEIS failed to discuss the conflict between the project and state water quality standards. In reviewing the Bradwood proposal, DEQ made clear that project would

likely violate water quality standards. For example, DEQ stated, “the hydrodynamic geomorphic changes in the river ... may contribute to **unacceptable levels of erosion ..., introduction of toxics to the waterway, habitat loss, and wetlands loss – all of which reduce water quality.**” Oregon Preliminary Comments at 11. In addition, “**potentially debilitating impacts to these [threatened] species include noise, continuous light, suspension of sediment, turbidity, loss of salmonid habitat** and ability to rest or avoid predation, and potential attractant for sturgeon to a dangerous construction zone.” *Id.* ODFW agreed, stating, “**Significant fish habitat will be lost and mitigation is not adequate.**” *Id.* at 4. DEQ expressly noted that the impacts of the pipeline are contrary to state law: “**Loss of riparian vegetation in these areas is directly contradictory to the applicable Water Quality Management Plan . . .** which requires preservation and restoration of riparian areas in tributaries to address temperature and other water quality parameters.” *Id.* at 12. DEQ also stated that the impacts of the pipeline are contrary to state law: “Loss of riparian vegetation in these areas is directly contradictory to the applicable Water Quality Management Plan . . . which requires preservation and restoration of riparian areas in tributaries to address temperature and other water quality parameters.” *Id.* Oregon’s review indicates that the project does not comply with Oregon’s water quality standards.

Specifically, Bradwood will cause or contribute to violations of the following water quality standards, all of which the DEIS fails to discuss:

**Protection of the designated use of aquatic life, OAR 340-041-0101**

The LNG terminal and pipeline fail to protect the designated use of aquatic life, including threatened salmonids and the North American green sturgeon. As described in detail above, the expansive acreage of dredging and filling in critical salmon habitat fails to protect salmon. The construction and operation of the terminal and pipeline, including removing riparian vegetation, tanker traffic, wastewater discharge, ballast water intake, pipeline stream crossings, and the risk of catastrophic damage due to a gas fire combine to create unacceptable harm to aquatic life. The fact that some of the aquatic life, including 13 ESUs of salmon and the North American green sturgeon, are on the brink of extinction makes the project less acceptable.

The LNG terminal also fails to protect the designated use of fishing because the terminal and tankers degrade the struggling fishery and block or delay access to traditional fishing grounds, as described in detail above.

**Narrative criteria, OAR 340-041-0007**

OAR 340-041-0007 prohibits “the creation of ... toxic or other conditions that are deleterious to fish or other aquatic life ...” Bradwood’s 58 acres of dredging and expansive wetland fill is clearly a condition deleterious to fish due to permanent loss of habitat. In addition, NMFS and DEQ raised as a major concern that LNG tankers will impinge and entrain juvenile salmon and other fish when the tankers take 6,000,000,000 gallons of ballast water each year. Additional deleterious conditions include: modification of river flow and hydrology at mouth of Clifton Channel, wake stranding of juvenile fish, discharge of warm engine cooling

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water, long-term piling driving and dredging, and destruction of riparian and upland habitat along entire pipeline.

**Biocriteria, OAR 340-041-0011**

Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities. As described above, the LNG terminal will degrade resident biological communities due to habitat destruction, wake stranding of juvenile fish, toxic discharges, increase temperature and turbidity, and removal of riparian vegetation, among other impacts.

**Dissolved Oxygen, OAR 340-041-0016**

Dredging and lengthy in-water work will reduce the dissolved oxygen in the Columbia River to levels that violate the water quality standard. The Columbia River is water quality limited for dissolved oxygen so any additional oxygen demand from Bradwood’s dredging or terminal construction and operation will certainly cause or contribute to violations of the water quality standards.

**Temperature, OAR 340-041-0028**

Bradwood’s dredging, vegetation clearing, and wastewater discharge will contribute to the exceedance of the temperature water quality standard of 68 degrees F for salmon rearing and migration. Bradwood’s proposed summertime discharges of firewater system testing of 74 degrees F and hydrostatic testing water of 75 degrees F will violate the temperature criterion. Because the lower Columbia River is already water quality limited, any contribution of heat from Bradwood above the ambient river temperature causes or contributes to a violation of the temperature water quality standard. The Ninth Circuit has recently made clear that new dischargers may not add a pollutant into a water body that is water quality limited. *Friends of Pinto Creek v. United States Environmental Protection Agency*, No. 05-70785, (9th Cir. Oct. 4, 2007).

**Toxic substances, OAR 340-041-0033**

Toxic substances may not be introduced above natural background levels in concentrations that may be harmful to aquatic life. Bradwood will discharge chromium, silver, and other toxic pollutants from the SCVs at concentrations harmful to aquatic life. In addition, DEQ and NMFS raised concerns about toxic pollutants, including phytosterols, mobilized from dredging or erosion of former industrial site.

Bradwood’s wastewater will contain the toxic pollutant silver at levels 14,900% greater than EPA considers safe for fish. Bradwood will discharge at 0.018 mg/L when the safe level is 0.00012 mg/L.<sup>170</sup> In addition, Bradwood’s discharge of the highly toxic chromium III and chromium VI are 119% and 2,354% greater than Oregon’s chronic water quality criteria,

<sup>170</sup> Technical Memorandum: Mixing Zone Analysis for Bradwood Landing Point Source Discharges, July 27, 2007 at 3, 5.

respectively.<sup>171</sup> This discharge violates both the numeric and narrative water quality standards. Bradwood's solution for their toxic discharges is to create a giant toxic mixing zone, in which the "silver concentrations determine the size of the chronic mixing zone."<sup>172</sup> This backwards approach – building a big enough toxic mixing zone to accommodate any amount of pollution – is contrary to the CWA. DEQ cannot issue a permit that contains this toxic mixing zone. The DEIS failed to discuss the conflict between DEQ regulations and this project.

#### **Turbidity, OAR 340-041-0036**

Bradwood's long-term dredging will violate the standard of no more than a ten percent increase above background levels. The turbidity from the dredging is likely much worse than presented by FERC because the DEIS failed to consider dredging through organic matter and packed sand, and it failed to consider the necessity of blasting, clamshell dredging, and other methods that create more turbidity.

The turbidity standard has an exception for "limited duration activities necessary to address an emergency or to accommodate essential dredging." The 24-hour, 7-day dredging over 3 months is not limited in duration and not essential.

#### **Antidegradation, 340-041-0004(7)**

Oregon rules state that "water quality limited waters may not be further degraded . . ." OAR 340-041-0004(7). The Columbia River is water quality limited for temperature, dissolved oxygen, and other pollutants. Therefore, Oregon cannot allow Bradwood's new, additional discharge of these pollutants into the already degraded Columbia River. OAR 340-041-0004(7) says Oregon may grant narrow exceptions, but only if the "benefits of the lowered water quality outweigh the environmental costs of the reduced water quality" and the discharge will not harm endangered species. The environmental costs of this project are tremendous and the discharge will certainly harm endangered species by permanently destroying critical habitat, including the designated critical habitat of the Snake River sockeye.

#### **Bradwood will cause or contribute to violations of Washington's water quality standards**

The DEIS must assess the entire project's compliance with Washington's standards, not just the pipeline, because the terminal construction and operation will affect Washington's waters in the Columbia River. The DEIS fails to discuss compliance with Washington's standards at all. As described above, the LNG terminal and pipeline do not protect the Washington designated use of aquatic life, including threatened salmonids and the North American green sturgeon, due to expansive acreage of dredging and filling in critical salmon habitat.

<sup>171</sup> *Id.*

<sup>172</sup> *Id.*

The LNG terminal also fails to protect the designated use of fishing, WAC 173-201A-010, because the terminal and tankers degrade the struggling fishery and block or delay access to traditional fishing grounds. The pipeline crossings will degrade fishing access and fish habitat.

Bradwood's dredging and pipeline construction will violate the one-day maximum turbidity criterion. Multiple streams that the pipeline would cross, including Cameron Creek, Abernathy Creek, Germany Creek, Tributary 5 to Coal Creek, Coal Creek, Ostrander Creek, and others are designated salmon spawning streams. The turbidity criterion is 5 NTU over background when the background is 50 NTU or less, or a 10% increase in turbidity when the background turbidity is more than 50 NTU. WAC 173-201A-200(e). FERC and the public cannot adequately assess the impact to salmon because the application materials do not discuss which streams contain salmon. For the streams that do not contain salmon, the criterion is 10 NTU over background when the background is 50 NTU or less, or a 20% increase in turbidity when the background turbidity is more than 50 NTU. *Id.* The dredging will greatly exceed this standard. The pipeline construction will also exceed the standard for trenching, and has the possibility of exceeding the standard for HDD and bore due to the potential for frac out, which causes bentonite clay or drilling mud to foul the streams.

The turbidity criteria allows a temporary mixing zone for in-water construction, but dredging and pipeline trenching will even violate the mixing zones in WAC 173-201A-200(e)(i). In addition, the mixing zone is not allowed here because it will substantially interfere with the salmon using the waterbody and damage the ecosystem as prohibited by WAC 173-201A-200(e) and WAC 173-201A-400(4).

The LNG terminal and pipeline will also violate Washington's temperature, WAC 173-201A-200(c), and dissolved oxygen, WAC 173-201A-200(d), water quality standards due to removal of riparian vegetation and increased siltation, and turbidity, as described in detail above. In addition, Cameron, Abernathy, Germany, Tributary 5 to Coal Creek, Coal Creek, and Ostrander Creek are listed on 303(d) list for temperature. The proposed pipeline will cause an increase in temperature in these streams during construction, which is prohibited by the CWA. Also, the long-term removal of riparian vegetation will increase temperature, which will further degrade the listed streams, in violation of the CWA.

The project will also violate Washington's antidegradation policy, WAC 173-201A-300, the purpose of which is to restore and maintain the highest possible quality of surface waters in Washington. The project fails to protect Tier I streams, including those on the 303(d) list, which "must be maintained and protected." WAC 173-201A-310(1). No degradation is allowed. *Id.* The pipeline construction would certainly degrade these Tier I streams. In addition, the pipeline will cross multiple Tier II streams, in which new activities are prohibited unless the lowering of water quality is necessary and in the overriding public interest. WAC 173-201A-320. Bradwood could redesign the pipeline route or crossing procedures, so the lowering of water quality is not necessary. Also, the pipeline route is not in the overriding public interest.

Overall, the DEIS fails to disclose and discuss the fact that the project will violate Oregon's and Washington's water quality standards, and the DEIS fails to discuss any alternatives that can eliminate or minimize this conflict.

### **The DEIS fails to adequately consider cultural resources and environmental justice**

The DEIS fails to analyze the cumulative, direct, and indirect impact to cultural resources and environmental justice.

#### **Lack of current data for analysis**

On page 4-334 and 4-335 are located three tables (4.8.1-6, 4.8.1-7 and 4.8.2-1) which demonstrate income distribution and ethnicity in areas affected by the project. Two of these tables are derived from U.S. Census Bureau Census of 2000, while one of them (4.8.2-1) includes information from the U.S. Census Bureau Census of 2006. This raises concern regarding the use of outdated statistics. If the 2006 Census has been made available, then the EIS should include and analyze data from those graphs. A considerable change in ethnic composition and income distribution for the affected areas could easily occur within that 6 year gap. If data from 2006 was available at the time of data analysis for this DEIS, then why is it not included here? This should be remedied prior to an EIS being published so as to provide accurate information and appropriate analysis of affected populations.

#### **Non-compliance with section 106 of the NHPA**

On page 5-13 it is stated that "We have not yet completed the process of complying with section 106 of the NHPA. Cultural resource surveys are needed for about 11 miles total of the pipeline route." This analysis must be completed for any accurate statements to be made regarding impact on disenfranchised or minority populations. This should be remedied prior to an EIS being published.

#### **No consideration for other disenfranchised communities, especially senior citizens and the physically disabled**

Residents living along the pipeline route who are elderly or have physical disabilities are at a great disadvantage in participating in the FERC/NEPA process. With informational meetings being held at night and at various locations the participation of affected citizens with disabilities or frailties due to age becomes very difficult. Analysis should be done on these affected communities and information should be made available to them in an accessible format (such as large print and daytime meetings in all the affected communities -- not just a central location that people are expected to drive long distances to attend).

#### **Questionable conclusions made by analysis of minority populations which result in a lack of information being made available to the public**

In analyzing data regarding ethnic make-up and income distribution in areas that are affected by the project (terminal, marine traffic and pipeline) it appears that erroneous conclusions have been drawn. In the community of Navy Heights in Astoria the population is 22.9% Hispanic (table 4.8.1-6, which relies on the outdated 2000 census), but the conclusion drawn in the DEIS is that "there are no predominantly minority communities within the Zones of

Concern." (page 4-333) Additionally, table 4.8.1-7 shows that over 25% of the population of Navy Heights lives below the poverty level. What percentage of the population would have to be non-white and/or impoverished for it to be considered a "predominantly minority community?"

Furthermore, within section 4.8.1.9 on environmental justice it is stated that "each federal agency must ensure that public documents, notices, and hearings are readily available to the public." The DEIS claims that this is achieved through making notices available through "local government representatives, local libraries and newspapers, and local environmental groups." (page 4-333) Were notices written in Spanish and submitted to Latino-based newspapers that circulate in areas like Navy Heights? Were meetings held with translators in an effort to inform the quarter of the population of that area that is Hispanic and potentially non-English speaking? Were notices to Hispanic property owners provided in Spanish? And was this done in other areas where Hispanic population makes up a lower percentage of the overall population (such as Clatsop County where 4.5% [1,603 actual residents] were Hispanic at the time of the 2000 census)?

With regard to the impoverished peoples living in the zones of concern, it appears that in most areas there are typically well over 10% of the population living below the poverty line (tables 4.8.2-10, 4.8.1-7 and 4.8.3-6). And yet he conclusion is repeatedly drawn that "there are no predominantly low-income or minority communities" in the zones of concern. Again, the question must be raised- what percentage of impoverished and/or minority groups would be relevant for a consideration to be made on the impact on those communities?

#### **Further consideration of historic sites such as the LCNHT, Hunt Lumber Mill, historic shipwrecks and site 35CO16**

In section 5.1.9 the conclusions and recommendations of cultural resources indicate that more work must be done on the part of the applicant to verify that historic cultural sites will not be adversely affected by the project (marine traffic, terminal and pipeline). Of primary concern are the Lewis and Clark National Historic Trail, the Hunt Lumber Mill and site 35CO16. These analyses and mitigation plans should be addressed before publishing an EIS. Additionally further analysis should be made regarding the impact of a low-probability high-impact event on the 37 shipwrecks that are identified outside of the navigation channel. Mitigations should be considered that would protect historic sites potentially impacted by a disaster that may cause damage to outlying areas surrounding the project.

#### **The DEIS fails to discuss conflicts between the project and federal, state, and local plans, policies and controls**

The DEIS fails to include discussion of the project's conflict with federal, state, and local plans, policies and controls. The project is inconsistent with multiple regulations and policies to protect the estuary. First, the project is inconsistent with Clatsop County's Comprehensive Plan and land use development ordinances. Bradwood has asked for over 20 amendments to the Clatsop County land use plans, including radically modifying the Comprehensive Plan's designation portions of the project site from "Natural" to "Industrial" and from "Conservation"

to "Development."<sup>173</sup> The DEIS must discuss the conflicts with County land use plans, as described in: the June 28, 2007 Clatsop County Staff Report from Mitch Robse to the Planning Commission; the July 10, 2007 letter from the Coalition to the Clatsop County Planning Commission; and the July 20, July 24, July 31, and August 8, 2007 letters from Columbia Riverkeeper to Clatsop County Planning Commission, all of which are attached. The DEIS fails to explain the existence and importance of this conflict. Even if Clatsop County modifies its land use plans, which it has not done, FERC must still address the conflict between the project and the land use plans. If Clatsop County amends its land use plans specifically to accommodate this project, the EIS must discuss the all direct, indirect, and cumulative effects of this land use amendment, including the environmental, economic, and social impacts of amending these plans and laws, and any alternatives to amending the plan that would avoid or minimize the adverse impacts.

The DEIS fails to include a discussion about conflicts between the Bradwood pipeline and Cowlitz County laws that protect natural resources, economics, and public safety. For example, the pipeline will violate the Cowlitz County Comprehensive Plan, zoning ordinances, development ordinances, Critical Areas Ordinances ("CAO") and Shorelines Management Plans. The DEIS fails to discuss the direct, indirect, and cumulative effects of violating these laws, including the environmental, economic, and social impacts. The DEIS also fails to discuss any alternatives to violating the laws that would avoid or minimize the adverse impacts.

The DEIS fails to discuss the conflicts between the Bradwood project and Oregon law and policies. First, the DEIS fails to disclose and discuss that the project may violate Statewide Planning Goal 16, attached, which requires the protection of Oregon's estuarine resources, including the economic, social, and environmental values in the estuary. The DEIS fails to discuss the impact of disregarding or taking an exception to Goal 16. Second, the DEIS fails to discuss the project's noncompliance with Oregon's implementation of the CWA's wastewater permitting program under CWA section 402. Oregon cannot issue an NPDES permit to Bradwood because the Columbia River is water quality limited for temperature and dissolved oxygen. Also, the proposed discharge violates the toxic pollutant criteria. Third, the DEIS fails to discuss the project's conflict with Oregon's obligation to certify a project as consistent with water quality standards under CWA section 401. Bradwood does not comply with water quality standards, and Oregon cannot issue the permit, because the project does not protect designated uses and does not comply with narrative and numeric criteria for temperature, turbidity, dissolved oxygen, chromium, silver, and other pollutants. Fourth, the DEIS fails to discuss the project's conflict with Oregon's duty to evaluate whether a water appropriation should be granted by the Water Resources Department. Oregon's evaluation must consider the public interest, and should consider the 6,000,000,000 gallons of ballast water used each year. The DEIS failed to consider project's conflict with the public interest assessment. Fifth, the DEIS failed to discuss the project's conflict with Oregon's duty to protect the public interest when leasing state land. The DEIS failed to distinguish which land is State-owned and which land is private at the facility site. This distinction is critical because the project conflicts with Oregon's

<sup>173</sup> Bradwood Landing LLC Narrative in Support of Applications for Local Approval of the Bradwood Landing LNG terminal and Associated Facilities; Comprehensive Plan and Zoning Ordinance Text Amendment application; NorthernStar Natural Gas Narrative in Support of Applications for Local Approval of Natural Gas Pipeline.

fiduciary duties to protect State land in the public trust. A conflict exists because Oregon may not be able to lease the land to Bradwood. The EIS must look at alternatives to Oregon abdicating the public trust. In addition, Oregon has a duty to evaluate the public trust when issuing a dredge and fill permit. The DEIS fails to discuss the direct, indirect, and cumulative effects of not complying with these laws, including the environmental, economic, and social impacts of noncompliance, and any alternatives to noncompliance that would avoid or minimize the adverse impacts.

In addition to state law, the DEIS fails to discuss the conflict with federal laws, as required by the NEPA regulations. The DEIS fails to discuss the project's conflict with the CWA section 404 dredge and fill permit, as described in detail in the Coalition's December 18, 2007 letter to the Corps. In addition, the DEIS fails to discuss the project's conflict with the Endangered Species Act of 1973. As discussed in detail above, the dredging and filling of over 70 acres of prime estuarine habitat will jeopardize the struggling populations of 13 threatened ESUs of salmonids and the threatened North American green sturgeon. In addition, the proposal will increase in deep draft ship traffic by 25%, which will increase wake stranding of juvenile fish and increase vessel strikes and other harassment of endangered and threatened marine mammals, including several whale species and steller sea lion. The conflict exists because FERC cannot issue a cite certification in violation of the ESA. The DEIS fails to discuss the direct, indirect, and cumulative effects not complying with these federal laws, including the environmental, economic, and social impacts of noncompliance, and any alternatives to noncompliance that would avoid or minimize the adverse impacts.

#### **The DEIS fails to integrate the environmental analysis with other agencies**

40 C.F.R § 1502.25 states, "to the fullest extent possible, agencies shall prepare [DEISs] concurrently with and integrated with environmental impact analysis and related surveys required by the Fish and Wildlife Coordination Act, the National Historic Preservation Act of 1966, the [ESA], and other environmental review laws and executive orders." FERC violated this requirement by proceeding with the DEIS without acting concurrently with the review required by each of these laws. For example, FERC produced the DEIS long before the ESA section 7 consultation has been completed. In fact, Bradwood does not even have a current Biological Assessment submitted the NMFS and USFWS, yet FERC blindly moves forward without the assistance of the expert analysis at NMFS and USFWS. In fact, NMFS submitted critical comments that the DEIS is inadequate and too vague to conduct a reasonable evaluation. An integrated analysis would reduce this problem. The failure to comply with 40 C.F.R § 1502.25 also harms public review because the public, like FERC, cannot take advantage of the insight of the expert agencies.

#### **The DEIS information is inadequate and inconsistent with the CWA section 404 application**

The DEIS is inconsistent with other documents submitted by Bradwood, including the 404 application. The 404 application states that the "impact area in acres" is "45.87 (temporary and permanent)." This differs greatly from the DEIS, which show the impact area is over 100 acres. Both the DEIS and the 404 application simply do not contain adequate information to

assess the impact on aquatic resources and to conduct an alternatives analysis. The application materials contain inadequate information on the site of stream crossings due in part to the fact that the applicant has not visited many of the locations in which they plan to conduct major work. How can FERC assess the impact on aquatic resources if no one has conducted a field assessment of the specific site?

The DEIS states that the facility will contain two storage tanks, DEIS ES-1; 2-20. To the contrary, the 404 application states, "the Terminal would be designed with three LNG storage tanks." This is a major difference that affects the aquatic resources at the site, the number of tankers arriving per year, and the entire alternatives analysis. For example, NMFS stated that "Originally, during conversations with the applicant, it was stated that the addition of a third tank would likely correspond with an approximate 50 percent increase in LNG vessel traffic." NMFS DEIS comments at 4. It is unclear whether the applicant has backtracked on that statement, or how the third tank would influence vessel. The number of tanks is a prominent issue, but not the only discrepancy between the 404 application and the DEIS. FERC must circulate a new DEIS that contains accurate information about the design and operation of the facility.

The project has dramatically changed since the application was submitted. FERC must request a new application to reflect these changes. If FERC issued the permit now, it would be unclear which project FERC is approving. NMFS stated, "the applicant's proposed action has changed significantly since the DEIS was issued and aspects of the proposed action remain poorly defined." NMFS DEIS comments at 3.

In addition, the DEIS defers many design specifications to later in the process. This is inappropriate for LNG. When dealing with a project that can cause explosions and fires, and that would be located in an area known for high seismic activity and severe wind and river conditions, it is critical that the applicant submit complete information so that the DEIS can thoroughly and adequately assess the safety implications of the Project. Deferring the analysis to staff review after Project approval does not provide the public and decision-makers with complete information *before* the Project is approved, in accordance with the mandates of NEPA.

In addition, FERC cannot evaluate the environmental impacts and alternatives of this project without evaluating the proposed Palomar Pipeline. As described in great detail in the alternatives analysis section of this comments letter, the Palomar Pipeline would directly connect to the Bradwood terminal. NMFS stated, "extension of the [Palomar] pipeline to Bradwood Landing would have no utility independent of the proposed action." NMFS DEIS comments at 5. In fact, the Bradwood terminal is fully dependent on the proposed Palomar Pipeline for gas distribution. FERC cannot let Bradwood and Palomar attempt to obtain approval of this large project in a piecemeal fashion.

#### **Incorporation by reference**

These comments include all the documents referenced herein and the documents attached hereto and all documents we submitted to FERC. We request that all of these documents be part of the record before FERC for this matter. The Coalition's comments also adopt and incorporate by reference the comments submitted by the Columbia River Intertribal Fish Commission.

("CRITFC"), Gloria McKenzie, Duncan McKenzie, Marjie Castle, Frans Eykel, Carolyn Eady, George Exum, Irene Martin, James Reed, and Rick Beck. In addition, we request FERC to pay particular attention to the critical comments submitted by NMFS, U.S. Environmental Protection Agency, the State of Oregon, Cowlitz County, Clatsop County, and the City of Astoria.

#### **Conclusion**

For the reasons stated above, the DEIS is wholly inadequate for public review and does not satisfy the requirements of NEPA. The Coalition urges FERC to reissue a supplemental EIS permit for this misguided project.

Sincerely,  
/s/ Brett VandenHeuvel  
Staff Attorney  
Columbia Riverkeeper

Brent Foster  
Executive Director  
Columbia Riverkeeper

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List of Attachments:

Comments of Oregon Department of Geology on Bradwood DEIS. December 2007. (DogamiComments). This file contains comments of the Oregon Department of Geology and Mineral Industries (DOGAMI) on the Bradwood project.

Excerpts of State Agency Comments on Bradwood DEIS. (State\_agency\_quotes). This file contains excerpts of key State agency comments on the Bradwood project.

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Puget Island Hazard Zone Diagram. 2007. (FHZ\_Puget\_Island.) Figure demonstrating extreme proximity of Puget Island and its hundreds of residents to Bradwood LNG project.

Dr. Jerry Havens Comments Regarding Bradwood LNG Terminal. 2007. (Havens\_Comments.) Dr. Jerry Havens, Director of the Chemical Hazards Research Center at University of Arkansas, articulates his opinion of the short-comings of FERC analyses regarding Bradwood LNG.

Astoria Thermal Hazard Zone Diagram. 2007. (FHZ\_Astoria2.) Figure demonstrating extreme proximity of Astoria and its hundreds of residents to Bradwood LNG project tanker vessel path.

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Columbia Riverkeeper – Portland Office  
 917 SW Oak Street, Suite 414  
 Portland, OR 97205  
 Phone: (503) 224-3240  
[www.columbiariverkeeper.org](http://www.columbiariverkeeper.org)

## CERTIFICATE OF SERVICE

I certify that on the 21st day of December, 2007, I electronically filed the original document, **Comments on Draft Environmental Impact Statement, Bradwood Landing Project, FERC/EIS-0214D, Docket Nos. CP06-365-000, CP06-366-000** plus the exhibit attachments listed at the end of that document on behalf of Interveners Columbia Riverkeeper et al with:

Kimberly D. Bose, Secretary  
 Federal Energy Regulatory Commission  
 888 First Street, N.E., Room 1A  
 Washington, DC 20426

I further certify that on the 21st day of December, 2007, I served one copy of **Comments on Draft Environmental Impact Statement, Bradwood Landing Project, FERC/EIS-0214D, Docket Nos. CP06-365-000, CP06-366-000** on behalf of Interveners Columbia Riverkeeper et al via electronic mail on all parties listed on the office service list compiled by the Secretary in this proceeding. I served the exhibit attachments on a CD to all parties via first class mail. For those parties for which service is not specified at an electronic address, I served one copy of **Comments on Draft Environmental Impact Statement, Bradwood Landing Project, FERC/EIS-0214D, Docket Nos. CP06-365-000, CP06-366-000** and the exhibit attachments on a CD via first class mail.

DATED this 21st day of July 2007.

Brett VandenHeuvel  
 for  
 R. Scott Jerger  
 Of Attorneys for Interveners

## Attachments to the Columbia Riverkeeper Letter (CO11)

Copies of these attachments are available for viewing by the public on the FERC's Internet web page at [www.ferc.gov](http://www.ferc.gov), through the eLibrary link, by selecting "General Search," entering the docket number minus the last three digits (i.e., CP06-365), and putting in the proper date range. The accession number for this document is 20071222-5001.

### Attachment A

- Columbia Riverkeeper. 2007. Bradwood Landing DEIS Coordinated State of Oregon Comments, Oregon Department of Geology and Mineral Industries. Table and 6 pp.
- Climate Mitigation Services. 2006. LNG Supply Chain Greenhouse Gas Emissions for the Cabrillo Deepwater Port: Natural Gas from Australia to California. Prepared for Environmental Defense Center. 27 pp. + notes.
- Jaramillo, P., W. M. Griffin, H. S. Matthews. Undated. Comparative Life Cycle Carbon Emissions of LNG Versus Coal and Gas for Electricity Generation. 16 pp.
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- National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 2007. May 11, 2007 letter from M. Tehan (Director, Oregon State Habitat Branch, Habitat Conservation Division) to L. Lister (Branch Chief, Federal Energy Regulatory Commission). 26 pp.

### Attachment B

- National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 2007. December 17, 2007 letter from R. F. Weiher (NOAA NEPA Coordinator, Office of Program Planning and Integration) to K. Bose (Secretary, Federal Energy Regulatory Commission). 2 pp. + attachments.
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## Attachments to the Columbia Riverkeeper Letter (CO11)

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- Columbia Riverkeeper and Columbia River Clean Energy Coalition. 2007. July 31, 2007 letter from D. Serres (Staff, Columbia Riverkeeper) to the Clatsop County Planning Commission. 2 pp.
- Columbia Riverkeeper and Columbia River Clean Energy Coalition. 2007. July 31, 2007 letter from D. Serres (Staff, Columbia Riverkeeper) to the Clatsop County Planning Commission. 3 pp.

### Attachment C

- Ratepayers for Affordable Clean Energy. 2007. July 6, 2007 letter from R. Cox (Coordinator, Ratepayers for Affordable Clean Energy) to the Clatsop County Planning Commission. 13 pp.
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- Havens, J. 2004. February 29, 2004 letter from J. Havens (Distinguished Professor of Chemical Engineering, University of Arkansas) to T. Ridge (Secretary, Department of Homeland Security). 2 pp.
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- Columbia Riverkeeper. Undated. Figures - LNG Tanker Fire Hazard Zone (LNG Vessel Transit Route and 1.5 mile project fire hazard overlaid on aerial photos of Astoria, Warrenton, and Puget Island).

## Attachments to the Columbia Riverkeeper Letter (CO11)

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The Rainland Fly Casters is a 501(c)(3) of the Internal Revenue Code. Gifts are tax deductible to the full extent of the law.

December 21, 2007

Kimberly D. Bose, Secretary  
FEDERAL ENERGY REGULATORY COMMISSION  
888 First Street NE, Room 1A  
Washington, D.C. 20426

RE: Bradwood Landing Draft Environment Impact Statement Review  
Docket No. CP06-365-000; CP06-366-000

Dear Secretary Bose:

The Rainland Fly Casters club, of Astoria, Oregon would like to submit the following input regarding the proposed Bradwood Landing LNG plant on the lower Columbia River. Our club, located in the lower Columbia River region and comprised of over 50 members, is dedicated the sport of fly fishing, but also to the conservation of fisheries resources and the education of people about these resources and the associated stream health issues which support our fisheries resource. Listed below are some of the questions and concerns we have, from a fisheries conservation viewpoint, about the proposed LNG plant and associated gas pipelines:

2007 DEC 31 P 2:13

K-756

- CO12-1 • The LNG company claims that our region would gain 60 jobs from the operation of this plant. The document should estimate how many jobs might be impacted by a major spill of fuel oil from one of the transport ships as well as disruption with boat anglers and other users in the minimum 500 yard moving safety/security zone around all LNG transport ships. Much of our lower Columbia's economy is dependent on commercial fishing, recreational fishing, crabbing and tourism
- CO12-2 • The liability issue for a major fuel oil pollution incident caused by an LNG ship board accident or incident needs clarification. In the possible event of a major pollution incident, there should be a requirement for sufficient bonding and insurance for clean-up and damage compensation by both the shipper and facility operator.
- CO12-3 • Northern Star has advertised its commitment to a \$50 million Salmon Enhancement Project for the lower Columbia. This commitment is entirely voluntary, with no contractual obligation for Northern Star or its successors to actually spend funds for salmon enhancement. Therefore, we have serious doubts as to whether any salmon enhancement will actually take place. We recommend this funding be clearly obligated for mitigation that still need to be identified for major biological problems on the river, forest and tributary streams.
- CO12-4 • Other concerns include dredging the river bottom to create ship berthing and maneuvering areas at the plant. The accompanying overland pipeline from the LNG

## Companies and Organizations 12

CO12-1 We do not believe that any jobs would be lost as a result of an unlikely spill of oil or fuel from LNG carriers in transit in the waterway to the proposed Bradwood Landing LNG terminal. As discussed in the revised section 4.3.2.2, fuel on each carrier is protected by the vessel's double hull. Furthermore, each LNG carrier would maintain a SOPEP as required by international convention. The SOPEP would comply with MARPOL [marine pollution] 73/78 Consolidated Edition 2002 Annex 1 Regulation 26, which requires every oil tanker of 150 tons gross and above, and every vessel of 400 tons gross and above to carry an approved SOPEP. All LNG carriers would also be required to comply with state spill prevention and contingency plans, including the applicable requirements in Chapter 317-40 of the Washington Administrative Code – Bunkering Operations. As discussed in section 4.7.1.4, the project should not have significant impacts on commercial or recreational fishing or tourism.

CO12-2 See our response to comment FA2-35.

CO12-3 See our response to comment FA4-12.

CO12-4 Potential impacts on aquatic resources (including salmonids) due to dredging are discussed in section 4.5.2.1. Potential impacts on aquatic resources (including salmonids) due to construction of the pipeline waterbody crossings and unstable slopes are discussed in sections 4.5.3.1. In addition, NorthernStar's Waterbody and Wetland Construction and Mitigation Procedures Plan provides a detailed description of construction methods, potential impacts on aquatic species and habitat, mitigation, and monitoring. This plan was filed with the FERC on December 21, 2007 and is available for viewing by the public on the FERC's internet web page at [www.ferc.gov](http://www.ferc.gov), through the eLibrary link, selecting "General Search," entering the docket number minus the last three digits (i.e. CP06-365), and putting in the proper date range.

The adequacy of compensatory mitigation for project impacts is addressed in the response to comment FA2-10.

CO12-4 | plant toward gas markets will also have impacts on fish spawning and rearing areas  
cont'd | in the major streams the pipeline will cross. These detrimental effects on stream  
crossings and landslide areas need to be identified, fully mitigated and closely  
monitored for this project to pass any kind of environmental muster.

CO12-5 | In closing, The Rainland Fly Casters feel that the proposed project can cause detrimental  
effects on our local fisheries resources beyond those identified in the document and feel  
that these potential effects should be thoroughly identified and mitigated. We recommend  
exploring alternative LNG facility sites that are more compatible with the Columbia estuary.  
Receiving facilities for LNG ships are perhaps best located off-shore where major  
accidents or incidents cannot damage the extremely valuable estuary. Pipeline routes  
used by the project should be located where they best protect the forest and streams. We  
believe a better job can be done in finding a site for these facilities.

Thank you for the opportunity to comment.

Sincerely,



Tom Scoggins, President

cc. File

## Companies and Organizations 12

CO12-5 Alternative locations, including offshore, are discussed in section 3.0.

K-757

ORIGINAL

# The National Grange

Of the Order of Patrons of Husbandry



*Building Communities*

December 19, 2007

Magalie Roman Salas, Secretary  
Federal Energy Regulatory Commission  
888 First Street NE  
Washington, DC 20426

NOT DEC 26 P 4:45  
OFFICE OF THE SECRETARY

Re: Docket Nos. CP06-365-000; CP06-366-000; CP06-376-000; CP06-377-000  
Northern Star Energy LLC, Bradwood Landing LLC, Natural Gas Import terminal facilities and associated facilities in Bradwood, Clatsop County, Oregon

Dear Secretary Salas,

K-758

CO13-1 The National Grange urges the Federal Energy Regulatory Commission (FERC) to develop and strengthen regulations regarding the siting of Liquefied Natural Gas (LNG) terminals and to consider the overall economic impact on any region being considered before any LNG site is approved. This policy is also supported by the Washington State Grange, which adopted similar statewide policy urging FERC to deny the Northern Star Natural Gas application to construct an LNG terminal at Bradwood Landing and an associated 34 mile high-pressure pipeline through a portion of Washington State.

The National Grange of the Order of Patrons of Husbandry (National Grange) is the oldest general farm and rural public interest organization in the United States of America. Founded in 1867, the National Grange has been representing the interests of family farmers and rural citizens of the United States for 140 years. Today the National Grange represents individual farmers and rural Americans affiliated with more than 3000 local, county and state Grange chapters in rural communities across the United States including chapters in the states of Washington and Oregon.

CO13-2 The primary concern of the Washington State Grange and the National Grange with the Bradwood Landing option is the danger associated with the movement of large LNG vessels through the bar at the mouth of the Columbia River and the narrow channels upstream to the site. The potential hazards and disruption caused by this traffic to other shipping on the river are great, particularly the movement of agricultural commodities from existing facilities further upstream.

CO13-3 Additionally, the proposed terminal and pipeline threatens public safety and security in the Lower Columbia River area for local citizens. Finally the proposed terminal creates a threat to the critical salmon habitat in the Columbia River Estuary.

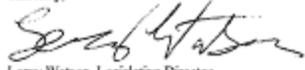
CO13-5 The National Grange urges the FERC to carefully weigh safety issues, river traffic concerns, potential pollution, habitat impacts, and the comments and recommendations of the Coast Guard about the potential problems associated with the additional traffic when siting any LNG terminal facilities. Until FERC takes positive action to strengthen regulations regarding the siting of Liquefied Natural Gas (LNG) terminals and to consider the overall economic impact on any region being considered before any LNG site is approved, we urge you to disapprove the

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- CO13-1 The FERC considers the current regulatory framework for reviewing applications for LNG facilities to be sound. Our regulations at 18 CFR 380.12(h) require a report on socioeconomic impacts to be filed by proponents of LNG facilities. The EIS includes an analysis of socioeconomic impacts in section 4.8. The Commission's Order will contain a more fully developed discussion of economics and need for this project.
- CO13-2 Section 4.11.5 includes discussions of shipping safety. This section includes discussions of the potential hazards and disruption that could occur on the other shipping activities on the river. As discussed in section 4.8.1.7, we believe that the Bradwood Landing would not have significant adverse impacts on other commercial shipping traffic on the lower Columbia River.
- CO13-3 See our response to comment PM6-20. Safety is addressed in section 4.11.
- CO13-4 Sections 4.5 and 4.6 address impacts on designated critical habitat for salmon within the Columbia River. As stated in section 4.6.3, the FERC would not allow construction to begin until after we have concluded formal consultation with the FWS and NMFS.
- CO13-5 The EIS address safety, river traffic, air quality, and impacts on habitats. The Coast Guard is a cooperating agency in the production of the EIS.

Northern Star Natural Gas application to construct an LNG terminal at Bradwood Landing. Thank you for your consideration in this matter.

Sincerely,



Lenny Watson, Legislative Director  
National Grange of the Order of Patrons of Husbandry

## Companies and Organizations 13