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RE: Millennium Bulk Terminals - Longview Coal Export Terminal
Comments on Draft Environmental Impact Statement (Draft EIS)

Dear Dr. Placido and Ms. Toteff:

Thank you for the opportunity to submit comments on the April 29, 2016 Draft Environmental Impact Statement (Draft EIS) for the Millennium Bulk Terminals - Longview (MBT-Longview) Coal Export Terminal project (Project). Publication of the Draft EIS is a critical milestone in the permitting process. We are pleased to have reached this point in the process and anxiously await the completion of the Final EIS.

The Washington State Environmental Policy Act (SEPA) designates the Department of Ecology with the duty and function to assure that environmental impact statements (EISs) are "simple, uniform, and as short as practicable. EISs are required to analyze only reasonable alternatives and probable adverse environmental impacts which are significant, and may analyze beneficial impacts."[1] After four years of study, the 828-plus page Draft EIS [2] found only one unavoidable and significant adverse impact that would be directly caused by the Project--namely, demolition of the remains of the Reynolds Aluminum

[1] RCW 43.21C.110(1)(d)
[2] Ecology's SEPA Rules also require that the EIS be limited to one hundred and fifty pages, maximum. See WAC 197-11-425 (4). Ecology's DEIS alone is 827 pages which exceeds their own regulations by 500%. The DEIS with all appendixes totals 3927 page.

Plant. Voluntary mitigation for this impact has already been identified with appropriate federal, state, and local agencies, including the Washington Department of Archeology and Historic Preservation. The mitigation measures are expected to be documented before the Final EIS is published. Completion of this process will reduce the impact of demolition below a level of significance, and the Final EIS should reflect this change.

No ***direct*** unavoidable and significant adverse impacts from constructing or operating the Project were found for the other elements of the environment, including coal dust, water quality, surface waters, groundwater, wildlife, fish, natural resources or air quality.

The scope of the EIS was significantly expanded to include eight elements identified in the Draft EIS as having ***indirect*** impacts that could be unavoidable and adverse. Those indirect impacts result from activities within a global coal supply chain that are clearly outside the control of MBT-Longview. These indirect impacts result from trains and vessels using existing rail and navigation corridors, or the combustion of coal in Asia by its Asian end-users. These alleged impacts are speculative, are not proximately caused by the Project, and lack the required disclosure of substantial uncertainty in linking the alleged impacts to the Project.

With this letter, MBT-Longview submits substantive comments on the Draft EIS. Our letter includes a summary of comments, followed by a summary of the legal framework that an EIS issued pursuant to the State Environmental Policy Act (SEPA) must follow, and concludes with specific comments on the DEIS's approach in specific "study areas." A more detailed discussion of the legal framework for SEPA analysis is included as *Attachment 1*. We have identified technical corrections to the Daft EIS text in the form of suggested text revisions, and these are included in a table included as *Attachment 2*. *Attachment 3* includes a technical analysis of Columbia River Zone 6 fishery resources, and *Attachment 4* includes technical reports and memoranda on greenhouse gas (GHG) emissions.

A. Summary of MBT-Longview's Comments

- Publication of the Draft EIS and completion of its accompanying comment period are critical milestones in the permitting process. Given the thoroughness and extensive nature of the Draft EIS, it should not require substantial effort or time for the co-leads to complete the Final EIS. We see the comprehensive nature of the Draft EIS as providing the opportunity to make up for lost time and publish the Final EIS before the end of 2016.
- MBT-Longview agrees with the co-leads no ***direct*** unavoidable and significant adverse impacts related to coal dust, water quality, surface waters, groundwater, wildlife, fish, natural resources or air quality will ensue from the construction and operation of the Project, with the exception of impacts resulting from the demolition of 1968-era Reynolds Aluminum smelter buildings,
- MBT-Longview agrees with the co-leads that the operation of the Project will not (i) result in coal dust or emissions that exceed Washington's stringent air quality standards; and (ii). will not affect the quality of drinking water or surface waters.

Unprecedented and Expansive Scope

- The Draft EIS departs from long-established SEPA precedent by analyzing effects that are not causally related to MBT-Longview's Project and that improperly focus on the commodity being shipped, instead of the act of transloading material from trains to vessels. MBT-Longview applied for permits to construct and operate a transloading facility on an approximately 190-acre site. A standard SEPA analysis would have focused on the property for which permits were requested and the immediate surrounding area. Had this Project been evaluated under the rules applied to other straight-forward port development projects, the Draft EIS would have concluded that many of the so-called identified project indirect effects would have occurred in the absence of the Project (*i.e*. under the "No-Action Alternative"), while the remaining true Project impacts can be readily mitigated or would not occur anyway.

- The Draft EIS addresses alleged indirect impacts that may result from the operation of trains or vessels in existing rail and shipping corridors, or the combustion of coal in Asia by the end users of the commodity that would be shipped overseas from the MBT-Longview terminal. The studied impacts are speculative and lack the required disclosure of substantial uncertainty in linking the alleged impacts to the Project.

Unprecedented Transportation Scope of Review

- The Draft EIS acknowledges that with or without the Project, rail operations will double in the next 20 years and thereby reach capacity. Nonetheless, the Draft EIS improperly concludes that the Project will result in significant impacts from increased train traffic by focusing on the immediate future, instead of the long-term 20-year temporal approach used by the WSDOT 2013-2035 Rail Plan on which the Draft EIS capacity analysis was based. The difference between the State Rail Plan capacity forecast and the capacity forecast in the Draft EIS is one of timing, which has never previously been a significant adverse impact requiring analysis under SEPA.

- The DEIS estimates that projected rail traffic will require increased capacity created through changes in operation and capital investments by the railroads. The DEIS acknowledges that the railroads traditionally make these improvements-a point underscored by the letter from BNSF Railway's CEO to then-Washington Governor Chris Gregoire.

- As a result of the Columbia River Channel Deepening Project, surplus capacity exists to accommodate the vessel traffic resulting from Project operations. Vessel traffic has declined in the reach of the Columbia River that would be used by vessels accessing the Project docks. Attracting additional vessel traffic was the community's goal when it succeeded in obtaining over $180 million in public funding to deepen the river shipping channel. Even at maximum operation, the number of vessels serving the proposed docks, when combined with other current and projected vessel traffic, would be similar to historic operations that existed twenty years ago.

Unprecedented Greenhouse Gas Scope of Review

- The Draft EIS engages in an unprecedented geographic scope of review of GHG emissions by attempting to forecast the price and demand of coal, not just in the United States, but across Asia.
- Forecasting commodity and energy market demand is inherently speculative over the short-term, let alone over the course of 20 years. If such forecasting could be accomplished with the degree of "reasonable foreseeability" that SEPA demands, then the commodity- and energy-markets would offer a relatively safe haven for investors and far less opportunity to profit from derivatives, arbitrage, and speculation on commodity futures. It is simply not possible to accurately ascertain what will occur in energy and commodities markets in the near term, much less over the course of a multi-decade time period.
- Of the four scenarios used to predict probable GHG emissions, the Draft EIS chose to employ the most speculative scenario, which it predicts will result in a significant increase in GHG emissions. In so doing, the Draft EIS chose not to employ less speculative outcomes based on present day conditions that if selected, would have demonstrated a significant decrease in GHG emissions as a result of the construction and operation of the Project.

Unprecedented Proposed Mitigation

- Applicants cannot be required, and the Draft EIS proposes, to mitigate for speculative GHG impacts created by the combustion of the coal overseas. Even the most aggressive of the GHG regulations proposed by Ecology would not require facilities to mitigate for any impacts beyond state boundaries. Nor has the State Legislature ever contemplated this sort of expansive scope of regulation or mitigation, reaching well beyond Washington State, across the Pacific Ocean and throughout Asia.
- If finalized, the GHG analysis employed in the Draft EIS will violate the Commerce Clause of the U.S. Constitution. These constitutional rights were established to protect the interests of land-locked states such as Wyoming and Montana seeking to move their products to international markets. By proposing to require the Applicant to mitigate for effects resulting from Asian coal consumption and by attempting to regulate effects resulting from federally regulated rail transportation- the Draft EIS runs afoul of well- established constitutional and federal preemption doctrinal constraints.

B. SEPA Legal Framework

A SEPA EIS is intended to evaluate potential significant, adverse environmental impacts, including direct, indirect, and cumulative effects that are reasonably foreseeable and proximately caused by a proposed project.

"Significance" as defined under SEPA means "a reasonable likelihood of more than a moderate effect on the environment" "Impacts" are defined as "the effects or consequences of actions." SEPA requires an analysis of probable *significant* impacts, not every conceivable impact. Ecology's SEPA regulations

establish that "'[p]robable means likely or reasonably likely to occur" and "is used to distinguish likely impacts from those that merely have a possibility of occurring, but are remote or speculative." Accordingly, the Draft EIS should address "only those probable adverse environmental impacts that are significant."

In addition, the Draft EIS must analyze only those probable significant adverse impacts that are proximately caused by the Project and reasonably foreseeable. An EIS is not to consider indirect or cumulative effects that are remote or speculative, or where the chain of causation relies on too many independent actions. To ensure that the SEPA analysis focuses on only those impacts that are proximately caused by the Project, SEPA requires that a "no-action alternative" be simultaneously analyzed in order to distinguish between the significant environmental effects that will be proximately caused by the Project and those impacts that will occur in the event the Project is not permitted.

In addition to addressing "direct" and immediate impacts and those which will occur later in time ("indirect" impacts), SEPA requires that every EIS analyze cumulative impacts. "Cumulative impacts" are "the impacts[s] on the environment which result from the incremental impact[s] of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions." However, if a Project is not likely to result in significant direct or indirect impacts, it cannot result in significant cumulative effects.

As discussed below, the analysis employed in the Draft EIS ventures far beyond these well-established statutory constraints into uncharted territory. The unprecedented and expansive scope of this Draft EIS- which focuses on impacts from the end-use of the commodity being shipped instead of the act of transloading across the docks that MBT-Longview proposes to construct, invites a discriminatory approach to SEPA implementation for unpopular and/ or particularly "controversial" projects. The Final EIS should correct this significant legal error, and refrain from employing this sort of speculative approach and patently invalid geographic scope that goes well beyond state boundaries.

Most, fundamentally, SEPA calls for a simple and uniform approach for impact analysis. Portions of the Draft EIS go well beyond the simple and uniform approach by evaluating potential impacts that (a) are not proximately caused by the Project, (b) are not "likely or reasonably likely to occur" or speculative, and may not happen at all, and (c) may happen whether or not the Project goes forward. In these instances, the substantial uncertainty in these studies was not properly disclosed. The inclusion of potential mitigation measures for impacts that are not proximately caused by the Project invites the agencies to exceed their regulatory authority.

C. Substantive Comments on Specific Elements of the Environment

C.1 Social and Community Resources

Accessibility to Community Resources and Public Services

The Draft EIS draws conclusions about rail impacts that do not rationally relate to the underlying facts established in the document. For example, 0n page 3.2-25, the Draft EIS acknowledges that trains would not adversely impact daily average vehicle delay at public at-grade crossings and that peak-hour vehicle delay would not be affected if track improvements are made. Under these scenarios, access to public services, including emergency response, would not change significantly. The Draft EIS also states that any vehicle delay due to train crossings would be temporary (limited to PM peak hour) and the probability for two trains to pass during peak hour traffic would be low. In considering potential delays to emergency vehicle waiting to cross the tracks, the Draft EIS on page 5.3-26 states that

> *"in a 24-hour period, the Proposed Action would increase the probability of an emergency response vehicle being delayed by 1% at study crossings along the Reynolds Lead, BNSF Spur, and BNSF main line."*

Nonetheless, the Draft EIS concludes in Section 3.2: *Under these scenarios, Proposed Action-related trains would adversely affect the accessibility to community resources and public services at selected public at-grade crossings on the Reynolds Lead, BNSF Spur, and BNSF main line. [see DEIS, page 3.2-25)*

These conclusions are not supported, especially when compared with the Draft EIS's analysis of similar impacts from the "No-Action Alternative. *The Draft EIS on p. 3.2.28 concludes that the No-Action Alternative would not be expected to affect vehicle delay, and therefore, would not affect social and community cohesion and public services.* Given that the No-Action Alternative includes more trains than exist today, the analysis of effects from the Project should reflect a similar low level of impacts resulting from vehicle delay and effect on public services. The description of impacts of the No-Action Alternative in the Final EIS should reflect this impact, similar to the proposed Action.

Train Horns

The DEIS incorrectly states that "all necessary improvements" to convert railroad crossings at Oregon Way and Industrial would be funded by MBT-Longview. The Longview Switching Company (LVSC) is the operational entity for the short line. LVSC intends to upgrade the Reynolds Lead for Class II speeds. Central traffic control (CTC) automation from Ft Worth Operations Center is also required and would be installed by BNSF or others to handle the additional train activity associated with the Project and other development in the industrial area. To eliminate or reduce the need for train engineers to sound their horns at crossings at Oregon Way and Industrial Way, MBT-Longview voluntarily proposed to fund additional improvements to convert these two crossings to quiet crossings. The improvements would include electronics, barricades and crossing gates and would occur as part of the overall upgrade performed by LVSC. MBT-Longview would provide the funding prior to reaching full operation of the

Project. This voluntary mitigation measure is intended to reduce noise impacts to the two neighboring residential communities. Thus, it is not accurate to suggest that the costs of "all necessary improvements" would be ascribed to or funded by MBT-Longview, and that statement should be corrected in the text of the EIS.

The conclusions of the direct and indirect noise impacts on adjacent uses should be revised to reflect the applicable zoning (rather than non-conforming uses). The Final EIS should recognize that the noise emanating from the Project site would be in compliance with applicable noise regulations. For uses that would be allowed under the applicable zoning, Project-related noise would not cause a significant adverse impact.

The Draft EIS concluded that train noise on the Reynolds Lead during Project operation would be significant and unavoidable unless noise measures were put in place. Both the State of Washington and Cowlitz County exempt railroad noise from regulation.

> Chapter 173-60 WAC MAXIMUM ENVIRONMENTAL NOISE LEVELS, WAC 173-60-050 Exemptions.
> (4) *The following shall be exempt from all provisions of WAC 173-60-040: (c) Sounds created by surface carriers engaged in interstate commerce by railroad.*
>
> Cowlitz County Code Chapter 10.25 NOISE CONTROL, 10.25.050 Exemptions.
> *A. The following sounds are exempt from the provisions of this chapter: 9. Sounds created by the operation of equipment or facilities of surface carriers engaged in commerce by railroad;*

Noise impacts are considered based on the receiving property (the users who will receive or hear the noise). Housing located at California Avenue and Industrial Way is located within an area zoned for Mixed Use Commercial/Industrial. Page 3-19 of the Longview Comprehensive Plan acknowledges that "Housing will more than likely be lost in areas targeted for redevelopment to other uses." Four areas are identified, including "Industrial/California area bounded by Industrial Way, Oregon Way, Tennant Way and 3rd Avenue." The Draft EIS states that there are 44[3] such residences at 3rd Avenue and California Way that would be indirectly affected by the project due to increased noise from train horns. These residences are non-conforming uses.

The No-Action Alternative is required to recognize and account for growth and development to occur in a manner consistent with adopted zoning and comprehensive plans. Non-conforming uses, while they may be legal, are disfavored under Washington law. [4] Thus, the No-Action Alternative should anticipate that over the planning period (which is at least the time for project build out), the land on which these 44 non-conforming uses exist will be redeveloped consistent with zoning and the adopted comprehensive plan. Properly conducted, the Draft EIS would have considered the 44 residences to be

[3] Draft EIS, page 5.5-25, Table 5.5-4.
[4] *Rhod–A–Zalea & 35th, Inc. v. Snohomish County,* 136 Wn.2d 1, 7, 959 P.2d 1024 (1998), and *State ex rel. Miller v. Cain,* 40 Wn.2d 216, 218, 242 P.2d 505 (1952).

replaced as part of the No-Action Alternative. The future use, consistent with zoning, should be used as the basis for determining the noise impacts from trains traveling on the short line. The Final EIS must clarify that the existing uses are inconsistent with the City of Longview's applicable zoning and comprehensive plan designations, and that such non-conforming uses are disfavored under the law. The Final EIS should modify the No-Action Alternative to reflect uses allowed under the applicable City zoning.

On page 5.5-31 of the Draft EIS, the Co-lead agencies have added mitigation measure NV-2 as follows:

> **MM NV-2. Support Implementation of a Quiet Zone along the Reynolds Lead.** *To address moderate and severe noise impacts along the Reynolds Lead due to rail traffic, before beginning full operations, the Applicant will coordinate with the City of Longview, Cowlitz County, LVSW, and the affected community to inform interested parties on the FRA process to implement a Quiet Zone that will include the 3rd Avenue and California Avenue crossings. Public outreach on the Quiet Zone process will include low-income and minority populations. The Applicant will assist interested parties in the preparation and submission of the Quiet Zone application to FRA. If the Quiet Zone is approved, the Applicant will fund all improvements.*

We question the expense of installing quiet crossings in these two locations (3rd Avenue and California Way) for a short-term impact.

As with the voluntary mitigation proposed for Oregon Way and Industrial Way, were MBT-Longview to agree to this mitigation measure, as addressed above, MBT-Longview would fund additional electronics, barricades and crossing gates, not "all necessary improvements". The Final EIS should accurately reflect the various entities' roles in funding these improvements.

C.2 Noise and Vibration

On page 5.5.3 of the Draft EIS, the Co-lead agencies have added mitigation measure NV-2 as follows:

> ***MM NV-1. Monitor and Control Increased Noise from Coal Export Terminal Construction and Operations at Closest Residences.*** *If agreed to by the property owner(s), the Applicant will monitor noise levels at the two residences nearest the project area to detect possible noise impacts from the Proposed Action during construction and operations. Noise will be monitored during construction and until at least 6 months after initiation of operations. The Applicant will submit monthly noise reports to Cowlitz County Building and Planning. If the monitoring identifies a noise impact due to coal export terminal operations, the Applicant will reduce the noise exposure of the receptors with modifications to terminal operations or installation of building sound insulation at the noise receptor.*

MBT-Longview agrees with the proposed mitigation measures involving noise monitoring. This can occur through noise monitoring at the site boundaries, or at adjacent properties should the property owners agree.

C.3 Hazardous Materials

The Draft EIS incorrectly categorizes coal as a hazardous material. The Draft EIS also mistakenly includes a list of chemicals that would be used in an on-site laboratory. MBT-Longview is not proposing to include an on-site laboratory. Coal samples would be collected and sent to an off-site lab for any required testing. Finally, the Draft EIS incorrectly identifies water treatment chemicals and chemical categories that MBT-Longview does not expect to use during normal operations.

The errors noted above are also present in the SEPA Hazardous Materials Technical Report.

The errors are found on Page 3.6-22 of the Draft EIS and emphasized in bold below. Each of the words in bold below, including the description of onsite coal handling, should be deleted from Section 3.6 of the EIS.

> *The following hazardous materials are expected to be used during normal operations of the Proposed Action.*
>
> - *Diesel fuel, gasoline, oils, greases, hydraulic fluids, antifreeze/coolants, and solvents used for equipment operation and maintenance.*
> - ***Sulfuric acid, calcium hydroxide**, flocculants, **lime, and antiscalants** used for water treatment.*
> - ***Chemicals used in the on-site laboratory (generally in small quantities of 5 gallons or less) could include methylene chloride, toluene, acetone, and 2-butanone.***
> - *Wastes classified as hazardous and nonhazardous waste and sanitary sewer waste.*
> - ***Coal handled during facility operations and during transportation***

Coal is not a "Hazardous Material." The Hazardous Materials section begins with the broad definition of hazardous materials found on page 3.6-5. The definition focuses on "contaminated environmental media, dangerous waste, solid waste, hazardous substances and petroleum products" and includes a list of federal and state regulatory programs that define and regulate these hazardous materials. Despite the Draft EIS's page-long definition of hazardous materials, none of the identified programs regulates coal or defines coal as a hazardous substance or a hazardous material. Further, federal and state regulatory definitions *not* included in Draft EIS do not identify coal as a hazardous material. These include the U.S. Department of Transportation's hazardous materials definition found at 49 C.F.R. §171.8 (including the materials designated in the Hazardous Materials Table at 49 C.F.R. §172.101);

EPA's Consolidated List of Lists, dated March 2015 (covering chemicals with reporting requirements under CERCLA, the Emergency Planning and Community Right-to-Know Act and the Clean Air Act); and Washington State's various lists of hazardous substances and hazardous materials. See http://www.ecy.wa.gov/hsieo/hazSubA-Z.html.

Because coal is not a "hazardous material" under the Draft EIS definition of the term, or any other relevant definition of that term, the description of various features of the Project related to coal handling found on page 3.6-23 should be deleted from the Hazardous Materials section and the associated Hazardous Materials Technical Report. Similarly, the water treatment and laboratory chemicals that are mistakenly identified as being used in normal operations should be deleted. The Draft EIS definition of hazardous materials should be made consistent with state and federal definitions.

C.4 Wildlife

The presence of whitetail deer has been disclosed previously and will be considered in detail in the Endangered Species Act (ESA) consultation for the Project. No separate analysis is required for the Final EIS.

C.5 Tribal Resources

Chapter 3.5 of the Draft EIS (Tribal Resources) states that *"[i]n-water construction-related activities would cause physical or behavioral responses in fish."* (EIS pg. 3.5-14) However, the likely magnitude of those physical or behavioral responses is not discussed, and the possibility that permit conditions (e.g., CWA Section 404 conditions) would minimize those effects is not mentioned. The Draft EIS then states that the Project's construction-related impacts *"could affect aquatic habitat, which could reduce the number of fish surviving to adulthood and returning to areas upstream of Bonneville Dam"* where tribal fisheries are present. The same issue is identified for construction-related indirect impacts, again with no discussion of the magnitude of impacts to fish behavior or to the fish themselves: *"Construction-related activities would cause physical or behavioral response in fish or affect aquatic habitat, which could reduce the number of fish surviving to adulthood and returning to areas upstream of Bonneville Dam, thereby affecting the number of fish available for harvest by the tribes."* (Draft EIS pg. 3.5-14,).

The Draft EIS references no studies or other documentation supporting the statement that potential impacts to aquatic habitat or to fish behavior due to Project construction and operation "could" reduce the number of fish available for harvest by tribes. In reality, the impacts to aquatic habitat and fish from the Project would be minor or non-existent and those minor impacts would have no effect on the numbers of fish available for harvest by tribes in the Zone 6 Columbia River fishery. Documentation concerning the lack of impact to fish runs that are harvested in the Zone fishery is provided in Grette Associates' "Analysis of Population-level Impacts on tribal Fish Resources in Zone 6" (*Attachment 3* to these comments).

By discussing unsubstantiated Zone 6 harvest impacts that "could" occur, the Draft EIS inappropriately engages in speculation concerning impacts to tribal fishery resources. For example, and as documented in the attached Grette Associates report, minor changes in fish behavior for any fish present during construction, such as avoiding the immediate vicinity of locations where pile driving is temporarily causing high noise levels, should not result in fish mortality. This is especially true in an extremely large river like the Columbia. In the absence of information demonstrating likely fish mortality from planned construction activities, the Draft EIS should not speculate concerning the possibility that construction-related activities will directly or indirectly result in a decreased number of returning adults and fewer fish available for Zone 6 harvest. Further, Section 3.5.8, which identifies "unavoidable and significant adverse environmental impacts," should not discuss impacts that have not been shown to be likely to occur, and the Final EIS text should reflect this difference.

The Draft EIS should acknowledge that other permitting programs take into account potential impacts to fish and impose conditions that limit those impacts. In this case, many of the fish harvested by tribes in Zone 6 are protected under the ESA, and the Corps of Engineers must undergo consultation with the U.S. Fish and Wildlife Service and NMFS before issuing a permit for in-water work. Permit conditions to ensure that "harm" to those fish is avoided will be added to permits based on this ESA consultation.

Project Operations: Indirect Impacts to Access to Fishing Sites: The Draft EIS improperly attributes to the Project impacts on access to tribal harvest locations along the Columbia River upstream of Bonneville Dam. The Draft EIS concludes that these impacts result from rail operations on the mainline which cause tribal fishers to have to wait to access 20 managed fishing sites on the Washington side of the river (managed by CRITFC[5]), and at an unknown number of unmapped, unimproved access locations. But these impacts result from the No Action Alternative- not the Project. Again, the rail system operating at capacity is, part of the No-Action Alternative. The State Rail Plan forecasts that the rail system will reach capacity without the Project. Thus, impacts on access to traditional fishing sites from the No Action Alternative will be no different from impacts resulting from the Project. According to Table 5.1-5 on page 5.1-15 of the DEIS, the 2028 capacity of the Spokane to Pasco segment of the mainline would be 38 trains per day, and the 2028 capacity of the Pasco to Vancouver segment would be 41 trains per day. The same table estimates that train traffic in 2028 **without the Project** would exceed these capacity figures (56 trains between Spokane and Pasco, and 48 trains between Pasco and Vancouver).

Train operations along mainline rail corridors should be attributed to baseline conditions. The Draft EIS should not attribute impacts from the operation of trains through mainline rail corridors to an individual project. Potential impacts from increased rail traffic on those mainline corridors should be -- and indeed are typically evaluated only when permits are sought to expand rail system capacity.

[5] Columbia River Inter-Tribal Fish Commission

The Draft EIS included a series of "to be considered" mitigation measures that are programmatic rather than site specific in nature. Many are beyond the authority of the applicant to implement, including, for example, the suggestion that the U.S. Corps of Engineers *"could continue consultations with treaty tribes to identify potential impacts and resolve conflicts related to the Proposed Action."* This suggestion amounts to nothing more than additional governmental process measure on top of the anticipated total five-year SEPA and NEPA process that does not directly mitigate any established impacts and could t neither be required through a Shorelines permit nor voluntarily implemented by MBT-Longview. Similarly, coordinating with CRITFC to identify and address access issues is a process suggestion, rather than a mitigation measure. These programmatic measures should be removed from the list of mitigation measures.

The Draft EIS included a series of "to be considered" mitigation measures that are programmatic rather than site specific in nature. Many are beyond the authority of the applicant to implement, including, for example, the suggestion that the U.S. Corps of Engineers *"could continue consultations with treaty tribes to identify potential impacts and resolve conflicts related to the Proposed Action."* This suggestion amounts to nothing more than additional governmental process on top of the anticipated total five-year SEPA and NEPA process that does not directly mitigate any established impacts and could neither be required through a Shorelines permit nor voluntarily implemented by MBT-Longview. Similarly, coordinating with CRITFC to identify and address access issues is a process suggestion, rather than a mitigation measure. These programmatic measures should be removed from the list of mitigation measures.

C.6 Air Quality

MBT-Longview agrees with the conclusions of the air quality analysis. However, here are some technical issues that should be corrected in the Final EIS. The split of Direct and Indirect impacts is not correctly applied to a Study Area. Statements such as *"Emissions are aggregated and regulated at a larger scale than a localized study, and therefore direct and indirect emissions are combined"* do not follow standard process for evaluation of air quality. Rail and marine vessel emissions were evaluated beyond the immediate Project area, but the split is not consistently presented.

Several regulatory evaluations were unclear, misleading, or inapplicable. The discussion of toxic air pollutants (TAPs) in Section 5.6.1.2 is over-reaching, implying that all sources will need a full TAPs review. This discussion also includes statements regarding coal dust that are speculative. See discussion of Coal Dust below.

Both the Project and the No-Action Alternative discussed in the Draft EIS use federal conformity de minimis as a reference for acceptable emission levels. Federal conformity is not applicable to this Project. The General Conformity Rule applies to all Federal actions that are taken in designated nonattainment or maintenance areas. This Project is not in nonattainment/maintenance area.

MBT-Longview has proposed that the control efficiency for onsite coal handling be 99%. The current facility permit was modified in 2014 to include a retrofit of coal handling areas with fogging systems. A control efficiency of 99% for enclosure plus fogging was based on vendor information, and was approved by the Southwest Clean Air Agency (SWCAA) during permitting. The Draft EIS, incorrectly employs a 95% efficiency on the basis of a draft permit from Oregon Department of Environmental Quality (DEQ). There is no basis for applying the lower control efficiency due to one draft permit from Oregon DEQ. The Final EIS should use the 99% efficiency rate, which is, expected to be approved by SWCAA.

C.7 Coal Dust

The Draft EIS treats coal dust as a subcategory of air pollution. Applying air quality regulations to this pollutant alone is meaningless, as are comparisons of potential emissions and/or impacts to any federal or State air quality standards. While we agree with the conclusion that coal dust deposition would be minimal, the discussion in the Final EIS should be pared down to describe coal dust, to show how the EIS employed a methodology for assessing coal dust deposition rates, and to describe the results.

The classification and assessment of coal dust as a nuisance is correct, but the analysis in the report is far-reaching for the Draft EIS. There are no federal or State regulatory measures for dust nuisance. On page S-26, regarding coal dust, the Draft EIS states *"A reference standard commonly cited on the question of levels of dust deposition for nuisance and environmental effects is a New Zealand Ministry of Environment study"*. The New Zealand document is entitled: *"Good practice guide for assessing and managing the environmental effects of dust emissions"*. The New Zealand document is not an applicable regulatory standard, and is instead guidance. We also question the basis for the assertion that the New Zealand guideline is *"commonly cited."* The authors arbitrarily chose the New Zealand guideline for 'highly sensitive residential areas', even though there are other guidelines mentioned, including one from British Columbia which shows levels more than twice the New Zealand level for average dustfall in residential areas as acceptable. Nuisance is subjective; the more local, Canadian guideline is better suited, on cultural, socioeconomic, and geographical/climatic levels, to address potential for coal dust *nuisance* in Washington State. Any references to nuisance guidelines within the Coal Dust reports should be clearly marked as *guideline* values, and all adjectives such as 'threshold', 'trigger', 'limit', or the like should be removed.

The Draft EIS is incorrect in comparing coal dust PM10 and PM2.5 impacts (concentration in air) to the National Ambient Air Quality Standards (NAAQS). Impacts from the whole Project were evaluated in the Air Quality report. Breaking out the source type for coal dust can be used to show what percentage of the impact is attributable to coal dust, but should not be evaluated by the standard. A quick assessment of that could have been made just by looking at the apportionment of particulate emissions (coal dust or combustion). The Air Quality report already showed Project impacts meeting the standard, so evaluating a portion of the Project would also show impacts that meet the standards.

C.8 Rail Transportation/Capacity

The Draft EIS errs by attempting to attribute to the Project rail impacts from use of the mainline interstate rail corridor. These impacts should be considered appropriately as part of the No-Action Alternative because they will occur with or without the Project.

MBT-Longview proposes to construct a port facility that will provide a transloading service to customers seeking to export coal. Coal will be delivered to the transloading facility through use of the U.S. freight rail transportation system, just as a myriad of other products and commodities are delivered by rail to port facilities for transshipment. But unlike SEPA reviews for other proposed port facilities, the Draft EIS extends its analysis far beyond the impacts caused by increases in localized train traffic. Instead of limiting its analysis to rail traffic from the main interstate rail line to the Project, the Draft EIS includes an unprecedented attempt to discern impacts caused by the use of interstate rail corridors by future customers desiring to use its services. Rather than identifying Project impacts, however, the Draft EIS dwells on the obvious fact that over time, use of the interstate freight rail system will experience growth in the number of trains as it accommodates the economic growth of the region. But this will happen with or without the Project.

The Draft EIS's mitigation discussion compounds these errors by requiring MBT-Longview to mitigate for the Project's contribution to the previously planned for and entirely expected transportation growth on these interstate rail lines. The rail capacity analysis used in the Draft EIS was based on the WSDOT 2013 – 2035 Rail Plan (State Rail Plan) forecast. The State Rail Plan recognizes that the rail system is intended to serve a wide variety of customers who have no operational control over these interstate rail lines. The Plan also recognizes that the rail system is planned, designed, constructed, and managed to operate at or as near full capacity as market demand allows.[6] The Plan forecasts that these rail lines will face capacity constraints by 2035 as a result of expected economic growth. The State Rail plan also recognizes that a rapid increase in the volume of any particular commodity shipment could create capacity constraints prior to 2035. However, rather than viewing a rapid increase in shipment of a particular commodity as a problem, the State Rail Plan affirmatively anticipates "the Class I railroads (BNSF and UP) and other infrastructure owners will likely address key capacity issues as they emerge." *State Rail Plan at page 39.* In other words, the possibility that the state system will reach capacity constraints more rapidly should not be treated as an "impact" in the Draft EIS because the railroads will be highly motivated to address anticipated system capacity constraints before they become a problem.

The Draft EIS acknowledges- as it must- that rail capacity will be exceeded by 2035 with or without projected increases associated with coal trains. The Draft EIS over-simplified the projection that adding eight trains per day to the rail system would add a total of eight trains to overall traffic. The only

[6] The rail system in Washington State serves freight and passengers as part of a multimodal transportation strategy to provide choices to the potential customers of the rail system and to support economic growth. *See Secretary Peterson's cover letter to the State Rail Plan.*

material difference between the State Rail Plan capacity forecast and the capacity forecast in the Draft EIS is one of timing--i.e., when capacity constraints might be reached. For this reason, the No-Action Alternative should conclude that existing capacity will be reached with or without the Project. The Draft EIS rail capacity analysis acknowledges that the construction and operation of the MBT-Longview Project would NOT exceed existing capacity. The EIS should be revised to acknowledge that the Project simply would not cause a significant net impact when compared to the No-Action Alternative.

The Draft EIS analysis identified that rail system capacity exists for what is projected to be at least 12 more years of growth (until 2028 or earlier depending on the railroad segment) even if the Project is operating continuously at full capacity.

The Draft EIS does not recognize fundamental aspects of the rail system in the United States and the State of Washington--namely, that the railroad is managed to serve customers. Its owners seek to operate it at full capacity irrespective of any specific commodity or demand for access to the railroad system. The State of Washington's own studies forecast that the rail system will reach capacity irrespective of whether the rail system is used to ship coal to a terminal in Washington State.

The Draft EIS's failure to recognize the dynamic nature of rail system management and operations results in an analysis that incorrectly attributes future rail system problems to the Project.

Accordingly, the Draft EIS erroneously concludes that the indirect impacts of trains serving the Project will cause rail capacity to be exceeded at almost all points along BNSF's line in Washington and will delay or block other rail users. If future growth in rail system use results in blockages and delays, those impacts would be caused by a failure in rail system management, not the construction and operation of a single port terminal which plans to use existing capacity. Put simply, potential congestion is not an environmental impact issue; it is a planning issue for BNSF and UP. By its very nature, the rail system is managed to accommodate growth and ongoing economic activity.

The Draft EIS improperly suggests mitigation measures to address impacts attributable to the No-Action Alternative. The DEIS considers potential mitigation that "could include upgrading main track, adding new main track, or extending or adding siding". *See DEIS at page 5.1-24.* However, the trains bound for the Project only represent a portion of total train traffic. A condition that requires mitigation for impacts caused by the use of the existing rail system by others would constitute an unconstitutional regulatory taking. This sort of mitigation requirement lacks the requisite "rough proportionality" and is an unlawful exaction.[7] It is not an applicant's obligation to mitigate pre-existing conditions or the natural expansion of rail use within existing capacity constraints.

Federal law pre-empts any exercise of SEPA substantive authority to address rail capacity constraints and more generally, rail operations on the mainline system. The Final EIS should affirmatively recognize

[7] See Attachment 1 for more detailed discussion on the Constitutional limitations on the exercise of SEPA substantive authority

that the U.S. interstate rail transportation system is managed to function near or at capacity. The Final EIS should state that growth in rail system use, and future increases in rail system capacity, are attributable to the No-Action Alternative rather than an adverse impact attributable to the Project. The Final EIS should also recognize that analysis of the rail system along the mainline in Washington State is for disclosure purposes only. Finally, the Final EIS should acknowledge that the Project will not cause a probable adverse direct or indirect impact related to interstate rail system capacity and therefore need not mitigate for what is more properly described as No-Action Alternative effects.

C.9 Rail Safety

The errors identified above with respect to mainline rail capacity issues are exacerbated in the Draft EIS Rail Safety chapter. Contrary to conclusions reached in the Draft EIS, rail safety impacts from the operation of the existing rail system are not within MBT-Longview's control, will exist with or without the Project and therefore cannot be attributed to the Project.

Any rail safety concerns are the same with or without the Project. The only material difference between the State Rail Plan projection of capacity constraints, and the capacity forecast in the Draft EIS is one of timing--i.e., when capacity constraints might be reached without rail system management by the owners of the system. The corresponding effect on rail safety is that there is no probable significant impact on rail safety caused by the Project for the same reasons addressed above that the Project does not cause the rail system to reach capacity constraints. The Draft EIS and the No-Action Alternative should conclude that the Project will not cause a probable significant impact to rail safety along the rail system as compared to the No-Action Alternative.

The Draft EIS uses an extremely broad and unusual definition of "accident" to include events that are neither significant nor adverse to the environment, and which inflates occurrence rates. For example, the Draft EIS at page 6-40 states: *"A train accident involves one or more railroads that have sustained combined track, equipment, and/or structural damage in excess of the reporting threshold. The FRA reporting threshold was $10,500 in 2015. FRA accident reporting threshold was $10,500 in 2015, which means any incident of $10,500 or more is classified as an accident. Therefore, accidents include a wide a variety of incident types and severities, and are not limited to collisions or derailments."* Using an FRA financial reporting threshold as a significance threshold is improper because it skews the incident rates of so called significant adverse impacts. The Final EIS should use thresholds of significance that effectively narrows the incidents that are properly labeled as "accidents." This requires that the Final EIS refine and narrow the definition of an accident as applied in the Draft EIS to those accidents that may actually be significant adverse impacts. This does not require a new analysis, only a refinement of the existing forecasts, which must be applied to the No-Action Alternative in relation to the projected growth of the rail system and the forecast that the system will reach capacity by 2035 with or without the Project.

Further, the Draft EIS improperly aggregates crossing incidents to create total per-day crossing times to indicate a significant adverse impact. Each crossing event functionally has the same crossing time as the current conditions, regardless of growth in the use of the system under the No-Action Alternative. Simply put, the Draft EIS erroneously aggregated the crossing times of individual crossing events to suggest a higher per-crossing risk. The Final EIS should correct this error and the resulting erroneous conclusion. The Final EIS should reject the aggregation of the time of individual crossing delays as a method of impact analysis resulting from a single crossing delay. An increase in the number of individual crossing delays per day does not change the delay time of any single crossing delay.

The Final EIS should state that because the time of individual crossing delays is not altered by the Project, the Project does not cause a significant adverse impact. The Draft EIS appears to have used the percentage increase in rail traffic and applied that factor to rail safety. "*The predicted accident frequency would increase over baseline conditions in 2028 by approximately 22% in Cowlitz County and Washington State with trains related to the Proposed Action.*" (page S-31) A 22 percent increase in the rate of accidents, even if properly attributed to the Project, would still result in a very small number of new events compared to existing accident rates. This is another example of an improper aggregation of events over time and is not a probable significant adverse impact caused by the Project.

In any event, the accident statistics used in the Draft EIS do not establish that rail accidents are a significant problem, or that the chance of future accidents is an impact that could be properly attributed to the Project. For example, the Draft EIS establishes that "*cased on FRA data, there were two accidents in Cowlitz County in 2014, and neither involved an injury or fatality. One incident was in a rail yard with no derailment and the other involved a derailment of 11 cars on main line track.*" (Draft EIS, page 5.2-5). It goes on to state that "*in Washington State, there were 36 accidents in 2014, two of which involved an injury. Thirteen accidents were on main line track, and the remainder was in rail yards or on industry track. Derailments (main line and industry track) involved between 0 and 11 rail cars.*" (Draft EIS, page 5.2-5).

The Final EIS should clarify that the fact that trains traveling to and from the Project will be carrying coal instead of some other commodity has absolutely no bearing on the rate of accidents or on rail safety more generally. The Final EIS should affirmatively declare that the Project does not cause a significant adverse impact in relation to rail safety.

C.10 Vessel Transportation

In 2010 the State of Washington joined the U.S. Army Corps of Engineers and the State of Oregon to invest over $183 million to deepen the Columbia River navigation channel to a depth of 43 feet. The purpose of this Project was to enable the river system to move more tonnage, even with the decrease in shipping noted in the Draft EIS. Information provided by the Columbia River Bar Pilots shows that the number of bar crossings has decreased by approximately 27 percent in the last 34 years, from 4,751 crossings (2,376 ships) in 1979 to 3,448 crossings (1,724 ships) in 2013. According to information

submitted to the Washington Energy Facility Site Evaluation Council for the Tesoro Savage Vancouver Energy Distribution Terminal (Application for Site Certification Agreement (SCA), August 2013, page 4-424): "*The number of deep draft vessels entering the Columbia River system has declined markedly over the past two decades. There were an average of 2,100 vessel transits*[8] *between 1995 and 2000; consisting of 1,930 cargo and passenger vessels (92 percent of total vessel entries) and 170 tanker vessels (8 percent of total vessel entries). Approximately 60 percent of these transits occurred at Oregon ports and 40 percent at Washington ports. During 2011 and 2012, there were an average of 1,414 vessel entries; consisting of consisting of 1,326 cargo and passenger vessels (94 percent of total vessel entries) and 88 tanker vessels (6 percent of total vessel entries). Approximately 51 percent of these transits occurred at Oregon ports and 49 percent at Washington ports.*

The number of transits declined from 2,100 (average 1995 to 2000) to 1,414 (average 2011 and 2012), which represented a decrease of 687 vessel entries. This included a decrease of 604 cargo and passenger vessels and 83 tanker vessels. The number of vessel entries decreased by 33 percent. This primarily occurred as a result of increased average vessel size. The average load per vessel increased from 16,658 tons (average load of vessels from 1995 to 2000) to 27,826 tons (average load of vessels for 2011 and 2012), which represents an increase of 67 percent. These changes reflect the increased loads that can be moved on the Lower Columbia River as a result of the channel deepening from 40 feet to 43 feet which was completed in November 2010."

Page 4-431 of the Tesoro Application for Site Certification states: "*Information from the Columbia River Pilots indicates that the number of inbound vessels (1 transit) varied from as low as 1,404 vessels in 2009 to 2,086 vessels in 2000. 2012 data indicated a total of 1,474 vessels.*"

Table 5.4-7 of the Draft EIS (page 5.4-19) provides a tabulation of large vessel transits in the study area for 2004 – 2014. For this time period, vessel traffic peaked at 3,858 transects in 2007, and is reported at 3,638 in 2014. The numbers show a minor decrease in shipping volumes, less than 0.1% per year.

Despite the differences in the data, it is clear that vessel traffic has declined in the reach of the Columbia River that would be used by vessels accessing the Project docks. The data show that demand on the river system has fluctuated significantly over the years; river shipping traffic cannot be forecasted in future years with any level of reasonable probability. Forecasting future river traffic is a fundamentally speculative endeavor. It can be reasonably expected that at some time in the future ship traffic may return to historic levels. The data show that, if historic shipping levels return as a result of the Project, such an increase would not present capacity constraints. The Draft EIS should have concluded that the Project would not cause a probable significant impact to the navigability of the Columbia River, or its use as an interstate and foreign commercial transportation channel.

[8] The Tesoro information is based on a transit being a single trip on the river. One ship-call requires two transits.

The No-Action Alternative did not properly account for anticipated growth, similar to the errors found in the rail transportation analysis. Market-driven fluctuations in vessel traffic on the Columbia can be anticipated to occur over time whether or not the Project is ever permitted. Indeed, the No-Action Alternative assumes growth in river traffic, such as that anticipated to result of the Project. Under traditional vessel traffic modeling, a projected future growth factor would anticipate new development on the River, such as that proposed by MBT-Longview. The Draft EIS errs in increasing the anticipated future growth number by *adding* traffic generated by the Project, and attributing that expected growth to the Project.[9] As shown on page 5.4-35 of the Draft EIS: "*The Proposed Action would load 70 vessels per month or 840 vessels per year, which would equate to 1,680 vessel transits in the Columbia River*." Table 5.4-1 4. *Existing and Projected Large Commercial Vessel Traffic in the Lower Columbia River*, page 5.4-39 of the Draft EIS, identifies future No-Action Alternative (2028) traffic at 4,440 trips per year, and Proposed Action (2028) at 6,120 trips, a difference of 1,680 vessel transits. The Draft EIS thus improperly assigns all new trips associated with the Project to the proposed Action rather than as a natural growth factor that would occur with or without the Project. Table 5.4-9 (page 5.4-29) shows an anticipated growth in vessel traffic to 4,440 transits in year 2028 without the Project, and 6,120 with the Project. The result is to over-estimate Project impacts. As with the rail transportation, the only material difference between the forecasts on vessel river capacity with and without the Project is one of timing-when possible river capacity constraints might be reached without river system management by the Columbia River Pilots. As discussed below in Section B.12 Cumulative Impacts, we question why some or all of the vessels transits associated with the MBT-Longview Project would not be accounted for in the vessel traffic baseline.

Accordingly, the Final EIS should conclude that vessel traffic rates will be generally the same, with or without the Project and that any nominal differences resulting from the Project do not rise to a level of "significance" within the meaning of SEPA. Consistent with the above, the Final EIS should clarify that river traffic as a result of the Project will not reach capacity constraints. In short, the Final EIS should conclude that the Project does not cause a significant adverse impact to the navigability of the Columbia River, the function of the Columbia River as a system of commerce (both interstate and foreign commerce), or the capacity of the Columbia River System. The Final EIS should state that analysis of the shipping on the Columbia River was for disclosure purposes only.

C.11 GHG and Climate Change

I. Overview

The Draft EIS's treatment of GHG emissions attributable to the Project is laden with factual and legal errors. Its attempt to forecast energy consumption and commodity market behavior across Asia and the U.S. over a period of 20 years is fundamentally speculative and legally and technically unprecedented.

[9] *See* comments submitted by the Pacific Northwest Waterways Association dated October 25, 2013.

These errors cannot be overcome by additional analyses or information, refined assumptions, or increased technical rigor.

The Draft EIS, which already discloses the potential range of future conditions, cannot be made any more reliable. Refining assumptions or updating information in the analysis today may add greater precision in outputs, but there is no basis to conclude those outputs are a more accurate reflection of future market behavior over 20 years. As a result, additional analysis will not add any more reliability or confidence in a 20 year forecast than an investor could expect the commodity futures-market to predict with "reasonably foreseeability" where coal prices and demand will be in 20 years.

The Final EIS should recognize this limitation and apply SEPA's rule of reason to accord the appropriate weight to the GHG analysis: i.e., given the inherent uncertainty in forecasting how commodity and energy markets will behave over 20 years, no projection of incremental changes in coal use that might be caused by opening an export terminal on the Columbia River can legitimately be considered "reasonably certain" to occur and there is no basis to exercise SEPA substantive authority.

To the extent the Ecology believes that long-term forecasts of incremental GHG emissions are necessary for the Final EIS, the analysis should be provided for disclosure purposes only. And to the extent Ecology feels the need to identify a scenario from the four provided that is more likely to occur, it should select the 2014 Scenario or the Low Bound Scenario as the most probable, for the reasons discussed below.

The Final EIS should abandon any conclusion that the Project would be the proximate cause of (a) environmental impacts in Washington State, or (b) a significant level of emissions. Rather, the Final EIS should adopt the conclusion in the Draft EIS that climate change impacts to Washington State will be the same with or without the Project. This conclusion is supported by scientific evidence and case law that project-level emissions cannot be shown to cause environmental impacts that would not otherwise occur in the No Action Alternative. Furthermore, the Final EIS should abandon its attempt to use laws and guidance having no regulatory bearing on the Project to establish a *de facto* level of significance for GHG emissions. As discussed in detail below, any exercise of SEPA substantive authority to impose GHG mitigation would violate SEPA and the U.S. Constitution.

The Final EIS should, therefore: acknowledge that it is not possible for GHG emissions related to the Project to be the cause of a discernable and new environmental impact in Washington State that would not otherwise occur; acknowledge that there are no laws or regulations that govern the level of GHG emissions attributed to the Project that could serve as a basis for a finding of significance; and eliminate any proposed GHG mitigation requirements for the Project.

II. The GHG and coal markets analysis are inherently speculative and are based on faulty assumptions

Forecasting commodity and energy market demand is inherently speculative over the short-term, let alone over the course of 20 years. If such forecasting could be accomplished with the degree of

"reasonable foreseeability" that SEPA demands, then the commodity- and energy-markets would offer a relatively safe haven for investors and far less opportunity to profit from derivatives, arbitrage, and speculation on commodity futures.

The Draft EIS analysis of GHG emissions is an attempt to forecast the price and demand of coal, not just in the United States, but across all of Asia. This unprecedented geographic and temporal scope for a SEPA EIS is all the more audacious because -- the document purports to predict with "reasonable foreseeability" how coal will be priced and consumed across Asia over 20 years.

The Draft EIS attempts to make long-term predictions of commodities market behavior, and projections of what are in reality planned-economy choices made by sovereign foreign governments. As a result, the Draft EIS ignores SEPA's rule of reason and ventures into an arena where little or no certainty can be found, no matter the degree of rigor applied to the analysis.

SEPA requires an assessment of ***significant impacts caused*** by a proposed project -- i.e., impacts having a reasonable likelihood of more than a moderate adverse impact on environmental quality. Regulators cannot exercise SEPA substantive authority absent a clear demonstration that the Project is the proximate cause of an adverse impact that would not otherwise occur in its absence. These statutory constraints cannot be met in the context of a commodity and energy forecast covering an enormous geographic area over a 20 year period. And -- as discussed below -- when many of the assumptions used in the Draft EIS analysis are demonstrably false, or otherwise ignore the fundamentals of Asian and U.S. commodities and energy markets, the conclusions reached are not only unreliable, they are no more than ill-informed guesses.

Because the Draft EIS already brackets its analysis with extreme outliers -- the upper and lower bound scenarios -- the potential universe of future conditions are reflected in the document. Refining assumptions, updating information, or increasing technical rigor may add more precision to the analysis; but it will not add any more reliability or confidence to the analytical outputs. Because there is no reliable way to discern within a reasonable range of certainty whether permitting the Project would result in changes in market demand -- and therefore increases or decreases overall net GHG emissions from coal combustion over a 20 year period -- there is no reason to conduct additional coal markets and GHG emissions analyses to further refine the guesses provided in the Draft EIS.

The Final EIS should limit its GHG analysis to emissions from the Project itself and related nearby operations, as Cowlitz County and the U.S. Army Corps of Engineers both determined was appropriate for the scope of their analyses. To the extent the Ecology determines that information on GHG emissions from the use of the exported coal should be included in the Final EIS, the analysis should be provided solely for the purpose of disclosing a range of potential outcomes. This information has been amply studied and detailed in the Draft EIS; therefore, no further analysis is required for purposes of disclosure. Therefore, the Final EIS should affirmatively acknowledge that commodity and energy

forecasts are predictions, which are inherently speculative and unreliable over long timeframes and not the basis for exercising SEPA substantive authority.

1. **Long term energy and commodities market forecasting is inherently speculative**

Forecasts of long-term energy production choices and commodities demand must rely on input values for parameters that are highly variable through time No matter how well-researched and well-reasoned the inputs are, forecasts become less and less reliable as the analysis extends out over time due to the inherent complexity and variability of market dynamics (*e.g.*, fluctuations in economic policy and currencies, changes in energy policy and regulation, advancements in technology, natural disasters or black swan events, etc.). As such, deviations from expected outcomes can be introduced gradually, or can occur suddenly.

For example, consider the earthquake that led to the Fukushima Daiichi nuclear power plant disaster and fundamentally altered domestic energy use in Japan; or consider how technological innovations that spurred shale gas and oil resource development in the U.S. fundamentally altered U.S. domestic resource production. The resulting dramatic shifts in U.S. and international prices for natural gas and crude oil, and for coal in the U.S. as gas supplies soared and prices dropped, were not predicted even a handful of years before they occurred.

In addition, technological developments have advanced our renewable power supply, and smart grid, energy efficiency measures, and automation capabilities have continued to improve productivity. Tremendous research and development has occurred and continues, and the predictability of the changes and the order of magnitude on impact and timing is very difficult to anticipate. These shifting market dynamics create uncertainty and additional risks.

Macroeconomic factors and globalization further complicate the reliability of commodity and energy forecasts. Faster GDP growth can spur additional needs for electricity and increased power demand. Foreign exchange risk exists with respect to the subbituminous coal that the Project will export, which will compete with Indonesian subbituminous coal. Indonesian coal is denominated in the rupiah currency. Therefore, exchange rate risk associated with a relatively weaker or stronger U.S. dollar relative to the Indonesian rupiah will impact the relative economic attractiveness and competitiveness of U.S. Powder River Basin (PRB) coal.

Professional energy forecasters acknowledge the high degree of uncertainty they must deal with, and use a variety of approaches to bind that uncertainty. For example, the Energy Information Administration ("EIA"), which is the data arm of the Department of Energy, utilizes a reference case, along with high- and low-probability cases and some additional scenario analyses to produce an Annual Energy Outlook ("AEO"). The AEO is a comprehensive long-term energy forecast that is published annually. The EIA defines its AEO reference case forecast as follows:

> *The projections in the AEO are not statements of what will happen* ***but of what might happen****, given assumptions and methodologies. The AEO Reference case projection assumes trends that are consistent with historical and current market behavior, technological and demographic changes, and current laws and regulations. The potential impacts of pending or proposed legislation, regulations, and standards are not reflected in the Reference case projections.*[10]

The EIA goes on to discuss how reliable its forecasts have been over time:

> *In general, energy consumption quantities tend to be more stable and thus projected with greater accuracy than the relatively volatile concepts of net imports and energy prices. This is because energy consumption trends reflect underlying sources of inertia in the energy-consuming capital stock, substantial lead times for capital purchase decisions, locked-in contract periods, and consumer perceptions of and responses to price changes. The average absolute percent differences for energy consumption, production, and carbon dioxide emissions range roughly between 5% and 11%.* ***The absolute percent differences for energy prices range between 10% and 38%. Net imports tend to exhibit even larger average absolute differences, ranging between 25% and 55%, primarily influenced by pre-2008 AEOs which projected much higher net imports.***[11]

There are many reasons for the deviations between the AEO Reference case projection and actual outcomes, and many reasons why experts' annual projections concerning commodity import volumes and energy prices routinely end up being off the mark by such a wide margin.

Changes in economic, market, and technological trends in addition to policies affecting energy choices are key drivers for deviations between projections and actual outcomes. This explains why there is little certainty in even short-term projections concerning energy and commodities movements and prices. The Draft EIS does not acknowledge the magnitude of uncertainty inherent in the types of forecasts used in the GHG and coal markets analysis; it simply charges forward with a nested series of blanket assumptions, many of which ignore reality or are simply wrong.

While the Draft EIS identifies various input assumptions in the four scenarios that are analyzed, the Draft EIS fails to fully disclose the uncertainty regarding the primary input assumptions and the likelihood or probability of the occurrence of these assumptions. Moreover, the Draft EIS fails to discuss the validity of the selected scenarios, the uncertainty regarding each scenario, and the likelihood or probability of occurrence.

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[10] http://www.eia.gov/forecasts/aeo/retrospective/

[11] *Id*. (emphasis added) While the EIA establishes that ultimate outcomes deviate significantly from initial forecasts the Draft EIS errs in not reflecting these dynamics. Experts in this area of forecasting readily concede that there is tremendous uncertainty in forecasts, which routinely vary from their predictions. Those who use projections for advocacy purposes, or with a desired outcome in mind, are sometimes less willing to recognize how far from what actually occurs most projections ultimately prove to be.

In addition, the Draft EIS presents a range of possible outcomes of net GHG emissions resulting from the Project that does not reflect the likelihood that the Project will substantially reducing GHG emissions; when more closely scrutinized, there is little probability that the GHG emissions resulting from the Project would be as large as the Draft EIS ultimately predicts, and there is a high likelihood that the GHG impact attributable to the Project is very low, if not negative.[12]

Outside of the Draft EIS, Ecology and ICF (the contractor used to develop the Draft EIS) have addressed forecasting uncertainty issues head-on. For instance, both Ecology and ICF have acknowledged the speculative nature of evaluating commodity markets. In a separate SEPA Draft EIS evaluating, among other things, future GHG emissions related to a proposed crude oil transloading facility, Ecology and ICF concluded:

Whether the cumulative projects result in an increase in GHG emissions relative to the no-action alternative depends on speculative factors. For example, the relative contribution of the cumulative projects to the net change in CO2 emissions would depend on whether the cumulative projects result in increased demand for crude oil or displace other crude oil consumed by end users (which depends, in part, on the source and final destination of the oil), what type of crude oil is being transported (i.e. which emissions factors are used) and what the end use is (*e.g*. combustion, development of other products.)"[13]

The Draft EIS does not explain how Ecology and ICF can conclude that the level of uncertainty is too high to accurately evaluate increases in GHG emissions from crude oil shipments, but is not too uncertain to evaluate incremental new GHG emissions that might be caused by the Project.

In sum, the Draft EIS analysis of international market factors relating to coal consumption and resulting GHG emissions is not, and cannot be made to be any more reliable than other attempts at this speculative endeavor such as the EIA. The Final EIS should acknowledge the high degree of variability that is inherent in all long-range forecasts of commodity and energy markets. Short of demonstrating that there is a reliable basis to conclude that the incremental new emissions forecast by the Draft EIS are likely or reasonably likely to occur, Ecology must apply SEPA's rule of reason and conclude that the analysis is too speculative to be used a predicate for the exercise of SEPA substantive authority.

2. <u>SEPA does not permit selection of a "most likely" scenario when all scenarios are speculative</u>

The GHG analysis in the Draft EIS does not provide an analysis that identifies what is "likely or reasonably likely" to occur,[14] and in fact, no analysis could accurately predict what will occur in energy

[12] For a detailed discussion of confidence in the Draft EIS outputs see, Attachment 4 (document 1)- *Evaluation of the Statistical Confidence Level of the Draft EIS GHG Forecast Analysis*
[13] Westway Expansion DEIS August 2015, Chapter 6 Cumulative Impacts, page 6-13.
[14] SEPA does not require analysis of impacts that are "merely speculative." An impact is not speculative if it is "likely or reasonably likely to occur, as in there is a reasonable probability of more than a moderate effect on the

and commodities market between 2018 and 2038. Instead, Ecology simply defines four scenarios that are all considered "plausible," and then chooses one of the four that it deems the "most probable outcome."

The Draft EIS is silent on the probability that events in the world will play out through 2038 as depicted in the "most probable outcome" scenario. Rather, the selection process was based on Ecology's view that this scenario -- the 2015 Energy Policy Scenario -- is somewhat more likely than the other scenarios.

SEPA, however, requires an analysis of significant impacts. "Significant" means "a reasonable likelihood of more than a moderate adverse impact on environmental quality"; and "impacts" are defined as "the effects or consequences of actions."

The Draft EIS provides no rational basis to conclude that the 2015 Energy Policy Scenario (the "2015 Scenario") is a more likely outcome than any of the other scenarios discussed. The Final EIS must conclude that any effort to forecast commodity and energy markets, and select one scenario to reflect the reasonably foreseeable impacts of the Project on the Asian market place over a 20 year period, does not meet SEPA's "rule of reason" standard.

While the analytic approach in the Draft EIS is sufficient for disclosure purposes, it is not reliable enough to exercise SEPA substantive authority. SEPA requires that an agency demonstrate identifiable impacts are "likely or reasonably likely" to occur before imposing any mitigation. As described more fully below, because the range of scenario alternatives analyzed in the Draft EIS reflects the fundamentally and inherently speculative nature of this exercise, it does not provide a valid basis for imposing GHG mitigation offsets.

3. <u>The 2015 Energy Policy Scenario is especially biased and unrealistic because it relies on many flawed assumptions</u>

As noted above, any attempt to forecast international commodities market dynamics must rely on assumptions and other inputs. To the extent those assumptions and inputs do not reflect reality, the outputs of the analysis will be unreliable. All four of the GHG analysis scenarios are underpinned by assumptions that are either highly questionable or involve variables that cannot reliably be predicted over a longer time period.

In particular, the 2015 Scenario is based on highly speculative and unrealistic assumptions and other inputs that are quite simply wrong. In each case, the assumptions and faulty inputs used in the 2015 Scenario all have the effect of increasing the net GHG emissions that particular scenario predicts will be caused by the Project. All of the concerns enumerated below all relate to the 2015 Scenario, and some apply to other scenarios as well.

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quality of the environment." However, if an impact "merely ha[s] a possibility of occurring," SEPA treats it as "remote or speculative."

a. Elasticity of Demand

The Draft EIS GHG analysis does not discuss unique structural constraints and market limitations in Asian economies. Instead, it incorrectly assumes an induced level of additional coal consumption in Asia based on a change in delivered coal prices that it assumes will result from the Project.

While the Draft EIS states that its assumptions concerning induced demand are based on eight academic studies of the elasticity of demand somewhere in Asia, the studies are not identified and there is no supporting documentation concerning the assumptions and analytical methods used in those studies.[15]

By simply assuming the new coal consumption will be induced in Asia, the Draft EIS fails to take into account how energy production decisions are actually made in many Asian countries that run on planned economies. Rather than choices being made in a functioning market where dispatch decisions routinely occur based on differences in price between competing commodities (e.g., natural gas vs. coal), power producers in countries like Japan, South Korea and Taiwan have much more limited options. They rely on coal for baseload power production without being able to switch from one form of baseload power production to another in response to market price fluctuations. Even if the Project results in a small price decrease in coal in Asia, that price difference should not cause additional coal to be consumed because the subbituminous PRB coal that will be exported through the Project would simply substitute for subbituminous coal from Indonesia or other suppliers in the Asian market.

The Draft EIS's induced demand assumptions also ignores the reality of how energy production decisions are made in Asian countries, where new power plants are constructed based on the implementation of long-term national energy plans rather than being the product of electric utility decision-making in a functioning power production market, as in the U.S. For example, Japan, South Korea and Taiwan employ government-directed energy plans that seek to ensure that relatively inexpensive electric power is reliably available for industrial and household use.[16] Decisions concerning how baseload power will be produced are made in those plans, and then implemented. The result is a system where potential small changes in the price of coal are irrelevant.

Moreover, even though the Draft EIS impact analysis extends well beyond the borders of Washington State and the United States, it does not account for international or foreign country requirements and enforcement that would mitigate GHG emissions. By way of analogy, RCW 80.70 mitigates for carbon dioxide emissions for power plants to be located in Washington State. Likewise in Asia, power plant emissions are also regulated. If CO2 mitigation provisions in RCW 80.70 are presumably reasonable for GHG mitigation, then the Final EIS should account for GHG mitigation measures in Asia.

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[15] For a detailed discussion of elasticity of demand, see Attachment 4 (document 2)-*Evaluation of Draft EIS Assumed Induced Demand for Coal in the Pacific Basin Based on an Elasticity of Demand Assumption.*
[16] *Id*. (for a discussion of planned economies).

For example, mitigation measures have already been implemented in other countries as expressed in their policies and laws, including the countries that will receive our exports:[17] Japan has a carbon tax;[18] Korea has a carbon cap and trade program;[19] and Taiwan has mandated cuts in GHG emissions.[20] In other words, the Draft EIS implementation of GHG commitments is inconsistent across countries.

While the DEIS includes policies for the U.S. and China, the GHG reduction policies of other Pacific Basin countries ae not included. If all of the countries analyzed in the Draft EIS commit to GHG reductions and an effective cap on GHG emissions, then no increase in GHG emissions in the Pacific Basin would result from the Project. The Draft EIS improperly assumes that more coal will be consumed in Asian countries in response to any decrease in price, no matter how small. This means that Asian countries will either use more coal at existing plants by increasing operational levels in response to a small price drop, or will choose to build new coal-fired power plants that they would not have otherwise constructed.[21] Given the planned nature of Asian economies, neither of these outcomes is likely.

In Asia, where coal is used as baseload power and power plants are constructed based on long-term energy plans that take a myriad of factors into account, assuming that additional power plants will be built because a new coal export dock is opened on the Columbia River is patently unrealistic and unreasonable. And unlike in the U.S., where coal competes directly with natural gas in a functioning power production market, there is little or no opportunity for Asian power producers to choose different base load power production methods in the short term in response to a small price decrease -- they are already locked into whatever their national energy plan has provided for them for baseload power generation. The failure to take the reality of how Asian power production choices are made results in an analysis that simply assumes its way to an answer rather than objectively evaluating what can reasonably be foreseen.

b. Relative Heat Content of PRB Coal versus Indonesian Coal

The Draft EIS erroneously assumes (without any supporting documentation) that the heat content of subbituminous coal exported from Indonesia (which is the only source of subbituminous coal in ICF's model other than the PRB coal exported through the Project) has much higher heat content than PRB

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[17] *See* www.iea.org/policiesandmeasures/climatechange

[18] http://www.iea.org/policiesandmeasures/pams/japan/name-139284-en.php?s=dHlwZT1jYyZzdGF0dXM9T2s,&return=PG5hdiBpZD0iYnJlYWRjcnVtYiI-PGEgaHJlZj0iLyI-SW50ZXJuYXRpb25hbCBFbmVyZ3kgQWdlbmN5Jnp3bmo7PC9hPjxzcGFuPiAmZ3Q7IDwvc3Bhbj48YSBocmVmPSIvcG9saWNpZXNhbmRtZWFzdXJlcy8iPlBvbGljaWVzIGFuZCBNZWFzdXJlczwvYT48c3Bhbj4gJmd0OyA8L3NwYW4-PGEgaHJlZj0iL3BvbGljaWVzYW5kbWVhc3VyZXMvY2xpbWF0ZWNoYW5nZS8iPkNsaW1hdGUgQ2hhbmdlPC9hPjxzcGFuIGNsYXNzPSJsYXN0Ij48L3NwYW4-PC9uYXY-

[19] http://thinkprogress.org/climate/2015/01/12/3610553/south-korea-cap-and-trade/

[20] https://www.linkedin.com/pulse/passage-greenhouse-gas-reduction-act-taiwan-brings-business-yang?articleId=7781337123632157209

[21] For a detailed discussion of the economic basis for construction of new thermal plants, see Attachment 4 (document 2) -*Evaluation of Draft EIS Assumed Induced Demand for Coal in the Pacific Basin Based on an Elasticity of Demand Assumption.*

coal. As a result of this erroneous assumption, the Draft EIS projects that it will require greater quantities of coal shipped through the Project to replace the same heat content of Indonesian coal. This assumption results in higher GHG emissions for the same amount of electricity generated from exported coal, both from coal combustion and transportation and thereby r biases the EIS's prediction of greater GHG emissions when PRB subbituminous coal substitutes for Indonesian subbituminous coal.[22]

On the contrary, the average heat content for Indonesian subbituminous coal is approximately 4,820 kcal/kg, equal to 8,676 Btu/pound. This heat content is lower (rather than higher as asserted in the Draft EIS) than the heat contents for U.S. PRB coals which are likely to be exported through the Project (Montana – 9,300 Btu; Wyoming – 8,800 Btu). And the actual average heat content for Indonesian subbituminous coal is much lower than the heat content for Indonesian subbituminous coal assumed in the Draft EIS (5,400 kcal/kg, equal to 9,720 Btu/pound). The average heat content for Indonesian bituminous coal is approximately 6,365 kcal/kg (11,457 Btu/pound), which is similarly much lower than ICF's assumption of 6,583 kcal/kg (11,850 Btu/pound).

c. Relative CO2 Content of PRB Coal versus Indonesian Coal

The Draft EIS also erroneously assumes that the carbon coefficients of the U.S. subbituminous and bituminous coals that would be exported through the Project are significantly greater than the carbon coefficients of the coal from Asian sources that would be displaced. In other words, the analysis assumes that a ton of exported U.S. coal will produce more GHG emissions when it is burned than a ton of Asian coal. This incorrect assumption results in an increase in GHG emissions attributed to the Project even without assuming an induced greater demand for coal.[23] As with the inaccurate heat content assumption, this error introduces an unwarranted bias to the analysis. This error alone accounts for 42% of the total increase in GHG emissions that the 2015 Scenario attributes to the Project.

For example, the average CO2 emission factor for Indonesian subbituminous coals is higher than the average emission factor assumed in the Draft EIS (214.6 pounds per mmBtu vs. 212.7 pounds per mmBtu) and is higher than the emission factors for US subbituminous coals (211.3 – 213.1 pounds per mmBtu). As a result of these erroneous assumptions, the Draft EIS shows that U.S. coal has higher carbon coefficients than other Asian coal, accounting for 42% of the total increase in GHG emissions from coal combustion under the 2015 Scenario.

[22] For a more detailed discussion on relative heat content, see Attachment 4 (document 3) - *Heat Content of Indonesia Coals.*
[23] For a detailed discussion on relative CO2 content, see Attachment 4 (document 4)- *Carbon Coefficients of US and Indonesian Coals*.

d. Relative efficiency of U.S. versus Asian coal-fired power plants

The operational efficiency of the Asian fleet of coal plants is superior to the U.S. coal plant fleet.[24] The Asian coal fleet has newer supercritical or ultra-supercritical coal plants that require a lower quantity of coal to produce a single unit of power. On average an Asian coal plant that consumes PRB coal produces fewer GHG emissions because it produces more power per unit of coal input. Failing to take this difference into account results in a biased prediction of greater GHG emissions than would actually occur even if one were to assume improperly that the Project would induce greater demand for electric power in Asian economies.

For example, in South Korea and Japan, approximately 73% and 74% of the respective coal fleets are supercritical or ultra-supercritical coal plants. In comparison, approximately 27% of the coal fleet in the U.S. includes supercritical or ultra-supercritical coal plants. On average, the U.S. fleet of coal plants is approximately 15% less efficient than the South Korean and Japanese coal fleets. This means that the South Korea and Japan coal fleet consumes 15% less coal to generate the same level of power, respectively, than U.S. coal plants. Therefore, Japanese and South Korean coal plants will emit approximately 15% less CO2 to generate the same level of power than U.S. coal plants consuming PRB coal.[25]

e. Substitution of Subbituminous Coal for Bituminous Coal

The Draft EIS erroneously assumes that the Project will result in the substitution of subbituminous coal for bituminous coal, rather than substituting for subbituminous coal from other sources. In particular, the Draft EIS 2015 Scenario assumes that Japanese power plants, which are designed for bituminous coal use but can use a mix that includes a small percentage of the less expensive subbituminous coal, will increase the percentage of subbituminous coal used in their power plants from the current 7% to 30% in response to the Project being permitted and operating.

This error is significant because it may not be possible and it is thus unreasonable to assume that Asian power plants may readily substitute subbituminous coal in place of bituminous coal .This error also biases the analysis because it results in increased GHG emissions from: (i) coal substitution (subbituminous coal has greater carbon coefficients than bituminous coal.); (ii), coal transportation (more tons need to be mined and transported), and (iii) even induced coal demand (subbituminous coal is cheaper than bituminous coal).

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[24] For a more detailed discussion of relative efficiencies, see Attachment 4 (document 2)- *Evaluation of Draft EIS Assumed Induced Demand for Coal in the Pacific Basin Based on an Elasticity of Demand Assumption.*

[25] This relative efficiency is further augmented by efforts to manage and capture CO2. For example, South Korea's power plants capture and recycle CO2 gas (http://www.koreatimes.co.kr/www/news/biz/2016/05/123_205426.html) http://www.iea-coal.org.uk/site/2010/news-section/news-items/iea-clean-coal-centre-points-to-japans-clean-coal-leadership); and Japan's power plant designs will reduce CO2 and GHG emissions over the study period

These erroneous assumptions also ignore the fact that Japanese power producers already have a powerful economic incentive to maximize the use of subbituminous coal because the price of the Indonesian subbituminous coal they already use is substantially less than bituminous coal. Current market prices would imply that end-users cannot substitute more subbituminous coal for bituminous coal than they are already doing in the market. There is a large differential in market prices for Indonesian bituminous and subbituminous coals, especially for the lower heat content coals (4,200 kcal/kg). Economics would dictate that, if Japanese customers could use more subbituminous coal to displace bituminous coal in existing boilers, they would already be doing so today. Yet, the Draft EIS provides no explanation for why Japanese power producers will make this switch in response to the Project becoming operational when they have not done so to date in response to the ready availability of comparable subbituminous coal from Indonesia.[26] A substantial portion of the increased GHG emissions that the 2015 scenario attributes to Project results from this erroneous assumption, independent of whether or not additional coal use is induced by the Project.

f. The CPP Will Not Eliminate Price Competition Among Fuels in the US

The Draft EIS states that the 2015 Scenario is intended to reflect "how recent international climate negotiations and perspectives on future climate policies might affect GHG emissions under the Proposed Action"; and to evaluate how "the November 2014 U.S.-China announcement on climate change action goals and implementation of the proposed U.S. EPA Clean Power Plan" could impact coal consumption and energy production on both sides of the Pacific.[27]

The Draft EIS analysis of the 2015 Scenario eliminates any offset from reduced U.S. GHG emissions by assuming that implementation of the Clean Power Plan (CPP) will essentially eliminate the current competition between coal and natural gas in the U.S. (and will do so *before* any induced increase in price of US coal reduces coal usage and accordingly, GHG generation, in the U.S.). Coal use in the U.S. has dropped substantially in recent years, largely due to the availability of inexpensive natural gas. The 2015 Scenario relies on a projected increase in gas prices and a projected price gap that would allow coal-fired power generation to outcompete natural gas power generation when an anticipated massive influx of new power from renewables frees up space below emissions caps.

In the 2015 Scenario, a small increase in U.S. coal prices caused by the Project would not make any difference in the U.S. because slightly more expensive coal will still be significantly cheaper than gas. For this to work, however, gas prices will have to rise significantly in relation to coal. Currently, the

[26] For a detailed discussion on coal substitution, see Attachment 4 (document 5) - *Substitution of Subbituminous Coal for Bituminous Coal in Asia*.

[27] Millennium Bulk Terminals—Longview SEPA Environmental Impact Statement: SEPA Coal Market Assessment Technical Report, p. 5-5. Note the use of the words "might" and "could" with respect to Ecology's choices concerning key variables in the analysis. When an analysis is based on predicted events that only "might" or "could" take place in a particular fashion, the results of that analysis cannot validly be called "reasonably certain" to occur.

short run marginal cost of producing power with natural gas is comparable to or less than producing power with coal in many U.S. markets, so the 2015 Scenario depends on it becoming cheaper to generate power using coal rather than natural gas.

The 2015 Scenario assumes this will happen by inflating the price of natural gas from its average 2014 Henry Hub price of $4.4/MMBTU (presumably the most recent price available when the analysis was done). For the 2015 Scenario to be anything more than an interesting theoretical exercise, the price of gas has to rise significantly above that level, with coal prices remaining at their current historic low levels. For 2016, the 2015 Scenario projects that the price of gas will remain at the 2014 price of $4.4/MMBTU, and then rise to $5.0 in 2018. Instead of remaining stable through 2016, however, natural gas prices dropped to $2.6/MMBTU in 2015 and have declined further to $2.0/MMBTU so far in 2016. Rather than stabilizing prior to beginning the steady upward climb predicted by the 2015 Scenario, natural gas prices unexpectedly dropped by over 50% from the 2014 price.

The fact that the 2015 Scenario analysis was likely inaccurate before the Draft EIS could even be printed highlights the speculative nature of commodity forecasts (see Section I.A above). As of this writing, the Draft EIS's projected gas prices are more than 100% higher than actual gas prices and are clearly off by a very wide margin, and we have not yet even arrived at the 2018 start year for the 20-year Draft EIS analysis.

This error alone should be sufficient to demonstrate that the 2015 Scenario cannot accurately predict gas price movements. At a minimum, it now appears highly unlikely that the well-documented price elasticity of the demand for coal that has been present in the U.S. power sector for a very long time (and is accounted for in the 2014 and Low Bound Scenarios) will be eliminated by the CPP, even if it survives judicial review and is implemented in its current form.[28]

The Draft EIS also errs in improperly assuming that the CPP will be implemented in a blanket fashion across all states, no matter the differing energy production options and market dynamics that exist across the country. As with the commodity price assumptions embedded in the 2015 Scenario, the effect of this assumption is that states implementing the CPP will have little or no choice concerning the power generation mix used to fit within emissions caps. Options will be limited, choices will be obvious, and a small change in coal prices will therefore make no difference. As with the commodity price assumptions, this assumption requires that longstanding U.S. energy market realities be turned upside down. Cost-based choices that are freely available to electric utilities would have to be extinguished across the entire country. Even if the CPP survives judicial review without any significant changes, is not altered by a future EPA or Congress, and is implemented in its current form through 2038, each state would have the opportunity to customize how it intends to generate electricity and offset GHG

[28] In addition to applying an outdated and draft version of the CPP, the Draft EIS only considers a rate cap mechanism to comply with the CPP even though there are additional approaches available. For example, a mass base approach would likely lead to lower GHG emissions from the Project, as would emissions trading.

emissions. The price of coal will not suddenly become irrelevant in the U.S., as it will be factored into decisions made at the state and regional levels even if the CPP is implemented in its current form.

The Draft EIS choice of this scenario as "most probable" is unsupportable when that scenario depends on sudden and dramatic changes in longstanding U.S. market dynamics and price change projections that have already proven to be far off the mark.

g. The 2015 Scenario Depends on Non-Compliance with International Agreements

The 2015 Scenario only takes into account international GHG reduction commitments of the U.S. and China. However, the Paris Accord was signed by 175 countries on April 22, 2016. Signatories include South Korea, Taiwan and Japan -- the key target markets for PRB coal. Emissions reductions commitments by those countries will limit the potential for expanded coal use (see discussion in Section I.3.a). These limitations, when implemented, will function as a cap on the use of coal, meaning that customers for PRB coal exported through the Project will be substituting PRB coal for coal from other sources, rather than expanding their use of coal. For the 2015 Scenario to work, the Project must induce greater coal demand in Asia, with that greater demand most likely coming from Japan, Korea and Taiwan. For that to happen, the national commitments made by those countries in signing the Paris Accord must be violated. There is no basis provided in the Draft EIS for concluding that Japan, Korea and Taiwan will not live up to their commitments.

h. 2014 Scenario provides a more accurate reflection of U.S. market dynamics

Given the significant infirmities associated problems detailed above with the 2015 Scenario, the Past Conditions (2014) Scenario (the "2014 Scenario") provides a more realistic view of potential future outcomes in the U.S. while the Low Bound Scenario is a more realistic scenario concerning effects in overseas markets. The 2014 Scenario assumes current market dynamics in the U.S., where coal and natural gas actively compete and any increases in price for either commodity will decrease its use. The 2014 Scenario does not project dramatic changes in market dynamics due to future regulatory constraints such as the CPP or major price shifts. It projects that some displacement of coal use by natural gas will occur in the U.S. due to higher coal prices generated by the opening of other markets for PRB coal. The assumed decrease in coal consumption employed in this Scenario results in a net decrease in GHG emissions throughout the time period examined in the Draft EIS.

The results of the 2014 Scenario are also consistent with the results of an analysis recently employed in a federal agency's environmental review addressing similar coal export terminals (Tongue River). That analysis quantified a reduction in U.S. GHG emissions due to new export terminal capacities driving up U.S. coal prices, resulting in decreased U.S. coal consumption. Although none of the four scenarios can reasonably be said to accurately predict the manner that U.S. markets and energy production will evolve over the next 20 years, the 2014 Scenario offers the least uncertainty because it simply carries forward the domestic market dynamics that are currently in place.

With respect to Asian GHG emissions, the Low Bound Scenario most accurately reflects market dynamics, as it assumes the lowest level of induced demand. As detailed above, the planned nature of power generation decisions in Asian economies, the limited ability to switch fuels, and baseload dynamics of Asian power production show that very little or no increased consumption will be induced by the Project's introduction of a new source of coal into a market that is already amply supplied with low cost subbituminous coal.

i. Conclusion

All forecasts rely on assumptions and other inputs. Projections can be made and opinions about what may happen can be offered, but decades-long changes in commodities and energy markets cannot be forecast with reasonable certainty. As shown above, many of the assumptions used in the Draft EIS do not reflect reality or are simply wrong, rendering the analysis unreliable.

While correcting these errors may provide greater precisions, additional analysis will not increase reliability. No matter how well researched data inputs and assumptions are many questions simply cannot be reliably answered with modeling or other analysis. Due to the complexity and inherent variability of market behavior over time, any snapshot of reality today can quickly distort over time due to the unforeseen or the unpredictable.

This explains why the EIA and other forecasters continually update and refine their analysis -- on a daily, monthly and yearly basis -- to account for intractable and constantly changing market dynamics. The inherent unreliability of commodity and energy forecasts requires constant course correction to allow models to more closely approximate actual market conditions. This is why no amount of additional information, refined assumptions, or increased technical rigor will -- in a snapshot EIS -- result in an accurate energy commodity market forecast reflecting domestic and international dynamics over a twenty year period, let alone accurately account for the impact of a single domestic export project on those markets.

4. <u>No Additional Analysis is Needed for the Final EIS</u>

For these reasons, the Final EIS need not incorporate any additional analyses. The Draft EIS analysis has bracketed a wide range of potential outcomes, each of which is identified as "plausible," without demonstrating with any degree of certainty whatsoever that any of the alternatives provided represents what will most likely occur through 2038.

Due to the inherent uncertainty and variability involved with all such forecasts, no amount of analysis can ascertain what will occur in energy and commodities markets over the relatively near term, much less over the course of a multi-decade time period. Given this fact, there is no need for Ecology to revisit the coal markets analysis other than to simply identify the scenarios as what they are – "guess estimates" at what may occur in the future that are provided for disclosure purposes.

III. SEPA substantive authority cannot be exercised because the EIS does not demonstrate an environmental impact in Washington State that would be caused by the Project

Even though the Draft EIS suggests that the Project would result in incremental new GHG emissions, the Draft EIS does not establish a rational basis to conclude that the Project would be the proximate cause of (a) environmental impacts in Washington State, or (b) a significant level of emissions.

To the contrary, the Draft EIS states that climate change impacts in Washington State will be the same with or without the Project. Despite this statement, the Draft EIS concludes -- without any legal basis -- that laws and guidance having no regulatory bearing on the Project to establish a *de facto* level of significance of GHG emissions.

However, without establishing the causal link between the purported GHG emissions and an environmental impact that would be avoided were the No Action Alternative selected there is no basis to exercise SEPA substantive authority to mitigate for any assumed increase in GHG emissions as a result of the Project. Further, the proposed mitigation in the Draft EIS fails to demonstrate how it has an essential nexus or is roughly proportionate to the impacts.

Nexus and proportionality are essential to the exercise of substantive authority to impose mitigation; and a failure to demonstrate either violates SEPA and the U.S. Constitution. The Final EIS should, therefore:

- disclose that GHG emissions related to the Project are not likely to be the probable cause of a discernable and new environmental impact in Washington State that would not otherwise occur;
- acknowledge candidly that there are not yet applicable laws or regulations that govern the level of GHG emissions attributed to a transloading facility like the Project that could serve as a basis for a finding of significance; and
- eliminate any proposed GHG mitigation requirements for off-site emission.

1. <u>The Draft EIS fails to establish a causal link between the Project and an identified environmental impact</u>

Causation is a central issue for a SEPA EIS.[29] To establish causation in the context of a GHG analysis under SEPA, Ecology has adopted the use of the "proximate cause" test. Proximate cause requires a showing that the proposal is the cause of the emissions in a direct sequence, unbroken by any superseding cause. The courts have further defined proximate cause as whether the action and the

[29] WAC 197-11-752 (defining "impacts" as "the effects or consequences of actions"); WAC 197-11-060(4)(e) (noting that the "range of impacts to be analyzed in an EIS….will depend [in part on] the extent to which the adverse impacts are attributable to the applicant's proposal").

impacts (emissions) are "two links of [the same] chain." If the environmental impact is linked to the action, then it should be considered under SEPA.[30]

Even assuming the Draft EIS' commodity and energy market forecast correctly predicts (which it does not) the incremental new emissions caused by the Project, the analysis does not show how these new emissions are the "proximate cause" of new adverse impacts to the Washington State environment.[31] The 9th Circuit Court of Appeals' discussion in *Washington Environmental Council v. Bellon* is instructive on the application of the causation requirement to GHG emissions.[32] There, the Court concluded that

> [I]t is not possible to quantify a causal link, in any generally accepted scientific way, between GHG emissions from any single oil refinery in Washington or the collective emissions of all five oil refineries located in Washington, and direct, indirect or cumulative effects on global climate change in Washington or anywhere else."[33]

The Draft EIS ignores the science that shows the causal chain between project-level GHG emissions and impacts to the environment as being too attenuated, i.e. the disjunction -- or breaking of the causal chain between localized injuries and the environmental effects due to the accumulation of GHG concentrations over the course of many decades. The Draft EIS attempts to bootstrap the analysis by stating that "[t]he climate change impacts resulting from [the Project's] increase to greenhouse gases would persist for a long period of time, beyond the analysis period and are considered permanent and, while global in nature, would affect Washington State."[34] This conclusory statement, however, is entirely unsupported because the Draft EIS does not comment upon or attempt to link specific climate-change impacts in Washington State that would not otherwise occur due to emissions associated with the Project, nor does it show how these incremental new GHG emissions rise to the level of "significance."

It may be tempting to assume a relationship between the workings of general circulation models ("GCMs")[35] and the workings of air quality models commonly used to assess the health and other impacts of criteria pollutant emissions. But unlike criteria pollutants, GHGs mix across a "global airshed," which makes it impossible to establish through modeling the kinds of "cause and effect" relationships

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[30] Ecology, *Guidance for Ecology Including Greenhouse Gas Emissions in SEPA Reviews* at 3 (June 3, 2011) (citing *U.S. Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 754 (2004)) ("Although Washington courts have not ruled on this issue as it relates to SEPA, we have used the same standard in the state because it presents a reasonable approach to defining the scope of impacts that need to be considered.").

[31] An overview of the basis to establish an impact was provided to the Co-Leads (*Greenhouse Gas Emissions and Environmental Impact Analysis: evaluating climate change impacts under NEPA and SEPA for Millennium Bulk Terminals - Longview*, Tohan, A., August 1, 2014).

[32] *Washington Envtl. Council v. Bellon*, 732 F.3d 1131, 1142-43 (9th Cir. 2013).

[33] *Id*.

[34] Draft EIS, p. 5.8-16.

[35] General Circulation Models ("GCMs" also called Global Climate Models) are the primary tool available for forecasting climate change on the basis of alternative GHG emissions scenarios. Many GCMs are in use today. Climate change forecast are built on multiple GCMs run as an ensemble to avoid potential biases or limitations of any individual GCM.

between GHG emissions and climate change impacts that may be possible when modeling criteria pollutant impacts on human health or the environment. GCMs -- and other methods to downscale emission impacts -- cannot be run to assess environmental impacts attributable to a single project because model assumptions and scale, and the complexity of the climate system itself, do not allow for it.[36]

The Draft EIS appears to conclude as much with respect to climate change impacts **to** the Project: "[o]ngoing and expanded operations in the project area [under the No Action Alternative] would be affected by climate change as described for the Proposed Action."[37] As a result, the Draft EIS determines that "potential climate change impacts on the Proposed Action in the project area are not considered significant and would not necessitate mitigation."[38] In effect, the Draft EIS concludes that climate change impacts are the same with or without the Project.

The Final EIS should extend this same conclusion to the Project because GHG emissions, which the Draft EIS claims are attributable to the Project, cannot be the proximate cause of detectable environmental impacts in Washington State.

2. **Even if GHG emissions are a proxy for an environmental impact, the Draft EIS fails to establish that the emissions constitute a significant impact**

Just as it ignored the science about whether a causal link between the Project and an identified environmental impact can be established, the Draft EIS similarly ignores the science related to what level of emissions may be significant under SEPA. A federal district court recently concluded that:

> "[G]iven the current state of science it is impossible to determine what effect any given amount of GHG emissions resulting from an activity might have on the phenomena of global warming, climate change, or the environmental effects stemming from it. It is therefore not currently possible to associate any particular action and its specific project-related emissions with the creation or mitigation of any specific climate-related effects at any given time or place. However, it is known that certain actions may contribute in some way to the phenomenon (and therefore the effects of) climate change, even though specific climate-related environmental effects cannot be directly attributed to them."[39]

While NEPA and SEPA guidance describe the use of GHG emissions as a "reasonable proxy" for impacts, there is no legal basis to exempt from the analysis the principles of reasonable foreseeability and proximate causation to identify discernible, non-speculative impacts. In addition, even if emission levels could arguably provide a meaningful proxy for comparing alternatives (which they do not), emission levels are useless for imposing mitigation unless the 'nexus' and proportionality requirements are satisfied. .

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[36] For a detailed discussion on GCMs, climate change and environmental impacts, *see* Attachment 4 (document 7) - *Review of Approaches for Significance and Mitigation*.
[37] Draft EIS, p. 5.8-33.
[38] *Id*.
[39] *WildEarth Guardians v. United States Forest Service*, 120 F. Supp. 3d 1237, 1271 (2015).

To properly use GHG emissions as a proxy for a traditional SEPA environmental impact analysis, the analysis must show why those specific emissions are significant -- *i.e*., there is "a reasonable likelihood of more than a moderate adverse impact on environmental quality."[40] Short of demonstrating how a specific quantity of GHG will actually result in more than a moderate adverse impact on environmental quality, there is no basis to conclude any emissions would be significant impact attributable to the Project.

Given the infirmities identified above, the Draft EIS bootstraps its significance analysis with a comparison to various intensity thresholds proposed in federal and state regulations and guidance, including the draft Washington State Clean Air Rule, the EPA's Tailoring Rule and also the Draft Council on Environmental Quality (CEQ) guidance.

a. ***The Draft EIS improperly concludes that "[t]hese standards provide guidance on assessing the significance of various levels of greenhouse gas emissions"[41]This statement and approach adopted leads to the Draft EIS conclusion that "…emissions attributable to the operations of the Proposed Action under the 2015 Energy Policy Scenario are considered adverse and significant". This conclusion is misleading and an incorrect basis for determining significance for the following reasons: These federal and state thresholds are not risk-based and were not established with a view to determining significance. For example, the Draft CEQ guidance provides the 25,000 metric tons of CO2e per year as a reference point and states "When using this reference point, agencies should keep in mind that the reference point is for purposes of disclosure and not a substitute for an agency's determination of significance under NEPA."***

b. ***The Washington State Clean Air Rule and the EPA's Tailoring Rule apply to direct facility-level emissions, and not to indirect life-cycle emissions that might occur outside the fence line of a regulated facility; and as such, are intended for comparison to emissions for a different set of boundary conditions than those used in the Draft EIS.***

Determining significance by comparing emissions to other laws and guidance is inappropriate because they do not apply to Project permitting decisions. In addition, unlike other proxies developed through legislation and rulemaking -- such as National Ambient Air Quality Standards or state water quality standards -- the Draft EIS provides no basis to conclude that these proxies demonstrate a reasonable likelihood that the Project emissions will cause more than a moderate adverse impact on environmental quality.

Nor do comparisons to other proxies -- such as "an equivalent number of cars" -- offer a more defensible or legally appropriate way to comply with SEPA. These types of proxies simply attempt to make the analysis more intuitive, but they do not provide any greater rational for why project-level emissions will cause impacts to the Washington State environment that would not otherwise happen; nor do they

[40] WAC 197-11-794(1).
[41] Draft EIS at 5.8-16.

provide a standard against which to measure an impact -- as a matter of changes in global GHG concentration or as a policy matter where a legislative body has created a significance threshold.

For example, the Draft EIS states that under the 2015 Scenario, the level of new net emissions from the Project would be "equivalent to adding about 672,100 passenger cars on the road each year."[42] Yet in 2015, Northwest ports from Portland to Vancouver imported more than 900,000 cars.[43] Each of those ports is "actually importing cars," but none has been asked to study the lifecycle effect in SEPA documents.

As discussed above, current science -- be it GCMs or downscaling methods -- cannot be applied to show environmental impacts attributable to project-level emissions. Because the state of the science precludes meaningful analysis -- or renders the analysis of those impacts speculative -- the Final EIS should expressly conclude that gaps in relevant information or scientific uncertainty concerning significant impacts limit use of the analysis to disclosure purposes only.[44]

Furthermore, there is no foundation under law or policy that SEPA can be applied to use a lifecycle analysis to impose mitigation requirements. If every state through which a commodity or industrial product passed could decide to perform a lifecycle analysis and require mitigation for alleged impacts, the cost in permitting delay and mitigation expense would virtually stop commerce. This, of course, would lead to Constitutional violations under the Commerce Clause as well as to violations of international trade laws.

The U.S. Constitution vests Congress with the exclusive power to regulate interstate commerce.[45] As a corollary, the Commerce Clause "denies the States the power unjustifiably to discriminate against or

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[42] Draft EIS, p. S-38.

[43] Using information obtained from the respective ports, auto handling volumes in the Pacific Northwest for 2015 was as follows:

Portland	262,874
Seattle /Tacoma	175,802
Grays Harbor	76,628
Vancouver WA	90,183
Vancouver BC	384,500
TOTAL	**989,987**

[44] SEPA's rule of reason standard states that an EIS need not discuss "every remote, speculative, or possible effect or alternative[.]" *Toward Responsible Dev. v. City of Black Diamond*, No. 69418-9-I, 179 Wn. App. 1012, at *2 (Wn. Ct. App. Div. 1 Jan. 27, 2014).

[45] *Oregon Waste Systems, Inc. v. Dep't of Environmental Quality of the State of Oregon*, 511 U.S. 93, 98, 114 S.Ct. 1345, 128 L.Ed.2d 13 (1994) (citing U.S. Const. Art I, § 8, cl. 3); *Gibbons v. Ogden*, 22 U.S. 1, 74-75, 6 L.Ed. 23, 9 Wheat. 1 (1824) (Congress's power to regulate interstate commerce necessarily includes the "power to regulate navigation . . . within the limits of every State in the Union; so far as that navigation may be, in any matter, connected with commerce with foreign nations, or among the several States, or with the Indian tribes.").

burden the interstate flow of articles of commerce."[46] The clearest example of discrimination or burden on the flow of commerce is a law that overtly blocks the flow of interstate commerce at a State's borders.[47] Even laws with legitimate local concern, such as environmental protection and resource conservation, are limited by the Commerce Clause.[48] In short, a state may not accomplish even legitimate goals "by the illegitimate means of isolating [itself] from the national economy."[49]

These basic and well-established principles of federal constitutional law take precedence over Washington's interest in implementing mitigation requirements for the Project. Washington State has few commercially viable coal reserves as compared with reserves of landlocked states like Montana and Wyoming. Washington thus has little interest in regulating companies that own, produce and sell coal nationally or internationally. In addition, Ecology has never to our knowledge studied the life-cycle GHG emissions from other commodities or industries -- such as timber/wood products, commercial vehicle engine manufacturers, or airplane manufacturers -- let alone proposed to regulate life-cycle emissions from end-use of those commodities or industrial products overseas.

The impact of any decision to regulate, limit or prohibit coal exports through the Project -- i.e., by requiring 50% mitigation of end-use emissions or reduction in the volume of coal shipped through the terminal -- would fall entirely on those landlocked states and their industries and economies that have an interest in coal production. It would also burden navigation at Washington's borders in direct contravention of the Commerce Clause. Additionally, there is no demonstrable or verifiable benefit associated with a SEPA imposed mitigation requirement in comparison to the concrete and substantial interference on interstate commerce. In short, the mitigation conditions proposed in the Draft EIS would potentially have the effect of blocking coal exports due to changes in export volumes or increased cost of operation, which would violate the Commerce Clause and would be unconstitutional.

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[46] *Oregon Waste Sys.*, 511 U.S. at 98 (citations omitted). The Commerce Clause requires that some aspects of trade generally must remain free from interference by the States, and when a State "ventures excessively into the regulation of these aspects of commerce, it trespasses upon national interests . . . and the courts will hold the state regulation invalid under the Clause alone." *Kassel v. Consolidated Freightways Corp. of Delaware*, 450 U.S. 662, 669, 101 S.Ct. 1309, 67 L.Ed.2d 580 (1981) (holding Iowa limitations on the length of freight trucks transporting goods within the state unconstitutional under the Commerce Clause) (internal citations and quotations omitted).

[47] *City of Philadelphia v. New Jersey*, 437 U.S. 617, 624, 98 S.Ct. 2531, 57 L.Ed.2d 475 (1978) (declaring unconstitutional—in the face of environmental protectionist arguments—a New Jersey law prohibiting importation of solid and liquid wastes generated outside the state) (citations omitted).

[48] *Minnesota v. Clover Leaf Creamery Co.*, 449 U.S. 456, 471, 101 S.Ct. 456, 66 L.Ed.2d 659 (1981) (holding minor burdens associated with packaging requirements imposed on milk products allowed to continue to move freely across the Minnesota border were not unconstitutional where no approach with a lesser impact on interstate activities existed) (citations omitted). Laws designed to promote public health and safety "may further the [public] purpose so marginally, and interfere with commerce so substantially, as to be invalid under the Commerce Clause." *Kassel v. Consolidated Freightways Corp. of Delaware*, 450 U.S. 670.

[49] *City of Philadelphia*, 437 U.S. at 627.

The Commerce Clause also vests Congress with exclusive authority to regulate foreign commerce—a power "greater" than Congress's right to regulate interstate commerce.[50] Indeed, "[f]oreign commerce is pre-eminently a matter of national concern."[51] The Foreign Commerce Clause is designed to ensure the federal government "speak[s] with one voice when regulating commercial relations with foreign governments."[52] Ecology's proposed mitigation requirement on the Project for coal consumed in Asia, based on Ecology's belief that exporting coal will exacerbate GHG emissions, invades Congress's absolute power to regulate foreign commerce. It is not within Ecology's jurisdiction to limit international access to domestic resources that Congress has not deemed protected or limited.

For these reasons alone the review of potential GHG emissions from the use of coal in Asian must be limited to disclosure purposes only, and cannot be the basis of the exercise of SEPA substantive authority.

c. Without establishing nexus and proportionality there is no basis to exercise SEPA substantive authority

The U.S. Constitution's Fifth Amendment limits governmental authority to deny or condition permits. Specifically, when denying or conditioning a permit the government must demonstrate that its action (a) has an "essential nexus" to the permit, and (b) that the action is "roughly proportional" to the project's impacts.[53]

Washington courts apply the nexus and proportionality tests to restrictions, including those under SEPA, imposed on land development in Washington.[54] The agency imposing the restriction has the burden of proving that a SEPA mitigation condition satisfies the essential nexus and rough proportionality tests, or else the development condition constitutes an illegal tax, fee, or charge under RCW 82.02.020, or the Washington State Constitution.

Nexus is an essential component to the exercise of SEPA substantive authority because it establishes the relationship between a project's environmental impact and an agency's "individual determination" that

[50] *Japan Line, Ltd. v. Los Angeles Cnty.*, 441 U.S. 434, 448, 99 S.Ct. 1813, 60 L.Ed.2d 336 (1979) (striking down a California tax on instrumentalities of foreign commerce because the tax jeopardized federal uniformity with respect to foreign trade).
[51] *Japan Line, Ltd.*, 441 U.S. at 448. *See also Chemical Waste Management, Inc. v. Templet*, 770 F. Supp. 1142, 1152 (M.D. La. 1991) (declaring unconstitutional Louisiana statues prohibiting imports of hazardous wastes generated in Mexico).
[52] *Japan Line, Ltd.*, 441 U.S. at 449.
[53] *See Nollan v. California Coastal Commission*, 483 U.S. 825, 837 (1987) (exactions violate the Takings Clause of the Fifth Amendment unless there is an "essential nexus" between the exaction and the public impact of the proposed development) and *Dolan v. City of Tigard*, 512 U.S. 374 (1994) (an exaction of property must be "roughly proportional" in nature and extent to the impact of the proposed land development).
[54] *See Trimen Dev. Co. v. King County*, 124 Wn.2d 261, 274, 877 P.2d 187 (1994) (citing *Dolan*, 512 U.S. 374); *City of Olympia v. Drebick*, 156 Wn.2d 289, 301-03, 126 P.3d 802 (2006).

a proposed restriction is necessary to address that impact.[55] Most simply, nexus is about causation and the mitigation required to address an impact caused by a proposed project.

Similarly, rough proportionality requires that the type and amount of mitigation is related in nature and extent to the proposed project's impact. To establish proportionality, the condition must be "impact specific" and the agency must "base its condition on an "evaluation of the proposed development's demonstrated impact."[56]

The Draft EIS proposes that a mitigation condition requiring a 50% reduction in emissions associated with the Project is necessary to address significant impacts from the Project. However, there is no basis to establish an essential nexus because the Draft EIS cannot on the basis of existing science or law demonstrate that emissions attributed to the Project will cause a discernable environmental impact in Washington State – i.e., there is no nexus between the proposed mitigation requirement and an environmental impact caused by the Project.

The proposed mitigation also fails the rough proportionality test. The Draft EIS assumes without any rationale or justification that mitigating 50% of incremental new GHG emissions from the Project will mitigate – below a level of significance – the adverse climate change impacts presumably caused by the Project. It also fails because the identified range of emissions is so large that picking one amount is the product of speculation. Specifically, if the Project actually reduces GHG emissions, as predicted by two of the Draft EIS GHG scenarios and sets of assumptions, then no amount of mitigation is proportional. Similarly, mitigation based on the high end scenario is not roughly proportional if emissions are moderate.

The Final EIS cannot address – with any degree or validity – the inherent uncertainty of a long-term commodities market and energy production prediction by simply reducing the mitigation required to 50% of the GHG emissions purportedly caused by the Project. And when that prediction is made even more questionable by its use of an array of demonstrably incorrect assumptions, the mitigation requirement loses all grounding in reality. Rather than demonstrating that a particular increment of future increased emissions from the burning of coal will be caused by the Project, the 50% mitigation requirement is an implicit recognition that there is too much variability in potential outcomes to predict with reasonable certainty whether the Project will have any effect at all on overall net global GHG emissions.

The statutes and regulation cited in the Draft EIS to justify the 50% mitigation figure are not applicable to Project permitting decisions. By importing mitigation requirements into the Draft EIS from other statutory programs that were not intended to apply to dock permitting decisions, Ecology is attempting to usurp the authority of the Legislature.

There is simply no rational basis for Ecology to conclude that a 50% mitigation requirement for the GHG emissions attributed to the Project is close to roughly proportional when the Draft EIS GHG analysis is

[55] *Compare Trimen Dev. Co.*, 124 Wn.2d at 275 *with Isla Verde Int'l Holdings, Inc. v. City of Camas*, 146 Wn.2d 740, 745-746, 49 P.3d 867 (2002).
[56] *Citizens Alliance v. King County.* 145 Wn. App. at 654, 668.

based on a set of speculative scenarios that are deemed "plausible and reasonable" or "most probable" but result in vastly different predicted new GHG emissions.[57]

d. Conclusion

The Draft EIS must acknowledge the substantial uncertainty that permeates the GHG emissions analysis and limited this discussion to disclosure purposes only.

The Draft EIS and the Final EIS cannot establish a causal link between the purported GHG emissions and an environmental impact that would be avoided when compared to the No Action Alternative. As such, the mitigation proposed in the Draft EIS is incapable of demonstrating how it has an essential nexus or is roughly proportionate to the identified impacts. Nexus and proportionality are essential to the exercise of substantive authority to impose mitigation; and a failure to demonstrate either violates SEPA and the U.S. Constitution. The Final EIS, therefore, should remove the proposed GHG mitigation requirements for the Project.

C.12 Cumulative Impacts

The discussion of cumulative impacts in Chapter 6 at times contradicts itself (is there a cumulative impact or not?), seems to double-count some impacts relating to transportation, and includes impacts that are speculative or inconclusive.

Table 6-1 Resources Potentially Contributing to Cumulative Impacts on Page 6-2 of the Draft EIS shows a potential cumulative impact on every element of the environment with the exception of groundwater. Yet the sections that follow show that there would be no cumulative impacts for several elements A few examples are 6.3.1.6 Hazardous Materials, 6.3.2.1 Geology and Soils, and 6.3.2.3 Wetlands.

In other elements of the environment, impacts appear to be double-counted because background growth in transportation is intended to accommodate future projects such as this Project, yet all of the Project impacts are added on top of the background forecast to result in a cumulative impact. Examples are in rail transportation, rail safety, and vehicle transportation. In 6.3.3.1 Rail Transportation, Page 6-35, Table 6-5, Projected Trains per Day on Reynolds Lead and BNSF Spur in 2038 by Scenario. Background growth does not account for any traffic from MBT-Longview Project. On Page 6-38: Table 6-6. Projected 2038 Train Volumes in Washington State by Scenario. Background growth does not account for any traffic from MBT-Longview Project. In 6.3.3.2 Rail Safety, page 6-41:*The 2038 predicted number of freight train accidents in Cowlitz County (BNSF main line, BNSF Spur, and Reynolds Lead) is 7.2 per year without Proposed Action-related trains (Cumulative No-Action scenario), and 8.1 with Proposed Action-related trains (Cumulative Proposed Action scenario). The predicted number of loaded coal train accidents is 1.5 per year with Proposed Action-related trains.* The forecasted growth in train traffic should account for some or all of the coal trains.

[57] Millennium Bulk Terminals—Longview SEPA Environmental Impact Statement: SEPA Coal Market Assessment Technical Report, p. 5-3-5.

And in 6.3.3.3 Vehicle Transportation, traffic growth is projected at 2 percent per year: Page 6-42: "*Background traffic was estimated by developing a linear growth rate between existing and forecast traffic volumes in the immediate area. Traffic volumes are forecast to increase at a rate of 2% annually. For comparison purposes, a 2% annual growth rate was applied to traffic count data to reflect baseline traffic conditions in the SR 432 Highway Improvements and Rail Realignment Study (Cowlitz-Wahkiakum Council of Governments 2014). The 2% annual growth rate was applied to the 2028 No-Action scenario traffic volumes for 10 years to develop 2038 No-Action Cumulative Proposed Action scenario traffic volumes. Vehicular traffic related to the Proposed Action was added to the 2038 No-Action Cumulative Proposed Action scenario to develop the 2038 Cumulative Proposed Action scenario traffic volumes".* The 2% growth factor should account for some if not all of any traffic from resulting from redeveloping the Project site.

There are also several places in the cumulative impact analysis where the analysis includes impacts that are speculative and subjectively inconclusive: Some examples include:

6.3.1.3 Aesthetics, Light, and Glare: Page 6-20 lists the projects included in the cumulative analysis of aesthetics, light and glare: *The following cumulative projects are located in this study area: Barlow Point Master Plan Project, Riverside Refinery, Washington Energy Storage & Transfer, SR 432 Rail Realignment and Highway Improvement Project, Reynolds Lead and BNSF Spur Improvements, and the Kelso Martin's Bluff Rail Improvement Project.* None of these projects have progressed to the point of having design information on which to base a study of aesthetics, light and glare. Yet, on page 6-21, the Draft EIS concludes: *Overall, the Proposed Action, in combination with the cumulative projects, would contribute to cumulative impacts related to aesthetics, light, and glare by adding to the concentration of industrial features along the Columbia River visible to viewers at rural, residential, and natural viewpoints.* Given that there is no basis for the conclusion and it is highly speculative without seeing lighting designs, "would contribute" should be changed to "could contribute."

6.3.1.4 Cultural Resources: Page 6-21 of the Draft EIS, *During operations, the Proposed Action could affect onshore archaeological resources if increased shoreline erosion, due to wakes from Proposed Action-related vessels, altered or destroyed the landforms on or in which resources are located.* ***Although a shoreline analysis concluded that impacts on archaeological sites along the lower Columbia River were not likely to result from an increase in project-related vessel traffic,*** *other cumulative projects (Table 6-4) would increase vessel traffic in the Columbia River. Therefore, the Proposed Action,* ***in combination with the cumulative projects, could contribute to cumulative impacts on archaeological resources related to shoreline erosion from vessel wakes.****(emphasis added)* This is speculative and not supported by the shoreline analysis.

6.3.1.5 Tribal Resources: Pages 6-22 through 6-23. "*Operation of the Proposed Action would also affect tribal resources through activities that cause physical or behavioral responses in fish or that affect aquatic habitat. These impacts could reduce the number of fish available for*

harvest by the tribes in areas upstream of Bonneville Dam. Cumulative projects would also introduce vessel traffic and other activities that may cause physical or behavioral responses in fish or affect aquatic habitat. Therefore, the Proposed Action, in combination with the cumulative projects, would contribute to cumulative impacts on tribal fish resources." The text on page 4.7-34 of the Draft EIS describes project-related vessel traffic increases as an impact that ***could*** cause behavioral responses, not ***would***. The cumulative impact analysis appears to string together a series of information that is inconclusive and determine it would be an impact rather than could be an impact, and the text should be revised to use the word "could."

6.3.3.2 Rail Safety: On page 6-41, the Draft EIS concludes: "*Within Washington State, the predicted number of freight train accidents is approximately 98 per year without Proposed Action-related trains, and 110 accidents per year with Proposed Action-related trains. The predicted number of loaded coal train accidents in Washington State is approximately19 per year*." As was noted above, there is no evidence that coal trains would have a different accident rate than other commodities, and if the number of accidents is tied strictly to the number of trains using the line, then the accident rate predicted for the with-Project Action-related trains in 2028 would be the same as in year 2035 without the Project Action- related trains.

6.3.3.4 Vessel Transportation: The Draft EIS acknowledges that "*the likelihood of a vessel allision is low in the Columbia River because there are few impediments close to the edge of the navigation channel."* (page 6-56) It also acknowledges the "*factors that influence the potential for incidents during vessel transport are complex but are driven largely by changes in the pattern of vessel traffic, particularly those vessels limited to the navigation channel (i.e., deep-draft vessels).*" (page 6-56) "*The modeling predicts approximately 26.30 incidents per year in 2038 Cumulative Proposed Action scenario conditions, compared to 24.70 incidents in 2038 Cumulative No-Action scenario conditions. Groundings (powered and drift) are projected to account for 21.84 of the incidents (17.30 powered groundings and 4.54 drift groundings). The Proposed Action's incremental contribution to this cumulative impact would be small, approximately 1.6 incidents per year over the 2038 Cumulative No-Action scenario."* (page 6-57). And then at the end of the section, the Draft EIS writer appears to throw in several other elements of the environment without a clear conclusion, yet states that "*In general, the increase in deep-draft vessels associated with the Proposed Action and cumulative projects would result in the increased potential for vessel-related cumulative impacts to occur."* The conclusion that additional coal terminals would result in even greater induced demand in Asia and increased GHG emissions presumes that the Draft EIS coal markets and GHG analysis provides reasonably certain conclusions concerning the effects in Asia of the Project. Because all commodities market and energy use predictions extending out over two decades are inherently speculative, the draft EIS should conclude that it is not possible to predict with any reasonable degree of certainty the effect in Asia of multiple new coal export terminals being constructed in the U.S.

6.3.3.8 Greenhouse Gas Emissions: The GHG analysis in the Draft EIS is highly speculative, and makes use of incorrect outputs, and this approach of using highly speculative information is continued in the discussion of cumulative impacts. On page 6-71: "*The coal market assessment found that the operation of the planned coal export terminals in Table 6-27 would increase the domestic coal prices and decrease domestic coal consumption, resulting in a decrease in domestic greenhouse gas emissions. Natural gas consumption would increase as it would be used as a substitute for coal. Therefore, the net domestic greenhouse gas emissions would decrease. However, internationally, Asian coal displacement coupled with induced demand from reduced international coal prices would outweigh any reduction in domestic emissions and would result in an increase in international greenhouse gas emissions. Induced demand under the Cumulative Proposed Action scenario would be higher than the Past Conditions (2014) scenario due to the effects of all coal export terminals.*" The conclusion that additional coal terminals would result in even greater induced demand in Asia and increased GHG emissions presumes that the Draft EIS coal markets and GHG analysis provides reasonably certain conclusions concerning the effects in Asia of the Project. Because all commodities market and energy use predictions extending out over two decades are inherently speculative, the Draft EIS should conclude that it is not possible to predict with any reasonable degree of certainty the effect in Asia of multiple new coal export terminals being constructed in the U.S.

D. Table of Corrections

Attached as Attachment 2 is a table identifying suggested corrections or revisions to the Draft EIS. While not substantive in nature, many of these corrections could have been avoided with greater transparency during the Draft EIS drafting process. These changes will correct misstatements, clarify analyses, and/ or perhaps strengthen the analytical foundation for conclusions. The analysis completed to date for the Draft EIS is sufficient and new analysis does not need to be performed for the Final EIS.

E. Closing

MBT-Longview appreciates the efforts taken by the County and Ecology to reach the Draft EIS publication milestone. We recognize the effort that your teams have expended in the preparation and publication of the document. This Draft EIS is an exceptionally thorough document supported by extensive public participation during the 45-day public comment period, which included three public hearings. We remain committed to working with you to swiftly arrive at the next milestone – the issuance of the Final EIS.

SEPA requires a "reasonably close causal relationship" between a project and a potential impact before an EIS must study or recommend mitigation for that impact. The Final EIS should narrow the recommendation of mitigation measures to those impacts that are clearly caused by the Project and assign impacts that would happen without the Project to the No-Action Alternative. Areas of indirect

impacts that are clearly outside of the Applicant's control should be included in the Final EIS for disclosure purposes only.

We take specific issue with the inclusion of mitigation for remote and speculative impacts and the lack of disclosure where there is substantial uncertainty in the studies, and with the attribution to the Project of impacts that will occur even with the No-Action Alternative. The No-Action Alternative should properly account for growth in rail, vessel traffic, demolition of the historic buildings and climate change – *as all will occur with or without the Project*. The incremental difference between the No-Action Alternative (including proper accounting for background growth in transportation) and the Project should be clearly described for the reader. Only impacts clearly created by the Project should be mitigated, and the mitigation measures must be reasonably related to the proposal and reasonably capable of being achieved.

Again, we thank you for giving us the opportunity to submit comments on the Draft EIS. We look forward to the finalization of the EIS by the co-leads in 2016.

Sincerely,

Millennium Bulk Terminals – Longview

William Chapman
President and Chief Executive Officer

Kristin Gaines
Vice President, Environment

Attachments:

Attachment 1 – Legal Framework
Attachment 2 – Table of Corrections
Attachment 3 – Draft EIS Comments, Technical Response Analysis of Population-level Impacts on Tribal Fish Resources in Zone 6
Attachment 4 – Greenhouse Gas Technical Reports and Memoranda

ATTACHMENT 1 – LEGAL FRAMEWORK

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MEMORANDUM

TO: ELAINE PLACIDO
DIRECTOR, BUILDING AND PLANNING
COWLITZ COUNTY

DATE: JUNE 13, 2016

SALLY TOTEFF
DIRECTOR, SOUTHWEST REGIONAL OFFICE
WASHINGTON STATE DEPARTMENT OF ECOLOGY

FROM: JON SITKIN

SUBJECT: MILLENNIUM BULK TERMINALS-LONGVIEW'S COAL EXPORT TERMINAL DRAFT ENVIRONMENTAL IMPACT STATEMENT (DRAFT EIS); LEGAL FRAMEWORK APPENDIX TO COMMENTS ON DRAFT EIS

This memorandum addresses the legal framework of a proper Washington State Environmental Policy Act (SEPA) Environmental Impact Statement (EIS) impact analysis. It is to be read in conjunction with Millennium Bulk Terminals-Longview's substantive comments on the Draft EIS for MBT-Longview's proposed coal export terminal (Project) contained in its comment letter of the same date (Comment Letter).

A. LEGAL FRAMEWORK

1. SEPA-EIS Basics

A SEPA EIS is intended to evaluate potential significant, adverse environmental impacts, including direct, indirect, and cumulative effects that are reasonably foreseeable and proximately caused by a proposed project.[1] According to Ecology's SEPA rules, and as established in Washington case law, "significant" means a reasonable likelihood of more than a moderate effect on the environment.[2] "Impacts" are defined as "the effects or consequences of actions."[3] Washington courts have recognized that SEPA limits this analysis to probable significant impacts, not every conceivable impact.[4] Ecology's regulations explain "'[p]robable' means likely or reasonably likely to occur" and "is used to distinguish likely impacts from those

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[1] RCW 43.21C.031, WAC 197-11-792(2) (c).
[2] *See WAC 197-11-794.*
[3] WAC 197-11-752.
[4] *See Citizens v. Klickitat Cnty,* 122 Wn.2d 619, 641, 860 P.2d 390 (1993), *op. revised*, 866 P.2d 1256 (1994); and *Cheney v. City of Mountlake Terrace*, 87 Wn.2d 338, 344, 552 P.2d 184 (1976).

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that merely have a possibility of occurring, but are remote or speculative."[5] An EIS impact analysis must satisfy the "rule of reason" standard.[6]

The Draft EIS is to be confined to "*only* those probable adverse environmental impacts that are significant."[7] Further, the Draft EIS analysis of probable significant adverse impacts is required to be limited to those impacts that are proximately caused by the proposal.[8] To ensure that the SEPA analysis focuses on only those impacts that are proximately caused by a proposed project, SEPA requires that a "no-action alternative" be simultaneously analyzed in order to distinguish between the significant environmental effects that will be proximately caused by a proposal and those impacts that will occur in the event the proposal is not permitted. An EIS is not to consider indirect or cumulative effects that are remote or speculative, or where the chain of causation relies on too many independent actions.[9] The proximate cause test requires reasonable foreseeability.[10] SEPA impact analysis requires consideration of only probable significant impacts because an analysis of "remote and speculative" impacts would be insufficiently reliable for decision-makers.[11]

Where analysis has "gaps in relevant information or scientific uncertainty concerning significant impacts, agencies shall make clear that such information is lacking or that substantial uncertainty exists" (emphasis added).[12] Scientific uncertainty exists when there are an increasing number of variables that have independent effect to cause the link between the Project and any indirect and cumulative impacts to become more distant and remote.

"[Mitigation] will depend upon the specific impacts, the extent to which the adverse impacts are attributable to the applicant's proposal, and the capability of applicants or agencies to control

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[5] WAC 197-11-782.
[6] See *Mountlake Terrace v. Cheney*, 87 Wn. 2d 338, 244 (1976). ("The 'rule of reason' is a 'broad, flexible cost-effectiveness standard and is determined on a case by case basis, considering all of the policy and factual considerations reasonably related to SEPA's terse directives.'" quoting R. Settle, *The Washington State Environmental Policy Act: A Legal and Policy Analysis* § 14(a)(i) (4th ed.1993)).
[7] RCW 43.21C.031 (2) (emphasis added); *see* also WAC 197-11-408.
[8] The SEPA EIS scope is both governed by and defined through principles of causation. SEPA imports the NEPA proximate cause standard. The U.S. Supreme Court explained that a direct, an indirect, or a cumulative impact is within the scope of the NEPA impact analysis *only if* there is "a reasonably close causal relationship between the environmental effect and the alleged cause." *Department of Transportation v. Public Citizen*, 541 U.S. 754, 752, 124 S. Ct 2204, 159 L.Ed. 2d 60 (2004). (internal quotation marks and citation omitted, emphasis added). *See* also *Ecology, Guidance for Ecology Including Greenhouse Gas Emissions in SEPA Reviews*, at 3 (June 3, 2011) ("GHG Guidance") (citing *Public Citizen*, at 767).
[9] *See*, e.g., *Ctr for Biological Diversity v. U.S. Dept of Hous & Urban Dev.*, 541 F. Supp. 2d 1091 (D. Ariz. 2008),
[10] "Some effects that are 'caused by' a change in the physical environment in the sense of 'but for' causation, will nonetheless not fall within [NEPA] because the causal chain is too attenuated." *Metro. Edison Co. v. People Against Nuclear Energy*, 460 US 766, 774 (1983). See also *id.* at 767.
[11] *Cascade Bicycle Club v. Puget Sound Regional Council*, 175 Wash. App. 494, 509, 306 P.3d 1031 (2013).
[12] WAC 197-11-080(2).

the impacts in each situation."[13] "Mitigation measures shall be reasonable and capable of being accomplished."[14] Agencies shall also consider whether local, state, or federal requirements and enforcement would mitigate an identified significant impact.[15]

Traditional Impact Analysis - Direct and Indirect Impacts of Construction and Operation

The Draft EIS's evaluation of the direct and indirect impacts of the construction and operation of the terminal is straightforward and satisfies SEPA requirements; the Draft EIS fully evaluated all such impacts (i.e., gave a hard look). In regard to these impacts, the Draft EIS impact analysis is consistent with what has been uniformly conducted for other projects for decades. Although the conclusions in these areas are accurate and no further study is necessary, there are technical corrections that have been noted in the technical appendix. *See Attachment 2.* The Draft EIS also recognized the vast array of mitigation measures built into the terminal design as well as construction and operational plans and procedures that will mitigate potential significant adverse impacts arising at the site and neighboring areas. The Draft EIS concluded that with the Project design and operational plans developed by MBT-Longview, there are no significant adverse impacts resulting from the construction and operation of the Project at or near the site.

Unprecedented Expanded Impact Analysis

In this Draft EIS, the impact analysis has ventured far beyond the proper limits of SEPA impact analysis. Portions of the Draft EIS evaluate potential impacts that (a) are not proximately caused by the Project; (b) are not "likely or reasonably likely to occur" or speculative, and may not happen at all; and (c) may happen whether or not the proposed Project goes forward. In these instances, the Draft EIS did not include an adequate disclosure of substantial uncertainty in the studies. The inclusion of potential mitigation measures for impacts that are not proximately caused by the Project invites the agencies to exceed their regulatory authority.

This is particularly evident in the unprecedented scope of Ecology's attempt to review greenhouse gas (GHG) emissions from the use of a commodity, and the use of the statewide rail system to deliver goods, products or a commodity to a port terminal. The Draft EIS makes conclusions about impacts without disclosing the substantial uncertainty that exists in its study of those impacts. For instance, this Draft EIS identifies GHG emissions occurring outside of the State of Washington, on the other side of the Pacific Ocean, as an *offsite* unavoidable and significant indirect impact. To arrive at this conclusion, Ecology has undertaken a novel and unprecedented analysis of emissions based primarily on speculation and inconsistent assumptions.[16] In the GHG emissions analysis, as well as the vessel, rail transportation, and

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[13] WAC 197-11-060(4)(e).
[14] RCW 43.21C.060.
[15] WAC 197-11-660(1)(e).
[16] Cowlitz County's August 19, 2014 letter to Millennium Bulk Terminals-Longview, LLC identified that Ecology was taking a far broader scope of review of greenhouse gas emissions in the EIS than was supported by Cowlitz County. Thus, the analysis of GHG emission occurring outside of Cowlitz County is referred to as Ecology's analysis.

rail safety sections (all of which are discussed in greater detail in the Comment Letter, as well as in this appendix), the Draft EIS violates the SEPA threshold analytical requirements of causation by attributing impacts to the Project that are not proximately caused by the Project, and that are remote and speculative. The Draft EIS analysis of GHG emissions and climate change impacts is extraordinarily speculative and is based primarily on an analysis that simply stacks a series of assumptions on top of one another to reach a result for each of the four coal market model scenarios that is the basis of the GHG emissions analysis. Each of these scenarios, independently and especially if evaluated together given their divergent predictions, reveal the inability to forecast long-term changes in commodity and energy markets, and, in particular, global commodity markets, with the degree of precision required for impact analysis under SEPA. No amount of coal-market analysis can be done that would discern a level of incremental new-coal combustion emissions caused by the Project with sufficient certainty to justify the imposition of mitigation requirements.

Long-term commodities projections simply cannot be made with certainty as even short-term commodity prices are subject to major gyrations in major commodities trading exchanges. These markets are speculative precisely because commodity prices are unpredictably variable. The recent rapid decline in gas prices from the time the Draft EIS analysis was completed to the time the Draft EIS was published provides a perfect illustration. The "most probable" GHG emissions scenario identified by the EIS depends on gas prices increasing over time so that gas will not displace coal when coal prices increase. This scenario predicted a gas price of $4.4/MMBTU in 2016, with prices rising from there. Instead, prices have dropped, with the 2016 average price to date being $2.0/MMBTU. Despite its own commodity price projection being clearly inaccurate before the Draft EIS was even published, the Draft EIS concludes that its 20-year commodity forecast was sufficiently precise to support a GHG mitigation requirement.

As addressed in the Comment Letter, any GHG emission analysis, including that provided in the Draft EIS, is not capable of demonstrating with any degree of certainty that the Project will result in greater GHG emissions than would otherwise occur. Ecology's GHG analysis does not and cannot establish a causal link between the Project and increased GHG emissions from the use overseas of a product that is abundantly available from other global sources. Notably, a different conclusion was reached by a federal agency conducting a similar environmental review using the same econometric techniques, underscoring the speculative and inconsistent nature of this analysis.[17]

The Final EIS must recognize that forecasting global commodity and energy markets is fundamentally speculative, and based upon uncertain futures. The Final EIS should not attempt to predict what is inherently unpredictable, and, at a minimum, must disclose the unpredictable nature of commodity and energy market forecasting. The final EIS should limit its GHG analysis to emissions from the Project itself and related nearby operations as Cowlitz County and the U.S. Army Corps of Engineers have both determined was appropriate for the scope of their

[17] *See* Tongue River Railroad Environmental Impact Statement.

analyses. To the extent Ecology determines that information on GHG emissions from the use of the exported coal should be included in the Draft EIS, that analysis should be provided solely for the purpose of disclosing a range of potential, yet uncertain outcomes. There is no need to re-do the analysis with alternative assumptions, as the Draft EIS already brackets and discloses a very wide range of potential outcomes. Because there is no reliable way to even discern within a reasonable range of certainty whether permitting the Project will result in increased or decreased overall net GHG emissions from coal combustion, there is no basis for conducting additional coal-market and GHG emissions analyses to further refine the guesses provided in the Draft EIS.

Similarly, impacts resulting from train or vessel traffic are also affected by the inherent difficulties with making accurate forecasts of train or vessel traffic over the study period. It is speculative and not reasonably foreseeable to conclude that construction of the Project will cause train or vessel traffic to increase. Rail and vessel traffic naturally ebbs and flows due to a variety of factors, such as future market conditions, competing modal choices, and a diverse set of rail customers with different demands for rail services, etc. As a system, the railroad is designed, permitted, and constructed to operate at capacity, with that capacity managed by its owner/operator, as it has traditionally occurred for decades. Indeed, as the Draft EIS Technical Reports and the Draft EIS noted, these impacts resulting from the rail system operating at capacity will occur with or without the Project, and will be avoided or reduced to below a level of significance through infrastructure improvements or transportation management by the parties who own or operate these transportation systems. Due to the dynamic nature of traffic, no overall increase in rail traffic above historical levels may be attributed to the Project.

While disclosing that there is substantial uncertainty with regard to any forecast for future rail traffic, even using the most current forecasts as to train numbers, the Washington State Rail Plan forecasts that rail capacity will be reached by 2035 *without* this Project. Because these impacts will occur with or without the Project, SEPA requires that they be studied as part of the no-action alternative. An impact wholly associated with a train traffic volume level already predicted and evaluated in Washington should, where logic and fairness apply, be attributed to the No-Action Alternative.

The analysis in the Draft EIS concludes that adding the trains bound for the Project site will result in mainline rail capacity being reached earlier than 2035 and that in itself was determined to be a significant indirect impact. This conclusion is in error, and must be revised. Reaching capacity a few years sooner than the State Rail Plan predicts is not a significant indirect impact. Temporal or timing difference is not a significant adverse impact. The DEIS must disclose that the impact of reaching capacity earlier than 2035 is based upon speculation and that substantial uncertainty exists due to the complexities associated with predicting future rail use due to uncertainties in future rail demand. The Draft EIS should adjust their conclusion to note that adding the trains associated with the Project <u>may</u> result in rail capacity being reached earlier than 2035, but that the timing difference is not a significant indirect impact.

With regard to vessel traffic, a similar analysis applies, as addressed in the Comment Letter. Vessel traffic ebbs and flows, fluctuating with the market, similar to rail traffic. It is speculative to attribute an overall increase in vessel traffic on the Columbia River directly and solely to the Project. Additional overall vessel traffic may result, though overall vessel traffic in the Columbia River could also decline due to factors outside of MBT-Longview's control. The data shows that, if historical shipping levels return with the Project, such levels would be similar to historical levels. The only reasonable conclusion in the Draft EIS should have been that the Project would not cause a probable significant impact to the navigability of the Columbia River, the function of the Columbia River as a system of commerce (both interstate and foreign commerce), or to the capacity of the Columbia River System. Mitigation measures should not be proposed in the Final EIS due to the lack of nexus between the adverse impacts attributable to the Project and the capability of MBT-Longview to control the impacts.

2. No-Action Alternative/Reasonable Alternatives

SEPA also requires that a "no-action alternative" be analyzed in order to distinguish between the significant environmental effects that will be proximately caused by the Project and those impacts that will occur whether or not the Project is permitted. The "no-action" alternative is used to compare baseline effects against the effects of the proposal and its reasonable alternatives.[18] The lead agency is "required to evaluate only the no-action alternative plus other reasonable alternatives for achieving the proposal's objectives on the same site."[19] Reasonable alternatives to the Project are evaluated under the "rule of reason" and considerations of feasibility.[20] For instance, with respect to rail capacity, rail safety, vessel transportation, and vehicle transportation, SEPA analysis requires a description of the baseline conditions, which include both existing conditions and the conditions that will exist in the future based on anticipated growth and development. The baseline conditions can then be compared to the anticipated conditions that will exist if the Project is implemented.

The Draft EIS should have examined those impacts proximately caused by MBT-Longview's Project as compared to impacts that would result whether or not MBT-Longview's Project is approved (i.e., impacts identified in the No-Action Alternative). The Draft EIS did not properly account for anticipated growth in the use of transportation infrastructure and systems in the No Action Alternative in making these comparisons.

Examples within the EIS where the No-Action Alternative failed to account for anticipated growth in the use of transportation infrastructure are addressed in the Comment Letter. Examples are summarized here to put the substantive comments in context with SEPA's legal requirements:

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[18] *See* WAC 197-11-786 and WAC 197-11-440(5)(d).
[19] WAC 197-11-440(5)(d); *Toandos Peninsula Assoc. v. Jefferson County*, 32 Wn. App. 473, 483-484 (1982); accord *Weyerhaeuser v. Pierce County*, 124 Wn.2d 26, 38-39, 873 P.2d 498 (1994).
[20] *Weyerhaeuser*, 124 Wn.2d at 38, 873 P.2d at 504. *See* also, *Citizens Alliance To Protect Our Wetlands v. City of Auburn*, 126 Wn.2d 356, 362, 894 P.2d 1300, 1304 (1995) and *Klickitat Cy. Citizens Against Imported Waste v. Klickitat Cy.*, 122 Wn.2d 619, 633, 860 P.2d 390, 399 (1993).

i. The following are four initial examples of analytic errors in the Draft EIS regarding rail transportation capacity. First, the Draft EIS does not recognize that the rail system in the United States and the State of Washington is managed to serve customers; the owners seek to operate the system at full capacity, irrespective of any specific commodity or demand for access to the railroad system. The very nature of the managed rail system, as recognized by WSDOT in the State Rail Plan, is that there may be capacity constraints, but the system is not physically capable of exceeding capacity. Being at or near capacity is not a significant adverse impact caused by a port facility. Second, the analysis in the Draft EIS assumes a growth in train traffic between 2015 and 2028. It then assigns all of the train trips to the MBT-Longview facility as additional trips not accounted for in the background growth. *See* Table 5.5-5 *Infrastructure Capacity and Projected Rail Traffic* on page 5.5-18 of the Draft EIS. Because the Project is proposing to use only existing rail capacity, the effects of such rail use should be accounted for as part of the No Action Alternative as rail use on the mainline is already authorized and does not identify specific source, destination or commodity. MBT-Longview's proposed facility operation is not the proximate cause of rail impacts or the rail system potentially reaching capacity in the future. Third, the State Rail Plan recognizes that there are multiple factors that contribute to the rail system reaching capacity constraints, none of which can be ascribed to a particular commodity or transportation infrastructure facility. The Draft EIS erroneously seeks to ascribe the rail system reaching capacity constraints in 2028 to the Project. Fourth, as with vessel transportation, the temporal or timing difference between the rail system being projected to reach capacity constraints in 2028 is speculative, and is not a significant impact. The substantial uncertainty of the rail forecast should be disclosed, and the increase in the MBT-Longview facility traffic cannot be considered a significant adverse impact. The Final EIS must correct these errors by affirmatively stating that the rail system reaching capacity constraints is not a probable significant adverse impact caused by the Project. Nor is it something that MBT-Longview can control. The Final EIS should also reflect that the rail system is managed by the owners of the system to assure that its customers' needs are met and that capacity constraints cannot be exceeded.

ii. Similar to the vessel transportation impact analysis in the Draft EIS, increases in vessel traffic on the Columbia River will continue to occur whether or not the Project is permitted. The following are four initial examples of errors in the Draft EIS regarding vessel traffic. First, the Draft EIS estimates that 840 vessels would be loaded and travel the Columbia River per year. The Draft EIS should recognize that this vessel traffic, in addition to existing levels, would be similar to historical traffic levels of shipping on the Columbia River, and that such levels are not a significant adverse impact. Second, under

normal traffic modeling, the projected future growth factor would account for projects, such as MBT-Longview's Project, occurring (thus contributing to the future growth in volume), but the No-Action Alternative in this Draft EIS appears to take the future growth number and double count by adding *all* of the traffic generated by the Project. The result is to over-estimate Project impacts. Third, even with the Draft EIS's failure to properly account for additional trips in the background growth, the only difference between the forecasts in the No-Action Alternative and the Project is that the capacity constraints are to be reached at an earlier point in time. Again, temporal or timing difference is not a significant adverse impact. Fourth, capacity and vessel traffic on the Columbia River is managed to avoid capacity constraints by the Columbia River Pilots. Thus, the system is managed to operate within capacity levels by third parties outside of MBT-Longview's control. The Final EIS must correct these errors by acknowledging substantial uncertainty in its vessel study, that even the high volume modeled scenario does not show a probable significant adverse impact because the river system does not exceed historical capacity constraints, and vessel traffic is not controlled by MBT-Longview. Capacity and vessel traffic on the Columbia River is managed to avoid capacity constraints by the Columbia River Pilots.

3. Cumulative Impacts

"Cumulative impacts" are "the impacts[s] on the environment which result from the incremental impact[s] of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions."[21] If, however, a proposed project is not likely to result in significant direct or indirect impacts, it cannot result in significant cumulative effects. Put otherwise, a cumulative-effects analysis of a particular environmental effect will not serve the purpose of promoting an informed assessment of environmental considerations and policy choices in situations where the underlying direct and indirect effects analysis demonstrated an absence of significant environmental effects. Further, a cumulative impacts analysis lends itself to speculation as the results are affected by a number of independent and uncertain factors that cause any link between the Project and any cumulative impacts to become more distant and remote.

An example of the Draft EIS's errors in considering cumulative impacts is its incorrect statement that the Project "*would*" affect tribal resources as a result of rail traffic "delaying tribal fishers' access to traditional fishing locations and delivery of fish to buyers." Draft EIS at 6-22. In fact, Chapter 3.5-14 concludes that the Project "*could*" affect access to fishing sites due to increased rail traffic. The Draft EIS was careful not to attribute a level of "significance" to impacts on tribal fishing because the co-leads concede that "other factors besides rail operations affect fishing opportunities, such as the number of fishers, fish distribution timing and duration of fish migration periods and seasons." Draft EIS at 3.5-17. The fact that other cumulative actions

[21] 40 C.F.R. §1508.7; WAC 197-11-792(2) (c).

could also affect access to fishing sites does not change the outcome here and allow the co-leads to conclude that cumulative effects to tribal resources *"would"* occur. As demonstrated in Attachment 3 to the Comment Letter,[22] the Project will not result in significant adverse effects on tribal resources. The Draft EIS concluded that the Project *would* contribute to cumulative impacts on tribal resources by aggregating the *de minimis* - to non-existent effects of the Project on tribal resources with potential effects from other projects that the co-leads speculate might impact tribal resources in Zone 6. Draft EIS at 6-22-6-23. The Final EIS should clarify that any impacts to tribal resources from the Project—whether from direct, indirect, or cumulative effects—are not significant. The Final EIS should affirmatively state that this is not a significant adverse impact caused by the Project requiring mitigation or, in the alternative, disclose that substantial uncertainty exists in its conclusion.

4. Ecology's Proposed Mitigation Measures Exceed the Agency's Authority and Limits on Mitigation Measures/Substantive Authority

SEPA provides limited authority to a permitting agency to exercise SEPA substantive authority. Mitigation measures must be "related to specific, adverse environmental impacts," provided the measures are "reasonable and capable of being accomplished."[23] The Draft EIS must evaluate how to avoid or mitigate probable significant adverse environmental impacts caused by the Project that would not otherwise occur under the No-Action Alternative. This effort requires more than merely pointing out an adverse impact that "could" result from a proposed action, as is the case with many of the potential significant adverse impacts identified in the Draft EIS. Where an adverse impact is caused by a proposed action, any proposed mitigation condition must be proportionate to the nature and extent of that specific impact. In addition, the agency must make an individual determination that any proposed permit condition imposed to avoid or mitigate an adverse impact is specifically necessary to address that impact. To the extent the impact and associated mitigation is based on information that is substantially uncertain, it must be disclosed.

As addressed in the Comment Letter, the Draft EIS primarily focused on impacts that are not proximately caused by the Project, or that are fundamentally speculative in nature, is an unprecedented application of SEPA. Ecology's approach to GHG emission analysis fails to apply SEPA in a manner consistent with law, policy or practice. Ecology fails to identify any impact related to climate change that would be caused by the MBT-Longview Project, and is fundamentally speculative in nature. Ecology fails to establish that the impacts of GHG emissions from coal being used in Asia would not occur without the MBT-Longview Project. It was an error for the Draft EIS to propose mitigation measures for speculative indirect impacts that are not caused by the Project. The Final EIS must recognize the limits of SEPA substantive authority, and state that an agency may not exercise SEPA substantive authority in relation to impacts that are speculative and/or are not proximately caused by a project.

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[22] *See* Grette Associates' "Analysis of Population-Level Impacts on Tribal Fish Resources in Zone 6".
[23] WAC 197-11-660.

The U.S. Constitution, including the Takings Clause of the Fifth Amendment, and Federal law[24] prevent Ecology or any other agency from applying its SEPA substantive authority to impose conditions that would discriminate against interstate commerce, burden foreign commerce, [25] or affect the development, infrastructure, or operation of the rail system.[26] In this case, the commerce in question is both among "many of the states" and "with foreign nations," and is, therefore, preempted from state regulation. The Draft EIS's suggestion that SEPA substantive authority could be exercised in relation to the interstate transportation network (rail and river systems of commerce) and mitigation of GHG emissions outside of the Project area imposes a significant burden on interstate and international commerce without the necessary link to the avoidance of specific intrastate impacts, thereby violating the dormant commerce clause.

SEPA requires that any mitigation measures must be reasonable, capable of being accomplished, and reasonably related to the proposal's adverse impacts. [27] With this Draft EIS, Ecology suggests that a regulatory agency could impose mitigation measures (a) without identifying an impact that is caused by a proposed project; (b) on speculative and uncertain impacts; (c) without regard to how the proposed mitigating measures will address such impacts; and (d) without discussing the technical feasibility and economic practicability of performing the mitigation measures. This precedent would have far-reaching implications for a vast array of projects in Washington State, such as transportation infrastructure projects that support domestic and foreign trade in agricultural goods and other products, not to mention the burden placed on small and large city and county agencies throughout the State of Washington.

5. Conclusion-Final EIS

The Final EIS should address the errors associated with the unprecedented expansion of the SEPA impact analysis as discussed herein and in the Comment Letter. The Final EIS should narrow the discussion to those significant adverse impacts that are clearly caused by the Project. The Final EIS must affirmatively state that the rail system and/or the Columbia River's commercial shipping traffic reaching capacity constraints are not probable significant adverse impacts caused by the Project. Nor is the capacity of these systems something that MBT-

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[24] The Surface Transportation Board ("STB") has exclusive jurisdiction with respect to railroad operations under the Interstate Commerce Commission Termination Act ("ICCTA"), specifically 49 U.S.C. § 10501(b).[24] The ICCTA preempts state and local regulation of railway operation.

[25] *Shaffer v. Heitner*, 433 U.S. 186, 199 (1977) ("'[T]he authority of every tribunal is necessarily restricted by the territorial limits of the State in which it is established [.]'" (citation omitted)). "[T]he State may regulate the activities of foreign corporations within the State but it cannot regulate or interfere with what they do outside." *St. Louis Cotton Compress C. v. Arkansas*, 260 U.S. 346, 349 (1922).

[26] *City of Auburn v. Surface Transp. Bd.*, 154 F.3d 1025, 1031 (9th Cir. 1998).

[27] WAC 197-11-660. "Substantive authority and mitigation...(c) Mitigation measures shall be reasonable and capable of being accomplished. (d) Responsibility for implementing mitigation measures may be imposed upon an applicant only to the extent attributable to the identified adverse impacts of its proposal. Voluntary additional mitigation may occur." *West Main Associates v. City of Bellevue,* 49 Wn. App. 513, 742 P.2d 1266 (1987), *rev. denied*, 112 Wn.2d 1009 (1989). *See also Cougar Mountain Associates v. King County,* 111 Wn.2d 742, 765 P.2d 264 (1988).

Longview can control. The No-Action Alternative should properly account for growth in rail, vessel traffic, demolition of the historic buildings and climate change—*as all will occur with or without the Project*. The Final EIS must properly account for anticipated growth in the use of transportation infrastructure and systems in the No Action Alternative in making comparisons between the No Action Alternative and the Project, correcting the Draft EIS errors in this regard. The Final EIS should acknowledge and disclose the substantial inherent uncertainties and speculation associated with commodity forecasts, and the forecasts of future demands for use of the rail and vessel transportation systems. The Final EIS should not attempt to predict what is inherently unpredictable, and at a minimum must disclose the unpredictably nature of commodity and energy market forecasting. The Final EIS should limit its GHG analysis to emissions from the Project itself and related nearby operations. There is no need for the Final EIS to re-do the GHG emissions analysis with alternative assumptions, as the Draft EIS already brackets the range of coal market scenarios, and discloses a very wide range of potential yet uncertain outcomes. The Final EIS should limit the evaluation of SEPA's substantive authority and potential mitigation measures to those direct and indirect impacts specifically caused by the construction and operation of the Project, not the result of the transportation of commodities to or from the site, or the use of commodities shipped through the site.

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ATTACHMENT 2 – TABLE OF CORRECTIONS

Attachment 2: Requested Text Corrections or Revisions

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
Summary	Page S-15, Cultural Resources, third paragraph	The sentence beginning "No archaeological resources…." should be modified to read "No precontact archaeological resources…."	Sentence not accurate as written
Summary	Page S-17, Tribal Resources, Operations	Operations under Tribal Resources: Revise the discussion to discuss increased freight trains in general, not specific to coal trains.	The reference to trains here should not be one specific to coal trains. The impact would occur due to more trains on the track, and this is a normal and expected result of expanding freight by rail, not specifically because of trains carrying coal to the MBT-Longview terminal.
Summary	Page S-17, Tribal Resources, Operations, second paragraph, first line	Replace "would" with "could".	The technical reports do not show or conclude that operation of the Proposed Action would result in impacts on tribal resources. See Attachment 2 *Technical Response Analysis of Population-level Impacts on Tribal Fish Resources in Zone 6* to Comment Letter.
Summary	Page S-17, Tribal Resources, Operations, third paragraph	Rewrite "Coal dust particles from trains related to the Proposed Action would" to "If coal dust particles were to come from trains…"	Modify so consistent with conclusions of coal dust portion, which do not establish dust particles coming from trains sufficient to cause impact.
Summary	Page S-21, Wetlands, Construction, first paragraph, last	The last sentence of the first paragraph should be revised to: "*Implementation of the proposed mitigation (Table S-2) to prepare a comprehensive wetland*	The DEIS states that implementation of proposed mitigation "**would**" compensate for the loss of wetlands that are

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
	sentence	*mitigation plan would ~~could~~ off-set the impact."*	filled completely. In next two sentences discussing partial filling of Wetland Y, the DEIS states that implementation of the proposed mitigation "**could**" off-set the impact. This should be changed to "**would**" to be consistent with previous statement regarding compensatory mitigation.
Summary	Page S-22, Groundwater, Operations, second paragraph	*"Water reused on site would be brought to Washington State Class A Reclaimed Water standards."*	What is the basis for this statement? The Applicant has not specified a need for this standard to be met because the water will be reused within the coal stockpile.
Summary	Page S-25 Fish	Introductory sentence above Construction. Add: *"The study area extends upstream of the project area to River Mile 67."*	The project area extends upstream of the project location to RM 67, which is correctly described in the text of the SEPA Fish Technical Report.
Summary	Page S-27, Wildlife, Construction, third paragraph	We suggest that the proposed mitigation measure to monitor wildlife during dredging and pile driving be removed. *"Implementing proposed mitigation to monitor wildlife for distress during pile-driving and dredging activities (Table S-2), implementing construction best management practices, and complying with permit conditions would minimize dredging impacts."*	We disagree that monitoring for wildlife distress during dredging or pile driving activities would be a necessary or effective mitigation measure. Impacts would be sufficiently minimized through timing restrictions of the work, construction BMPs, and noise mitigation measures.
Summary	Page S-28Wildlife,	We suggest that the proposed mitigation	We disagree that monitoring for

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
	Operation, first full paragraph	measure to monitor wildlife during dredging and pile driving be removed. *"Maintenance dredging could result in impacts on benthic organisms and wildlife as the initial-construction related dredging activities. Impacts would be minimized through implementation of construction best management practices, compliance with permit requirements, and proposed mitigation to monitor wildlife during dredging activities (Table S-2)."*	wildlife distress during maintenance dredging would be a necessary or effective mitigation measure. Impacts would be sufficiently minimized through timing restrictions of the work, construction BMPs, and noise mitigation measures. These other mitigation measures are deemed to be sufficient for other similar dredging projects on the river.
Summary	Page S-30 Rail Safety, Operations	"The predicted accident frequency would increase over baseline conditions in 2028 by approximately 22% in Cowlitz County and Washington State with trains related to the Proposed Action."	This impact is due to more freight trains on the track, not specific to coal trains; more importantly, perhaps, the impact is projected and expected to occur within a period of years afterwards under the No-Action Alternative.
Summary	Page S-34 Noise, Construction, first paragraph	*"The greatest noise levels would result from pile-driving, which could exceed applicable noise-level criteria at one residence near the project area."*	The "applicable" criteria is based on FRA guidelines. Consistent with comment regarding 3.1.1.1 of the Noise & Vibration TR, the FRA standard that is used is not applicable to construction noise from the terminal, it has been arbitrarily applied as there is not regulation in Washington. The analysis is interesting but inappropriate. Washington State maximum

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
			permissible noise level regulations (WAC 173-60-040) do not apply to construction noise during daytime hours (between 7 a.m. and 10 p.m.).
Summary	Page S-35, Air Construction	Clarify language to show that computer modeling was not used to determine compliance with air quality standards. Maximum emissions were compared to operational emissions, and those were modeled (and shown to be compliant).	Statement is misleading, because there was no computer modeling performed for construction impacts.
Summary	Page S-35, Air Operations, third paragraph	Clarify meaning of *"The largest emissions for a single pollutant would be carbon monoxide (69%) and volatile organic compounds (VOCs)(63%)"*, or remove sentence.	This sentence does not make sense. What are these percentages of?
Summary	Page S-36, Coal Dust, first paragraph	Revise sentence to read: "*The movement of the train cars during transit <u>may</u> create vibrations that could break larger pieces of coal into smaller <u>pieces</u>*."	As originally written, this is an unsubstantiated claim and would need to be proven to be referred to here. To have it remain in the text is misleading.
Summary	Page S-35, Coal Dust first paragraph, last sentence.	Rewrite to be less definitive: "Coal dust ~~would~~ <u>may</u> also be generated and dispersed by wind~~s~~ ~~and air currents~~ during coal stockpiling …."	This is not necessarily fact, as controls, including natural controls (rain and coal moisture), would prevent this. No need to use "air current" in here as anything different from wind; the use of "air current" suggests coal dust moving long distances with large air masses, and could imply that a light current could move coal dust around, which is, in fact, highly unlikely.

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
Summary	Page S-36, Coal Dust second paragraph	Add information about the site being part of the study area.	One or both of the study areas needs to include the site, not just the rail lines outside of the site.
Summary	Page S-36, Coal Dust third paragraph	Use correct terminology for PM2.5 and PM10: particulate matter with a mean diameter less than *or equal to* [2.5/10] *micrometers* in diameter.	Consistent with federal definitions. "Micron" is old terminology and no longer correct.
Summary	Page S-36, Coal Dust fourth paragraph	Remove references to "standard" when discussing nuisance. Clarify usage of New Zealand document and any reference concentrations/rates.	The assessment of nuisance is subjective. There are no standards, and referencing a threshold level from another country is inappropriate. In addition, the New Zealand document is a guide, not a standard. The New Zealand materials describe this as a "Good practice guide for assessing and managing the environmental effects of dust emissions" . Furthermore, page 32 of the New Zealand document states: "In some industrial or sparsely populated areas, deposition rates of more than 4 g/m2/30 days may not cause significant nuisance. However, in highly sensitive residential areas deposition rates in the order of 2 g/m2/30 days, above background concentration, may cause nuisance." It is misleading to have the NZ

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
			document represented the way it is here (authors are citing the 2 g/m2/30 day trigger level throughout the report, when it is likely not even applicable to the project study area (industrial and rural).Also, there are British, Australian and IOS standards; provide justification for referring only to the New Zealand case.
Summary	Page S-36, Coal Dust, Operations, second paragraph	Remove discussion of "trigger level for sensitive area".	There is no substantiation in technical report regarding a 'trigger' level or any valid regulatory threshold, and there is no discussion defining 'sensitive' areas or receptors.
Summary	Page S-36, Coal Dust, Operations, second paragraph	Coal Dust: *"The study found the estimated maximum coal dust deposition from coal export terminal operations at and beyond the project area boundary would be 0.31 gram per square meter per month (near Mount Solo Road). This estimated maximum deposition would be below the trigger level for sensitive areas (2.0 grams per square meter per month) used for the analysis. Within a few thousand feet of the project area, the annual deposition of coal dust is estimated to be less than 0.1 gram per square meter per month."* Revise/clarify this conclusion statement. Simplify to discuss that analysis shows potential for coal	This is first mention of "the study" (clarify that this is an analysis of proposed project), and first mention of a specific "trigger level" (see comment above), which makes it seem like an absolute/definitive standard. Make whole statement qualitative and refer to New Zealand (or whichever is eventually used) nuisance guideline level.

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
		dust deposition, but do not quantify, as these results and potential impacts are misleading.	
Summary	Page S-37 Coal Dust, second sub bullet under each of the bulleted headings	Remove/rewrite 2nd sub-bullet in each case.	Do not use inapplicable 'threshold' terminology. References to nuisance should be qualified as subjective.
Summary	Page S-37, Coal Dust BNSF Main Line, Cowlitz County and BNSF< Mainline, Washington State, second sub-bullet under each of the headings	Provide explanation as to why the results change between the County and Washington State,	Provide brief/summary explanation (and details in Coal Dust section and Technical Report).
Summary	Page S-37, Coal Dust, Operations, first paragraph bellow the bulleted items, last sentence	Remove/rewrite sentence to exclude the 'threshold' terminology.	Threshold reference is not applicable; reference is to a foreign guideline for nuisance.
Summary	Page S-41 Cultural Resources	Language should be updated to reflect agreed to language in Section 106 MOA	Section 106 MOA is intended to mitigate for the loss of the Historic District
Summary	Page S-46, Section 3.4, Cultural Resources, MM CR-1	Language should be made consistent with language stated in Section 106 MOA Stipulation: *"Archaeological Monitoring. MBT-Longview does not anticipate excavating into potentially intact sediments, but if they do, the work will be conducted under a monitoring plan/inadvertent discovery plan (IDP) reviewed by the Consulting Parties and approved by the Corps and DAHP prior to ground-disturbing work in the Project*	Section 106 MOA will be the controlling measure

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		area. Prior to approval of the plan, MBT-Longview can coordinate with DAHP and the Corps to determine if proposed ground-disturbing work would require monitoring/IDP on a case-by-case basis (e.g., demolition of a building on 10+ feet of verified fill would not likely require archaeological monitoring).”	
Summary	Page S-46, Section 3.4Cultural Resources	Additional stipulations from agreed upon Section 106 MOA should be added	Text should be updated to reflect status as of time of FEIS
Summary	Page S-46, Section 3.5, Tribal Resources, MM FISH-3	We suggest that the proposed mitigation measure to monitor wildlife during dredging and pile driving be removed. *“MM FISH-3. Monitor Pile-Driving and Dredging Activities for Distress to Fish and Wildlife. See discussion in Section 4.7, Fish, in this table.”*	We disagree that monitoring for wildlife distress during maintenance dredging would be a necessary or effective mitigation measure. Impacts would be sufficiently minimized through timing restrictions of the work, construction BMPs, and noise mitigation measures, as required at other similar dredging projects along the Columbia.
Summary	Page S-51, Section 4.7, Fish, MM FISH-3	We suggest that the proposed mitigation measure to monitor wildlife during dredging and pile driving be removed. *“To minimize the potential harm to marine mammals, diving birds, or fish, a professional biologist will observe the waters near pile-driving and dredging activities for signs of distress from fish and wildlife during these activities.”*	We disagree that monitoring for wildlife distress during pile driving or dredging would be a necessary or effective mitigation measure. Impacts would be sufficiently minimized through timing restrictions of the work, construction BMPs, and noise mitigation measures. [ditto if true]

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	Page S-52, Section 4.8, Wildlife, MM FISH-3	We suggest that the proposed mitigation measure to monitor wildlife during dredging and pile driving be removed. *"MM FISH-3. Monitor Pile-Driving and Dredging Activities for Distress to Fish and Wildlife. See discussion in Section 4.7, Fish, in this table."*	We disagree that monitoring for wildlife distress during pile driving or dredging would be a necessary or effective mitigation measure. Impacts would be sufficiently minimized through timing restrictions of the work, construction BMPs, and noise mitigation measures. [ditto if true]
Summary	Page S-54, Section 5.2, Rail Safety	*"Without improvements to rail infrastructure to improve rail safety, the Proposed Action could result in an unavoidable and significant adverse impact on rail safety."*	The suggestion that coal trains are causational is misleading, suggesting it has something to do with the coal being transported. If the statement about more accidents is true then it is about more trains, not coal trains.
Summary	Page S-54, Section 5.4, Vessel Transportation	*"If an incident such as a collision or allusion occurred, the Proposed Action could result in unavoidable and significant adverse impact on vessel transportation."*	The suggestion that coal ships are causational is misleading, ... If the statement about shipping being compromised is true, then it is about vessels using the river, not coal vessels.
Summary	Page S-57, Section 5.7, Coal Dust	CDUST-4: *"Provide Information to the Columbia River Gorge Commission. To address statewide public interests and concern of coal dust emissions, the Applicant will attend at least one Columbia River Gorge Commission public meeting per year and be available to present information on coal dust emissions and rail traffic related to the Proposed Action and discuss concerns."*	This requirement should be deleted. This is not an issue within the control of the Applicant. Trains and dust in the Gorge are not something the Applicant has information on or manages. This is information held by the railroad.

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Chapter 1 Introduction	No comments		
Chapter 2 Project Objectives, Proposed Action and Alternatives	Page 2-15, Water Systems, second paragraph, last sentence	Revise "*The proposed trestle and docks would have capture and containment measures ~~beneath them~~ and all water…*"	The capture and containment measures are not necessarily beneath the trestle and docks
Chapter 3 Built Environment: Existing Conditions, Project impacts, and Potential Mitigation Measures			
3.1 Land and Shoreline Use	Page 3.1-1, Table 3.1-1	Match Table 3.1-1 to the table in the "SEPA Land and Shoreline Use" Technical Report	Table in Section 3.1 is labeled the same as the table in the Technical Report, but does not match exactly.
3.1 Land and Shoreline Use	Page 3.1-1	Include the City of Longview Comprehensive Plan in Table 3.1-1	This would give a more thorough background and should be included.
3.1 Land and Shoreline Use	Page 3.1-4, Subsection 3.1.4.1	Move Section 3.1.4.1 into Section 3.1.1 Regulatory Setting.	The subsections in 3.1.4.1 discuss the regulations and ordinances for the project area. It is confusing that these paragraphs are contained within the "Existing Conditions" section as they are not describing the land itself but rather the regulatory limitations imposed on it.
3.1 Land and Shoreline Use	Page 3.1-10, Figure 3.1-4	Include a map (or possibly a call-out box on figure 3.1-4) that shows the two single-family residences that are within the 500-foot study area.	The map in Figure 3.1-4 does not show enough detail to highlight where these parcels are located.
3.1 Land and Shoreline Use	Page 3.1-14, Land Use and Shoreline Resources	Modify or clarify language contained in section titled *"Modify Existing Land and Shoreline Uses in the Project Area"*	The lines, *"the Proposed Action would not change the land use character of the project area substantially and […] the land use character of the project area*

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			would remain generally consistent with other land uses in the 500-foot study area," implies that there will be changes (though small), but doesn't give any detail about what those changes will be. Remove words "substantially" and "generally".
3.1 Land and Shoreline Use	Page 3.1-17, Section 3.1.5.2, Subsection "Construction—Direct Impacts"	Include definitive statement about impacts similar to other sections.	This section implies that there would be no impacts, but doesn't actually include a statement saying that. All other sections have a sentence that states directly whether or not there will be impacts (and whether they are temporary).
3.1 Land and Shoreline Use	Page 3.1-17, Section 3.1.5.2, Subsection "Construction—Indirect Impacts"	Include more details and explanation for the finding of no indirect construction impacts.	Refer to the August 2014 URS Resource Report for Land Use and Shoreline Plans and Policies, which states that there will be minor and temporary impacts anticipated adjacent to the property.
3.2 Social and Community Resources	Page 3.2-2	"Information Sources" should include a review of the Vulnerable Populations Emergency Plan for Cowlitz County.	This would add an additional level of depth to the chapter.
3.2 Social and Community Resources	Page 3.2-14	*"An existing sewage treatment system provides sewer service to the project area"*	Should be deleted. The project site will be connected to City sewer.
3.2 Social and Community Resources	Page 3.2-23, paragraph above	Clarify whether the $38,730 annual salary for transportation and material moving occupation in	The previous paragraph mentions that the assumed annual wage in

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	"Generate Tax Revenue"	Cowlitz County includes benefits.	the economic impact analysis was $130,000, including benefits. To make a complete comparison between this number and the lower annual salary for a line of work similar to work from the Proposed Action in Cowlitz County, the EIS should compare numbers that factor in the same things.
3.2 Social and Community Resources	Page 3.2-25, "Affect Accessibility to Community resources and Public Services"	Revise discussion on the impacts caused by train delays during peak traffic hours.	Avoiding significant traffic delays caused by two or more Proposed-Action trains coming through during peak traffic times relies on the assumption that improvements will be made by the owners of the Reynolds Lead and BNSF Spur, but mentions that no plans have been submitted or permitted.
3.3 Aesthetics, Light and Glare	No comments		
3.4 Cultural Resources	Cultural Resources	General Comment - Language should be updated to reflect agreed to language in Section 106 MOA	Section 106 MOA is intended to mitigate for the loss of the Historic District
3.4 Cultural Resources	Page 3.4-8, Ethnographic Context, third paragraph, last sentence	It is requested that the word *"entirely"* be deleted so sentence would read: *"….quarrying of Mount Coffin's volcanic rock gradually reduced the landform in size until it was ~~entirely~~ removed."*	Remnants could exist
3.4 Cultural Resources	Page 3.4-19, 3.4.7.1 Applicant	Language should be made consistent with language stated in Section 106 MOA Stipulation:	Section 106 MOA will be the controlling measure

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	Mitigation, MMCR-1	*"Archaeological Monitoring. MBT-Longview does not anticipate excavating into potentially intact sediments, but if they do, the work will be conducted under a monitoring plan/inadvertent discovery plan (IDP) reviewed by the Consulting Parties and approved by the Corps and DAHP prior to ground-disturbing work in the Project area. Prior to approval of the plan, MBT-Longview can coordinate with DAHP and the Corps to determine if proposed ground-disturbing work would require monitoring/IDP on a case-by-case basis (e.g., demolition of a building on 10+ feet of verified fill would not likely require archaeological monitoring)."*	
3.4 Cultural Resources	Page 3.4-19, MMCR-1	Update language on Unavoidable and Significant Adverse Environmental Impact to reflect completion of Section 106 MOA and the mitigation agreed to for the loss of the Historic District; reducing impacts to less than significant	Text should be updated to reflect status as of time of FEIS
3.4 Cultural Resources	Page 3.4-19, 3.4.7.1 Applicant Mitigation	Additional stipulations from agreed upon Section 106 MOA should be added	Text should be updated to reflect status as of time of FEIS
3.4 Cultural Resources	Page 3.4-16, Section 3.4.8	Language should be updated to reflect agreed to language in Section 106 MOA (same comment as on page S-41 above)	Section 106 MOA is intended to mitigate for the loss of the Historic District
3.5 Tribal Resources	Page 3.5-1, and throughout	Most instances of the word "would" should be changed to "could"	There is not an absolute statement of cause to support the use of would. Eg "3.5.8 Activities related to the Proposed Action would cause physical or behavioral responses in fish"
3.5 Tribal Resources	Page 3.5-4, Figure	Verify the Figure 3.5-4 is accurate in showing the	Figure 3.5-4 shows the Zone 6

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	3.5-1	Zone 6 Treaty Commercial fishery extending below the Bonneville Dam. Edit if needed.	Treaty Commercial fishery extending below the Bonneville.
3.6 Hazardous Materials	Page 3.6-9, Cryolite Recovery Plant	Correct this language: *"the cryolite recovery plant also recovered reusable fluorides compounds call "underflow solids" which were eventually used to control air emissions that occurred during the aluminum manufacturing process"* The correct statement would be: *"the cryolite recovery plant also recovered reusable fluoride compounds called "underflow solids" which were generated from the air emission control systems that occurred during the aluminum manufacturing process."*	Statement is incorrect
3.6 Hazardous Materials	Page 3.6-11, 3.6.4.2 Remediation History	3.6.4.2 "In 2007, Northwest Alloys ~~and the Applicant~~ signed an agreed order with Ecology…" (delete reference to the Applicant)	MBT-Longview (Applicant) did not exist in 2007. Chinook Ventures signed the agreed order with NWA in 2007.
3.6 Hazardous Materials	Page 3.6-19, Caulking and Sealants, third paragraph	The section starting with " Project area preparations would involve preloading…" does not seem to fit in this section Caulking and Sealants.	
3.6 Hazardous Materials	Page 3.6-22, Operations – Direct Impacts, bulleted list	Delete from bullet references to sulfuric acid, calcium hydroxide, and lime	The water treatment ponds are used to settle out sediment. Flocculants would be used. There is a chance that the water distributi8on systems may need the addition of an antiscalant to manage the hardness in the process waters.

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2.6 Hazardous Materials	Page 3.6-22, Operations – Direct Impacts, bulleted list	Delete the bullet: "Chemicals used in the on-site laboratory…"	There is no on-site laboratory as part of the Proposed Action.
3.6 Hazardous Materials	Page 3.6-22, Operations – Direct Impacts, bulleted list	Delete reference to coal handled during operation as a hazardous material.	See substantive comments above in Comment Letter. Coal is not classified as a hazardous material under any definition.
Chapter 4 Natural Environment: Existing Conditions, Project impacts, and Potential Mitigation Measures			
4.1 Geology and Soils	Page 4.1-13, last paragraph	Revise: *"However, imported preload and rail ballast materials would be washed prior to delivery to the project area."*	There is no requirement nor intention on the part of the Applicant to wash ballast and preload materials before delivery.
4.1 Geology and Soils	Page 4.1-15, Ground Shaking	Suggest that the second sentence be changed to read: "*…between 0.4 to 0.5 g, which has a 2% chance of being exceeded in 50 years"*	Current text is missing the time period in reference to the per cent risk
4.2 Surface Water and Floodplains	Page 4.2-4 & 5, Figures 4.2-1 and 4.2-2	"*……. Downstream 1 mile from the project area"*	Figure 4.2.1 and 4.2.2 show the indirect study area extending 2 miles downstream of the project area, not 1 mile as in the text.
4.2 Surface Water and Floodplains	Page 4.2-14, Section 4.2.5.1, second bullet	*"Based on site grading and drainage areas, five water quality ponds (Wetponds) will treat runoff based on Ecology's requirements"*	This needs to be checked against the Water Management Plan. There are not five ponds planned.
4.2 Surface Water and Floodplains	Page 4.2-15, top of the page	*"some surface ponding will occur in both the yard areas and open conveyance systems."*	The open conveyors are designed to drain water not hold water.
4.2 Surface Water and Floodplains	Page 4.2-15, top of the page	*"The piped conveyance systems will be sloped at a 0.50% minimum."*	The proposed conveyance system is not considered a "piped conveyance system."
4.2 Surface Water and Floodplains	Page 4.2-17, Operations – Direct Impacts, Alter	This statement is incorrect *"The Proposed Action would include modifications to the existing stormwater management system to address the*	The statement as written is incorrect.

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	Water Collection and Discharge, first paragraph, last sentence	*anticipated need."* We suggest that this be rewritten: *"The Proposed Action would develop a water management system, including capture of stormwater from the project area, separate from the existing stormwater management system and isolated from it."*	
4.2 Surface Water and Floodplains	Page 4.2-17, Operations – Direct Impacts, Alter Water Collection and Discharge, second paragraph, first sentence	*"The proposed modifications to the water management system would……"* Change this to read "The Project Water Management System would ….."	A new Water Management System would be developed for the project.
4.3 Wetlands	Page4.3-3, Section 4.3.3.1: Information Sources	Second sub-bullet should read: "*Bulk Product Terminal Wetland and Stormwater Ditch Reconnaissance ~~Delineation~~Report–Parcel 10213* (Grette Associates 2014b)".	Bulk Terminal Wetland Report for Parcel 10213 is misidentified.
4.3 Wetlands	Page 4.3-6, Figure 4.3-1 Wetlands in the Study Area	Revise figure to indicate surface water feature along bank of Columbia River in southeast portion of site as "unsurveyed".	The feature in the lower right corner of the figure categorized as Surface/Stormwater Features, was characterized as "unsurveyed" in the Grette report.
4.3 Wetlands	Page 4.3-9, Figure 4.3-4 Wetlands in the Study Area – South	Revise figure to indicate surface water feature along bank of Columbia River in southeast portion of site as "unsurveyed".	The feature in the lower right corner of the figure categorized as Surface/Stormwater Features, was characterized as "unsurveyed" in the Grette report.

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4.3 Wetlands	Page 4.3-10, Table 4.3-2: Wetlands Identified in the Study Area	Revise table. AS1 size should be 8.86 acres, instead of 8.72 acres. Wetland total should be revised to 87.09 acres, instead of 86.95 acres.	Wetland AS1 is reported to be 8.72 acres in size. According to *Bulk Product Terminal Wetland and Stormwater Ditch Reconnaissance Report–Parcel 10213* (Grette Associates 2014b), Wetland AS1 is 8.86 acres in size.
4.3 Wetlands	Page 4.3-11, Section 4.3.4.2 - Scrub-Shrub Wetlands	Area of forested wetlands may be incorrectly calculated.	To calculate the area of forested wetland in Section 4.3.4.1, ICF divided the acreages of wetlands C and NW4 in half, presumably since the wetlands are listed as PEM/PFO and PSS/PFO, respectively. Here, it appears they used a different breakdown. Using the above logic, the total would be 7.46 acres of PSS wetland as opposed to the 5.10 acres reported in the DEIS. Grette Associates did not report a breakdown of wetland classes by acreage. The EIS text needs to identify methods used and remain consistent with the source documents.
4.3 Wetlands	Page 4.3-11, Section 4.3.4.3: Emergent (Herbaceous) Wetlands	Acreage for Emergent Wetland may be incorrectly calculated.	Same comment as above. Unclear how the EIS authors came up with this acreage for Emergent Wetland (73.67 acres) considering several wetlands have more than one Cowardin class. This total

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			also includes the incorrect wetland acreage in Comment above regarding Table 4.3-2.
4.3 Wetlands	Page 4.3-16, Section 4.3.5.1 – Proposed Action, Construction - Indirect Impacts	Coal dust settling on vegetation is identified as an indirect impact in the construction section.	This topic should be addressed in operations rather than construction.
4.3 Wetlands	Page 4.3-18, Section 4.3.7.1 - Applicant Mitigation	*"Any applicant-sponsored mitigation will be consistent with mitigation ratios as stipulated local, state and federal guidance and regulations."*	It is unclear why the DEIS states that the highest wetland mitigation ratio must be used. The process for developing ratios for wetland mitigation is contained in *Wetland Mitigation in Washington State* (Washington State Department of Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10, 2006). This guidance, along with the requirements of the appropriate local, state and federal agencies, are used to develop mitigation ratios for impacts to wetlands. In the subsequent paragraph, the DEIS explains that the mitigation ratios will be developed "consistent with current local, state and federal guidance and regulations". The preceding

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			paragraph should be revised to be consistent with this statement.
4.4 Groundwater	Page 4.4-16, three lines above heading for Construction – Direct Impacts	*"Operational activities that could impact groundwater ~~geology and soils~~ include the following."*	Incorrect reference to geology and soils; should be reference to groundwater
4.5 Water Quality	Global comment on number of piles	*"Removing ~~4,312~~* **4,263** *square feet of river bottom for ~~630~~* **603** *piles used for the proposed docks* **below OHW**.*"*	This is a global edit regarding an incorrectly stated number of piles and associated pile footprint. The current pile numbers are 622 total, 603 of which would be below OHW. This results in removal of 4,263 sq ft of river bottom (Grette Associates, LLC. 2014; Table 1, p. 17).
4.5 Water Quality	Page 4.5-1, end of first sentence	Period missing "…..recreational activities The quality of……..."	typo
4.5 Water Quality	Page 4.5-3, Local Regulations, Statutes, and Guidelines for Water Quality, Table 4.5-1	Missing City of Longview Stormwater Ordinance that is presented in the Technical Report	Establishes methods for controlling the introduction of runoff and pollutants into the municipal storm drain system (MS4) in order to comply with requirements of the Western Washington Phase II Municipal Stormwater NPDES Construction Stormwater General Permit process.
4.5 Water Quality	Page 4.5-14, bulleted list, 5th primary bullet	Starting with the fifth first-level bullet on the page *("Stormwater, sediment and erosion control…),* the list of commitments is not consistent with and significantly more extensive	Need to confirm the list of commitments are consistent with expectations and previous discussions and/or agreements

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		than the list provided in Section 3.1 Impacts of the SEPA Water Quality Technical Report	
4.5 Water Quality	Page 4.5-16, first primary bullet	Add the word pile before extraction *"Where possible, pile extraction equipment…"*	Clarify that it is pile extraction equipment
4.5 Water Quality	Page 4.5-17, fifth primary bullet	5th Bullet: *"Project construction would limit the impact of turbidity"* – clarify if this reference is to pile removal or construction in general Delete 8th bullet: "Project construction would limit the impact of turbidity"	Sentence is repeated as both 5th and 8th bullet
4.5 Water Quality	Page 4.5-18, top of page	The last two bullets under section 4.5.5.1 Proposed Action, have been added to the DEIS text and are not present in the Water Quality Technical Report in the list of potential impacts resulting from the Proposed Action: • *"Operations of 16 trains a day* • *Operations of 70 ships a month"*	Text between the two documents should be made consistent
4.5 Water Quality	Page 4.5–21, Section 4.5.5.1 – Proposed Action, Temporarily Mobilize Pollutants or Increase Turbidity from In-Water Work and Dredging	*"A total of ~~610~~* **603** *of the ~~630~~* **622** *36-inch diameter steel piles required for the trestle and docks would be placed below the ordinary high water mark, permanently removing an area equivalent to 0.10 acre (~~4,312~~* **4,263** *square feet) of river bottom."*	Global pile number and footprint edit (Grette Associates, LLC. 2014; Table 1, p. 17).
4.5 Water Quality	Page 4.5–21, second to last paragraph	The second to last paragraph states that the process of removing the creosote-treated piles could result in the release of chemical contamination and sediment into the surface water. The document does not discuss the potential option of cutting off the piling at the	Suggest that this potential mitigation measure be considered if not discussed earlier and is feasible

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		mud line instead of removal, and whether that option is feasible.	
4.5 Water Quality	Page 4.5-23, Operations – Direct Impacts, Introduce Contaminants from Coal Spills and Coal Dust, first sentence	*"would be 16 trains a day under the Proposed Action. An average of 70 ships a month"* Text should be revised to *"would be 8 trains a day under the Proposed Action. An average of 70 ships a month.*	References are inconsistent. If this discussion is intended to refer to the trains and vessels that are carrying coal, then it would seem it would be 8 trains per day and 70 ships per month. The other 8 trains would be empty and not carrying coal.
4.5 Water Quality	Page 4.5-24, top of page, first paragraph	*"…….would be collected within the stockpile pads (which are impervious), conveyed within an enclosed."*	The reference to impervious is incorrect, elsewhere it is referred to as low permeability, see page 3.6-23 2nd paragraph as an example
4.5 Water Quality	Page 4.5-24, first paragraph, eight lines from the bottom	"surge bin~~d~~s" (delete the d)	typo
4.5 Water Quality	Page 4.5-25, last paragraph	*"The deposition of coal dust could be as high as 1.88 grams per square meter adjacent to the project area."*	Is this an annual deposition?
4.5 Water Quality	Page 4.5-28, Propeller wash	*"….Tankers and cargo vessels…."* – delete reference to tankers	No tankers are included in the Proposed Project
4.5 Water Quality	Page 4.5-31, MM WQ-1	*"MM WQ-1. Locate Spill Response Kits Near Main Construction and Operations Areas"* is included under BMP C154. It is not clear why MM WQ-1 is presented as a separate mitigation measure	Should consider deleting this mitigation measure unless there is a benefit in having it retained in the document
4.6 Vegetation	Page 4.6-17, Rail car unloaders	*"Rail car unloaders will be:* [illegible] *fog and water spray systems."*	Revise – these methods are used for dust control, not cleaning

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4.6 Vegetation	Page 4.6-17, Permanently Remove Vegetation, first sentence	Text should be revised: *"… permanently remove ~~189~~ 26 acres of nonwetland"*	The project area is only 190 acres. This should be 26 acres – see DEIS page 4.6-18, Table 4.6-6
4.6 Vegetation	Page 4.6-18, Table 4.6-6	Impacts to Upland Forested Habitat reported to be: *8.84 acres* Impacts to Upland Scrub-Shrub Habitat reported to be: *2.10 acres* Please review these calculations as they appear to include acres of wetlands, whereas Table 4.6-6 seems to indicate that wetlands are excluded from the total.	Total acres of impact to forested upland habitat are more than double Grette Associates' total. The cause of this discrepancy is unclear; however, it appears that the DEIS author may be reporting total forested habitat, including wetland acreage. In that case, the total would be close to Grette Associates' total. However, Table 4.6-6 seems to indicate that impacts to wetlands are not included in the total.
4.6 Vegetation	Page 4.6-20	"and ~~maintenance~~ control of vegetation under the conveyor"	Vegetation will not be maintained under the conveyor
4.6 Vegetation	Page 4.6-21, Alter Vegetation during Maintenance Activities,, first paragraph	*"Trees and tall shrubs around the conveyor to the shiploaders on Docks 2 and 3 would likely be regularly trimmed or removed, slightly reducing organic material delivered to the river, shade the upper beach and shoreline, and native foraging, resting, and perching opportunities to for passerine birds. The 45- to 50-foot-wide area that would be affected is small relative to the approximately 5,000 linear feet of vegetated shoreline in the project area."*	This should be deleted. There are no trees or tall shrubs currently nor planned for the location around the conveyor.
4.6 Vegetation	Page 4.6-21, Deposit Coal Dust	Why is coal dust singled out?	The discussion of coal dust on vegetation could apply to all

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	on Vegetation		forms of dust, why is coal singled out? There should be a mention of rail washing the leaves clean or any coal dust for the majority of the year, which will reduce impacts.
4.6 Vegetation	Page 4.6-24, Spill Coal during Rail Transport, last two lines	*"In Cowlitz County, the predicted number of loaded coal train incidents is approximately one every 2 years. The predicted number of loaded coal train incidents within Washington State is approximately five"*	Why is coal separated out from other commodities? What makes a coal train more likely to have an incident than another train?
4.7 Fish	Global comment on number of piles	*"Removing ~~4,312~~* **4,263** *square feet of habitat from the river bottom of the Columbia River to install ~~630~~* **603** *piles for the new docks."*	Global pile number and footprint edit (Grette Associates, LLC. 2014; Table 1, p. 17).
4.7 Fish	Page 4.7-3, Figure 4.7-1: Fish direct study area	Revise the figure to show the upstream portion of the project area to RM 67.	The upstream project area should go to RM 67, which is correctly described in the text of the SEPA fish report.
4.7 Fish	Page 4.7-5, Section 4.7.3.1 – Information Sources	Add the following document to the list: Grette Associates, LLC. 2014. *Millennium Coal Export Terminal Longview, Washington: Docks 2 and 3 and Associated Trestle: Indirect Effects of Structures and Site Operations*. September 2014. Wenatchee, WA. Prepared for Millennium Bulk Terminals—Longview, LLC, Longview, WA.	This document was not included.
4.7 Fish	Page 4.7-6, Section 4.7.3.2 – Impact Analysis, Assessing Noise Impacts	Strike paragraph 1, sentence 2.	It is not correct to indicate a range with different reference values (150 dB_{RMS} to 206 dB_{peak}, inclusive of 183/187 dB_{SELcum}). The table is correct for

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			thresholds.:
4.7 Fish	Page 4.7-8, Table 4.7-3	Suggest revising the definition for TSS to: Temporary loss of hearing sensitivity (Popper et al. 2014) Citation for inclusion: Popper, A.N., Hawkins, A.D., Fay, R.R., Mann, D., Bartol, S., Carlson, T., Coombs, S., Ellison, W.T., Gentry, R., Halvorsen, M.B., Løkkeborg, S., Rogers, P., Southall, B.L., Zeddies, D., Tavolga, W.N. (2014) Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. ASA S3/SC1.4 TR-2014. Springer and ASA Press, Cham, Switzerland.	The definition for TTS should be changed to something that does not indicate injury (temporary or otherwise). (e.g., Popper et al. 2014). Note: Popper et al. 2014 not cited in the DEIS or included in the references section.
4.7 Fish	Page 4.7-8, Section 4.7.4 – Existing Conditions	For consistency, please revise this section to adopt the definition for the Columbia River estuary as described below. Language from the Grette 2014a below for reference: Bottom et al. (2005) describe the entire lower Columbia River from its mouth to the base of Bonneville Dam (RM 146) as the Columbia River estuary, further defining four estuarine gradients within it. The tidal freshwater or fluvial region of the estuary extends from Bonneville Dam down to approximately RM 34 (RKm 55). Farther downstream are the brackish-mesohaline region between approximately RM 19 and 34 (RKm 30 and 55), the euryhaline region between approximately the mouth of the Columbia River	The last paragraph in this section describes the Columbia River estuary as being downstream of the project area. The supporting documents (e.g., Grette 2014a) use the definition of estuary (Bonneville Dam to mouth of the Columbia River) with four estuarine gradients adopted from Bottom et al. 2005.

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		and RM 19 (RKm 30), and the Columbia River plume which extends into the surface water beyond the mouth of the Columbia River. The Project area is located the tidal freshwater region.	
4.7 Fish	Page 4.7-9, Figure 4.7-3 and Page 4.7-10, Section 4.7.4.1 – Aquatic Habitat Types	Suggest revising the document to express depths relative to CRD datum for consistency.	This is the first example of a global comment regarding depths for habitat zones. The supporting/source documents (Grette 2014a - f) use the CRD datum for all depths (e.g., -20 ft CRD). The narrative in the DEIS uses an absolute depth (e.g., 31 feet deep). While it appears this is depth relative to OHW, it is confusing. Further, water levels in this area are highly variable due to season and daily factors (e.g., tides).
4.7 Fish	Page 4.7-10, Section 4.7.4.1 – Aquatic Habitat Types, Active Channel Margin	Revise the second sentence as follows: *"The ACM near the proposed docks covers approximately 25 acres and extends from 25 to 350 feet offshore with a maximum depth of about 11 feet* **below OHW***."*	The upper limit of ACM habitat is defined by the Ordinary High Water (OHW) mark, which is defined as +11.1 ft CRD. It is somewhat misleading and confusing to define the SCM by "depth", as this is highly variable and relative to water levels. Tying this depth to the CRD datum—either the OHW elevation or 0 ft CRD—would be clarifying.
4.7 Fish	Page 4.7-11, Section	Revise the narrative and Table 4.7-4 to be	Table 4.7-4 is confusing because

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	4.7.4.2 – Focus Fish Species, Salmon and Trout and Page 4.7-12, Figure 4.7-4	consistent with the impact discussion in the SEPA Fish Technical Report. Table 7 and narrative used for the impact discussion (Section 3.1.1.1) in the SEPA Fish Technical Report is much more consistent with the information in the source documents.	it combines adults, juvenile fish, yearlings, and subyearlings (see Table 7 for comparison) but distinguishes among the habitat type (ACM, SMZ, DMZ). Also, it is not consistent with the information from the source document (assumed to be Grette 2014b). For example, coho could be present in the DWZ in the winter and summer. Finally, for many fish ESUs, this table appears to add habitat use in the SMZ which was not included in the summary tables in the source documents. This is not necessarily supported in narrative citations. Roegner and Sobocinski 2008, which is cited on page 4.7-11, did not demonstrate abundant steelhead in beach seine or purse seine data (see slide 7 in Roegner and Sobocinski 2008).
4.7 Fish	Page 4.7-15, Section 4.7.4.2 – Focus Fish Species, Bull Trout	Suggest revising to focus on infrequent use in DMZ by bull trout.	Narrative indicates that, in addition to the potential DMZ use (infrequent, very low numbers) by adult bull trout, that the ACM and SWZ could be used as shallow water rearing areas by subadult bull trout. Unlike

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			subyearling and yearling salmonids, which are smaller and likely to rely on shallow waters, bull trout (infrequently present) in the Columbia River are not likely to be present in these areas. While it is possible, based on the general lack of bull trout observed in beach and purse seine data, it is probably not appropriate to characterize them as regularly using or likely to use these areas.
4.7 Fish	Page 4.7-15, Section 4.7.4.2 – Focus Fish Species, Eulachon	*"WDFW and ODFW conducted plankton tows to sample for eulachon eggs and larvae in the water column at an index site at about RM 34 (Report A in Mallette 2014).* ~~*Recent studies have documented egg and larvael stage eulachon between the Port of Longview above Barlow Point and the channel below the Cowlitz River mouth, including four sample sites offshore of the Project Area (Mallette 2014).*~~ *Peak larval abundance occurred in mid-March during two of the three survey years and from late April to early May in the third year. As part of a related one-time sampling effort, eulachon eggs/larvae were documented in plankton tows at six sample sites (inshore and offshore) near the proposed Project between RM 62.8 to 64.0 in February 2012 (Report B in Mallette 2014)."*	Paragraph 2, sentence 1 acknowledges documented egg and larvae eulachon presence near the proposed project (see Table 1 in Report B of Mallette 2014). Plankton tow samples documented presence of eulachon "egg/larvae = yes" in all plankton tows, which were taken on a single day (2/10/12). The next sentence, relates to data from Report A of Mallette 2014, which is for peak larval abundance over three survey years at a WDFW index site further downstream, and is a broader measure of larval downstream transport timing for

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			the lower Columbia River and many tributaries.
4.7 Fish	Page 4.7-18, Section 4.7.4.2 – Focus Fish, Water Quality Conditions	*"Turbidity in the study area is variable based on a number of factors. For example, over five days of water quality monitoring for dredging, background levels (upstream from active dredging) ranged ~~consistently ranges~~ from ~~29 to 67~~ the mid-20s to the mid-60s nephelometric turbidity units (NTUs) at all depths (US Army corps of Engineers Dredged Material Management Office 2010 in Grette 2014c)."*	Sentence 6, re. turbidity levels. These turbidity levels appear to be based on the background levels observed during water quality monitoring in December 2011 and January 2012 during dredging. Although these levels are representative of the background levels observed, they are from a brief period during a single season.
4.7 Fish	Page 4.7-22, Section 4.7.5.1 – Proposed Action, Temporarily Alter and Permanently Remove Aquatic Habitat	*"A total of ~~610~~* **603***, 36-inch-diameter steel piles would be placed in-water, permanently removing 0.10 acre (~~4,312~~* **4,263** *square feet) of benthic habitat."*	Global pile number and footprint edit (Grette Associates, LLC. 2014; Table 1, p. 17).
4.7 Fish	Page 4.7-23, Section 4.7.5.1 – Proposed Action, Cause Physical or Behavioral Responses from Elevated Turbidity during Pile Driving and Dredge Disposal	Paragraph 1 – strike sentence 2 (not part of this section).	The temporal discussion of deepening the project area is addressed in the previous section and does not belong in the Section pertaining to turbidity.
4.7 Fish	Page 4.7-23, Section 4.7.5.1 – Proposed	*"Installation of ~~610~~* **603** *structural steel piles to support* **the trestle and** *Docks 2 and 3 would*	Global pile number and footprint edit (Grette Associates, LLC. 2014;

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	Action, Cause Physical or Behavioral Responses to Underwater Noise during Pile Driving	*generate underwater noise during pile-driving (Grette Associates 2014b)."*	Table 1, p. 17). This pile number is reflective of the entire structure (e.g. trestle, Dock 2, and Dock 3) rather than only Docks 2 and 3.
4.7 Fish	Page 4.7-25, Table 4.7-7	Suggest replacing Table 4.7-7 with Table 7 from the SEPA Fish Technical Report. Also, suggest removing eulachon from the table and addressing them in the narrative.	Table 4.7-7 is confusing because it re-organizes the information layout, combines factors (e.g., shallow water subyearling vs. subyearling, shallow water), and does not correspond to Table 7 which is used for the detailed impact discussion in the SEPA Fish Technical Report.
4.7 Fish	Page 4.7-29, Section 4.7.5.1 – Proposed Action, Operations – Direct Impacts, Cause Physical or Behavioral Response to Vessel Noise	*"Source sound levels of bulk carrier vessels were measured in Puget Sound at between 187.9 and 198.2 dB re 1uPA at 1 meter when vessels were travelling between 9.0 and 11.0 knots (Hemmera Environchem et al. 2014)"*	Page 3-12 Cites bulk carrier vessel source sounds in Puget Sound. These values have little meaning if not referenced to dB_{peak} or dB_{RMS}. Without that context they cannot reasonably be compared to the behavioral threshold (150 dB_{RMS}).
4.7 Fish	Page 4.7-34, Section 4.7.5.1 – Proposed Action, Operations – Indirect Impacts, Spill Coal Dust During Rail Transport	*"In summary, spilled coal fugitive coal dust from project operations is not expected to increase…"*	Paragraph 1 (last in this section) is summarizing the discussion about spilled coal, not fugitive coal dust.
4.7 Fish	Page 4.7-34, Section	*"If ~~A~~adult fish targeted in commercial and*	Paragraph 1 posits that increased

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	4.7.5.1 – Proposed Action, Operations – Indirect Impacts, Affect Commercial and Recreational Fishing	*recreational fishing were to alter behavior in response to ~~would likely migrate outside of the navigation channel to avoid~~ increased underwater noise ~~levels~~, they could avoid the navigation lanes or migrate quickly through them. Commercial and recreational fishing vessels would not likely be fishing in the navigation channel when large vessels are present. Therefore, the Proposed Action would be unlikely to significantly reduce commercial or recreational fishing catches or limit access for fishing activities."*	vessel traffic could cause behavioral responses in fish (presumably from disturbance associated with increased noise and vessel movement), and that adult fish would likely migrate outside of the navigation channel to avoid increased noise. This is too strong of a statement which is not supported by our understanding of fish behavioral responses to increased underwater sound or the actual levels and extents of underwater sound associated with vessel traffic. It is possible that such a response could happen in some cases. In either case, the conclusion of unlikely to significantly reduce commercial or recreational fishing catches is correct, but the distinction regarding certainty of effect is important.
4.8 Wildlife	Page 4.8-6, Section 4.8.3.3 – Impact Analysis, Assessing Noise Impacts	Suggest using the 0.5 mile buffer around the project site for this analysis.	Overall, this section would benefit from clarity regarding area considered – for noise impacts it seems it should be the 0.5 mile "buffer" around the project site.
4.8 Wildlife	Page 4.8-8, Section	*"Undeveloped areas are relatively small and*	While these patches of habitat

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	4.8.4.1 – Terrestrial Habitat	*fragmented. Patches of potentially suitable habitat could support foraging and cover for small to large mammals, foraging and nesting for a variety of birds, and foraging, breeding, and nesting for amphibians.* **However, as these constitute a small percentage of the site, their habitat value is very limited.***"*	could potentially support the species described, their small cumulative acreage, combined with their fragmented distribution, severely limit their habitat value. Please add the sentence noted.
4.8 Wildlife	Page 4.8-16, Section 4.8.5.1 – Proposed Action	Suggest removing the summary list entirely and relying instead on narrative and conclusions in full context.	Including vessel strikes and underwater vessel noise impacts on marine mammals (and diving birds for noise) in the summary list overstates the conclusions, which are low risk and minimal response, respectively.
4.8 Wildlife	Pages 4.8-18, Section 4.8.5.1 – Proposed Action, Construction – Direct Impacts, Cause Temporary Displacement or Mortality	The section on the displacement/mortality should be reconsidered.	This appears to address the area which will be permanently removed. There are no temporary impacts – once it's been removed the displacement is permanent.
4.8 Wildlife	Page 4.8-19, Section 4.8.5.1 – Proposed Action, Temporarily Alter or Permanently Remove Aquatic Habitat	*"Construction of the Proposed Action would result in the alteration or permanent loss of approximately 59 acres of aquatic habitat in the aquatic study area. Dredging to provide vessel access to Docks 2 and 3 would* **temporarily** *alter approximately 48 acres of benthic deepwater habitat and construction would result in the permanent loss of approximately 11 acres of aquatic habitat (ditches and ponds) throughout*	While it is technically true that 59 acres aquatic habitat would be altered or permanently lost, through its lack of precision this statement obscures the short-term nature of the impacts.

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		the terrestrial habitats of the project area."	
4.8 Wildlife	Page 4.8-19, Section 4.8.5.1 – Proposed Action, Temporarily Alter or Permanently Remove Aquatic Habitat	*"The placement of ~~610~~* **603** *piles would permanently alter or remove benthic habitat in the Columbia River. Piles would displace approximately 0.10 acre (~~4,312~~* **4,263** *square feet) of river bottom habitat (7.07 square feet per pile multiplied by ~~610~~* **603** *piles)…"*	Global pile number and footprint edit (Grette Associates, LLC. 2014; Table 1, p. 17).
4.8 Wildlife	Page 4.8-19, Section 4.8.5.1 – Proposed Action, Temporarily Alter or Permanently Remove Aquatic Habitat	*"Construction of these docks would create ~~4.62~~* **5.13** *acres of new overwater surface area…"*	Docks 2 and 3 would cover 4.62 acres, but with the trestle the proposed structure would cover approximately 5.13 acres (Grette Associates, LLC. 2014; Table 1, p. 17).
4.9 Energy and Natural Resources	Page 4.9-1, Section 4.9.1	Include a discussion of building permits, Washington State Energy Code, and the county fire code.	This would add depth to the section.
Chapter 5 Operations: Existing Conditions, Project impacts, and Potential Mitigation Measures			
5.1 Rail Transportation	Page 5.1-4, last paragraph	*"The Applicant assumes a 10% increase in throughput (4 million metric tons of coal per year) from rail car capacity that can be achieved through industry process and technological improvements by 2028."* This is what the applicant actually stated …. The Applicant assumes a 10% increase in throughput (4 million metric tons of coal per year) is possible with rail car capacity increases, through process efficiencies and technological improvements by 2028"	Incorrect as written
5.1 Rail Transportation	Page 5.1-6, Future	*"Rail traffic estimates provided in the Washington*	We take issue with the addition of

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	Rail Traffic, first line	*State Rail Plan do not include the rail traffic for proposed coal or crude oil projects in Washington State. Therefore, Proposed Action-related rail traffic was added to 2028 baseline rail traffic estimates for the purposes of this analysis."*	all Project related trains to the numbers included in the Rail Plan. The Rail Plan contains estimates for the next 19 years, we would think it reasonable that some or all of the additional Project-related 8 trains per day be included in that estimate. Otherwise, this could be double counting of new trains. Note 3 at the bottom of the page says it all: "The rail traffic estimates in the Washington State Rail Plan are based on data collected between 2010 and 2013. Rail traffic is highly dynamic and fluctuates as a result of changing demand. The 2028 rail traffic estimates are intended to provide a "snapshot" of estimated rail traffic volumes; the rail traffic estimates do not represent actual volumes for 2028."
5.1 Rail Transportation	Page 5.1-15, Add Temporary Rail Traffic for Transport of Construction Materials, first line	*"The Applicant proposes that approximately 2.1 million yards of ~~rock~~ suitable material would be needed for Construction"*	Replace "rock" with "suitable material" – fill materials may be other than rock
5.1 Rail Transportation	Page 5.1-17, Add Rail Traffic on the BNSF Main Line in	*"This segment has two main tracks with CTC. Projected 2028 capacity without improvements or operating changes is approximately 80 trains per*	This is an odd conclusion, 81 trains vs approximately 80 trains for a 12 year out estimate is well

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	Cowlitz County, second paragraph,	*day. Projected 2028 volume with Proposed Action-related BNSF trains to and from the Powder River Basin is 81 trains per day; therefore, the projected volume on this segment with Proposed Action-related trains would exceed capacity (80 trains per day).”*	within the accuracy of the estimates
5.1 Rail Transportation	Page 5.1-24, Section 5.1.8 Unavoidable and Significant Adverse Environmental Impacts, last line	*“the Proposed Action could result in a significant adverse environmental impact on rail transportation.”*	This conclusion is unsupported in the preceding section; there is no discussion of how a rail capacity issue results in a significant environmental impact.
5.2 Rail Safety	Page 5.2-2	5.2.3.1 Information sources. In this section an accident is defined by things adding up to $10,500. In the 1st Paragraph of Section 5.2 it is stated “Rail safety for this analysis refers to train derailments and collisions that could lead to a loss of cargo”.	There is an inconsistency in these two statements. Which one is it?
5.2 Rail Safety	Page 5.2-7, Increase the Potential for Train Accidents, first bullet	*“With track improvements to the Reynolds Lead and BNSF Spur (Track Class 2): The predicted number of accidents is 0.25 per year for loaded Proposed Action-related trains, and 0.25 accident per year for empty Proposed Action-related trains. Therefore, 1.0 accident for each type of train (loaded and empty) every 4 years is predicted. Proposed Action– related traffic would increase the predicted accident frequency on the Reynolds Lead and BNSF Spur from 0.11 accidents per year to 0.61 accidents per year for all rail traffic.”*	These statements are inconsistent. Correct the language.
5.2 Rail Safety	Page 5.2-9,	*“Adding the train accidents from the inbound and*	Please clarify or explain why an

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	Statewide Impacts, second paragraph	*outbound trains related to the Proposed Action to the total accident baseline would increase accidents from 50.43 accidents per year to 61.81 accidents per year. This means that within Washington State, the predicted increase in rail traffic accidents related to the Proposed Action is approximately 11.38 accidents per year (an increase of approximately 22% over the baseline)."*	increase of 8 trains or 10% of capacity would cause a 22% increase in accidents.
5.2 Rail Safety	Page 5.2-10, Section 5.2.8 Unavoidable and Significant Adverse Environmental Impacts	Delete the word "in": *"potential train accidents along ~~in~~ the rail routes in Cowlitz County"*	typo
5.3 Vehicle Transportation	Page 5.3-8, Vehicles, last sentence of first paragraph	*"This factor was used to ~~covert~~ <u>convert</u> count data from peak hour."*	typo
5.3 Vehicle Transportation	Page 5.3-11, Railroad Crossing Performance Measures, last bullet	Under vehicle safety impact, there is a 0.04 rate shown in the third bullet	What is the unit for the 0.04, accidents per year?
5.3 Vehicle Transportation	Page 5.3-12, Level of Service, third paragraph below Figure 5.3-3	The third paragraph under Figure 5.3-3. It indicates that the 2000 HCM is being used to calculate a signalized PM peak hour level of service for each affected rail crossing.	This methodology will calculate an average delay for not only automobiles at the crossing, but for the trains also. Since the trains go through the crossings without any delay, was the calculated train delay deleted

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			from methodology at some point?
5.3 Vehicle Transportation	Page 5.3-12, Level of Service, fourth paragraph below Figure 5.3-3	The fourth paragraph under Figure 5.3-3indicates that the 2000 HCM is being used to calculate a signalized daily level of service for each affected rail crossing.	Since the trains go through the crossing without delay, was the calculated train delay deleted from methodology at some point? Since the HCM methodology is based on calculation of an hourly level of service, how was this rectified to get to a daily average delay estimate?
5.3 Vehicle Transportation	Page 5.3-14, second paragraph	2nd paragraph again has a 0.04 rate	What are the units for this rate (again accidents per year)?
5.3 Vehicle Transportation	Page 5.3-24, Average Vehicle Delay	Under Average Vehicle Delay, the text indicates that all study area crossings operate at LOS A in 2018	This does not appear to be the case in Table 5.3-5. Please clarify as to which is correct.
5.3 Vehicle Transportation	Page 5.3-24, Table 5.3-5	Table 5.3-5 level of service	Some of the levels of service in Table 5.3-5 don't appear to match what is in the attached Synchro worksheets. Is this because the calculated rail delay was removed from the level of service calculation? The analysis worksheets should be checked against the referenced tables.
5.4 Vessel Transportation	Page 5.4-5, fourth primary bullet	*"Increased risks of bunker oil spills were addressed."*	Why mention bunkering risk when it is not part of our proposed action?
5.4 Vessel Transportation	Page 5.4-35, Operation – Direct Impacts, second paragraph	*"Vessel loading would be performed using an electric-powered, single-traveling shiploader installed on Docks 2 and 3."* Should state: " Vessel loading would be performed using an	Each dock will have one shiploader. Text as written could be misinterpreted as having one traveling shiploader total.

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		electric-powered shiploader. Each dock will have one shiploader."	
5.4 Vessel Transportation	Page 5.4-36, footnote 33 at bottom of page	"[33] *Currents in the river at the project area are typically directed downriver or ebbing due to the river flow overriding the tidal currents. It is more efficient and safer to dock the ship heading into the current using the forward power of the engines which is stronger than the vessel's backing power. When the loaded vessel leaves the dock with the bow pointing upstream, the currents assist the vessel turning in the channel by pushing the bow around and downstream."*	This matter is under discussion with the Pilots and the Pilots have expressed a preference for the bow to be upstream. This is an unresolved matter and should not be presented here as definitive.
5.5 Noise and Vibration	Page 5.5-17, Section 5.5.5.1	"*Construction of the Proposed Action would result in the following direct impacts. These impacts would occur during the construction period in 2018.* • *Exceed Federal Railroad Administration Construction Noise Criteria* *Construction of the Proposed Action would result in noise levels exceeding FRA criteria at one residence (104 Bradford Place). This residence is the noise-sensitive receptor that is closest to the project area. The noise impact is predicted to occur only during pile driving when the maximum noise level is predicted to reach 83 dBA, exceeding the FRA criteria of 80 dBA for construction."*	(below duplicated from comment on Section 3.1.1.1 of the Noise & Vibration TR): The FRA standard that is used is not applicable to construction noise from the terminal, it has been arbitrarily applied as there is not regulation in Washington. The analysis is interesting but inappropriate. Washington State maximum permissible noise level regulations (WAC 173-60-040) do not apply to construction noise during daytime hours (between 7 a.m. and 10 p.m.).
5.5 Noise and Vibration	Page 5.5-31, MM NV-2, last line	" *the Applicant will fund all improvements."*	MBT-Longview has voluntarily proposed to fund additional

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		Change to: "the Applicant will fund additional electronics, barricades and crossing gates"	electronics, barricades and crossing gates to convert the railroad crossings to quiet crossings at Oregon Way and Industrial Way
5.5 Noise and Vibration	Page 5.5-31, MM NV-3, second line	"severe ~~and~~ impacts" (delete "and")	typo
5.6 Air Quality	Overall	Revise language to use more appropriate terminology for air emissions	Several instance of terminology that indicates author not air quality expert ('strength of emissions', 'freshly emitted').
5.6 Air Quality	Overall	Organize and provide more detail in calculations and assumptions.	Unable to thoroughly review findings (emissions/impacts). Authors used original URS spreadsheets (without reference), and made changes. Several references unclear or incorrect. We only received pdf version, so cannot follow links for calculations or review internal notes.
5.6 Air Quality	Page 5.6-3, Table 5.6-2	Remove Annual and 24-hour average SO2 standards for State.	These two standards are not applicable to this area (sunsetted).
5.6 Air Quality	Page 5.6-4, Section 5.6.1.2	Rewrite paragraph to more accurately describe Ecology's TAP program. Correct discussion about coal dust as TAP; include with general statement of TAP quantification for all sources with the speculative statements about coal dust.	This whole paragraph is misleading, and implies that all sources need to go through the entire TAP review process (including BACT). There are other TAP sources not mentioned (distillate combustions has TAP

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			emissions), and the comments about the 'possibility' of TAPs within coal dust is too far-reaching to include in this regulatory section.
5.6 Air Quality	Page 5.6-4, Section 5.6.2	Remove references to Direct and Indirect emissions/impacts. The sentence "Emissions are aggregated and regulated at a larger scale than a localized study, and therefore direct and indirect emissions are combined" should be removed altogether.	The split of Direct and Indirect impacts is not correctly applied to a Study Area. There is no scale factor for regulating these sources. Paragraph doesn't make sense and doesn't clearly define actual study areas for this report.
5.6 Air Quality	Page 5.6-4, Section 5.6.3.1	Make this a general list of sources (EPA, URS CET reports, Ecology, etc…) instead of a partial bibliography.	Besides being an incomplete list (eg, citing only Appendix L from the URS Air Quality report, instead of all parts, including all other appendices that are used directly and without reference), there are 2 repeated sources in this list. Make it more general and refer to complete references in Tech Report.
5.6 Air Quality	Page 5.6-5, Section 5.6.3.2, second paragraph	Correct PM2.5/10 definitions (… less than *or equal to* 2.5/10 micrometers in diameter…). Remove the 2 sentences about VOCs/HAPs.	Consistent with federal definitions. Make similar corrections throughout report (in several tables). See comments about this in Tech Report; there is no detailed identification of VOCs/HAPs in those appendices (as stated in Report), and this is just adding

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			concern over these HAPs which are extremely minor for this project. DPM is a TAP; that is the TAP to mention here.
5.6 Air Quality	Page 5.6-6, Section 5.6.3.2, Construction, last sentence	Remove "and model".	Construction emissions were calculated, but not 'modeled', which implies that they were modeled to assess impacts.
5.6 Air Quality	Page 5.6-7, Section 5.6.3.2, Coal Storage and Handling, last sentence	Remove last sentence.	Refer to comments regarding this reduced control efficiency in the Technical Report. The only basis for this reduction is a recent permit in Oregon. The current permit at the Millennium facility includes the 99% control efficiency for enclosure plus water fogging system (the 99% dust control measures are used *in place* of a negative pressure system).The information about negative pressure is too detailed here, and belongs in the Tech Report, if at all.
5.6 Air Quality	Page 5.6-7, Section 5.6.3.2, Vessel	Change heading to "Vessels", add 'marine' qualifier within text. Remove detail on operation schedule and numbers.	More than one vessel; note type of vessel (marine). Inconsistent with other sections that do not include this level of detail. These schedule details belong in Tech Report where they can be sufficiently explained.
5.6 Air Quality	Page 5.6-9, Section	Add qualifier on air quality concerns in Columbia	The visibility and regional haze

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	5.6.4.2, Air Quality along Transportation Routes, Rail Traffic, second paragraph	Gorge.	issues in the Gorge are documented as effects of Boardman power plant (reference ODEQ/SWCAA study). Discussions of other area concerns include in this section mention sources. These are not train-related sources.
5.6 Air Quality	Page 5.6-10, Section 5.6.5.1, Proposed Action, first paragraph	Clarify study area and impacts. Also clarify that 'impacts' are not addressed quantitatively for Construction; only emissions were evaluated.	Stating that they are aggregating/combining/regulating the direct/indirect impacts like this does not make sense. Simplify this to show breakdown of impacts for local and regional scales. (See comment above Page 5.6-4, Section 5.6.2.) This clarification needs to follow throughout this section; there is no mention of direct/indirect breakout in construction or operation.
5.6 Air Quality	Page 5.6-10, Section 5.6.5.1, Proposed Action, Construction, second paragraph	Either provide description of or remove Maximum Daily emissions.	Explain purpose of showing maximum daily emissions. How were these determined?
5.6 Air Quality	Pages 5.6-10-11, Section 5.6.5.1, Proposed Action, Construction, third paragraph and	Remove references to general conformity and de minimis levels, or make very clear (within text and table) that this is not subject to federal conformity rule.	General Conformity is not applicable to this project.

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	Table 5.6-3		
5.6 Air Quality	Pages 5.6-11-12, Tables 5.6-3 and 5.6-4	Define Project and Study areas (preferably prior to tables). Clarify sources associated with emissions.	Confusing breakout of sources and areas. These should be presented more clearly. Values in tables not thoroughly checked; hard to follow source/activity inclusion.
5.6 Air Quality	Page 5.6-13, Section 5.6.5.1, Proposed Action, Operations and Table 5.6-5	Same comment(s) as above (Pages 5.6-11-12, Tables 5.6-3 and 5.6-4)	As with construction section, confusing breakout of sources and areas. These should be presented more clearly. Values in tables not thoroughly checked; hard to follow source/activity inclusion.
5.6 Air Quality	Page 5.6-14, Section 5.6.5.1, Proposed Action, Operations, Impact Assessment, first paragraph, fifth sentence	Correct description of short-term emissions.	Not clear how short-term emissions were determined. Peak 1-hour and 24-hour rates are not necessarily the same, depending on source.
5.6 Air Quality	Page 5.6-14, Section 5.6.5.1, Proposed Action, Operations, Impact Assessment, second paragraph, last sentence	Provide more accurate summary of impacts and concentrations.	Meaningless to compare impact (without background) to NAAQS. Should provide better description of analysis results for all pollutants.
5.6 Air Quality	Page 5.6-18, Section 5.6.5.1, Washington State, first sentence	Correct sentence: "…are shown <u>in</u> Table 5.6-10" (add "in" before Table)	typo
5.6 Air Quality	Page 5.6-19, Section 5.6.5.1, Proposed Action, Sulfur	Introduce sulfate (deposition) before discussing (2nd paragraph). Add reference point for mercury deposition.	This is first, and only, mention of sulfates. Define sulfates in previous paragraph. Or remove

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	Dioxide and Mercury Emissions		paragraph, and keep this level of detail in the technical report and appendix. Describe potential effects of this mercury deposition; the number alone is not meaningful (high? low? acceptable?)
5.6 Air Quality	Page 5.6-20, Section 5.6.5.2, No-Action Alternative, last paragraph, second sentence.	Remove reference to de minimis levels.	See comment above (Pages 5.6-10-11); General Conformity de minimis levels do not apply to this project.
5.7 Coal Dust	Page 5.7-1	*"The vibration of the train during transit can break larger pieces of coal into smaller particles, creating more dust."* Revise sentence to read: "*The movement of the train cars during transit <u>may</u> create vibrations that could break larger pieces of coal into smaller <u>pieces</u>.*"	This statement needs to be substantiated, where is the study that measures this. If it can't be substantiated it needs to be deleted as misleading
5.7 Coal Dust	Page 5.7-2, first [t] paragraph	Use correct terminology for PM2.5 and PM10: particulate matter with a mean diameter less than *or equal to* [2.5/10] *micrometers* in diameter.	Consistent with federal definitions. "Micron" is old terminology and no longer correct.
5.7 Coal Dust	Page 5.7-2, second and third paragraphs	Remove sentence regarding NZ study as "most commonly cited". Combine these two paragraphs as examples of studies.	Number of citations is irrelevant; it does not make this study more valid. It is okay to describe these studies, but need to give them equal weight here, and not represent NZ 'thresholds' as better than Canadian ones. Also

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			need to stress that nuisance levels are subjective, and these values are used more as benchmarks than thresholds, or trigger/acceptable/maximum levels, as described throughout text.
5.7 Coal Dust	Page 5.7-4, Section 5.7.3.2 Impact Analysis, last paragraph	Explain what the "emissions rates" are that were adjusted.	First time mentioning emission rates, and we don't know what these are or where they came from. Instead, just saying how they were adjusted.
5.7 Coal Dust	Page 5.7-5, Direct Impacts, Table 5.7-2	Add reference to table. Correct values, as needed.	Reference appropriate Air Quality Tech Report appendices. Value for Ship Transfer and Conveyors uses lower control than proposed, making this emission rate 5 times higher than expected (see comments on Air Quality Tech Report). Value for Train Unloading is from original URS air quality appendix; update with ICF # (numbers have changed due to other changes made by ICF regarding train operations and characteristics).
5.7 Coal Dust	Page 5.7-5, Direct Impacts, second paragraph below Table 5.7-2	Remove the additional conservative factor (95%) for dust control, returning it back to 99%, consistent with the existing permit at the site.	The current facility permit was modified in 2014 to include a retrofit of coal handling areas with fogging systems. A control efficiency of 99% for enclosure

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			plus fogging was based on vendor information, and was approved by SWCAA during permitting. There is no basis for applying the lower control efficiency due to one draft permit from Oregon DEQ, as stated.
5.7 Coal Dust	Page 5.7-5, Direct Impacts, third paragraph below Table 5.7-2	Information here is misleading. Simplify, stating that data from other mines was used, and reference the technical report. Cannot say that analysis used "data from comparable mines".	Based on the technical report, although data from 11 mines was reviewed, the only 'comparing' done was that they used the "coal type with the highest near-field deposition" for this DEIS.
5.7 Coal Dust	Page 5.7-5, Direct Impacts, last paragraph	Remove paragraph. "*The U.S. Geological Survey is preparing a study that identifies methods for determining potential impacts on aquatic resources from coal dust exposure. The study, not yet published, uses two locations along rail lines in the Columbia River in Washington State as examples. The study will consider diet and other pathways of exposure and also compare results to levels of concern determined in previous studies. While not available for consideration for this Draft EIS, it is anticipated that the published study will be considered for the Final EIS."*	This information is not relevant to air quality. If there is an impact, it should be discussed within the appropriate element such as water quality or vegetation. If methods from this study are relevant to air quality evaluations, that would be only consideration for using it in the coal dust assessment, but citing this study here only adds unnecessary public concern and adds nothing to this section of the DEIS.
5.7 Coal Dust	Page 5.7-6, Indirect Impacts, fourth paragraph, first sentence	Remove *"…. , provided a representative sample"*, or provide more detail that this is representative of worst-case conditions.	This data is only representative of specific climate condition (dry season; at the end of approximately 4 months with

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			little precipitation); the study was purposefully done to collect coal dust, not to measure whether it occurs or not, or under varying (normal) conditions.
5.7 Coal Dust	Page 5.7-8, Indirect Impacts	Summarize these paragraphs, and make clear that 2014 coal train dust study was used along with conservative Australian coal data to develop emissions for analysis of impacts.	Details of the study (and the study itself) are included in the Technical Report. In this chapter, author should just state how this study was used to ground-truth and adjust emission factors. Showing various equations and random justifications for rail car assumptions is misleading and leads to misinformation when readers do not understand the technical background.
5.7 Coal Dust	Page 5.7-9, Section 5.7.4.1 Introduction to Coal Dust, first paragraph	Add agricultural and ground work (construction) to sources of particulates. Note that these examples are not exhaustive lists of natural or anthropogenic sources. Replace *"smoke from power plants and factories"* to *"industrial emissions"*.	The authors have listed anthropogenic sources that have negative imagery. Agriculture and construction are important contributors to particulate in the atmosphere. "Smoke" from power plants and factories also conjures a purely negative image; many emissions are due to fuel combustion, while there are many other non-smoke particulate emission sources, such as cooling towers and sanding/cutting/grinding

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			activities.
5.7 Coal Dust	Page 5.7-9, Section 5.7.4.1 Introduction to Coal Dust, second paragraph	Rewrite to be less definitive: "Coal dust ~~would~~ may also be generated and dispersed by wind~~s~~ ~~and air currents~~ during coal stockpiling …."	This is not necessarily fact, as controls, including natural controls (rain and coal moisture), would prevent this. No need to use "air current" in here as anything different from wind; the use of "air current" suggests coal dust moving long distances with large air masses, and could imply that a light current could move coal dust around, which is, in fact, highly unlikely.
5.7 Coal Dust	Page 5.7-9, Section 5.7.4.1 Introduction to Coal Dust, Coal Dust and Human Health	This section belongs in Air Quality. Refer to it in that section.	As described up front, the Coal Dust chapter is focused on nuisance issues. Federal and State air quality regulations include health-based standards.
5.7 Coal Dust	Page 5.7-10-11, Section 5.7.4.1 Introduction to Coal Dust, Coal Dust and Human Health	Remove paragraph discussing of Tongue River DEIS.	This information doesn't have anything to do with discussion on health effects. The modeling results shown here are not representative of the proposed Project; would need to show more relevance (similar operations and meteorological conditions) to be useful in this assessment. In addition, the discussion of modeled receptors has not yet been introduced and can be misleading to a reader,

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			confusing receptors "placed" for modeling with physical monitoring. The last sentence (regarding study conclusions) in this section is the only one that is appropriate here.
5.7 Coal Dust	Page 5.7-11, Section 5.7.4.1 Introduction to Coal Dust, Emissions, Dispersion, and Deposition of Coal Dust, first paragraph	Add bullets for "transfer or handling process", "enclosures or other physical barriers", "additional controls, such as spraying/fogging", and "shape (profile) of coal pile".	This list is for "rail cars and coal handling facilities", but seems to focus on rail cars only. Either add additional bullets or categorize properly.
5.7 Coal Dust	Page 5.7-11, Section 5.7.4.1 Introduction to Coal Dust, Emissions, Dispersion, and Deposition of Coal Dust, first paragraph after bullets	Delete second half of paragraph, starting with "Human exposure to deposited….."	This does not belong in this section. Section is for emissions, dispersion, and deposition. This is leading into impacts and effects again.
5.7 Coal Dust	Page 5.7-12-14, Section 5.7.4.1 Introduction to Coal Dust	Condense these three sections with the previous one under the composite title (Emissions, Dispersion, and Deposition of Coal Dust).	Confusing and repetitive. This is all part of "Introduction to Coal Dust" which is already 6 pages long. Detailed treatise of coal dust should be in tech report and references.
5.7 Coal Dust	Page 5.7-13, Section 5.7.4.1 Introduction	Remove all references to specific modeling impacts from other projects (paragraphs 2, 3, and	The modeling results shown here are not representative of the

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	to Coal Dust, Airborne Coal Dust Dispersion	4).	proposed Project; would need to show more relevance (similar operations and meteorological conditions) to be useful in this assessment.
5.7 Coal Dust	Page 5.7-14-15, Section 5.7.4.1 Introduction to Coal Dust	Ecological Impacts and Safety Impacts sections should be referred to other Chapters of the DEIS for those specific topics.	Although these issues are relevant to coal dust, this chapter of the DEIS does not include any assessment of potential ecological or safety impacts from this Project. Both topics are very complex. Besides being irrelevant, including descriptions of findings from other studies adds unnecessary negative and misleading information.
5.7 Coal Dust	Page 5.7-15, Section 5.7.4.2 Existing Conditions in the Study Area, Applicants Leased Area	Note that the existing facility has an air permit through SWCAA, and that all operations are in compliance.	This only mentions that "coal dust emissions are estimated to be small". State permitted levels to give more definitive sense of emissions at the facility.
5.7 Coal Dust	Page 5.7-15, Section 5.7.4.2 Existing Conditions in the Study Area, Cowlitz County	Instead of second and third paragraphs, just state attainment status and refer to Air Quality chapter/section.	The information regarding PM2.5 monitoring is related to wood smoke, not coal dust. The national toxics assessment and cancer risk discussion is not relevant to coal dust.
5.7 Coal Dust	Page 5.7-15, Section 5.7.4.2 Existing Conditions in the	Confirm this coal train count beyond Cowlitz County (seems like it was just copied over). Combine this section with previous one (Cowlitz	The two sections are almost identical. No need to separate.

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	Study Area, Washington State	County) if possible.	
5.7 Coal Dust	Page 5.7-17, Section 5.7.5 Impacts, Operations – Direct Impacts	Replace "would result in" with "has the potential to result in"	These modeled values are worst-case predictions (based on a combination of worst-case emissions aligned with worst-case meteorology). There is potential, but there is no certainty that this worst-case event would occur.
5.7 Coal Dust	Page 5.7-17, Section 5.7.5 Impacts, Operations – Direct Impacts	Add discussion describing how this was modeled. Specifically describe receptors/locations, and note why they are 'sensitive'. Remove label of "Trigger Level for Sensitive Areas". If referencing the NZ level at all, need to define sensitive areas vs. their other level(s).	Although some details are provided in Technical Report, there is NO discussion here of how it was done. There should be some basic description if results are provided (this is more than Summary section). The NZ "trigger" level is not an appropriate reference. Make it very clear that this is NOT a regulatory threshold. Discuss why both annual and monthly depositions rates were modeled; annual values are not referenced against anything.
5.7 Coal Dust	Page 5.7-20, Section 5.7.5 Impacts, Operations – Indirect Impacts, Reynolds Lead and BNSF Spur	Add discussion describing how this was modeled. . In addition, add discussion for first paragraph and Table 5.7-4 explaining how this is different from analysis performed in Air Quality report (coal only; describe sources removed).	Same comments as above. Why wasn't impact analysis for Direct sources of coal (facility sources) performed in previous section? (Inconsistent analyses.) Refer to Air Quality Technical report for modeling set up for impact

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			analysis. Why does Table 5.7-5 have an average and a maximum monthly deposition rate, while Table 5.7-4 has maximum annual and maximum monthly? (Inconsistent analyses.) Provide explanation of 'receptors', and make it clear that these are modeling locations. They should not be identified as 'sensitive', but rather as ambient (beyond facility boundary); there is no regulatory qualification for sensitive receptor associated with nuisance, and the maximum deposition location is not even in a residential area.
5.7 Coal Dust	Page 5.7-20-23, Section 5.7.5 Impacts, Operations – Indirect Impacts, BNSF Main Line	Add discussion describing how this was modeled.).. Remove Table 5.7-8 and associated text.	Same explanations as above. Table 5.7-8 is a toxics analysis that has had no introduction (until after the table). This does not belong here. Discussion of toxics belongs in Air Quality section; breaking out coal-only TAPs has no meaning, as the regulatory driver is ALL toxics from the proposed project. Additionally, the first tier of TAP analysis is review of the emission rates, which are not even mentioned here.

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C5.7 Coal Dust	Page 5.7-23, Section 5.7.5 Impacts, Operations – Indirect Impacts, Washington State (Outside Cowlitz County)	Add discussion describing how this was modeled. .	Same explanations as above. How was the whole state modeled (meteorology, terrain background concentrations, model)? The results do not make sense. If the BNSF Main Line has higher deposition rates due to increased train speeds, as suggested above, how come these trains do not have similar rates? Why is December the maximum month? This should be a wet month, with lower coal dust emission rates.
5.7 Coal Dust	Page 5.7-25, Section 5.7.6 Required Plans and Permits	Remove this section, or refer to Air Quality chapter.	Permitting is addressed in the Air Quality chapter. Coal Dust has no separate permitting requirements.
5.8 Greenhouse Gas Emissions and Climate Change		**See comments in comment letter and in Attachment 3.**	
Chapter 6 Cumulative Impacts			
Cumulative Impacts	Page 6-33, Section 6.3.2.7 – Wildlife, Aquatic Wildlife	Last sentence of paragraph 1. *"~~Impacts on p~~Pinnipeds and diving birds exhibit ~~would likely result in~~behavioral shifts and avoidance of those areas where underwater noise from in-water pile driving would occur."*	Paragraph 1, last sentence. Potential (could) effect is not an impact.
Volume !!			
Volume II **Appendix A - References**	Page A-14, Section 4.3 Wetlands	Revised the Grette 2014b reference as follows: Grette Associates, LLC. 2014b. *Bulk Product Terminal, Wetland and Stormwater Ditch Reconnaissance ~~Delineation~~Report–Parcel 10213*.	Bulk Terminal Wetland Report for Parcel 10213 is misidentified.

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Volume III.a: Built Environment Technical Reports			
SEPA Hazardous Materials Technical Report	Page 3-4	The section starting with " Project area preparations would involve preloading…" does not seem to fit in this section Caulking and Sealants	
SEPA Hazardous Materials Technical Report	Page3-8	Delete from bullet references to sulfuric acid, calcium hydroxide, and lime	The water treatment ponds are used to settle out sediment. Flocculants would be used. There is a chance that the water distributi8on systems may need the addition of an antiscalant to manage the hardness in the process waters.
SEPA Hazardous Materials Technical Report	Page 3-8	Delete the bullet: "Chemicals used in the on-site laboratory…"	There is no on-site laboratory as part of the Proposed Action.
SEPA Hazardous Materials Technical Report	Page 3-8	Delete reference to coal handled during operation as a hazardous material	See substantive comments above in Comment Letter. Coal is not classified as a hazardous material, under any definition.
Volume III.b: Natural Environment Technical Reports			
SEPA Water Quality Technical Report	Page 2-6	Including parameters from Weyerhaeuser's permit seems inappropriate.	The discharges from their facility are completely different than the proposed action. If there is a state water quality limit then reference that and not a reference to another permit
SEPA Water Quality Technical	Page 3-2	*Proposed Action could have the following adverse*	The DEIS lists the potential

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Report		*impacts on water resources…..*	impacts in the bulleted list but they do not appear to be discussed within the text – text and list should be made consistent
SEPA Ground Water Technical Report	Page 2-19	Footnote CAP completion reference 2015	
SEPA Fish Technical Report	Page 1-7, Figure 3: Study Area	Revise the figure to correctly identify the study area as extending upriver to RM 67.	The upstream project area should go to RM 67, which is correctly described in the text.
SEPA Fish Technical Report	Page 2-5, Table 2	Suggested global edit: Adopt the elevations relative to CRD datum in order to express depths. *"DWZ: The area waterward ~~extending from edge~~ of the SWZ, ranging in depth from -20 ft CRD to deeper than -40 feet CRD. ~~approximately 450 feet from the shore at a depth of 31 feet, outward to a maximum depth of 56 feet deep approximately 1,200 feet from the shore.~~"*	This is the first example of a global comment regarding depths for habitat zones. The supporting/source documents (Grette 2014a - f) use the CRD datum for all depths (e.g., -20 ft CRD). The narrative in the SEPA Fish Technical report uses an absolute depth (e.g., 31 feet deep). While it appears this is depth relative to OHW, it is confusing. Water levels in this area are highly variable due to season and daily factors (e.g., tides).
SEPA Fish Technical Report	Page 2-6, Section 2.2.2 - Study Area	*"TTS: Temporary hearing damage"* Revise the definition above to: TSS: Temporary loss of hearing sensitivity Reference to be added:	The definition for TTS should be changed to something that does not indicate injury (temporary or otherwise). TSS is more accurately described as a temporary loss of hearing

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		Popper, A.N., Hawkins, A.D., Fay, R.R., Mann, D., Bartol, S., Carlson, T., Coombs, S., Ellison, W.T., Gentry, R., Halvorsen, M.B., Løkkeborg, S., Rogers, P., Southall, B.L., Zeddies, D., Tavolga, W.N. (2014) Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. ASA S3/SC1.4 TR-2014. Springer and ASA Press, Cham, Switzerland.	sensitivity, not injury (e.g., Popper et al. 2014). Note: Popper et al. 2014 is not cited in the DEIS, and is provided here for reference.
SEPA Fish Technical Report	Page 2-7, Figure 5	Revise Figure 5 to express elevations relative to CRD datum.	Figure 5 – please apply the same comment as for page 2-5 re, expressing depths relative to CRD rather than as absolutes (this figure indicates an absolute value relative to 11.1 ft OHW).
SEPA Fish Technical Report	Page 2-9, Section 2.2.2.1 – Aquatic Habitat Types, Active Channel Margin	Suggest revising the document to express depths relative to CRD datum for consistency. OHW at the site is 11.1 ft CRD. This includes modifying the body text and footnote on this page. *"…and OHW is at approximately +11.1 ~~7.0~~ feet CRD (National Oceanic and Atmospheric Administration 2013~~, U.S. Army Corps of Engineers 2004a).~~[5]"* And Footnote: "~~The OHW is equivalent to the mean higher high water line in the tidally influenced Lower Columbia River."~~	The definition of Ordinary High Water is misleading. OHW has been defined by the US Army Corps in the Lower Columbia River according to river mile in feet, CRD. At the site, OHW is 11.1 ft CRD. This is the first example of a global comment regarding Ordinary High Water. On page 2-6 (subsection Riparian) there is the first reference to OHW in this document. *"The riparian zone includes lands less than 200 feet landward from ordinary high water (OHW)*

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			(+11.1 ft CRD)." This excerpt references the same value which is used in the source documents (Grette 2014 c). This elevation for OHW has been used for at least the last 5 years in a number of project and permitting documents for the Project as well as other actions at this site (e.g., Dock 1 maintenance), and is consistent with the OHW level used for Port of Longview projects approximately 3 miles upstream. On page 2-9 (subsection Active Channel Margin), there is a second reference to OHW which defines it at 7.0 ft CRD, which is equivalent to MHHW (per the NOAA Tide Station at the Port of Longview). USACE 2004a (cited here) is specific to the Portland Harbor and lower Willamette River and does not provide pertinent information for this location.
SEPA Fish Technical Report	Page 2-9, Section 2.2.2.1 – Aquatic Habitat Types, Deep Water Zone	*"The DWZ habitat type encompasses about 117 ~~115~~ acres…"*	The Shoreline Habitat Inventory Report lists Deep Water Zone (DWZ) as 117 acres. (Grette Associates, 2014a)
SEPA Fish Technical Report	Page 2-10 to 2-23,	We suggest that Table 3 and the narrative in this	Table 3 is confusing because it

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	Section 2.2.2.3: Focus Fish Species	discussion be modified for consistency with the impact discussion. See Table 5 and associated narrative.	combines adults, juvenile fish, yearlings, and subyearlings (see Table 7 for comparison) but distinguishes among the habitat type (ACM, SMZ, DMZ). Also, it is not consistent with the information from the source document (assumed to be Grette 2014c). For example, coho could be present in the DWZ in the winter and summer. Finally, for many fish ESUs, this table appears to add habitat use in the SMZ which was not included in the summary tables in the source documents. This is not necessarily supported in narrative citations (e.g. Roegner and Sobocinski 2008, cited 2-17) did not demonstrate abundant steelhead in beach seine or purse seine data, see slide 7). This table (Table 7) and narrative used for impact discussion (Section 3.1.1.1) is much more consistent with the information in the source documents.
SEPA Fish Technical Report	Page 2-18, Section 2.2.2.3 – Focus Fish Species, Bull Trout	Suggest revising text to focus on infrequent use in DMZ by bull trout.	Narrative indicates that, in addition to the potential DMZ use (infrequent, very low numbers) by adult bull trout, that

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			the ACM and SWZ could be used as shallow water rearing areas by subadult bull trout. Unlike subyearling and yearling salmonids, which are smaller and likely to rely on shallow waters, bull trout (infrequently present) in the Columbia River are not likely to be present in these areas. While it is possible, based on the general lack of bull trout observed in beach and purse seine data, it is probably not appropriate to characterize them as regularly using or likely to use these areas.
SEPA Fish Technical Report	Page 2-19, Section 2.2.2.3 – Focus Fish Species, Eulachon	Suggest revising Paragraph 3 as follows: *WDFW and ODFW conducted plankton tows to sample for eulachon eggs and larvae in the water column at an index site at about RM 34 (Report A in Mallette 2014).* ~~*Recent studies have documented egg and larvael stage eulachon between the Port of Longview above Barlow Point and the channel below the Cowlitz River mouth, including four sample sites offshore of the Project Area (Mallette 2014).*~~ *Peak larval abundance occurred in mid-March during two of the three survey years and from late April to early May in the third. As part of a related one-time sampling effort, eulachon eggs/larvae were documented in plankton tows at six sample sites*	Paragraph 3, sentence 1 acknowledges documented egg and larvae eulachon presence near the project (see Table 1 in Report B of Mallette 2014). Plankton tow samples documented presence of eulachon "egg/larvae = yes" in all plankton tows, which were taken on a single day (2/10/12). The next sentence, relates to data from Report A of Mallette 2014, which is for peak larval abundance over three survey years at a WDFW index site

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		(inshore and offshore) near the proposed CET between RM 62.8 to 64.0 in February 2012 (Report B in Mallette 2014)."	further downstream, and is a broader measure of larval downstream transport timing for the lower Columbia River and many tributaries.
SEPA Fish Technical Report	Page 2-25, Section 2.2.2.5 – Sediment and Water Quality Conditions	*"Turbidity in the study area is variable based on a number of factors. For example, over five days of water quality monitoring for dredging, background levels (upstream from active dredging) ~~consistently~~ ranged~~s~~ from the mid-20s to the mid-60s ~~29 to 67~~ nephelometric turbidity units (NTUs) at all depths (US Army corps of Engineers Dredged Material Management Office 2010 in Grette 2014c)."*	Paragraph 2, sentence 4, re. turbidity levels. These turbidity levels appear to be based on the background levels observed during water quality monitoring in December 2011 and January 2012 during dredging. Although these levels are representative of the background levels observed, they are from a brief period during a single season.
SEPA Fish Technical Report	Page 3-2, Section 3.1.1.1 – Construction: Direct Impacts, Temporarily Alter or Permanently Remove Aquatic Habitat	*"A total of 603 ~~610~~ of the 622 ~~630~~ 36-inch-diameter steel piles required for the trestle and docks would be placed below the OHW mark, permanently removing an area equivalent to 0.10 acre (4,263 ~~4,312~~ square feet) of benthic habitat."*	This is a global edit regarding an incorrectly stated number of piles and associated pile footprint. The current pile numbers are 622 total, 603 of which would be below OHW. This results in removal of 4,263 sq ft of river bottom (Grette Associates, LLC. 2014f; Table 1, p. 17).
SEPA Fish Technical Report	Pages 3-5 to 3-18, Section 3.1.1.1 – Construction: Direct Impacts, Increased Underwater Noise during Pile Driving	Global edit. Please check citations to Grette documents a, b, c, etc.	The citations for Grette documents do not track with the references section.

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SEPA Fish Technical Report	Page 3-5, Section 3.1.1.1 – Construction: Direct Impacts, Increased Underwater Noise during Pile Driving	Revise the following text to be consistent with the source document. *"Docks 2 and 3 and their associated trestle would be supported by 622 ~~630~~ 36-inch steel piles, 603~~610~~ of which would be installed in aquatic areas below OHW.""*	Global pile number and footprint edit (Grette Associates, LLC. 2014f; Table 1, p. 17).
SEPA Fish Technical Report	Page 3-9, Section 3.1.1.1 – Construction: Direct Impacts, Distance to Injury and Disturbance Thresholds	*"To install 603 ~~610~~ pilings in-water would require two years, based on the proposed in-water work window for impact pile driving."*	Global pile number and footprint edit (Grette Associates, LLC. 2014f; Table 1, p. 17).
SEPA Fish Technical Report	Pages 3-11, Section 3.1.1.1 – Construction: Direct Impacts, Increased Underwater Noise during Pile Driving, Juvenile Chinook Salmon Habitat Use and Timing	Revise the beginning of Paragraph 1 with the following: *The majority of juvenile Chinook from all ESUs outmigrate through the study area during the spring and summer or early fall. However, a relatively small number of subyearlings from ocean-type ESUs may be present in the ~~In general, juvenile Chinook salmon outmigrate through the study area within~~ SWZ and DWZ ~~habitat~~ during some or all of the September 1-December 31 proposed ~~in-water proposed~~ work window for impact pile driving (Table 7). Overall, habitat use and timing for juvenile Chinook salmon is summarized as follows (Grette 2014a).*	Paragraph 1 needs context in terms of timing and relative abundance.
SEPA Fish Technical Report	Page 3-21, Section 3.1.1.3 – Operations: Direct Impacts, Increased	Revise Paragraph 2 as follows: "The extent or magnitude to which an increase in overwater surface area may alter the predator-prey relationship at the project area is	Page 3-12, Paragraph 2 concludes that it is assumed that increased overwater structure would change predator/prey

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	Shading	unknown, but it is assumed that the relationship could ~~would~~ change and an increase in predation could occur where larger subyearling, yearling, or larger juvenile fish encounter the Dock 2 and 3 structures in the DWZ. ~~would be likely~~. This likely would not apply to smaller subyearling fish encountering the trestle in the ACM and SWZ.	relationships and increase predation, although extent or magnitude is unknown. This is specific to the Dock 2 and 3 structures, not the trestle. This was addressed in a supporting document which was not cited in the SEPA technical report (Docks 2 and 3 and Associated Trestle: Indirect Effects of Structures and Site Operations, Grette Associates 2014). As discussed in that document, based on the depth and offshore location, increased predation risk would not apply to those small subyearling fish utilizing shallow water (SMZ, ACM); see page 19 of that document. Larger subyearlings, and yearling and other juvenile fish using deep waters may experience an increased risk of predation, but this would apply to a relatively small number of fish based on the small width of the structure relative to the channel width at this location.
SEPA Fish Technical Report	Page 3-21, Section 3.1.1.3 – Operations: Direct	*"Source sound levels of bulk carrier vessels were measured in Puget Sound at between 187.9 and 198.2 dB re 1uPA at 1 meter when vessels were*	Page 3-12, Paragraph 2 cites bulk carrier vessel source sounds in Puget Sound. These values have

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	Impacts, Vessel Noise	*travelling between 9.0 and 11.0 knots (Hemmera Environchem et al. 2014)."*	little meaning if not referenced to dB_{peak} or dB_{RMS}. Without that context they cannot reasonably be compared to the behavioral threshold (150 dB_{RMS}).
SEPA Fish Technical Report	Page 3-30, Section 3.1.1.4 – Operations: Indirect Impacts, Affect Commercial and Recreational Fishing	*"If ~~A~~adult fish targeted in commercial and recreational fishing were to alter behavior in response to underwater noise from vessels, they could avoid the navigation lanes or migrate quickly through them. ~~would likely migrate outside of the navigation channel to avoid increased underwater noise levels.~~ Commercial and recreational fishing vessels would not likely be fishing in the navigation channel when large vessels are present. Therefore, the Proposed Action would be unlikely to significantly reduce commercial or recreational fishing catches or limit access for fishing activities."*	Paragraph 1 posits that increased vessel traffic could cause behavioral responses in fish (presumably from disturbance associated with increased noise and vessel movement), and that adult fish would likely migrate outside of the navigation channel to avoid increased noise. This is too strong of a statement which is not supported by our understanding of fish behavioral responses to increased underwater sound or the actual levels and extents of underwater sound associated with vessel traffic. It is possible that such a response could happen in some cases. In either case, the conclusion of unlikely to significantly reduce commercial or recreational fishing catches is correct, but the distinction regarding certainty of effect is important.
SEPA Wildlife Technical Report	Page 2-7, Section	Revised the ACM, SWZ and DWZ elevations as	Elevations and depths for habitat

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	2.2.2 - Aquatic Habitat	follows: ACM is OHW (11.1 ft CRD) to 0 ft CRD; SWZ is 0 ft CRD to -20 ft CRD; DWZ is waterward of -20 ft CRD.	zones should be expressed relative to CRD throughout the documents for consistency.
SEPA Wildlife Technical Report	Page 3-4, Section 3.1.1.1 – Construction: Direct Impacts, Temporary Impacts on Wildlife Habitat	Overall, this section would benefit from clarity regarding the area considered.	For temporary effects it seems the area considered should be the 0.5 mile "buffer" around the project site, since the project area itself will be permanently altered at the outset of project construction and is addressed in the previous section.
SEPA Wildlife Technical Report	Page 3-4 to 3-5, Section 3.1.1.1 – Construction: Direct Impacts, Temporary Impacts on Wildlife Habitat	The section on the displacement/mortality should be reconsidered.	This appears to address the area which will be permanent removed. There are no temporary impacts – once it's been removed the displacement is permanent.
SEPA Wildlife Technical Report	Page 3-5, Section 3.1.1.1 – Construction: Direct Impacts, Temporary Impacts on Wildlife Habitat	We request that the following sentence be added to the end of the final paragraph on page 3-5: "Impacts to steaked horned lark will be evaluated in detail in the Project's Biological Assessment and ultimately determined in the ESA consultation process."	We disagree with ICF's use of marbled murrelet as a surrogate for analyzing potential impacts to streaked horned lark due to their significantly different habitat use. Since streaked horned lark is an ESA-listed species, the project's Biological Assessment and the associated ESA consultation process will evaluate impacts in detail.
SEPA Wildlife Technical Report	Page 3-6 to 3-13, Section 3.1.1.1 – Construction: Direct	Effects of dredging on pinnipeds: The turbidity effects discussion would benefit from context of limited, minimal, and temporary increases in	

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
	Impacts, Aquatic Habitat and Wildlife Habitat	turbidity. Also, there is a timing component to consider regarding likelihood of presence for marine mammals similar to what is in the pile driving impact analysis.	
SEPA Wildlife Technical Report	Page 3-17, Section 3.1.1.1 – Construction: Direct Impacts, Aquatic Habitat and Wildlife Habitat	Aquatic spills and leaks –Reconsider conclusion regarding toxic or subacute impacts.	This section should mirror the section in the SEPA fish technical report, which focuses on the low potential and volume of spills that may occur in aquatic areas.
SEPA Wildlife Technical Report	Page 3-19, Section 3.1.1.3 – Operations: Direct Impacts, Produce Coal Dust	Consider revising the following conclusion: *"…to what extent coal dust could affect wildlife species and their habitats over the life of the Proposed Action is unknown."*	This statement implies too much impact.
SEPA Wildlife Technical Report	Page 3-24, Section 3.1.1.4 – Operations: Indirect Impacts	Effects of dredging on pinnipeds: Suggest revising this section to adopt the construction analysis by reference instead of repeating/summarizing it (as is done for "noise impacts from maintenance dredging" for terrestrial species).	This paragraph contains the same content as the construction discussion, and the same suggested edits for that section would apply (see suggested revisions above for Page 3-6 to 3-13, Section 3.1.1.1 – Aquatic Habitat and Wildlife Habitat)
SEPA Vegetation Technical Report	Page 2-19, Section 2.2.2.2– Land Cover Classification and Vegetation Cover Types	We request that ICF double-check calculations of habitat area, and in particular review the mapped upland forested habitats for accuracy.	It appears that habitat acres are based primarily on ICF's own vegetation surveys. ICF used slightly different habitat/vegetation type categories, making it difficult to

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
			track down specific differences in the two analyses. However, it appears that general habitat categories mapped by Grette Associates do not exactly match those mapped by ICF. Specifically, we identified less forested and scrub-shrub habitat than ICF, on parcel 61950 in particular. Nevertheless, we agree in principle with the analysis of the site as largely developed/disturbed with isolated patches of habitat potentially used by wildlife.
Volume IIIc Operations Technical Reports, Part 1			
SEPA Rail Transportation TR Appendix A Coal Train Operating Plans	Page A-2	Coal Train Operating Plans should be regarded as indicative but not contractual. Also there is a variety of abbreviation which we cannot find in the Abbreviations and Acronyms list. Eg ST	These plans have not been developed with MBTL. They should be regarded as indicative but not contractual.
SEPA Rail Transportation TR Appendix A Coal Train Operating Plans	Page A-2	*"MBTL crew takes lead locomotives to end of loading loop, couple to empty train when unloading completed. From dumper, train proceeds into storage track awaiting outbound train crew"*	This comment seems to indicate that locomotives would be uncoupled from rail cars. This is a new criterion that has not been discussed before and was not part of any discussions with BNSF. MBT-L proposes to keep the locomotives connected to the trains. The trains would be pushed around by indexer and

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
			when ready to leave, someone hops into the locomotive and drives – need to recheck the whole train when you reconnect locomotive
Volume IIIc Operations Technical Reports, Part 2			
SEPA Air Quality Technical Report	Technical Report, Page i	Add more description to "Appendix A. Air Quality Data". Should also revise all headers within appendices and reference throughout text correctly.	Old URS appendices A-J were modified and lumped together here. Confusing with references throughout report.
SEPA Air Quality Technical Report	Technical Report, Page 1-1, Section 1.1, 1st paragraph	Remove "blending" as part of proposed processes at terminal.	Blending is not part of the process, and emissions have not been estimated for this process.
SEPA Air Quality Technical Report	Technical Report, Page 1-4, Section 1.1.1, 3rd paragraph	Remove "blending" as part of proposed processes at terminal.	Blending is not part of the process, and emissions have not been estimated for this process.
SEPA Air Quality Technical Report	Technical Report, Page 1-7, Table 2	Remove Annual and 24-hour average SO2 standards for State.	These two standards are not applicable to this area (sunsetted).
SEPA Air Quality Technical Report	Technical Report, Page 1-8, Section 1.2.2, last paragraph	See comment above under Page 5.6-4, Section 5.6.1.2	This version in Technical Report includes mention of DPM and should be retained as that is primary TAP of concern from this project.
SEPA Air Quality Technical Report	Technical Report, Page 1-8, Section 1.3	See comment above under Page 5.6-4, Section 5.6.2	
SEPA Air Quality Technical Report	Technical Report, Page 2-1, Chapter 2	Move the introduction and content of Section 2.1 (Methods) after Section 2.2 (the real Existing Conditions section). Section 2.1 content includes description of the project air emission sources	This Chapter is for Existing Conditions. Section 2.2 (also title Existing Conditions) is the only piece that belongs in here.

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
		and processes and methodologies for assessment; this belongs in a different Chapter (or rename Chapter).	
SEPA Air Quality Technical Report	Technical Report, Page 2-1, Section 2.1, last sentence	Correct reference (add detail). Remove last part of sentence addressing applicable VOCs and HAPs.	Appendix A includes many parts. There is a specific header for construction calculations which includes various spreadsheets. There is no list of VOCs/HAPs.
SEPA Air Quality Technical Report	Technical Report, Page 2-3, Section 2.1.2.1, Construction Equipment	Correct reference for NONROAD emission factors. Add detail to Appendix A reference in last sentence.	Multiple references cited, including Appendix L of the URS Air Quality Report, which is the modeling analysis, which has nothing to do with construction emissions. Appendix A has many parts; be more specific about which parts apply to construction emissions.
SEPA Air Quality Technical Report	Technical Report, Page 2-3, Section 2.1.2.1, River Barges	Remove footnote reference for HAP factors.	Unnecessary and inconsistent to include this level of emission calculation detail here. Confusing and incomplete terminology to have footnote mention only 'HAP factors'.
SEPA Air Quality Technical Report	Technical Report, Page 2-4, Section 2.1.2.1, Vehicle Delays at Rail Crossings and Construction Worker Commute Vehicles	Add information/reference from traffic report.	Amount of detail here is inconsistent with other source area emission sections, and there is no detail on calculations shown in Appendices. Provide clearer reference than Appendix A.

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
SEPA Air Quality Technical Report	Technical Report, Page 2-4, Section 2.1.2.2, Coal Storage and Handling	Remove the additional conservative factor (95%) for dust control, returning it back to 99%, consistent with the existing permit at the site.	The current facility permit was modified in 2014 to include a retrofit of coal handling areas with fogging systems. A control efficiency of 99% for enclosure plus fogging was based on vendor information, and was approved by SWCAA during permitting. There is no basis for applying the lower control efficiency due to one draft permit from Oregon DEQ, as stated.
SEPA Air Quality Technical Report	Technical Report, Page 2-4, Section 2.1.2.2, Locomotives	Provide detail on emissions in appendices.	Unable to check emission calculations, which have changed significantly since URS report/tables. Some references appear to be incomplete or wrong. Unload hours in text doesn't match table value. Appendix 'Tabs' referenced in Table 3 are old URS Appendix headings.
SEPA Air Quality Technical Report	Technical Report, Page 2-5, Section 2.1.2.2, Vessel	Provide detail on emissions in appendices.	There are several changes in assumptions (eg. hours) without explanation/justification.
SEPA Air Quality Technical Report	Technical Report, Page 2-5, Table 3	Footnote a should be revised to read: *The on-site coal transfers would occur in enclosed areas (i.e.rotary coal car dump and conveyors), as well as areas that are not enclosed (i.e., coal piles ~~and the unloading of rail cars~~)."*	Footnote a to Table 3 is incorrect in its description of unloading of rail cars –rail car unloading would be done within an enclosed building
SEPA Air Quality Technical	Technical Report,	See comments above:	What is the purpose of daily

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
Report	Page 3-1-3, Section 3.1.1.1, Construction	Page 5.6-10, Section 5.6.5.1, Proposed Action, Construction, 2nd paragraph. Pages 5.6-10-11, Section 5.6.5.1, Proposed Action, Construction, 3rd paragraph and Table 5.6-3. Pages 5.6-11-12, Tables 5.6-3 and 5.6-4.	emissions for construction? General Conformity is not applicable to this project. Tables are confusing.
SEPA Air Quality Technical Report	Technical Report, Page 3-4-8, Section 3.1.1.2, Operations	See comments above: Page 5.6-13, Section 5.6.5.1, Proposed Action, Operations and Table 5.6-5. Page 5.6-14, Section 5.6.5.1, Proposed Action, Operations, Impact Assessment, first paragraph, fifth sentence. Page 5.6-14, Section 5.6.5.1, Proposed Action, Operations, Impact Assessment, second paragraph, last sentence	Difficult to assess emissions development in Appendices. Changes in emission factors (as compared to original URS report) caused some much higher impacts, notably for SO2 impacts from cargo vessels and CO from trains. Provide more justification for use of these factors.
SEPA Air Quality Technical Report	Technical Report, Page 3-8-10, Section 3.1.1.2, Proposed Action and Cowlitz County/Washington State Emissions Comparison	Clarify increases in source type vs. emissions. Verify emission factors (see comments above).	There seems to be a discrepancy between source increases and emission increases as compared to similar county/state sources. This indicates emission factors for some pollutants are different for similar sources. Explain these discrepancies, and justify emission factors. Rail emissions within County showing highest increase in PM10, while within state, the maximum increase are for CO and NOx from same sources. Details should be clarified and referenced in appendices.

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
SEPA Air Quality Technical Report	Technical Report, Page 3-9, Section 3.1.2, No-Action Alternative, 2nd to last sentence	Remove reference to de minimis.	General Conformity is not applicable to this project. Also, only construction emissions were compared to de minimis, not operations (which were modeled). Use another reference point.
SEPA Coal Technical Report (Coal Dust Emissions)	Technical Report, Page 18, Section 2.2.4 Coal Dust Monitoring	Rewrite/reorganize 1st paragraph. The comparison of the T&B Systems study results to Jaffe report is not correct (2nd bullet). Neither study identifies the makeup of the PM2.5 fraction, it is known to contain diesel combustion emissions, iron oxide particles, general dust and possibly coal particles. Jaffe report also shows "super dusters" which he did not verify to be coal, but has called them coal. This is poor science to base your conclusions on an invalidated assumption. It is my assumption from observation of the Jaffe report and a presentation by him on the matter that the super dusters are pet coke trains – not even coal.	This section starts off confusing with "As described in Section 3.1.3, Impact Analysis,…." and then starts discussing results of the T&B Systems study, which hasn't even been introduced yet. The whole section should be rewritten for clarity and organization.
SEPA Coal Dust Technical Report (Coal Dust Emissions)	Technical Report, Page 21, Paragraph describing Figure 4	Either remove figure and associated paragraph completely (if there is no reference for it), or at least add caveat that this linear regression is based on very limited data., and delete last sentence citing use of the lower (61%) emissions reduction effectiveness for subsequent modeling of coal trains instead of 85%.	OK to describe T&B Systems study, but do not make additional conclusions about the study within the DEIS Technical Report. This does not explain what 'modeling' is being compared to the study observations. Need a reference for Figure 4, as it does

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
			not relate to anything included with this report. The application of 85% control is cited in DEIS chapter (BNSF Coal Loading Rule), but is never mentioned in this Technical Report, and the 61% is never mentioned in the DEIS chapter. And there is no further mention of either control level applied during emission estimation (in Coal Dust OR Air quality sections).
SEPA Rail Transportation TR Appendix A Coal Train Operating Plans	Technical Report, Page 21	Figure 4	We question what Figure 4 or the paragraph before it means, and expect that BNSF are being challenged by saying the 85% reduction in dust from trains is invalid. There is not any reference to this graph in the Technical Report, or T&B Report. Also, if it is based on the T&B report it is unreliable due to their inconclusive findings.
SEPA Noise and Vibration TR	Page 2-16	typo for description of the FRP cladding material: should be 8 *ounces* per square foot, not 8 pounds per square foot.	Despite the typo, the corresponding estimated sound transmission loss values appear to be correct in Table 7.
SEPA Noise and Vibration TR	Page 3-1, Section 3.1.1.1	3.1.1.1 Construction: Direct Impacts "Construction of the Proposed Action would result in the following direct impacts. These impacts would occur during the construction	The analysis in the extract is inappropriate and misleading and should be deleted. The FRA standard that is used is

Environmental Resource	Page Number or Section Number	Text Correction/Revision	Comment
		period in 2018. • Exceed Federal Railroad Administration Construction Noise Criteria • Construction of the Proposed Action would result in noise levels exceeding FRA criteria at one residence (104 Bradford Place). This residence is the noise-sensitive receptor that is closest to the project area. The noise impact is predicted to occur only during pile driving when the maximum noise level is predicted to reach 83 dBA, exceeding the FRA criteria of 80 dBA for construction."	not applicable to construction noise from the terminal, it has been arbitrarily applied as there is not regulation in Washington. The analysis is inappropriate. Washington State maximum permissible noise level regulations (WAC 173-60-040) do not apply to construction noise during daytime hours (between 7 a.m. and 10 p.m.).
SEPA Noise and Vibration TR Appendix A – Existing Ambient Sound Pressure Level Survey Data	Page A-1	The Figures in this section do not have any meaningful units or labels on the X or Y Axis or colored lines	Please add label or key
SEPA Noise and Vibration TR Appendix B Construction Noise Impact Analysis	Page B-1	In Table B-1 the FRA standard for construction noise limits is used inappropriately. FRA construction noise standard applies to construction of rail lines, not to construction of a coal export terminal.	
Appendix H	H-5	Wrong Table number. Should be Table H-2	typo

ATTACHMENT 3 - DEIS COMMENTS, TECHNICAL RESPONSE, ANALYSIS OF POPULATION-LEVEL IMPACTS ON TRIBAL FISH RESOURCES IN ZONE 6

Millennium Coal Export Terminal
Longview, Washington

DEIS Comments, Technical Response
Analysis of Population-level Impacts on Tribal Fish Resources in Zone 6

June 8, 2016

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1 INTRODUCTION

Section 4.7 (Fish) of the Draft Environmental Impact Statement (DEIS) describes the potential direct and indirect impacts resulting from the construction and operation of the proposed Coal Export Terminal that could have an effect on fish (ICF 2016). The impacts listed were described qualitatively and none of the impacts acting individually or collectively were concluded to cause significant unavoidable adverse impacts to fish in Section 4.7.8 (Unavoidable and Significant Adverse Environmental Impacts).

This document evaluates the likelihood that impacts could reduce the abundance of fish available in the tribal commercial, subsistence, and ceremonial fishing zone on the Columbia River that is known as Zone 6. Zone 6 is a 147 mile stretch between the Bonneville Dam (River Mile 146) and McNary Dam in which commercial fishing is set aside exclusively for tribal fishers. Zone 6 begins approximately 83 river miles upstream from the Project Site. The approach used in this document is to first describe the timing and habitat use of the salmon and steelhead runs in the river from the Project Site (RM 63) to the mouth to determine which groups of fish have the potential to be exposed to impacts, and then to evaluate the likely magnitude of the impact. The results of the analysis are used to draw conclusions about the potential for population-level impacts to occur to fish that would be captured in the Zone 6 fishery.

Note that Sections 3 Built Environment and 4.7 Natural Environment – Fish of the DEIS define direct and indirect impacts associated with construction and operations somewhat differently. Because Section 3 adopts the analysis in Section 4.7 by reference, this technical response follows the organization of Section 4.7 as to direct and indirect impacts.

This technical response reviews DEIS Section 4.7 and provides supplemental analysis with respect to direct and indirect impacts referenced in Section 3.5 Tribal Resources and Section 6 Cumulative Impacts. As described in Section 4.7 of the DEIS and supplemental analysis provided in this document, it is appropriate to evaluate the potential for the project to directly and indirectly affect fish. However, based on a combination of restrictions on construction timing, and the low risk to individual fish, none of the potential impact mechanisms support a conclusion that the numbers of fish available to tribal fishers in Zone 6 would be reduced. Therefore, other DEIS sections (notably 3.5 and 6) are incorrect in using the analysis in Section 4.7 of the DEIS to draw conclusions of impacts on fish or, by extension, tribal fish resources.

2 POPULATIONS CONTRIBUTING TO TRIBAL FISH RESOURCES

Consistent with the approach in DEIS Section 3.5.4.2 (Tribal Resources in the Study Area), the focus of this technical response is fish resources which are available to tribal fishers in Columbia River Zone 6. As noted above in Section 1, Zone 6 is a 147mile stretch between the Bonneville Dam and McNary Dam in which commercial fishing is set aside exclusively for tribal fishers.

Specifically, the focus of this analysis is salmon and steelhead in Zone 6 (see brief section below addressing white sturgeon and Pacific and river lamprey). Per DEIS Table 3.5-2, over the last 10 years, the reported annual catch in commercial, ceremonial, and subsistence fisheries in Zone 6 of the Columbia River has been dominated by Chinook salmon (78 percent), followed by steelhead (15 percent), coho (6 percent), and white sturgeon (1 percent). As described in the DEIS (page 3.5-8) the majority of Chinook salmon harvested are summer and fall run fish (DEIS page 3.5-8).

Because Zone 6 is above Bonneville Dam, those fish harvested in Zone 6 would not include (or would include a negligible component of) the following evolutionary significant units (ESUs) (salmon)- and distinct population segments (DPSs) (steelhead):

- Lower Columbia River Chinook (threatened)
- Upper Willamette River Chinook (threatened)
- Lower Columbia River coho (threatened)
- Columbia River chum (threatened)
- Lower Columbia River steelhead (threatened)
- Upper Willamette River steelhead (threatened)

Therefore, while construction- and operations-related activities may affect fish and fish habitat used by the six ESUs/DPSs listed above, this would not affect tribal fish resources with respect to fish harvest in Zone 6.

The following ESUs/DPSs originate upstream of the Bonneville Dam, and are available to tribal fishers in Zone 6:

- Snake River fall-run Chinook (threatened)
- Snake River spring/summer run Chinook (threatened)
- Upper Columbia spring-run Chinook (endangered)
- Deschutes River summer/fall-run Chinook (not listed)
- Middle Columbia spring-run Chinook (not listed)
- Upper Columbia River summer/fall run Chinook (not listed)
- Snake River sockeye (endangered)
- Okanogan River sockeye (not listed)
- Wenatchee River sockeye (not listed)
- Snake River steelhead (threatened)
- Upper Columbia River steelhead (threatened)
- Middle Columbia River steelhead (threatened)

In addition to the twelve ESUs/DPSs that originate upstream of Bonneville Dam (listed above), tribal fish resources in Zone 6 include a number of salmon and steelhead artificial propagation (hatchery) programs in the Columbia River basin that are not considered to be part of any particular ESU (Grette Associates 2014a). Examples include the on-going coho reintroduction and/or hatchery programs on the Yakima, Wenatchee/Methow, Clearwater (Snake River), Umatilla, and Klickitat Rivers which have been established by the member tribes of the Columbia River Inter-Tribal Fish Commission (CRITFC).

The remainder of this analysis is focused on the 12 ESUs/DPSs that originate upstream of Bonneville Dam, and also applies to fish from the artificial propagation programs originating above Bonneville Dam.

White Sturgeon and Pacific and River Lamprey

Tribal fishers harvest white sturgeon in Zone 6 (1 percent of the catch). In addition, Pacific and river lamprey are captured by tribal members (no catch numbers reported in the DEIS). The following addresses those species briefly.

The white sturgeon population in Zone 6 is largely isolated from the lower Columbia River. Between 1998 and 2011, upstream passage was observed for between 22 and 133 individuals annually (Parsley et al. 2007). The current (2016) estimated abundance of 42-60 inch total length white sturgeon in the lower Columbia River is 147,100 individual fish (WDFW and ODFW 2015). Therefore, individual fish ascending Bonneville Dam would comprise less than 1/10th of one percent of the lower Columbia River fish. Based on the few adult sturgeon migrating past Bonneville Dam, construction of the proposed Project would expose a negligible number of those fish to pile driving sound. Further, the SEPA Fish Technical Report concludes that while juvenile and adult white sturgeon may be present during impact pile driving, there is generally low potential for injury or behavioral effects (page 3-18).

The SEPA Fish Technical Report (pages 2-22 and 2-23) concludes that juvenile and adult lamprey may be present in the Project area during their respective migration periods but would not be expected to hold, spawn, or rear in this area. Based on lamprey timing and proposed work windows, no juveniles and only a small proportion of adults (late returns) would potentially be exposed to dredging and impact pile driving. The SEPA Fish Technical Report addresses lamprey briefly with respect to elevated sound, concluding that impacts from pile driving would be expected to be less harmful than for salmon and other fish species because lamprey do not have swim bladders (page 3-18).

Potential impacts associated with elevated turbidity during dredging are not addressed in the DEIS for white sturgeon or Pacific and river lamprey. As with adult salmonids, no direct harm would be expected, and any behavioral effects would be so limited that they would not disrupt normal behavioral.

Predation (fish or bird) associated with permanent structures and wake stranding has not been identified as potential population-level impact mechanisms for white sturgeon or Pacific and river lamprey in the Columbia River.

Based on the separation of the populations by Bonneville Dam and the low potential for impact from the Project, the Project would not affect the population of white sturgeon available to tribal fishers in Zone 6.

Given the small proportion of adult lamprey potentially exposed to construction, and the low potential for actual effects on those individuals, the Project would not affect the population of lamprey available to tribal fishers in Zone 6 or elsewhere.

3 CONSTRUCTION IMPACTS

Section 3.5.5.1 of the DEIS generally identifies both direct and indirect effects of construction and references DEIS Section 4.7 (Fish) as well as DEIS Section 4.5 (Water Quality) for specific construction-related activities. However, both DEIS Sections 4.7 and 4.5 state that construction would not result in indirect impacts on fish or water quality, therefore this discussion only addresses the direct impacts of construction.

Section 3.5.5.1 of the DEIS concludes (combining language for direct and indirect impacts of construction):

> "In-water construction-related activities such as dredging and dock construction would cause physical or behavioral responses in fish. These activities could also affect aquatic habitat, which could reduce the number of fish surviving to adulthood and returning to areas upstream of Bonneville Dam…thereby affecting the number of fish available for harvest by the tribes…" (page 3.5-14)

Dredging and dock construction (notably impact pile driving) are the main activities referenced which could result in physical or behavioral responses, or affect aquatic habitat.

3.1 CONSTRUCTION TIMING AS A MINIMIZATION MEASURE

For dredging and impact pile driving to directly affect fish, the fish must be present during the activity. In-water construction timing is regulated by work windows that determine when in-water activities can occur and the relative exposure of the fish to the potential stress or risk.

For many years, the standard in-water work window used by the USACE in the lower Columbia River has been November 1 – February 28 (USACE 2016). This work window has been applied to all in-water activities, including pile work, dredging, material placement, and other construction. In recent years, the USACE and other regulators have begun to authorize in-water work within the period of October 1 – December 31. This shift attempts to balance work timing and animal presence among a broader group of species, including eulachon. Protection of eulachon has been a major factor leading to in-water work closures in January and February.

The in-water work windows referenced the DEIS and the SEPA Fish Technical Report are activity-specific, as illustrated in Table 1 below. These are the same in-water work windows proposed by the applicant and considered in the impact analysis submitted by the applicant (Grette Associates 2014b). These activity-specific work windows are designed to minimize impacts by more tightly regulating those activities with the greatest potential for impact to periods when the fewest sensitive life stages of the species of concern are present. They were developed considering the timing, presence, and use of the various species and the potential impacts of the different construction activities. These in-water work windows are intended to be protective while allowing time for construction.

The in-water work windows for dredging (August 1 – December 31) and impact pile driving (September 1 – December 31) are very protective of juvenile salmon and steelhead for populations originating upstream of the Bonneville Dam. Timing and habitat use for those populations is summarized in Table 2 below. This is consistent with the analysis which was

submitted by the applicant and considered in the DEIS (see SEPA Fish Technical Report page 3-10, Table 7). However, the summary provided in the SEPA Fish Technical Report focuses only on potential presence during construction. The context provided by the overview of the entire year highlights that dredging and impact pile driving are proposed during times that will avoid work during all or most of the juvenile salmon outmigration period (variable by ESU). In-water construction timing also minimizes overlap with most adult salmon and steelhead originating above Bonneville Dam (Table 2).

Table 1. Activity specific work windows proposed for the Project (gray fill)

Construction Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Vibratory Pile Driving (in water)		2/28							9/1			
Impact Pile Driving (in water, on land*)									9/1			12/31
Dredging (mechanical and hydraulic)								8/1				12/31
Flow Lane Disposal								8/1				12/31
General Construction, above water	no timing restrictions											
General Construction, on land*	no timing restrictions											

* 19 trestle pile would be driven in the adjacent uplands landward of OHW. Although installation of the 19 upland trestle pile would not be subject to in-water work restrictions, MBTL proposes to install them during the same period as the in-water pile in order to make the most efficient use of construction and equipment mobilization at the site.

Table 2. Anticipated presence and habitat use for Zone 6 harvestable salmonid populations in the tidal freshwater region of Columbia River

Impact Pile Driving														**9/ 1**									**12/ 31**																
Dredging and Flow Lane Disposal									**8/1**														**12/ 31**																
			Spring			***Summer***						***Fall***									***Winter***									***Spring***								
Species, ESU/DPS if applicable	**ESA Status**	**Life Stage**	**Jun**			**Jul**			**Aug**			**Sep**			**Oct**			**Nov**			**Dec**			**Jan**			**Feb**			**Mar**			**Apr**			**May**		
			A[1]	**S[1]**	**D[1]**	**A**	**S**	**D**	**A**	**S**	**D**	**A**	**S**	**D**	**A**	**S**	**D**	**A**	**S**	**D**	**A**	**S**	**D**	**A**	**S**	**D**	**A**	**S**	**D**	**A**	**S**	**D**	**A**	**S**	**D**	**A**	**S**	**D**
Chinook salmon ESUs[4]																																							
Snake River fall-run (non-listed: Deschutes River and Upper Columbia River summer/fall-runs)	T	Adults						X			X			X			…																						
		Yrlng			X																											X			X			X
		Subyr.	…[2]	X[3]		…	X	X	…	X	X		…	…		…	…		…	…										…	X		…	X		…	X	
Snake River spring/summer-run	T	Adults			X			X			X																					…			X			X
		Yrlng			X																											X			X			X
Upper Columbia River spring-run	E	Adults																														…			X			X
		Yrlng			X																											X			X			X
Coho salmon																																							
non-ESU artificial propagation etc.[5]	n/a	Adults						…			X			X			X			X			…																
		Juv.			X			…			…			…			…															…			X			X
Sockeye salmon ESUs																																							
Snake River ESU (non-listed ESUs: Okanogan River and Lake Wenatchee)	E	Adults			X			X																															
		Juv.			X			X																											X			X
Steelhead trout DPSs																																							
Snake River	T	Adults			…			X			X			X			…																						
		Juv.			X			X			X																					X			X			X
Upper Columbia River	T	Adults			…			X			X			X			…																						
		Juv.			X			X			X																					X			X			X
Middle Columbia River	T	Adults			…			X			X			X			…																						
		Juv.			X			X			X																					X			X			X

[1] A, S, and D habitat categories: Active Channel Margin (OHW waterward to 0 ft CRD), Shallow Water (0 ft CRD to -20 ft CRD), and Deep Water (beyond -20 ft CRD)
[2] "…" denotes may be present, low abundance
[3] "X" denotes present, no relative abundance
[4] As reviewed in Grette Associates 2014a and its Appendix D, juvenile Chinook timing and habitat use in the shallow margin was largely informed by Roegner et al. (2012, 2013), and focused on mainstem sampling locations between RM 34 and RM 70 (reaches C and D in those studies). Roegner et al. 2013 formed the basis for published article Teel et al. (2014). Chinook information here is consistent with the information presented for mainstem areas in reaches C and D in Teel et al. (2014).
[5] Added to address coho originating upstream of Bonneville Dam; based on run timing (2006-2015) for juveniles and adults at Bonneville (Columbia River DART 2016).

3.2 CONSTRUCTION IMPACTS: DREDGING

Timing

Dredging is proposed for August 1 through December 31.

Based on the timing of adult and juvenile salmonids movement through the Project area, the following ESUs are not expected to be present during dredging (Table 2):

- Upper Columbia River Chinook spring-run (endangered)
- Middle Columbia River Chinook spring-run (not listed)
- Snake River sockeye (endangered)
- Okanogan River sockeye (not listed)
- Lake Wenatchee sockeye (not listed)

For those five ESUs/DPSs, there would be no direct effects of dredging.

This leaves the following seven Chinook and steelhead ESUs/DPSs to consider, in addition to fish from artificial propagation programs (including coho):

- Snake River fall-run Chinook (threatened)
- Snake River spring/summer run Chinook (threatened)
- Deschutes River summer/fall-run Chinook (not listed)
- Upper Columbia River summer/fall run Chinook (not listed)
- Snake River steelhead (threatened)
- Upper Columbia River steelhead (threatened)
- Middle Columbia River steelhead (threatened)

The August 1 through December 31 dredging period is very protective of juvenile salmon and steelhead originating upstream of Bonneville Dam (Table 2). No juvenile steelhead and no Snake River spring/summer Chinook would be expected during the dredging period. Very small numbers of juvenile coho could be present though October, but this would represent less than 5 percent of the typical outmigration (95 percent have typically migrated past Bonneville Dam by the end of June). Subyearling Chinook from the fall-run Chinook Snake River, Deschutes River, and Upper Columbia River ESUs would be emigrating in August, and may persist in very small numbers through November.

For most populations, the dredging period overlaps with a portion of the adult salmon and steelhead originating upstream of the Bonneville Dam. Migration timing for adults of most populations is expected to go through August or September, with a very small proportion of fall-run and summer/fall Chinook extending into October. Much of the dredging would occur during months when few if any adults from these populations would be present. Coho salmon are the exception, with a portion of the adult migration extending through the proposed dredging period.

Overall, most of the dredging would occur during periods when few if any juvenile salmon or steelhead would be present. Adult Chinook and steelhead may be present as late as October, but

in relatively small numbers (October), and would not be present during dredging in November and December. The vast majority of adult Chinook and steelhead would not be exposed to the potential effects of dredging.

Adult coho would be present during most of the dredging period.

Effects if Fish were Present

The following effects analysis applies only to individual fish potentially present during dredging. Specifically, it addresses the potential for physical effects of elevated suspended sediments in the water column, and also the potential for behavioral effects as a response to increased turbidity during dredging.

The DEIS states that suspended sediments concentrations near dredging activity typically do not cause gill damage to salmonids (DEIS page 4.7-23, also SEPA Fish Technical Report page 3-4). This is consistent with the impact analysis submitted by the applicant (Grette Associates 2014b). Therefore, dredging is not anticipated to injure fish present during construction.

The DEIS addresses the potential for positive and negative behavioral effects due to turbidity (DEIS page 4.7-23, also SEPA Fish Technical Report page 3-4). Examples include both increased (coho) and decreased (Chinook) predator avoidance.

It is important to understand that turbidity during dredging at this location is anticipated to be minimal, temporary, and highly localized (well within 300 feet of active dredging) and deep (greater than -20 ft CRD). This is based on the sandy sediment and is demonstrated by observations during previous dredging at Dock 1 immediately upstream (Grette Associates 2014b). Temporary avoidance of the mixing zone by individual salmonids (juvenile or adult) in deep water would not disrupt behaviors such as rearing, foraging, or migration because it is limited to a relatively small area of the Columbia River and avoidance would not exclude the opportunity for fish to use or pass through any particular habitat type. Even with the general context of minimal, temporary, and highly localized turbidity, impact analysis submitted by the applicant included an evaluation of salmonid behavioral responses to elevated levels of suspended sediments (Grette Associates 2014b), which is summarized here for reference.

Salmonid behavioral responses to elevated levels of suspended sediment can include feeding disruption, changes in migratory behavior, or swimming near the surface and avoidance behavior. Results of laboratory studies for fish exposed to turbidity and/or total suspended sediments (TSS) indicate little to no feeding disruption response at the turbidity and/or TSS anticipated within the mixing zone during dredging (Bisson and Bilby 1982, Berg and Northcote 1985, Redding et al. 1987). While some disruption has been observed at turbidity levels as low as 20 NTU (e.g., Berg and Northcote 1985), given that levels of background turbidity already may be above these lower thresholds, and that background variability is so much greater than the difference in turbidity observed at various points during active dredging, foraging disruptions resulting from dredging conditions are very unlikely. Similarly, there is some evidence that TSS and turbidity levels expected at this location during dredging (see Grette Associates 2014b) are at the low end of those levels that can cause a behavioral response in juvenile salmonids such as avoidance (e.g., Martin et al. 1977) or rising to the surface (e.g., Servizi 1988) under controlled

conditions. However, based on relative background levels and variability, the temporary and highly localized alterations from dredging may not elicit a response. Even temporary avoidance of the mixing zone on the part of individual juvenile or adult salmonids in deep water would not disrupt rearing, foraging, or migration because it is limited to a relatively small area of the Columbia River and avoidance would not exclude the opportunity for individual fish to use or pass through any particular habitat type.

The DEIS proposes that elevated turbidity "could affect" juvenile salmon and steelhead behavior, potentially including reduced predator avoidance (SEPA Fish Technical Report page 3-4). As with other effects, the vast majority of juveniles from populations potentially present during dredging would not experience increased turbidity due to timing restrictions. Based on timing restrictions and the limited extent of turbidity during dredging, only a very small proportion of emigrating juvenile salmonids could ever be exposed to turbidity.

Conclusion

Dredging would cause localized turbidity that is expected to settle quickly. Timing restrictions on dredging will largely limit the potential for adult and juvenile salmonids produced above Bonneville Dam to be exposed to turbidity. Of those fish potentially present, not all would be exposed to turbidity due to the small area of the mixing zone (300 feet from active dredging).

For the very small subset of individual fish that could experience elevated turbidity, there is no expectation of injury due to gill damage. Behavioral responses could occur, but due to the limited spatial extent of the turbidity this would not be expected to disrupt foraging, rearing, or migration to the degree to lower the fitness or survival of the exposed fish. Overall, the risk posed by turbidity to individual fish is expected to be negligible.

The low risk to individual fish could not translate to high enough mortality to cause or contribute to a population-level effect for the salmonids originating upstream of Bonneville Dam. Therefore, dredging would not impact fish harvest by tribal fishers in Zone 6.

3.3 CONSTRUCTION IMPACTS: IMPACT PILE DRIVING

Timing

Impact pile driving is proposed for September 1 through December 31. Based on the timing of adult and juvenile salmonid movement through the Project area, the following ESUs/DPSs are not expected to be present during impact pile driving (see Table 2):

- Snake River spring/summer run Chinook (threatened)
- Upper Columbia River Chinook spring-run (endangered)
- Middle Columbia River Chinook spring-run (not listed)
- Snake River sockeye (endangered)
- Okanogan River sockeye (not listed)
- Lake Wenatchee sockeye (not listed)

For these six ESUs/DPSs, there would be no direct effects of impact pile driving.

This leaves the following six Chinook and steelhead ESUs/DPSs to consider, in addition to fish from artificial propagation programs (including coho):

- Snake River spring/summer run Chinook (threatened)
- Deschutes River summer/fall-run Chinook (not listed)
- Upper Columbia River summer/fall run Chinook (not listed)
- Snake River steelhead (threatened)
- Upper Columbia River steelhead (threatened)
- Middle Columbia River steelhead (threatened)

The list above is consistent with DEIS Table 4.7.7 (page 4.7-25), but also includes the non-listed Chinook ESUs (included in Table 2 of this technical response). This information is consistent with the impact analysis submitted by the applicant (Grette Associates 2014b).

The September 1 through December 31 impact pile driving period is very protective of juvenile salmon and steelhead originating upstream of the Bonneville Dam (Table 2); even more so than the dredging period because it avoids work during August when subyearling fall-run Chinook are expected to be present. Further, no juvenile steelhead would be expected during the impact pile driving period. Very small numbers of juvenile coho could be present though October, but this would represent less than 5 percent of the typical outmigration (95 percent have typically migrated past Bonneville Dam by the end of June). Similarly, very small numbers of subyearling Chinook from the fall-run Snake River, Deschutes River, and Upper Columbia River ESUs may persist through November.

For most populations, the impact pile driving period is also protective of adult salmon and steelhead originating upstream of Bonneville Dam. Return migration timing for most populations is expected to extend into August or September, with a very small proportion of fall-run and summer/fall Chinook extending into October. Much of the impact pile driving would occur during months when few if any adults from these populations would be present. Coho salmon are the exception, with returns extending well into the proposed impact pile driving period.

Overall, impact pile driving would occur when few if any juvenile salmon and steelhead are present. Adult Chinook and steelhead may be present as late as October, in relatively small numbers (October), and the vast majority of individual fish would not be exposed to pile driving. Adult coho are the exception and would be present during much of the impact pile driving period.

Effects if Fish were Present

The discussion above establishes that an impact pile driving work window will avoid direct effects dredging for six populations of salmon and steelhead originating above the Bonneville Dam. For those fish potentially present, excepting adult coho, the vast majority of individual fish move through the Project area outside of the impact pile driving period and therefore would not be exposed to pile driving.

The following effects analysis therefore applies only to those fish present during impact pile driving. It addresses the potential for physical effects of elevated underwater sound pressure levels, and also the potential for behavioral effects as a response to elevated underwater sound.

The DEIS analysis of direct effects of impact pile driving on juvenile and adult salmon and steelhead is generally consistent with the impact analysis submitted by the applicant (Grette Associates 2014b). The DEIS analysis concluded no unavoidable and significant adverse impacts for fish.

Individual subyearling Chinook and juvenile coho in the system during impact pile driving would be a very small proportion of emigrants in any given year. As described in the SEPA Fish Technical Report, the pile driving impact analysis is conservative with regard to the potential for injury (page 3-8) or behavioral effects (page 3-14). As part of ESA consultation for the Proposed Action it is expected that pile driving would be concluded to cause a small but unquantified "take" or loss of juvenile salmonids. Such a conclusion would be consistent with the conclusions for a number of other ESA consultations for larger projects on the lower Columbia River including:

- Port of Kalama North Port Marine Terminal Expansion (NMFS 2005)
- Port of Kalama United Harvest Pier Modernization (NMFS 2010)
- Columbia River Crossing (NMFS 2011a)
- Port of Vancouver Terminal 5 Bulk Potash Handling Facility Project (NMFS 2012)

As described in NMFS' conclusions for two of these consultations, "*the removal of a small number of juveniles from these populations [for which injury/mortality from pile driving is likely to occur] is not expected to affect the number of adults that will return to spawn, or the distribution or productivity of spawners… Thus, the proposed actions are not expected to affect the abundance, productivity, distribution, or diversity of any affected population and will not appreciably reduce the likelihood of survival and recovery for these species*" (NMFS 2010 and NMFS 2012). These consultations concluded that individual effects for these projects would not have population-level impacts (e.g., abundance, productivity).

The numbers of individual juvenile salmonids that could be lost due to pile driving is so small it would not change the number of adult fish returning to Zone 6.

Adult Chinook and steelhead would be present during September and could be present into October, comprising the late portion of returning fish for the six ESUs/DPSs considered. Adult coho originating from above the Bonneville Dam would be present throughout the impact pile driving period. All adult salmon and steelhead are expected to be migrating rapidly past the construction area (DEIS page 4.7-26), limiting their potential for and duration of exposure to elevated sound.

The SEPA Fish Technical Report concludes that it is extremely unlikely that individual adult fish present during impact pile driving would be injured due to elevated sound (page 3-14); behavioral effects are speculative (page 3-14 and 3-15). Based on the information in the SEPA

Fish Technical Report and our own analysis, the direct effects of impact pile driving on individual adult fish would be negligible (injury) or minimal (behavioral).

Conclusion

Overall, the timing restrictions during impact pile driving will limit the exposure of adult and/or juvenile salmonids originating above Bonneville Dam. Six ESUs will experience *no direct effects* of impact pile driving. Adult and/or juvenile salmonids from the remaining six ESUs/DPSs listed above, as well as other hatchery-origin salmonids, could be present during impact pile driving. As described above, for those populations, effects would either affect a very small proportion of individual emigrating subyearling (Chinook and coho) or would be negligible and/or minimal for individual returning adults (Chinook, steelhead, and coho). These effects on individual fish are not commensurate with population level effects for any of the populations originating from upstream of Bonneville Dam. Therefore, the direct effects of impact pile driving would not affect fish harvest for tribal fishers in Zone 6.

4 OPERATIONS IMPACTS

Chapter 4 of the DEIS addressed nine categories of potential direct and indirect impacts to fish that could result from the operation of the proposed Coal Export Terminal.

For the following seven categories, risks were speculated but strong conclusions were not drawn in terms of impacts to fish. Because risks for these categories were either determined or implied to be insignificant or were speculative at the level of individual fish and fish habitat, those analyses do not support conclusions of population-level impacts to fish originating upstream of Bonneville Dam:

- Cause Spills or Leaks that Contaminate Water Quality
- Cause Physical or Behavioral Response to Vessel Noise
- Generate and Disperse Coal Dust in the Aquatic Environment
- Spill Coal during Operations of the Proposed Action
- Periodically Remove or Alter Aquatic Habitat during Maintenance Dredging
- Spill Coal during Rail Transport
- Affect Commercial and Recreational Fishing

For the remaining two categories listed below, the DEIS identified potential appropriate impact mechanisms that warranted additional analysis relative to individual and population-level impacts.

- Increased Shading that Affects Fish and Fish Habitat
- Cause Fish Stranding from Vessel Wakes

4.1 OPERATIONS – DIRECT IMPACTS

4.1.1 Increased Shading that Affects Fish and Fish Habitat

The following conclusions are from page 4.7-28 of the DEIS:

"The height of the trestle would allow light to penetrate beneath the structure and would, therefore, not be expected to have measurable shading effects on primary productivity or fish behavior, migration, or predation in SWZ habitat."

"Based on the location of Docks 2 and 3 over DWZ habitat, and the relatively small area shaded in relation to the overall study area, the overall shading impact would be low."

Due to the determinations of no measurable and low potential impacts, no additional analysis is provided in the DEIS on these points. However, the DEIS does assume an increase in predation that would likely impact fish present in the Project Area. The DEIS concludes the following on page 4.7-28:

"The dock and moored vessels would be located over DWZ habitats, where shaded habitat could provide suitable conditions for larger predatory fishes and piscivorous birds (i.e., fish-eating) birds. Piles and moored vessels may also create flow conditions favorable for predatory

birds. The extent or magnitude to which an increase in overwater surface area could alter the predator-prey relationship in the study area is unknown, but it is assumed that the relationship would change and an increase in predation would be likely. "

The key issues for understanding whether these impacts can cause or contribute to a population level impact on fish is understanding the distribution and effect of predators in the river below Bonneville Dam. Piscivorous fish and birds are addressed separately below.

Piscivorous Fish

Docks 2 and 3 would be located approximately 700 feet offshore in deep water as measured perpendicular to shore. This would comprise most of the new structure including 563 of the new piling to be placed below OHW (93 percent of total) and 4.62 acres of the new overwater coverage (90 percent of total). Most of this structure would be supported by bents approximately 78 feet long (perpendicular to shore) spaced 15 feet apart, and alternating between 2 and 5 pile per bent. A portion of Dock 2 would consist of 6 bents 98 to 118 feet long spaced 20 feet apart supported by 6 or 7 pile each. Overall, pile spacing would vary between 15 and 30 feet between bents, and up to 60 feet within a bent. After dredging, most of Dock 2 and 3 would be located waterward of -40 ft CRD.

At its widest point the structure would be approximately 127 feet wide, which is about 5 percent of the channel width at the Project site; the majority of the structure is approximately 90 feet wide. Therefore, while there may be increased potential for piscivorous fish associated with the structure of Docks 2 and 3, a relatively small proportion of fish are expected to encounter this structure based on its depth and orientation relative to the channel.

Piscivorous Birds

In the context of Columbia River salmonid recovery planning, avian predation is not addressed specifically relative to overwater structures; however, it is addressed relative to pile, pile dikes, and other non-specific structures (NMFS 2011b). In the Columbia River, pile and pile dikes are repeatedly, specifically cited as bird roosting areas with regard to predation on juvenile salmonids whereas large overwater structures are not (Lyons, Roby, and Collis 2007; Lower Columbia River Fish Recovery Board 2010, NMFS 2011b).

In recent years, Caspian terns and double-crested cormorants (hereafter "terns" and "cormorants") nesting on East Sand Island consumed approximately 4.7 million and 11 million juvenile salmonids, respectively, per year (USACE 2014a, USACE 2014b). The diet of terns which nest on East Sand Island typically includes approximately 31 percent salmonids, on average, with the remainder primarily marine forage fishes (USACE 2014b). The diet of East Sand Island cormorants includes approximately 12 percent salmonids, on average, with the remainder constituting a wide variety of marine, estuarine, and freshwater taxa (USACE 2014a). The proportion of salmonids in the diet of these birds fluctuates with availability; peak salmonid consumption occurred in mid- and late-May for terns and cormorants, respectively (USACE 2014a, USACE 2014b). Based on colony size, it could be expected that predation on juvenile salmonids by terns and cormorants in the estuary is primarily associated with birds nesting on East Sand Island. This is consistent with the recovery of passive integrated transponder (PIT)

tags from nesting areas throughout the Columbia Basin, which revealed that terns and cormorants from East Sand Island consumed the highest proportion of PIT-tagged salmonids in comparison to all other colonies (Evans et al. 2012).

Cormorants nesting on East Sand Island were found to travel an average of 3 to 10 miles to forage (Anderson et al. 2004). Females generally traveled less than 6 miles from the colony while the majority of males traveled more than 9 miles but less than 15 miles; the two farthest foraging trips performed by males were approximately 26 and 29 miles. Terns nesting at East Sand Island forage primarily in the vicinity of their colony and only occasionally travel into the freshwater zone of the upper estuary (Lyons et al. 2005). The Project is located at RM 63, which is approximately 58 miles upstream of East Sand Island. Based on the foraging distances identified above, the majority of terns and cormorants nesting on East Sand Island (RM 5) would not be expected to forage above RM 34 and would thus not be expected to occur in the Project area. The majority of cormorants nesting near Miller Sands Spit and the upper estuary channel markers (~RM 23 to 33) would also be unlikely to forage in the Project area, as this would represent trips of 40 and 30 miles, which is at the farthest extent of the foraging range for males described by Anderson et al. (2004). Overall, the Project area is not expected to be utilized as a foraging area by cormorants or terns from the East Sand Island colonies or by cormorants from other smaller colonies in the lower estuary.

In addition to the low likelihood that cormorants or terns would forage in the Project area, the terminal is unlikely to provide suitable roosting habitat. Docks 2 and 3 and the associated trestle would constitute a busy, industrial terminal with 24-hour operations. This activity is likely to dissuade birds from regularly perching on structures at the facility. Therefore, new structures associated with the proposed terminal would not be expected to increase the presence of piscivorous birds at the Project site.

Conclusions on Population-level Impacts due to Predators

Recent studies have assessed mortality of juvenile salmonids migrating in the Lower Columbia River downstream of Bonneville Dam by using fish tagged with acoustic transmitters and fixed antennae arrays (McMichael et al. 2010, McMichael et al. 2011). The fish studied are salmon and steelhead stocks that are produced upstream of Bonneville Dam and would contribute to tribal fisheries in Zone 6.

These studies provide data on overall mortality experienced by juvenile salmonids as they emigrate through the lower river and allow partitioning of mortality to the reach of the river that mortality occurs. Survival from the dam to the mouth of the river varies by species, life history type, migration season and year. In 2010 the pooled survival probability was measured from just downstream of the mouth of Willamette River RKm 153 (RM 95), to the mouth of the Columbia River. Survival probability was 0.844 for yearling chinook, 0.603 for steelhead smolts, and 0.861 for subyearling fingerling Chinook[1]. These results fall within the range of results that have been measured previously for fish migrating from the dam to the mouth (McMichael et al. 2010,

[1] Fish were tagged and released at multiple locations above the Bonneville Dam, but survival probability was calculated based on "virtual releases" comprising tagged fish detected at RKm 153 (~RM 95), just downstream of the Willamette River. See McMichael et al. 2011, Section 2.1 (Fish Collection, Tagging, Release) and Section 2.8 (Migration Behavior).

McMichael et al. 2011). Figures 1, 2, and 3 show the results for Chinook yearling, Steelhead smolts, Chinook subyearling (fingerlings) passing through the lower Columbia River. Most of the mortality occurs below RKm 50 (~RM 31.5) with losses typically highest below RKm 37 (~RM 23). This zone of the Columbia River coincides with the location of the Caspian tern and cormorant colonies and the mortality that occurs in this area is typically concluded to be caused by bird predation (McMichael et al. 2011)[2]. The level of the mortality occurring downstream of RKm 50 (~RM 31.5) is consistent with an impact that would cause population-level losses that would affect the numbers of returning adult salmon to the Zone 6 fishery.

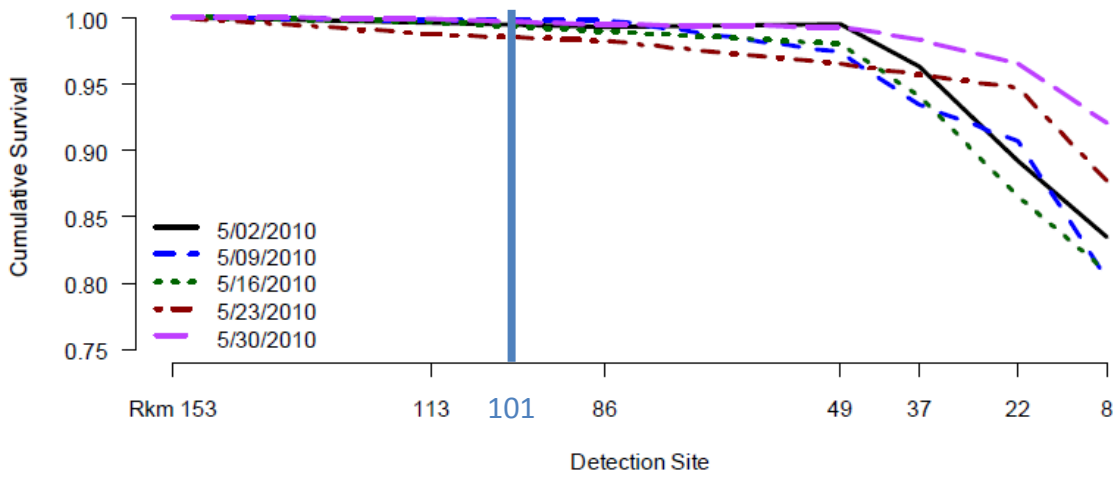

Figure 1. Yearling Chinook cumulative survival probability, adapted from McMichael et al. 2011, with Coal Export Terminal location shown (~RKm 101). Note differences in Y-axis scale among Figures 1, 2, and 3.

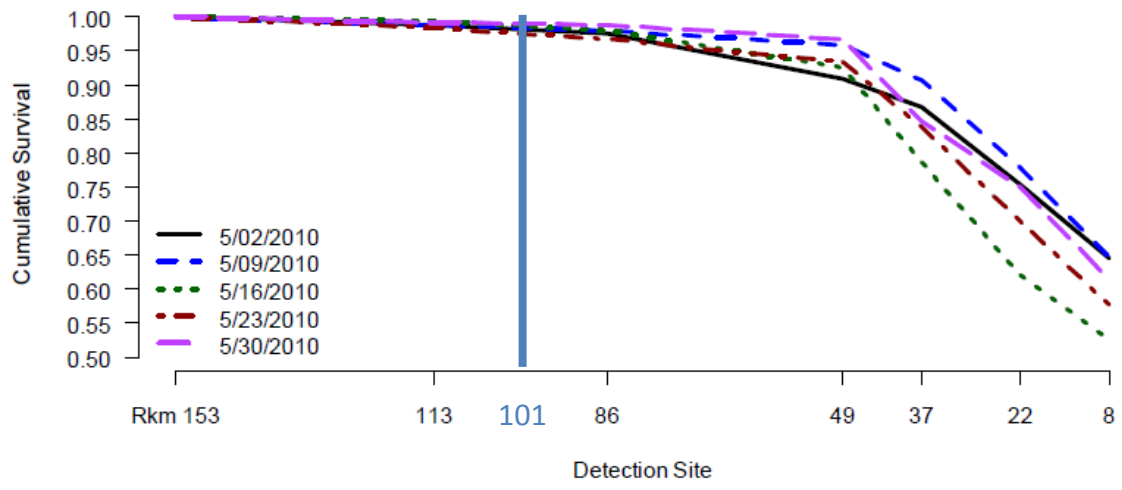

Figure 2. Steelhead smolt cumulative survival probability, adapted from McMichael et al. 2011, with Coal Export Terminal location shown (~RKm 101). Note differences in Y-axis scale among Figures 1, 2, and 3.

[2] The authors note that apparent decreased survival for the latest virtual release group of subyearling Chinook could result from individual fish ceasing migration in favor of extended rearing, rather than individual mortality (Figure 3; page 4.1 in McMichael et al. 2011).

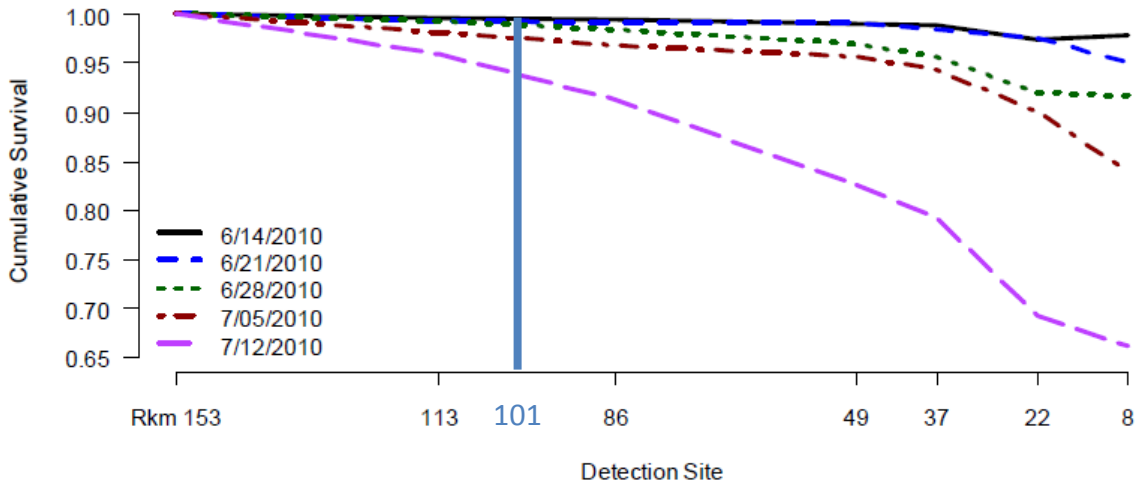

Figure 3. Subyearling Chinook cumulative survival probability, adapted from McMichael et al. 2011, with Coal Export Terminal shown (~RKm 101). Note differences in Y-axis scale among Figures 1, 2, and 3.

Based on the result in Figures 1, 2, and 3, very little mortality is occurring to migratory juvenile salmonids from near the mouth of the Willamette River to RKm 50 (~RM 31.5) from all causes. Further, the developed shorelines of Longview, Washington and Rainier, Oregon, with their numerous large overwater structures and pilings, are encompassed by the reach of the river described between RKM 113 (~RM 70) and RKm 86.2 (~RM 53.6). The results demonstrate that that survival is high through that developed reach (Figures 1, 2, and 3). Based on the analysis above, the potential for the new docks to cause a change in predation, by birds or fish, in the reach from RM 70 to Rm 53.6 is negligible and would not contribute to the population- level impacts of predation experienced below RKm 50 (~RM 31.5).

These conclusions are consistent with the low importance put on overwater structures in the Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead (NMFS 2011b). Specifically, predation impacts associated with overwater structures has been identified as a relatively low risk with a very low threat priority (NMFS 2011b).

4.2 OPERATIONS – INDIRECT IMPACTS

4.2.1 Cause Fish Stranding from Vessel Wakes

The following conclusion is from Page 4.7-32 of the DEIS

"The additional traffic associated with the Proposed Action would result in an increased risk of fish stranding."

Field studies have demonstrated that in order for subyearling Chinook salmon to be exposed to stranding, they must be present in the shallow water margin when ship wakes interact with the shoreline (Bauersfeld 1977, Hinton and Emmett 1994, Pearson et al. 2006). The distribution of subyearling Chinook salmon in the shallow margin varies seasonally, with differences in water

temperature, river level, and fish length all influencing habitat preferences (McCabe et al. 1986, Dawley et al. 1986, Healy 1991, Bottom et al. 2005, Bottom et al. 2008).

In general, habitat use and timing of Chinook salmon outmigration periods vary by age group. Most yearling fish emigrate in the spring, during which time they utilize deepwater areas. In addition, subyearling emigrants from the Snake River fall-run ESU are typically larger than other subyearlings (>99 mm), and like yearling fish are most likely to use deepwater areas. Unlike yearling fish, Snake River fall-run Chinook salmon emigrate over a longer period, which extends from the spring through the fall (see Table 2 in Section 3.1).

Small subyearling chinook use shallower water areas closer to shore. Collectively, subyearlings from several ESUs could be present in the lower Columbia year round, and in general their habitat use shifts from the very shallow margins to shallow water and eventually to deep water areas as fish size increases throughout the outmigration period.

Roegner et al. (2012, 2013) collected subyearling Chinook salmon with beach seines at sites throughout the lower Columbia River. For the purpose of considering stranding risk, this analysis focuses on results downstream from RM 63. This includes study sites from reaches C and D of Roegner et al. 2013 and the tidal freshwater sites in Roegner et al. 2012. These studies provide data between roughly RM 34 and 70 (Figure 4).

The authors performed genetic-stock analyses to assign subyearling fish to their ESU of origin[3] and to determine the proportional presence of each ESU in the nearshore by month/season (Table 3). Six of the eight Columbia Basin ESUs were represented in captured subyearlings, four of which are listed as threatened under the ESA. In reaches C and D, genetic stock analyses indicate that in all seasons, fall-run Chinook salmon from the Lower Columbia River ESU make up the vast majority (greater than 91 percent) of all Chinook salmon present in shallow water areas of the tidal freshwater region (Figure 5).

For most juvenile Chinook salmon, travel through the tidal freshwater region to the lower estuary is direct, on the order of days or weeks. Variations in migration rates are related, in part, to size (a function of swimming ability) and season (a function of river discharge). In addition, both yearling and subyearling Chinook salmon may extend their emigration by loitering within off-channel habitats, although occupation of these areas is typically brief (one to two tidal cycles). Overall, juvenile Chinook salmon generally move through the tidal freshwater region and do not hold or occupy areas within it for extended periods.

In summary, subyearling Chinook salmon can occur within the tidal freshwater region year-round, but presence in the shallow margin is limited largely to the spring, with low relative abundance in the winter and summer. Based on genetic-stock analyses, the majority of

[3] Roegner et al. 2012, 2013, and Teel et al. 2014 use different terminology for ESUs than those considered under the ESA. In ESA parlance, "Lower Columbia River Chinook ESU" includes the Roegner et al. categories "West Cascade Tributaries fall, West Cascade Tributary spring, and Spring Creek group fall". For this stranding analysis, this ESU divided only by fall and spring life history types. The Roegner categories also combine the Middle Columbia (not listed) and Upper Columbia (listed) spring-run ESUs, which were detected very rarely. Other minor differences in terminology exist – this analysis uses the ESU names as described by NOAA Fisheries for ESA management and recovery purposes as described on the NOAA Fisheries website http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/salmon_and_steelhead_listings/salmon_and_steelhead_listings.html.

subyearling Chinook salmon present in the shallow nearshore during all seasons originate from the Lower Columbia River ESU, and of those, the majority represent fall-run stocks (Figure 5).

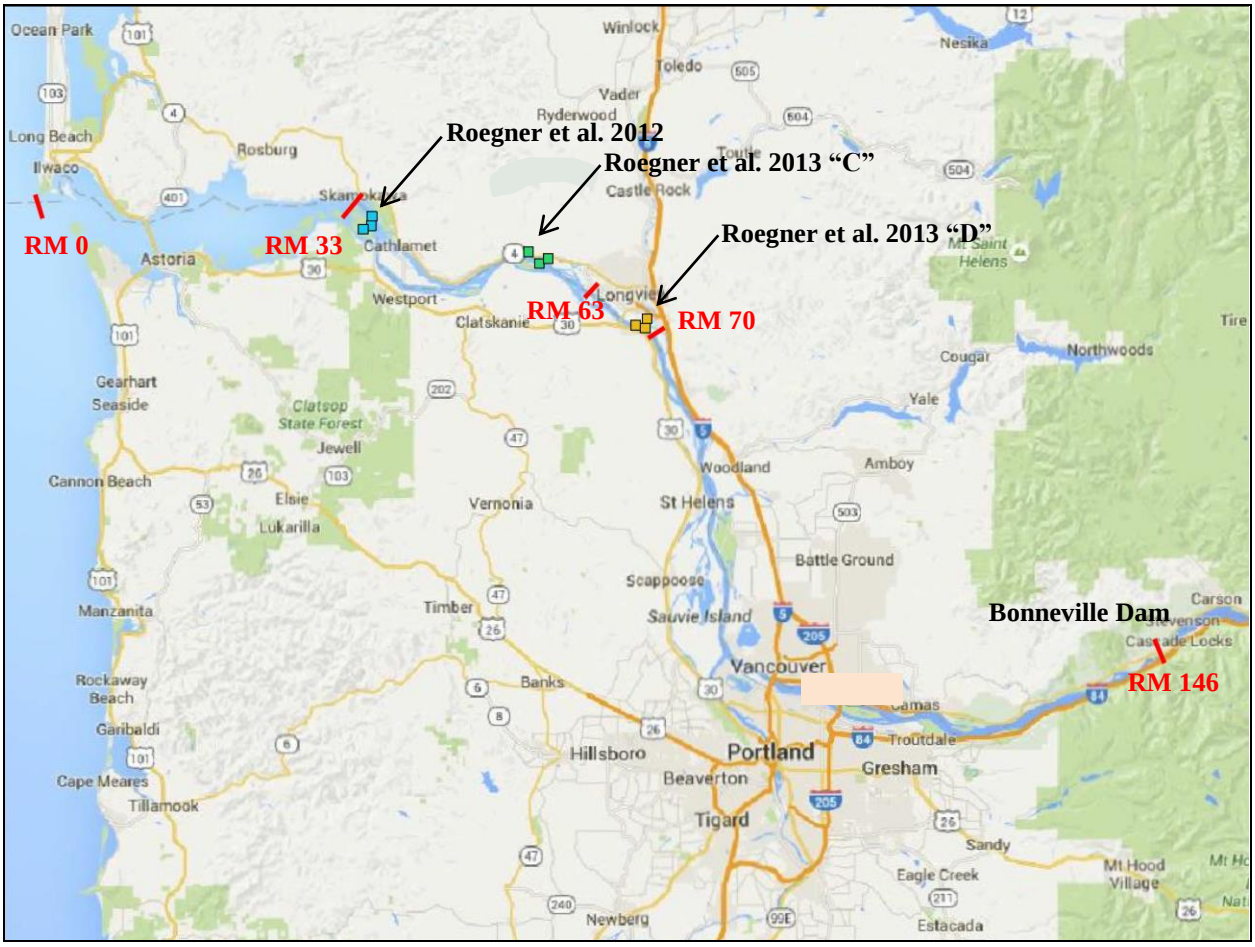

Figure 4. The subset of sampling sites of Roegner et al. (2012, 2013) that were located between RM 33 and 70 of the Columbia River

Table 3. Genetic-stock composition of subyearling Chinook salmon captured in the lower portion of the tidal freshwater region of the Columbia River estuary by month (gray shading, Roegner et al. 2013) and season (no shading, Roegner et al. 2012), between approximately RM 33 and 70 (see Figure 5). ESU names in bold font denote listing as threatened or endangered under the ESA. Composition in catch listed as '<0.01' represents a reported value of 0.005 to 0.009; reported values less than 0.004 are listed as '0.'

	Month/ Season	**January[3]**	**Winter[4]**	**March**		**May**		**Spring[4]**	**July**		**Sept/Nov**		**Summer/Fall[4]**
	Sampling Location	**Reach 'C'+'D'**	**Tidal freshwater**	**Reach 'C'**	**Reach 'D'**	**Reach 'C'**	**Reach 'D'**	**Tidal freshwater**	**Reach 'C'**	**Reach 'D'**	**Reach 'C'**	**Reach 'D'**	**Tidal freshwater**
ESU[6] (run component)	**n=fry[5] n=fingerling[5]**	***n=102 n=0***	***n=83 n=0***	***n=81 n=0***	***n=198 n=0***	***n=135 n=33***	***n=138 n=42***	***n=218 n=318***	***n=25 n=103***	***n=58 n=122***	***n=0 n=76***	***n=0 n=56***	***n=57 n=291***
Lower Columbia (fall[1])	fry	0.60	0.87	0.95	0.95	0.94	0.95	0.95	0.93	0.89	--	--	1.00
	fingerling	--	--	--	--	0.94	0.96	0.95	0.83	0.95	0.93	0.94	0.89
Lower Columbia (spring[1])	fry	0.39	0.12	0.05	0.03	<0.01	0.02	0.02	0.04	0.05	--	--	0
	fingerling	--	--	--	--	0.06	0.04	<0.01	0.05	<0.01	0.04	0.03	0.02
Upper Willamette	fry	0.01	<0.01	0	<0.01	0.02	<0.01	0	0	0	--	--	0
	fingerling	--	--	--	--	0	0	0	0	0	0.01	0.02	0
Deschutes River summer/fall-run	fry	0	0	0	0	0	0	0	0	0	--	--	0
	fingerling		--	--	--	0	0	0	0	0.02	0	0	0
Middle and **Upper Columbia spring-run[2]**	fry	0	0	0	0	0	0	0	0	0	--	--	0
	fingerling	--	--	--	--	0	0	0	0	0	0	0	0
Upper Columbia summer/fall-run	fry	0	0	0	0.01	0	0.02	0.01	0	0.03	--	--	0
	fingerling	--	--	--	--	0	0	0.03	0.11	0.02	0	0.02	0.08
Snake River fall-run	fry	0	0	0	0	0	0	<0.01	0.04	0.02	--	--	0
	fingerling	--	--	--	--	0	0	0	0	0	0	0	0.02
Snake River spring/summer-run	fry	0	0	0	0	0	0	0	0	0	--	--	0
	fingerling	--	--	--	--	0	0	0	0	0	0	0	0

[1] Lower Columbia fall-run and Lower Columbia spring-run represent the same ESU.
[2] Stocks from the Middle Columbia and Upper Columbia spring-runs represent two distinct ESUs but were not genetically differentiated. Only fish from the Upper Columbia ESU are listed as threatened under the ESA. Neither ESU was represented in beach seine catches in Roegner et al. (2012, 2013) between RM 33 and 70.
[3] Roegner et al. (2013) combined sampling from sites in reach C and D to determine the fry proportion for January.
[4] Roegner et al. (2012) defined seasons as: November–February = 'Winter'; March–June = 'Spring'; July–October = 'Summer/Fall'
[5] Roegner et al. (2012, 2013) defined the size threshold between fry and fingerling as 60 mm (FL) for subyearling fish.
[6] This table and visualization in Figure 5, exclude catches that were reported from non-ESA listed populations outside of the Columbia River (Rogue River, coast fall-spring fish), which were a very small catch component (not more than 4 percent).

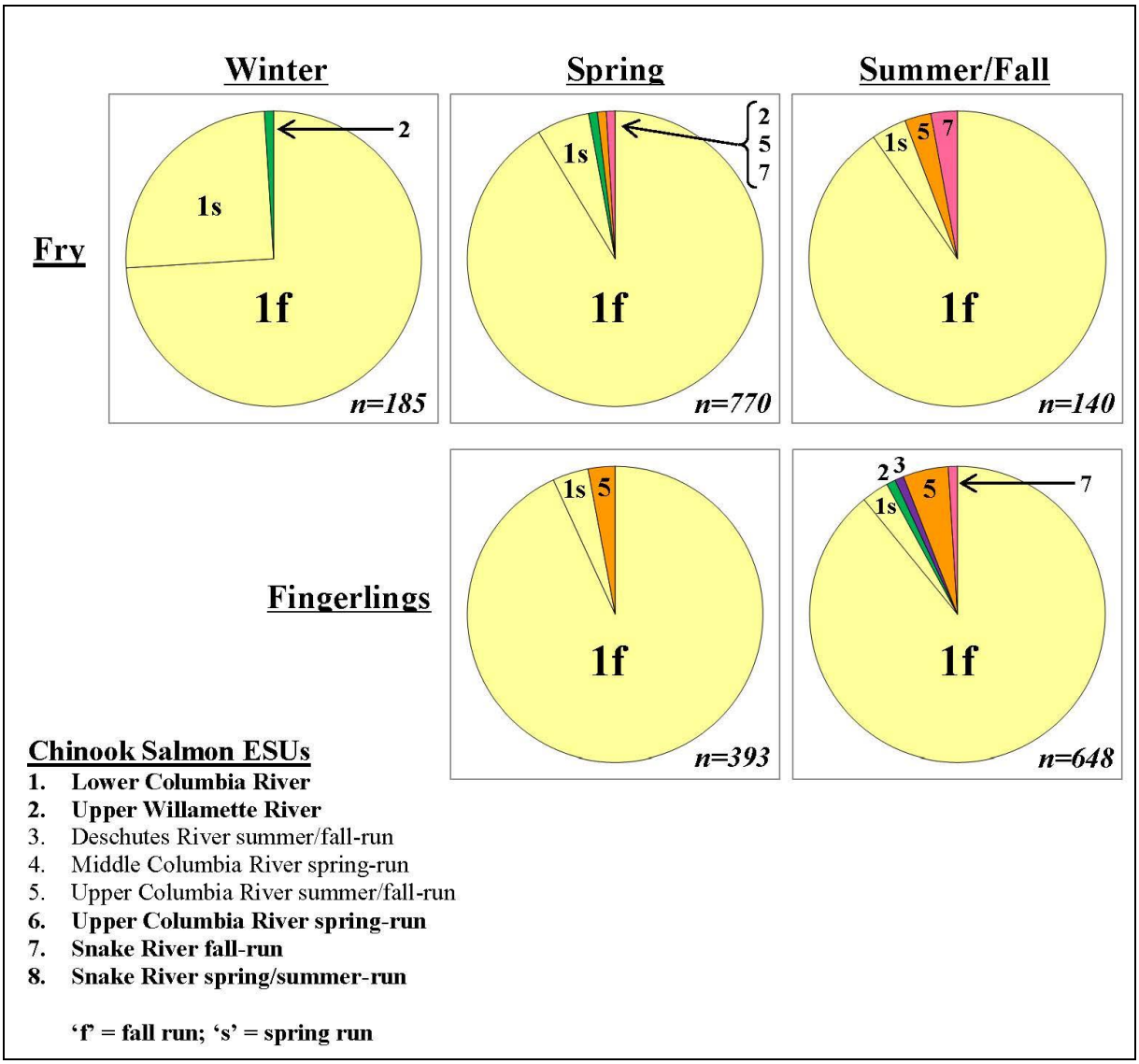

Figure 5. Spatiotemporal distributions, by ESU, of Chinook salmon fry and fingerlings captured at sites in the lower portion of the tidal freshwater region of the Columbia River estuary, between approximately RM 34 and 70 (data from Roegner et al. 2012, 2013). Chinook salmon ESU names in bold font denote listing as threatened or endangered under the ESA.

Stranding Susceptibility by ESU

Bottom et al. (2008) found that the presence of subyearling Chinook salmon in nearshore areas declined in July, once surface-water temperatures at sampling sites exceeded 19°C. The authors concluded that high temperatures reduced the availability of shallow-water habitat by mid-summer and shifted occupation to deepwater areas during the late-summer and fall. A shift away from the shallow margin to deeper habitat is also associated with the attainment of fingerling size. This has been observed during concurrent sampling where subyearling Chinook salmon occupying shallow-water areas were generally smaller than those subyearlings captured from adjacent deepwater channels (Dawley et al. 1986, McCabe et al. 1986, Weitkamp et al. 2012).

Additionally, fish length influences habitat preference by season. In the winter and early spring, mean length is typically consistent with fry (<60 mm), in spring and summer it is more typically consistent with small fingerlings (60 to 80 mm), and in the fall it is more typically consistent with larger fingerlings (80 to 120 mm) (Bottom et al. 2008, Johnson et al. 2011). Fish length influences habitat associations and outmigration pathways, with small fry and fingerlings occupying shallow margin areas and larger fish moving through deepwater channels (Dawley et al. 1986, McCabe et al. 1986, Bottom et al. 2008, Roegner et al. 2012, Roegner et al. 2013, Weitkamp et al. 2012). For instance, McCabe et al. (1986) determined that this habitat transition occurred when fish approached 99 mm. Based on the above discussion, a summary of expected presence in the different habitat zones between RM 34 and 61, by ESU, is included in Table 4. The river extent is based on the lower- and upper-most beach seine locations within Reaches C and D, which represent the tidal freshwater portion of the river below RM 63.

Table 4. Summary of expected presence in the different habitat zones between RM 33 and 63 of the tidal freshwater region for juvenile Chinook salmon from all Columbia River ESUs.

		Expected Presence[1]							
		Winter[2]		Spring[2]		Summer[2]		Fall[2]	
ESU (outmigrant age class)	**ESA Listing Status**	Shallower [3]	Deeper[3]	Shallower	Deeper	Shallower	Deeper	Shallower	Deeper
Lower Columbia River (subyearling and yearling)	Threatened	…[5]	….	X	X	…	X		…
Upper Willamette River (subyearling and yearling)	Threatened	…[6]	…	…	X				…
Deschutes River summer/fall-run (subyearling)[6]	Not Listed			…	X	…	X		…
Middle Columbia River spring-run (yearling)[6]	Not Listed				X				
Upper Columbia River summer/fall-run (subyearling and yearling)[7]	Not Listed			…	X	…	X		…
Upper Columbia River spring-run (yearling)	Endangered				X				
Snake River fall-run (subyearling and yearling)	Threatened			…	X	…	X		…
Snake River spring/summer-run (yearling)	Threatened				X				

[1] Information referenced from Roegner et al. (2012, 2013), Columbia River DART (2013), and Bottom et al (2008)
[2] Seasons are based on Roegner et al. (2012, 2013): December–February = 'Winter'; March–June = 'Spring'; July –August = 'Summer'; and September–November = 'Fall'
[3] Refers generally to shallow, nearshore water, e.g. 0-6 ft depth.
[4] Refers generally to deeper water, e.g. 6 ft and deeper.
[5] The use of '…' denotes low relative abundance within each ESU, X denotes higher relative abundance more typical of standard outmigration periods.
[6] Localized presence is higher in the Shallow water near and immediately downstream of the mouth of the Willamette River, but not generally within the tidal freshwater region.

Conclusions

Subyearling Chinook salmon documented in stranding events have been limited to those of fry and fingerling size, typically between 30 and 90 mm (Bauersfeld 1977, Hinton and Emmett 1995, Ackerman 2002, Pearson et al. 2006). This size range is consistent with those fish which have a strong association to shallow nearshore areas (see Table 4). Based on genetic-stock analyses from the shallow nearshore (Figure 5) and seasonal expectations for presence in the habitat zones (Table 4), exposure to stranding risk is expected to primarily concern small subyearlings from fall-run stocks of the Lower Columbia River ESU during the winter, spring, and early summer. All other ESUs are expected to be at very low risk of stranding due to vessel wakes from ships calling at the proposed Coal Export Terminal due to their near absence from the shallow water margin during seasons when stranding occurs. As described above,

subyearling outmigrants from the Snake River fall-run ESU are typically larger than other subyearlings (>99 mm), and like yearling fish are most likely to use deepwater areas.

As stated in Section 3.2 of this technical response, the Lower Columbia River Chinook ESU does not contribute to tribal fisheries in Zone 6. Therefore, wake stranding is not an important impact mechanism for evaluating population-level impacts on salmonid runs that support tribal fisheries in Zone 6.

5 SUMMARY AND CONCLUSION ON POPULATION-LEVEL EFFECTS

Section 4.7 of the DEIS did not identify any construction or operational aspect of the Proposed Action that would yield significant unavoidable adverse impacts on fish. However, DEIS Section 3.5 references the analysis in Section 4.7 to state that some construction- and operations-related direct and indirect effects could reduce the number of fish surviving to adulthood and returning to areas upstream of Bonneville Dam, thereby affecting the number of fish available for harvest by tribal fishers. Section 3.5.8 of the DEIS draws the same conclusions, implying unavoidable and significant impacts to tribal fisheries in Zone 6. This is not supported by the analysis in Section 4.7.

The analysis in DEIS Section 4.7 speculated that impacts could occur to fish. The supplemental analysis presented above identified only two impact mechanisms with a likelihood of causing injury or mortality to juvenile salmonids: impact pile driving (construction) and wake stranding (operations). Neither of these mechanisms is likely to cause mortality to adult fish.

Impact pile driving has the potential to injure or affect the behavior of only a very small number of juvenile fish due to in-water work timing restrictions the protective nature of the timing restrictions, and the low risk posed by pile driving. Based on the minor impacts, pile driving would not affect the adult population, and would not affect fish resources available to tribal fishers in Zone 6.

Further, wake stranding does not present a pathway by which tribal fisheries in Zone 6 could be affected by the project. This is based on beach seining and DNA data which shows that the ESU of salmon present in the shallow water margins and thereby vulnerable to wake stranding (Lower Columbia River Chinook) do not originate above Bonneville Dam and are not part of the tribal fishery.

Based on the conclusions presented in Section 4.7 of the DEIS and analysis presented above, the Proposed Action would not adversely impact tribal fisheries in Zone 6.

In the methods section for cumulative impacts, the DEIS states on Page 6-2

"If the Proposed Action would not result in adverse impacts in a particular resource area, then it would not have the potential to contribute to cumulative impacts in that resource area and no cumulative analysis for the resource area is warranted."

Based on the DEIS approach to cumulative impacts and the lack of impacts on tribal fisheries in Zone 6, the DEIS should have concluded the Proposed Action "would not have the potential to contribute to cumulative impacts". Instead Section 6.3.1.5 of the DEIS concluded on Page 6-22 and 6-23:

"Operation of the Proposed Action would also affect tribal resources through activities that cause physical or behavioral responses in fish or that affect aquatic habitat. These impacts could reduce the number of fish available for harvest by the tribes in the areas upstream of Bonneville Dam."

"Cumulative projects would also introduce vessel traffic and other activities that may cause physical or behavioral responses in fish or affect aquatic habitat. Therefore, the Proposed Action, in combination with the cumulative projects, would contribute to cumulative impacts on tribal fish resources."

Based on the lack of impacts on tribal fisheries presented in Section 4.7 of the DEIS and the analysis presented herein, it is incorrect and speculative to conclude the Proposed Action contributes to cumulative impacts affecting the populations of salmonids harvested by tribal fishers in Zone 6.

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ATTACHMENT 4 – GREENHOUSE GAS TECHNICAL REPORTS AND MEMORANDA

1. **Evaluation of the Statistical Confidence Level of the Draft EIS GHG Forecast Analysis, June 2016, Navigant**
2. **Evaluation of Draft EIS Assumed Induced Demand for Coal in the Pacific Basin Based on an Elasticity of Demand Assumption, June 2016, Navigant**
3. **Heat Content of Indonesia Coals, June 2016, Energy Ventures Analysis, Inc.**
4. **Carbon Coefficients of U.S. and Indonesian Coals, June 2016, Energy Venture Analysis, Inc.**
5. **Substitution of Subbituminous Coal for Bituminous Coal in Asia, June 2016, Energy Ventures Analysis, Inc.**
6. **Review of Approaches for Significance and Mitigation, June 2016, Environmental Resources Management**

NAVIGANT

Memorandum

Date: June 2016

Re: Evaluation of the Statistical Confidence Level of the Draft EIS GHG Forecast Analysis

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Introduction/Background

This memo provides an evaluation of the Draft EIS's scenario-based approach and use of a single "preferred scenario" to project incremental new GHG emissions caused by the Project. Specifically, this memo evaluates the likelihood or probability that the Draft EIS preferred scenario is an accurate reflection of future conditions, in light of uncertainty surrounding input assumptions and evaluation of the full range of possible outcomes, and demonstrates how predicted outputs can change significantly based upon small differences in assumptions and inputs. Based on the foregoing analysis, this memo will discuss the overall confidence level surrounding the Draft EIS GHG forecast's conclusions. A confidence level represents the probability that the value of a parameter falls within a specified range of values.

The Draft EIS uses four scenarios to analyze the potential GHG emissions that would be caused by the Project for the 2018 to 2038 period.[1] The four scenarios include [2]:

- Past Conditions (2014)
- Lower Bound
- Upper Bound
- 2015 Energy Policy

The Draft EIS advocates the 2015 Energy Policy scenario as its "preferred" scenario for evaluating the net GHG emissions from the Project.

Summary Conclusion:

While the Draft EIS identifies various input assumptions in the four scenarios that are analyzed, the Draft EIS fails to fully disclose the uncertainty regarding the primary input assumptions and the likelihood or probability of the occurrence of these

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[1] The Draft EIS also includes a cumulative scenario that evaluates the GHG emissions impact from the operation of numerous proposed coal export projects.

[2] Draft EIS. *The SEPA Coal Market Assessment Technical Report*, pp 5-1 - 5-6.

assumptions. Moreover, the Draft EIS fails to discuss the validity of the selected scenarios, the uncertainty regarding each scenario, and the likelihood or probability of occurrence. In addition, the Draft EIS presents a range of possible outcomes of net GHG emissions from the Project that does not reflect the potential outcome of the Project substantially reducing GHG emissions.

Upon close inspection, the Draft EIS relies on key assumptions that likely overstate GHG emissions attributed to the Project. The Draft EIS substantially overstates the Upper Bound of the GHG emissions impact range for the Project by using unreliable and untested assumptions that are extremely unlikely to occur. In addition, the Draft EIS does not give adequate weight to the potential likelihood or probability of the occurrence of a large negative GHG emissions impact from the Project in its preferred scenario and relies on certain assumptions that overstate the GHG emissions attributed to the Project.

When these factors are fully considered, the total evidence and analysis demonstrates that there is little probability that the GHG emissions resulting from the Project would be as large as in the Draft EIS preferred scenario. Moreover, a high confidence level exists that the GHG impact attributable to the Project is very low (i.e. de minimis) and likely negative.

This memo evaluates the validity of the Draft EIS approach to analyzing GHG emissions caused by the Project. Specific characteristics of the analysis evaluated include:

- 100% reliance on the 2015 Energy Policy scenario.
- No consideration of uncertainty concerning primary input assumptions.
- Inclusion of an unrealistic Upper Bound scenario that has little likelihood of occurrence.
- Lack of a more reasonable scenario showing that the Project would result in a much greater decrease in emissions than in the Lower Bound scenario.

Draft EIS Lacks Support for 100% Reliance on the 2015 Energy Policy Scenario

The Draft EIS selected the 2015 Energy Policy scenario as its "preferred" scenario for determining the net GHG emissions that would be caused by the Project. The Draft EIS provides no analytical or evidentiary support for its selection of the 2015 Energy Policy

scenario as its "preferred" scenario—but rather it simply states that this scenario is preferred because it is the most probable outcome.[3]

> Specifically, there is no supporting evidence or analysis to substantiate why other scenarios should not be given some amount of weight in the Draft EIS's conclusions concerning the level of GHG emissions likely to be caused by the Project. As discussed in the CPP memo, the 2015 Energy Policy scenario analysis uses input assumptions that are highly uncertain. This high degree of uncertainty with respect to multiple input variables greatly decreases the probability of likelihood that the scenarios will prove to be an accurate representation of what will occur in the future.

Draft EIS Does Not Sufficiently Ddisclose the Uncertainty Regarding Primary Input Assumptions and the Likelihood or Probability of Occurrence

It is important to disclose the uncertainty of primary input assumptions to determine the reliability of the inputs, because the results of the Draft EIS GHG emissions analysis are heavily dependent upon input assumptions. The Draft EIS fails to do so. A close examination of the Draft EIS analysis and the GHG emissions results shows that they are highly sensitive to the assumed input assumptions. The Draft EIS fails to conduct sensitivity analyses on any individual input assumption relied upon for the scenarios presented. Sensitivity analysis on individual input assumptions is one method that can be used to evaluate the reliability and uncertainty of the results with respect to specific input assumptions and to enable one to ascribe the appropriate evidentiary weight to the results.

While a comprehensive review is not possible due to the lack of supporting data provided with the Draft EIS, some examples of the untested input assumptions in the Draft EIS include[4]:

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[3] Draft EIS. The SEPA Coal Market Assessment Technical Report, p. 5-5. Draft EIS. Chapter 5. Operations: Existing Conditions, Project Impacts, and Potential Mitigation Measures, page 5.8-16. "The 2015 Energy Policy scenario is intended to represent existing conditions under which the Proposed Action would operate. Although the 2015 Energy Policy is based on the draft Clean Power Plan as proposed in June 2014, rather than the final Clean Power Plan promulgated in August 2015, this scenario is the most representative of current U.S. policy of the scenarios modeled, and consequently is the preferred scenario for the analysis."

[4] Other errors are discussed in the Subbituminous Substitution Memo and the Uinta Basin Coal Memo.

- **Induced Demand**[5]
    - The Draft EIS assumed induced demand for coal in the Pacific Basin based on assumed elasticity of demand estimates that range from .1 to 1.2.
    - Available evidence and economic analysis demonstrate that the elasticity of demand for subbituminous coal that is expected to be exported from the Project to the Pacific Basin region is likely to be de minimis and is best represented by the low end of the Draft EIS assumed elasticity of demand estimate, i.e., approximately .1.
- **Coal Substitution**[6]
    - The Draft EIS utilizes unreliable GHG emissions rates for coals to evaluate the relative coal quality of PRB and Indonesian subbituminous coal, which overstates GHG emission to the Project.
    - The Draft EIS utilizes unreliable heat content for coals to evaluate the relative coal quality of PRB and Indonesian coal.[7]
- **CPP**[8]
    - The Draft EIS relies on a draft proposal of the CPP for the 2015 Energy Policy scenario that has been revised, is currently stayed while under judicial review, and could be overturned or substantially modified by the courts, Congress, or a future presidential administration.
    - The Draft EIS overstates the impact of GHGs from the Project in the 2015 Energy Policy scenario by modeling inputs and assumptions that cap carbon dioxide (CO_2) levels and otherwise inhibit substitution of natural gas-fired power generation for coal-fired power plant generation.
    - The Draft EIS assumes, without explanation, that the GHG emissions commitments of various countries will be restricted accordingly while the emissions of other nations will continue without restriction.

These unrealistic input assumptions impact all of the scenarios, including the Draft EIS preferred scenario. Correcting the untested assumptions shows that there is a strong possibility of negative or de minimis levels of GHG emissions resulting from the Project and limited potential for substantial GHG emission from the Project.

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[5] See Demand Elasticity memo.

[6] See GHG Emission Rate of Coal Memo and Heat Content of Coal memo.

[7] This error causes an overstatement of GHG emissions from the Project attributed to railroad and shipping transportation because the errors in heat content erroneously cause higher volumes of U.S. coal to be exported from the Project to the Pacific Basin. See Heat Content of Coal memo.

[8] See Clean Power Plan memo.

Draft EIS Presents an Unrealistic Upper Bound Scenario That Has Little Likelihood of Occurrence

The Draft EIS presents an unrealistic range of potential outcomes for the net emissions that could be caused by the Project. The Draft EIS provides no evidence that it has identified the correct or complete range of possible outcomes, even assuming its calculations are accurate and reliable.[9] The Draft EIS also did not disclose the probability or likelihood of the expected outcome(s). An evaluation of the range of outcomes and input assumptions demonstrates that the Upper Bound scenario represents a statistical outlier and is not reliable.

A comparison of the Draft EIS scenarios and net GHG emissions for primary components is instructive for considering the reasonableness of the Upper Bound scenario (and the range of possible outcomes). Table 1 (below) shows the total net emissions from the largest emissions components in the Draft EIS, which includes the Pacific Basin and U.S. market-related emissions, as well as net emissions from international shipping and rail transportation attributed to the Project by the Draft EIS. These emissions account for 91% of total emissions included in the Draft EIS mitigation plan.[10]

[9] See Demand Elasticity memo, GHG Emission Rate of Coal memo, Heat Content of Coal memo, and Clean Power Plan memo.

[10] *The SEPA Greenhouse Gas Emissions Technical Report*, p 3-3, 3-7, 3-9 and 3-10. *Draft EIS Environmental Impact Statement: Summary p S-58.*

Table 1: Draft EIS Net Total GHG Emissions (MtC02e) from the Primary Components (2018-2038)[11]

	2015 Energy Policy	% Total	Lower Bound	% Total	Upper Bound	% Total	Past Conditions (2014)	% Total
Pacific Basin								
Induced	12,406,582	39%	-	0%	535,160,238	122%	29,944,771	-214%
Coal Substition	8,856,189	28%	12,106,757	-40%	(1,644,717)	0%	12,964,768	-93%
U.S. Market								
Decrease Coal	(2,518,738)	-8%	(66,717,663)	219%	(160,380,593)	-37%	(96,403,156)	690%
Increase Gas	1,497,089	5%	12,827,507	-42%	33,110,591	8%	23,415,889	-168%
Shipping	2,595,112	8%	2,168,462	-7%	22,161,047	5%	6,947,758	-50%
Rail	9,240,632	29%	9,116,598	-30%	9,774,949	2%	9,166,339	-66%
Total	32,076,866		(30,498,339)		438,181,515		(13,963,631)	
Total (No Induced Upper)	19,670,284		(30,498,339)		(96,978,723)		(43,908,402)	

This table shows that the net GHG emissions associated with the Upper Bound scenario is an outlier value relative to the other possible outcomes presented in the Draft EIS, because the values of the other three scenarios (Past Conditions [2014], Lower Bound, and 2015 Energy Policy) are relatively close together (i.e., statistically represented with a tighter central tendency). When an estimate is substantially different from the rest of the range of potential outcomes, its reasonableness should be considered.

In this case, the Upper Bound scenario reports significantly higher emissions than the other scenarios, including 13 times higher than the Energy Policy scenario, which is the only other scenario that reports increased emissions from the Project (Table 1).

In light of the differences described above, a brief evaluation of the Upper Bound scenario was conducted. Upon closer inspection, the Draft EIS's reported results for the Upper Bound scenario are substantially driven by two factors: the induced demand component and the increased demand for coal.

[11] Net total GHG emissions from the primary components include Pacific Basin and U.S. markets plus shipping and rail transportation. *The SEPA Greenhouse Gas Emissions Technical Report*, p 3-3, 3-7, 3-9 and 3-10.

The induced demand component is based on an assumed elasticity of demand value ranging from .1 to 1.2. [12] The Draft EIS's Upper Bound scenario relies on the highest maximum elasticity of demand statistic equal to 1.2, which is more than 10 times larger than the minimum elasticity of demand statistic in the Draft EIS equal to .1. [13] Available evidence and economic analysis demonstrate that the elasticity of demand for subbituminous coal that is expected to be exported from the Project to the Pacific Basin region is likely to be de minimis and have a negligible impact on coal consumption in the countries that will likely receive deliveries of this coal (South Korea, Japan, and Taiwan).[14] As such, the Lower Bound minimum elasticity (identified by the Draft EIS of .1) is most appropriate and reasonable for the Project.

Another input assumption used in the Upper Bound scenario that impacts the GHG emissions is the assumption of a 50% increase in coal demand.[15] A surge in future coal demand of substantial magnitude seems unlikely, as our energy industry has become increasingly diversified in fuel supply sources suggesting such coal demand growth targets in this range may no longer be realistic. Moreover, one possible factor that could cause a dramatic increase in future coal demand is if a carbon capture technology breakthrough occurs. This technological breakthrough would virtually eliminate carbon emissions from coal-generating power plants. Efforts to develop carbon capture and sequestration (CCS) technology continues to be made and, if successful, coal plants with CCS observe the greatest reductions in CO_2, if utilized.[16] CCS technology is most

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[12] Draft EIS. *The SEPA Coal Market Assessment Technical Report*, p 5-2.

[13] Draft EIS. *The SEPA Coal Market Assessment Technical Report*, p 5-2.

[14] As discussed in the Demand Elasticity memo, the following reasons support the Lower Bound minimum elasticity (identified by the Draft EIS of .1) as the most appropriate and reasonable for the Project based on the following: 1. The substantial government planning role in South Korea, Japan, Taiwan, and China determines the extent that coal-fired power plants will be built and is not likely to change as a result of the Project. Also, economic decision-making for building new coal-fired power plants in South Korea, Japan, and Taiwan is not materially changed as a result of the Project. 2. Economics of the coal fleets in South Korea, Japan, and Taiwan are largely baseload power plants and therefore can be expected to operate continuously, regardless of a small change in coal fuel costs. 3. The economics of the short run marginal cost (SRMC) demonstrates that coal-fired power plants don't compete with natural gas-fired power plants in South Korea, Japan, and Taiwan. 4. The total retail electricity rate of each country's customers would be negligibly impacted by a small change in coal fuel costs, and as such are not likely to increase electricity consumption (e.g., turn on more lights, run more appliances, etc.) in South Korea and Japan. 5. Efficiencies of coal-fired power plants in Japan, South Korea, and Taiwan are superior to the U.S. power plants and therefore consume less coal quantities to generate one unit of electricity.

[15] Draft EIS. *The SEPA Coal Market Assessment Technical Report*, p 5-2, 5-4.

[16] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014, pp 13-14. See also Congressional bipartisan group introduces carbon

suitable for larger, more efficient (i.e., younger) coal plants, which generally characterize the Asian power fleet as compared to the U.S. fleet.[17]

In addition to CCS technology, other technological developments are under way that would eliminate GHG emissions from coal-fired power plants. Specifically, a new company, Net Power, has developed technology to capture the carbon as part of the combustion process itself at no extra cost, resulting in zero air pollution (i.e., full capture of the carbon).[18] Net Power is working to develop the Allam Cycle, which is a high-pressure, highly recuperative, oxyfuel, supercritical CO_2 cycle. By burning fuel with pure oxygen at high temperatures, most airborne emissions are avoided, and using carbon dioxide rather than steam to propel the engine eliminates secondary CO_2 emissions.[19] For these reasons a 50% surge in coal demand is unlikely; it would only be likely to occur in conjunction with the use of new emissions reduction technologies that would avoid material increases in GHG emissions as a result of increased coal use.

Since the Upper Bound scenario results are largely driven by two factors: the induced demand component and the increased demand for coal, which are unrealistic and unsupported, the Upper Bound scenario is not reliable and should be disregarded.

Evaluation of the Impact of Removing Upper Bound Scenario and Induced Demand Impact

In light of the concerns described above, sensitivity analyses were conducted to understand the impact of removing the Upper Bound scenario, the induced demand component, the assumed coal substitution, and the assumed CPP impacts on the net GHG emissions attributed to the Project.

First, an analysis was conducted to evaluate the impact of removing the induced demand component and the Upper Bound scenario from the Draft EIS scenarios. This analysis, presented in Table 2 (below), shows that these adjustments have a material

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capture bill in House, February 26, 2016. http://www.utilitydive.com/news/congressional-bipartisan-group-introduces-carbon-capture-bill-in-house/414597/

[17] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014, pp 13-14.

[18] Net Power is working with several companies including Exelon Generation, a power utility; CB&I, an engineering, procurement, and construction services-infrastructure firm; and Toshiba, a turbine manufacturer. "Fossil fuel electricity with no pollution? This company is building a power plant to prove it." Vox Energy and Environment. April 5, 2016. http://www.vox.com/2016/4/5/11347962/net-power

[19] "Fossil fuel electricity with no pollution? This company is building a power plant to prove it." Vox Energy and Environment. April 5, 2016. http://www.vox.com/2016/4/5/11347962/net-power

impact on the range of possible outcomes presented by the Draft EIS. Specifically, these adjustments extend the range of possible outcomes to substantially lower and negative levels of net emissions, well below the lowest level of net emissions relied upon by the Draft EIS to calculate mitigation (i.e., the 2015 Energy Policy scenario).

Table 2: Draft EIS Net Total GHG Emissions (MtC02e) from the Primary Components (2018-2038):—Removing the Induced Demand Impact and the Upper Bound Range[20]

Scenarios*	Draft EIS	Exclude Induced Demand
2015 Energy Policy	32,076,866	19,670,284
Lower Bound	(30,498,339)	(30,498,339)
Past Conditions (2014)	(13,963,631)	(43,908,402)
Average Scenarios	(4,128,368)	(18,245,486)

*All Scenarios Exclude Upper Bound Estimates

Table 2 shows that removing the induced demand component from the 2015 Energy Policy scenario reduces the net emissions attributed the Project by 38% from 32 million to 19.67 million MtC02e. Also, the average of the remaining three scenarios (after removing the induced demand component and the Upper Bound scenario) yields a negative 18,245,486 M MtC02e net GHG emissions impact from the Project. Relying on an average of the three scenarios implies that 33% weight or probability of likelihood is attributed to each scenario.

Evaluation of the Impact of Removing Coal Substitution Impact (Cumulatively)[21]

The Draft EIS overstated the GHG attribution to the Project due to coal substitution that is the result of its reliance on inaccurate GHG emissions rates and heat content

[20] Net total GHG emissions from the primary components includes Pacific Basin and U.S. markets plus shipping and rail transportation. *The SEPA Greenhouse Gas Emissions Technical Report*, p 3-3, 3-7, 3-9 and 3-10.

[21] Note: the Upper Bound scenario and the induced demand impact are also removed.

assumptions to evaluate the relative coal quality of PRB and Indonesian subbituminous coal. [22]

The following analysis evaluates the impact of fixing the error by eliminating the coal substitution GHG impact included in the Draft EIS. Table 3 (below) begins with Table 2 and adds a column that eliminates the induced demand and the coal substitution impact on GHG emissions from the Draft EIS results for the 3 scenarios (excluding the Upper Bound Scenario).

Table 3 shows that removing the induced demand component and coal substitution impact from the 2015 Energy Policy scenario reduces the net emissions attributed the Project by 66% from 32 million to 10.8 million MtC02e. Also, the average of the remaining three scenarios (after removing the induced demand component, the coal substitution impact, and the Upper Bound scenario) yield a negative 29,554,724 M MtC02e net GHG emissions impact from the Project. Relying on an average of the three scenarios implies that 33% weight or probability of likelihood is attributed to each scenario.

Table 3: Draft EIS Net Total GHG Emissions (MtC02e) from the Primary Components (2018-2038):—Removing the Upper Bound Range, Induced Demand Impact and Coal Substitution Impact[23]

Scenarios*	Draft EIS	Exclude Induced Demand	Exclude Induced Demand & Coal Substitution
2015 Energy Policy	32,076,866	19,670,284	10,814,095
Lower Bound	(30,498,339)	(30,498,339)	(42,605,096)
Past Conditions (2014)	(13,963,631)	(43,908,402)	(56,873,170)
Average Scenarios	(4,128,368)	(18,245,486)	(29,554,724)

*All Scenarios Exclude Upper Bound Estimates

[22] See Coal Carbon Coefficients Report and Indonesian Coal Quality Report.

[23] Net total GHG emissions from the primary components include Pacific Basin and U.S. markets plus shipping and rail transportation. *The SEPA Greenhouse Gas Emissions Technical Report*, p 3-3, 3-7, 3-9 and 3-10.

Evaluation of the Impact of Correcting the CPP Energy Policy Scenario (Cumulatively)[24]

The Draft EIS relies on a Draft proposal of the CPP that is stayed while under judicial review for the 2015 Energy Policy scenario and overstates the impact of the CPP due to methodology errors. This overstatement is evidenced by comparing the GHG emissions assumed in the Past Conditions (2014) scenario to the 2015 Energy Policy scenario. For example, the U.S. GHG emissions are 71 times lower in the Past Conditions (2014) scenario as compared to the 2015 Energy Policy scenario reported by the Draft EIS.[25]

The following analysis evaluates the impact of fixing the error by utilizing the U.S. GHG emissions reported by the Draft EIS for the Past Conditions (2014) scenario instead of the 2015 Energy Policy scenario. Table 4 (below) begins with Table 3 and adds a column that fixes the error of relying on the CPP and eliminates the induced demand and the coal substitution impact on GHG emissions from the Draft EIS results for the three scenarios (excluding the Upper Bound scenario).

Table 4 shows that fixing the error of relying on the CPP and removing the induced demand component and coal substitution impact from the 2015 Energy Policy scenario produce negative net emissions attributed to the Project (reducing the net emissions from 32 million to negative 61.1 million MtC02e). Also, the average of the remaining three scenarios (after removing the induced demand component, the coal substitution impact, and the Upper Bound scenario) yield a negative 59,908,967 M MtC02e net GHG emissions impact from the Project. Relying on an average of the three scenarios implies that 33% weight or probability of likelihood is attributed to each scenario.

[24] Note: the Upper Bound scenario, the induced demand, and coal substitution impact are also removed.
[25] 71=-96,403,156+23,415,889/(1,497,089+-2,518,738).

Table 4: Draft EIS Net Total GHG Emissions (MtC02e) from the Primary Components (2018-2038)—Removing the Upper Bound Range, Induced Demand Impact, and Coal Substitution Impact, Using the U.S. GHG Emissions from the Past Conditions (2014)[26]

Scenarios*	Draft EIS	Exclude Induced Demand	Exclude Induced Demand & Coal Substitution	Exclude Induced Demand & Coal Substitution with 2014 Scenario
2015 Energy Policy	32,076,866	19,670,284	10,814,095	(61,151,523)
Lower Bound	(30,498,339)	(30,498,339)	(42,605,096)	(61,702,207)
Past Conditions (2014)	(13,963,631)	(43,908,402)	(56,873,170)	(56,873,170)
Average Scenarios	(4,128,368)	(18,245,486)	(29,554,724)	(59,908,967)

*All Scenarios Exclude Upper Bound Estimates

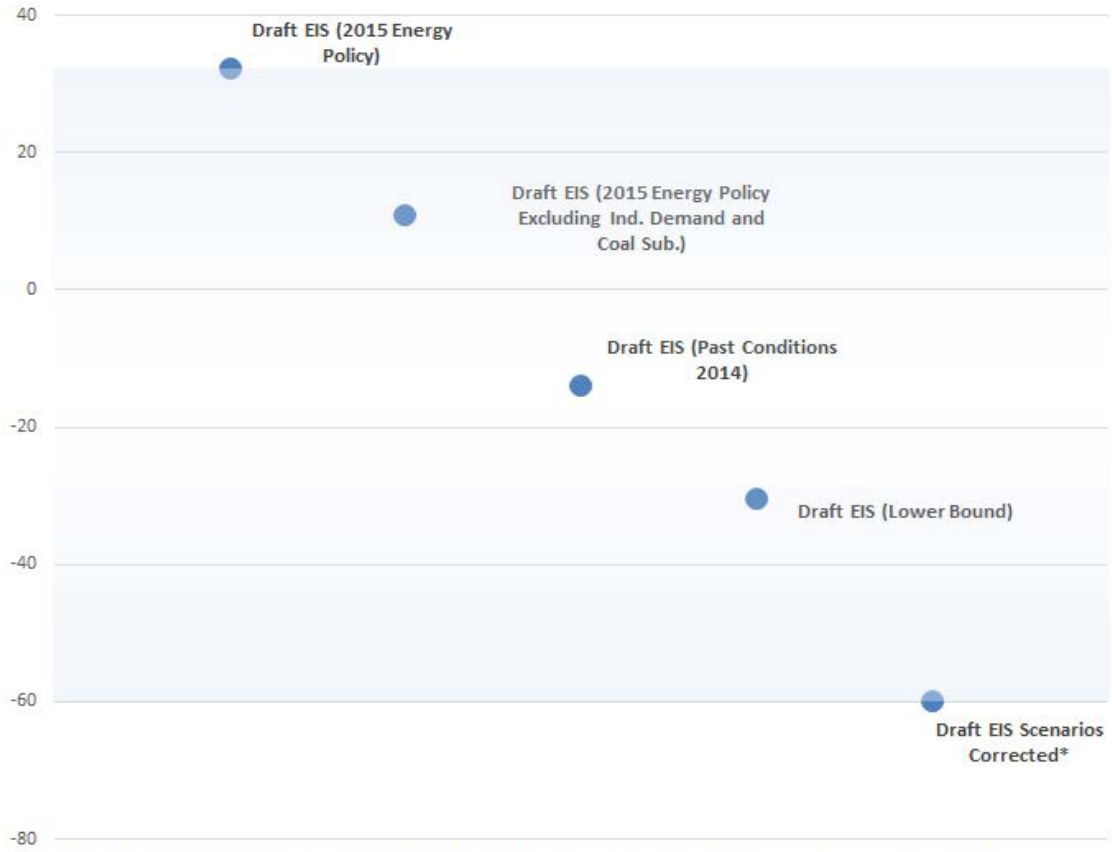
Conclusion

These sensitivity analyses enable a critical examination of the range of possible outcomes of the GHG impact attributable to the Project and demonstrate the substantial evidence of large negative GHG emissions attributable to the Project.

Based on the above evaluation, a reasonable revised range of possible outcomes attributable to the Project should exclude the unreliable Upper Bound scenario and include the large negative GHG emission scenario attributable to the project reported in Table 4. Figure 1 below illustrates the revised range of possible outcomes attributable to the Project.

[26] Net total GHG emissions from the primary components include Pacific Basin and U.S. markets plus shipping and rail transportation. *The SEPA Greenhouse Gas Emissions Technical Report*, p 3-3, 3-7, 3-9 and 3-10.

Figure 1: Draft EIS Revised Range of Net Total GHG Emissions (Million MtC02e) from the Primary Components (2018-2038)[27]



* Draft EIS Scenarios Corrected to Exclude Induced Demand & Coal Substitutions and uses the 2014 Past Scenario for U.S. emissions.

The revised range of possible outcomes attributable to the Project extends from approximately positive 30 to negative 60 million MtC02e. The average of the five scenarios presented in Figure 1 equals negative 12.3 million MtC02e. This figure also shows that the middle three scenarios are relatively close, with GHG emissions attributable to the Project ranging from positive 10 to negative 30 million MtC02e. The average of the middle three scenarios presented in Figure 1 (eliminating the highest and lowest scenario estimates) equals negative 11.1 million MtC02e.

For all of the reasons discussed above the analysis of the revised range of possible outcomes attributable to the Project is evidence that a high confidence level exists that the GHG impact attributable to the Project is very low and likely negative.

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[27] Net total GHG emissions from the primary components include Pacific Basin and U.S. markets plus shipping and rail transportation. *The SEPA Greenhouse Gas Emissions Technical Report*, p 3-3, 3-7, 3-9 and 3-10.

NAVIGANT

Memorandum

Date: June 2016

Re: Evaluation of Draft EIS Assumed Induced Demand for Coal in the Pacific Basin Based on an Elasticity of Demand Assumption

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Introduction/Background

The following memo evaluates the assumptions used in the Millennium Bulk Terminals – Longview Draft Environmental Impact Statement (Draft EIS) to quantify the degree of new GHG emissions that would be caused by opening a new coal export terminal (Project) on the Columbia River in Washington State. More specifically, this memorandum evaluates the assumption used in the Draft EIS of a uniform coal demand elasticity across the entire Pacific Basin region.

Price elasticity of demand (referred to generically in the Draft EIS as demand elasticity) is an economic measure that represents the responsiveness of the quantity demanded of a good or service to a change in its price, *ceteris paribus*. For example, if the quantity demanded for a good increases 1% in response to a 5% decrease in price, the price elasticity of demand would be 1% / 5% = .2. The degree to which the quantity demanded for a good adjusts in response to a change in price can be influenced by a number of factors. One factor is whether the good is a necessity or luxury; necessities tend to have inelastic demand, while luxuries are more elastic in nature. Also, the elasticity of demand can vary based on the availability of close substitutes with more elastic demand.

<u>Conclusion:</u>

The Draft EIS assumed induced demand for coal in the Pacific Basin based on a range of elasticity of demand estimates that range from .1 to 1.2, and relies on the average elasticity of demand estimate of .4 for the preferred scenario (2015 Energy Policy scenario.) Based on the following analysis and discussion, available evidence and economic analysis demonstrate that the elasticity of demand for subbituminous coal that is expected to be exported from the Project to the Pacific Basin region is likely to be de minimis and have a negligible impact on coal consumption in the countries that will likely receive deliveries of this coal (South Korea, Japan, and Taiwan). As such, the

Lower Bound minimum elasticity identified by the Draft EIS of .1 is most appropriate and reasonable for the Project. This is due to the following reasons:

1. The substantial government planning role in South Korea, Japan, Taiwan, and China determines the extent that coal-fired power plants will be built and is not likely to change as a result of the Project. Also, economic decision-making for building new coal-fired power plants in South Korea, Japan, and Taiwan is not materially changed as a result of the Project.
2. The coal fleets in South Korea, Japan, and Taiwan are largely baseload power plants and therefore can be expected to operate continuously, regardless of a small change in coal fuel costs.
3. The economics of the short run marginal cost (SRMC) demonstrates that coal-fired power plants do not compete with natural gas-fired power plants in South Korea, Japan, and Taiwan.
4. The average retail electricity rate of each country's customers would be negligibly impacted by a small change in coal fuel costs and, as such, any decrease in rates would be negligible and would not likely lead to increased electricity consumption (e.g., turn on more lights, run more appliances, etc.) in South Korea and Japan.
5. Efficiencies of coal-fired power plants in Japan, South Korea, and Taiwan are superior to the U.S. power plants and they therefore consume less coal to generate one unit of electricity.

Based on the totality of evidence and analysis completed, the Draft EIS assumed elasticity of .4 for the 2015 Energy Policy scenario is substantially overstated. Further, the Lower Bound minimum elasticity identified as .1 is more likely to be a reasonably appropriate elasticity estimate for the Pacific Basin countries that will likely receive deliveries of subbituminous coal from the Project (South Korea, Japan, and Taiwan).

Description of the Draft EIS Assumed Induced Demand for Coal

The Draft EIS relies on a literature search to identify a range of coal demand elasticities,[1] and then chooses a value from within that range for each of four different scenarios to calculate an induced level of new coal consumption in the Pacific Basin that would result from the change in delivered coal prices the Draft EIS assumes would be caused by Project operations. The increased level of coal consumption is then used to

[1] The literature survey identified eight studies of energy specific demand elasticities that bracket a very wide range of coal demand elasticity.

determine an increase in Pacific Basin GHG emissions that is attributed to the Project.[2] The Draft EIS elasticity assumptions chosen for each of the scenarios are as follows: [3]

- Lower Bound uses the minimum elasticity identified equal to 0.1.
- Upper Bound uses the maximum elasticity identified equal to 1.2.
- Past Conditions (2014) uses the average elasticity in the eight studies equal to 0.4.
- 2015 Energy Policy uses the average elasticity in the eight studies equal to 0.4.[4]

The discussion and analysis associated with the Draft EIS's attribution of a substantial quantity of increased GHG emissions to the Project from coal combustion due to induced demand is captured by the Draft EIS in a single paragraph:

> "Because the international coal demand is a forecast that is an input to the model, coal demand elasticity was used to adjust the demand based on the change in delivered coal prices. The demand elasticity is a measure of how much coal demand will change with a given change in the delivered coal price. As delivered coal prices change, the demand for coal changes in the opposite direction. ICF conducted a literature search to identify an energy-specific demand elasticity for this analysis. A total of eight sources were reviewed that provided demand elasticity for electricity, natural gas, and coal. The demand elasticity found in the sources ranged from a minimum of 0.11% to a maximum of 1.2%. Thus, for a 1.0% decrease in delivered coal prices there would be an increase in demand of between 0.11% and 1.2%. For the Past Conditions (2014) Scenario, the average of the eight sources, 0.4%, was used for the coal demand elasticity. The Lower and Upper Bound Scenarios used the minimum and maximum demand elasticity values from the literature search."[5]

For the Past Conditions (2014) and 2015 Energy Policy scenarios, the Draft EIS assumed average elasticity of demand is equal to .4 (based on the average of the eight literature search studies). The Draft EIS uses the .4 elasticity along with its calculation of the decrease in global coal prices resulting from the Project (not reported in the Draft EIS) to estimate the additional quantity coal demand (i.e., induced) from the Project. Specifically, the Draft EIS assumes that the quantity of coal demanded will increase by

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[2] Draft EIS. *The SEPA Coal Market Assessment Technical Report*, p 4-11.
[3] *Id.* at p. 4-11.
[4] *Id.* at p 5-5.
[5] Draft EIS. *The SEPA Coal Market Assessment Technical Report*, page 5-2. Table 23.

2% in response to a 5% decrease in price. In other words, the price elasticity of demand is 2% / 5% = .4 for the Past Conditions (2014) and 2015 Energy Policy scenarios.

Table 1 (below) reports the net GHG emissions the Draft EIS attributes to the Project from induced coal demand in the Pacific Basin. This table shows that the Draft EIS induced demand assumption causes 58% of the increase in net emissions from coal combustion in the Pacific Basin in the 2015 Energy Policy scenario. The Draft EIS induced demand assumption causes 70% and 100% of the increase in net emissions from coal combustion in the Pacific Basin in the Past Conditions and Upper Bound scenarios, respectively. According to the Draft EIS, induced demand has no impact in the Lower Bound scenario.[6]

Table 1: Net Emissions Coal Combustion from Induced Demand, Pacific Basin ($MtCO_2e$)[7]

	2015 Energy Policy	Lower Bound	Upper Bound	Past Conditions (2014)
Net Annual Emissions, 2028	867,958	0	37,439,547	2,094,921
Net Total Emissions, 2018–2038	12,406,582	0	535,160,238	29,944,771
Percent of Total (Induced Demand and Substitution)	**58%**	**0%**	**100%**	**70%**
Net Total Emissions from Coal Induced and Substitution, 2018–2038	21,262,771	12,106,757	533,515,521	42,909,539

Economic Analyses of Induced Demand and Elasticity

The Draft EIS relies on assumed elasticity of demand estimates to calculate an induced level of coal demand (i.e., new consumption) in the Pacific Basin based on the change in delivered coal prices the Draft EIS forecasts to result from the Project operations. Although a more thorough economic analysis could have been conducted, it is worth noting that even with a more rigorous economic analysis, challenges to forecasting reliably remain high. The evidence presented here and in the forecasting reliability

[6] This result appears inconsistent with the Draft EIS reported .1 elasticity assumption.

[7] Draft EIS. *The SEPA Greenhouse Gas Emissions Technical Report*, p. 3-9.

memo demonstrates that the Draft EIS' GHG emissions forecasts are especially unreliable because inaccurate or unreliable input assumptions were used, particularly in the following areas:

- Coal Combustion from Induced Demand, Pacific Basin Coal – uncited/assumed elasticity of demand estimate
- Coal Combustion from Coal Substitution, Pacific Basin Coal[8]
    - incorrect GHG emissions rates for coals
    - incorrect heat content for coals
- Clean Power Plan - Energy Policy Assumption
- Substitution of Subbituminous Coal for Bituminous Coal in the Pacific Basin
- Export of Uinta Basin Coal through MBT - Longview
- Failure to Consider Existing Export Terminals for Uinta Basin Coal

In addition, substantially reduced forecasting reliability exists because of other aspects of the underlying Draft EIS forecast, such as a forecast that covers a very large geographic area over an extremely long time horizon for complicated and interrelated energy markets undergoing dramatic evolutions.[9]

As discussed above, the Draft EIS GHG analysis is based on assumptions of demand elasticity that are themselves chosen from uncited and untested studies.

The following analyses were conducted for this memorandum in order to evaluate the potential for coal exported from the Project to induce greater demand for coal in Pacific Basin countries, thereby resulting in increased GHG emissions:

1. Evaluation of government planning roles and economic decision-making for building new coal-fired power plants and how the Draft EIS forecasted change in coal prices resulting from the Project would impact these decisions, if at all.
2. Evaluation of the economics of the coal-fired power plant fleets for selected countries in the Pacific Basin and the baseload nature of these fleets over the forecast period. A baseload power plant will operate continuously around the clock as

[8] See Carbon Coefficients Report and Indonesian Coal Quality Report.

[9] The energy markets face many market and non-market factors that contribute to the current state of challenges in reliably forecasting energy market behavior. Market-related factors relate to industry-specific developments that impact supply, demand, and pricing of energy-related products. Non-market factors relate to regulatory intervention and existing and potential requirements that impact supply, demand, and pricing of energy related products.

available, regardless of a small change in fuel prices that could arise from the Project.[10]

3. Evaluation of SRMC for selected countries in the Pacific Basin to see if operating coal-fired power plants compete with natural gas-fired power plants, which could create increased coal demand associated with increased coal-fired power generation (substituting for other fuels, such as natural gas-fired power plants). Evaluation of the impact of the Draft EIS forecasted change in coal prices resulting from the Project on SRMC.
4. Evaluation of retail customer electricity rates for selected countries in the Pacific Basin to determine the impact of a change in coal fuel prices on retail customer electricity rates, and evaluation of the potential likelihood of increased consumption.[11]
5. Evaluation of the differences in efficiencies between existing and planned power plants in the U.S. and selected countries in the Pacific Basin (Japan, South Korea, and Taiwan) expected from the Project (over the course of its operating life) to determine if a power plants operating in selected countries in the Pacific Basin produces more or less GHG emissions per unit of electricity produced.

The results of this work are provided below. Collectively, these economic analyses demonstrate that the elasticity of demand for the subbituminous coal that is expected to be exported from the Project is likely to be de minimis and result in negligible levels of induced demand in the countries that will likely receive deliveries of coal from the Project (South Korea, Japan, and Taiwan).

A. Evaluation of government planning roles and economic decision-making for building new coal-fired power plants and how the Draft EIS forecasted change in coal prices resulting from the Project would impact these decisions, if at all.

By using an assumed elasticity of demand to quantify induced coal consumption in the Pacific Basin, the Draft EIS avoids the question of whether a new coal-fired power plant would be built in South Korea, Taiwan, and Japan as a result of the Project. However, the answer to this question has significant implications for any evaluation of the validity of the demand elasticity assumed by the Draft EIS analysis. If coal demand is induced, it means that either more coal is used as a result of increased operational levels

[10] This economic analysis is the subject of a separate memo.

[11] I have not evaluated the potential induced coal consumption from bituminous coal based on the analysis of EVA that demonstrates that subbituminous coal does not compete with bituminous coal.

at existing coal plants or additional coal consumption will result from operating newly-built, coal-fired power plants.[12] This section will analyze whether the Project would likely result in the construction of new coal-fired power plants in South Korea, Japan, Taiwan, and China.

As discussed in more detail in Appendix A, the national government plays a substantial planning role in the decision-making concerning construction of new coal-fired power plants in South Korea, Japan, Taiwan, and China. The selection of the type of power plants is generally predetermined by the government entities and implemented by the energy sector. China and Taiwan's role in government planning for the selection of power plant types is substantial, while South Korea's and Japan's role in government planning is significant with some modest level of flexibility and input by constituents. For these reasons a small change in the price of coal that may result from the Project will not likely have an impact on government planning decisions to build new coal-fired power plants.

An analysis of the economic decision-making of building a new coal-fired power plant in South Korea, Taiwan, and Japan demonstrates that it is not likely to change due to a small change in the price of coal that may result from the operations of the Project. Coal-fired power plants are very large, capital-intensive projects, which can cost $1 billion to $2 billion or more depending on the size and technology. A small change in the price of coal has no impact on the total capital cost and a de minimis impact on the total annual capital and operating costs.

For these reasons, no new coal-fired power plants are likely to be built based on government planning or economic considerations as a result of the Project, which is evidence of a zero elasticity of demand (associated with newly-built power plants).

B. Evaluation of the economics of the coal-fired power plant fleets for selected countries in the Pacific Basin and the baseload nature of these fleets over the forecast period.

Research and analysis of economic conditions of electrical load shapes and minimum load forecasts for Japan, South Korea, Taiwan, and China was conducted. The purpose of the research is to gather data to analyze and evaluate whether coal-fired power plants are expected to operate as baseload power plants in the future forecast period

[12] Coal that is anticipated to be exported from the Project, such as PRB-originating coal, is used in coal-fired power plants to generate electricity.

when the Project is operating. A baseload power plant will operate continuously around the clock as available, regardless of a small change in fuel prices that could arise from the Project. If coal plants in these countries operate on a baseload basis, then they operate whenever they are available (i.e., throughout all hours of the day and seasons of the year). Said differently, a change in the price of coal will not cause these power plants to run more frequently.

Conclusion:

An evaluation of the economic characteristics of the electricity generation portfolio and the electrical load shapes in the Asian countries, and how these countries reliability operate their power system, demonstrates that a low elasticity of demand exists for coal consumed for power generation on an aggregate country level. This means that coal facilities are largely needed to operate continuously around the clock. As such, they have limited opportunity to operate more if coal prices fall for various reasons, including as a result of the operation of the Project. As such, operation of the Project is not likely to result in power generated from coal-fired power plants displacing power that would otherwise have been generated from natural gas-fired power plants.

By way of background, an electrical load shape reflects the variation in power usage over the days of the week and hours of the day. Specifically, the pattern of electrical consumption is generally low in the middle of the night, slowly rising in the morning, peaking in the middle of the day, and falling in the evening hours. As energy consumption (i.e., demand) rises over the day, additional power plants are turned on to increase the supply of power. Similarly, as energy demand falls, power plants are turned off. Operations are sequenced to turn on the lowest cost units first and only operate higher cost units as needed. SRMC is the economic cost metric used to identify the rank order of the power plants to conduct the economic operations of a power system, which is frequently referred to as least-cost dispatch.

For this research, we investigated government sector, electricity industry organizations and other publicly available sources to identify available electric demand data.

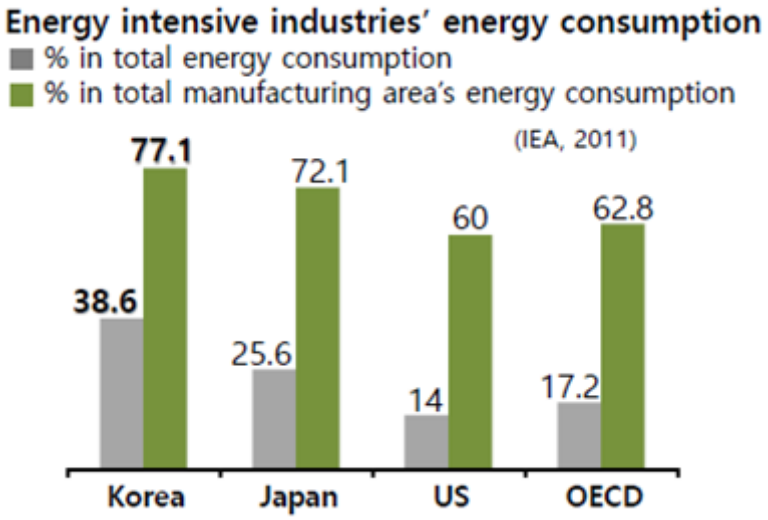
General Economic Data Impacting Load Shapes and Minimum Load Forecast

Economic and industry research was conducted to identify evidence of the economic characteristics that provide insight into the electrical load shapes and minimum load levels for the Asian countries. Recent statistics indicate that Japan, Korea, Taiwan, and

China have a relatively high percentage of industrial customers, notably compared to the U.S., which has a larger proportion of residential and commercial customers. A higher mix of industrial customers will yield a flatter load shape and higher levels of power consumption during the off-peak hours of the day (i.e., the middle of the night) which is used to meet around-the-clock electric needs. In contrast, residential and commercial customers that generally sleep at night consume lower levels of electricity.

As Table 2 (below) demonstrates, Japan and South Korea have a higher share of industrial customers, consisting of 38.6% and 25.6% energy-intensive industries (e.g., steel, refinery, chemical), respectively, as well as other manufacturing industries, in comparison to other major economies such as the U.S. Moreover, 60.7% of South Korea's energy production is used in industrial and manufacturing operations, and the country has continually focused on industrial competitiveness in long-range planning.[13]

Table 2: Japan and Korea Energy-Intensive Industries' Share of Energy Consumption[14]



Taiwan also has a very large component of its electricity consumed by industrial customers, because this country's economy is centered on the industrial sector. For

[13] Korea's Energy Policy, November 12th, 2015. Kim, Chang Kyu, Minister-Counselor for Trade, Industry & Energy. Embassy of the Republic of Korea at D.C., p. 2. http://www.mofa.go.kr/webmodule/download_hts.jsp?boardid=13871&filename=2015+Korea+Energy+Forum+-+Kim%2C+Chang+Kyu.pdf&shadowname=file_20151121043315053_0

[14] Korea's Energy Policy, November 12th, 2015. Kim, Chang Kyu, Minister-Counselor for Trade, Industry & Energy. Embassy of the Republic of Korea at D.C., pp. 3, 9. http://www.mofa.go.kr/webmodule/download_hts.jsp?boardid=13871&filename=2015+Korea+Energy+Forum+-+Kim%2C+Chang+Kyu.pdf&shadowname=file_20151121043315053_0

example, in 2014, 53.80% of the electricity produced in Taiwan was consumed by industrial customers, which is even higher than either Japan or South Korea.[15] Industrial development and revitalization remain a high policy objective for Taiwan's future business activity.[16]

In addition, China has historically relied substantially on heavy industrial activity, which requires a more continuous supply of electricity. For example, in 2010, heavy industrial manufacturers accounted for nearly one-quarter of China's primary energy demand and about 60% of its electricity demand.[17] While the Chinese economy is evolving, it has higher industrial demand in the near term which will recede somewhat by 2040, but remain at or above current levels across the forecast period.[18]

Electrical Load Shapes and Minimum Load Data

While substantial research was conducted to identify load shape data, ultimately limited data is reported and publicly available. The most comprehensive data identified was reported in an academic study of Northeastern Asia power markets that developed load shapes for China, Japan, South Korea, and Russia, and numerous sub-regions in certain countries (referred to hereafter as "Power Grid Study").[19] Load shapes used in

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[15] Energy Supply and Demand Situation of Taiwan in 2014. Ministry of Economic Affairs of the Republic of China (MOEA), p 7. https://web3.moeaboe.gov.tw/ECW/english/content/wHandMenuFile.ashx?menu_id=1551

[16] Forward-looking Trends and Industry Optimization Industry Upgrading and Transformation Action Plan, Annual. Industrial Development - Industries will gain new growth momentum through intelligent, green, and cultural creative applications. Industrial Development Bureau, Taiwan, Ministry of Economic Affairs. https://www.moeaidb.gov.tw/external/ctlr?PRO=english.About01&lang=1

[17] The Outlook for Energy: A View to 2040, China Edition. ExxonMobil, p. 14. http://cdn.exxonmobil.com/~/media/global/files/outlook-for-energy/em-2015-energy-outlook-chinese.pdf

[18] China's heavy industry demand is seen peaking around 2020 and then beginning to decline. This is the result of three factors: (1) a moderation in the rate of urban infrastructure development, reducing the demand for steel and cement; (2) a shift toward high-tech, lighter manufacturing, and services in China's economy; and (3) continued improvements in energy efficiency. We expect that by 2040, energy demand from China's heavy industry sector will have fallen back to 2012 levels. The decline in heavy industry demand post-2020 is expected to more than offset growth in other sectors. Consequently, we expect China's overall energy demand to peak around 2030. The Outlook for Energy: A View to 2040, China Edition. ExxonMobil, p. 14. http://cdn.exxonmobil.com/~/media/global/files/outlook-for-energy/em-2015-energy-outlook-chinese.pdf

[19] Electric power grid interconnections in Northeast Asia: A quantitative analysis of opportunities and challenges. Energy Policy. Takashi Otsuki, Aishah Binti MohdIsa, Ralph D. Samuelson. http://www.sciencedirect.com/science/article/pii/S0301421515301993 Other research did not identify system load profile data from the power system operators, government agencies for these countries, or electricity providers.

the Power Grid Study were developed by the study authors based on certain data they accessed from the country government agencies and electricity companies. The underlying source data and the output of the study is not publicly available. The load shape data reported in the Power Grid Study is presented in Table 3 (below) and reports the load shape for the hours of the day during the summer and winter seasons of the year for each country and region. It also reports the ratio of electric demand during the hours of the day as compared to the peak electric demand hour over the year.

Table 3: Electric Load Curve, Summer-peak and Winter-peak Seasons[20]

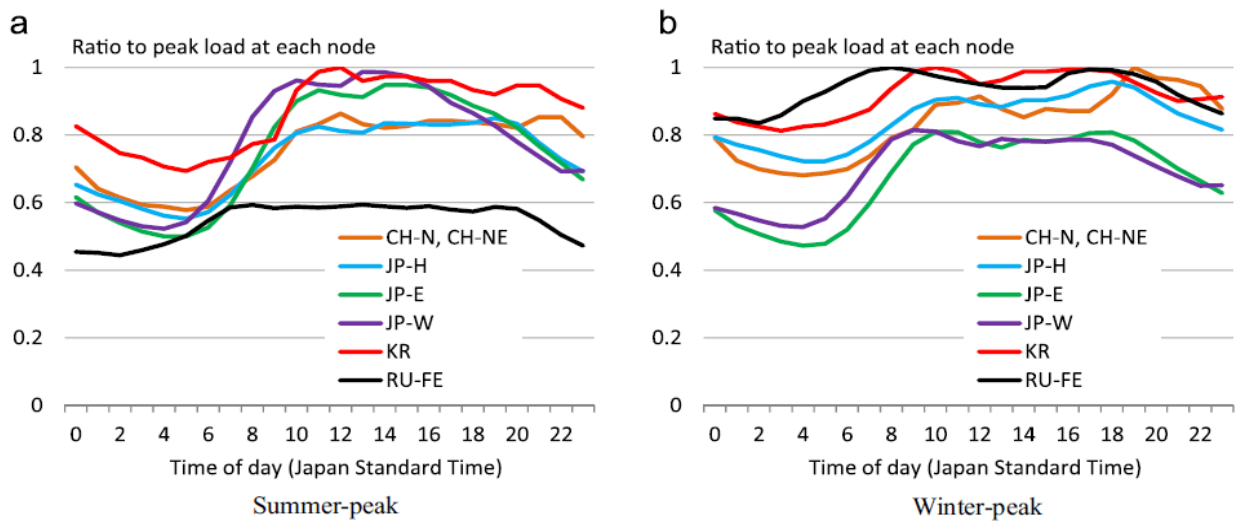

Fig. 3. Estimated electric load curve at city nodes in the summer-peak and winter-peak seasons (ratio to peak load at each node).

Electrical Load Shape Analyses and Evaluation of Baseload Coal Power Plants

The forthcoming section provides the results of the electrical load shape analysis conducted for each country and evaluates how coal-fired power plants may be expected to be operated in the future.

Japan

An economic analysis was conducted to determine if the coal fleet anticipated to be operating in 2030 in Japan may reasonably be expected to operate as baseload power plants (i.e., operate around the clock). The analysis utilized data forecasted for Japan to evaluate the supply and demand conditions and power system resource mix forecasted

[20] *Id.*

for 2030, along with the country electric load shape presented in the Power Grid Study.[21]

Table 4 (below) summarizes the analysis by comparing total derated baseload capacity to the minimum load hour level forecast for 2030 during each season.

- The total derated baseload capacity includes renewable power, nuclear, and coal-fired power capacity. The capacity is adjusted (or derated) to reflect seasonal availability and operational capabilities of these plants.[22]
- The minimum electric load level is calculated with an estimate of peak electric demand for 2030 based on the forecasted supply of derated capacity required to meet the peak annual electrical demand plus a 10% reserve margin, along with the load shape statistics reported in the Power Grid Study.

Table 4 demonstrates that the minimum or lowest electrical demand level during the seasonal peak and off-peak periods is forecast to be higher than the total derated baseload capacity of the Japan power system in 2030. This analysis indicates that coal-fired power plants can be expected to operate primarily as baseload facilities, i.e. operating all hours of the day. As such, the coal-fired power plants are not expected to operate any more if the price of coal falls.[23]

Table 4: Comparison of Minimum Electrical Demand to Derated Baseload Capacity (Japan – 2030)

	Japan			
	Winter		Summer	
	Peak	Off-Peak	Peak	Off-Peak
Minimum Electrical Demand Hour (GW)	144	109	138	103
Total Derated Baseload Capacity (GW)	112	91	115	93
Difference	32	19	23	9

[21] International Energy Agency. World Energy Outlook 2015. "Japan-Electrical Capacity, New Policies Scenario." November 2015, p. 614.

[22] No adjustment was made to account for unplanned outages, which could further lower the derated baseload capacity.

[23] This analysis does not differentiate between coal-fired power plants using different types of coal, such as subbituminous and bituminous coal.

The following discussion provides anecdotal evidence of how coal-fired power plants operate in Japan. Japan recently characterized coal-fired power plants as a "baseload power source" in the country's most recent long-term energy plan. Specifically, Japan defined "baseload power source" as a "power source that has a low operating cost and can stably generate electricity and continuously operate night and day." It is desirable that baseload power sources account for about 60% of all the power sources in Japan (in terms of output), the bureau announced.[24] In addition, the bureau said that geothermal, hydroelectric, nuclear, and coal-fired power plants are the base load power sources in Japan.[25] At the fourth meeting of the subcommittee, the bureau said the desirable composition ratio of geothermal and hydroelectric power plants combined was about 10.5%, meaning that the desirable composition ratio of nuclear and coal-fired power plants combined is about 50%.[26]

In setting energy policy goals, Japan's Fourth Strategic Energy Plan identifies the energy sources' characteristic with the goal of achieving energy supply structure with stable supply, low cost, and environmental acceptability. The energy sources' definitions include: [27]

1. Baseload Power Sources: Power output can be operated stably and at low cost regardless of day and night. Examples include geothermal energy, ordinary hydropower (run-of-river type), nuclear energy, and coal.
2. Intermediate Power Source: Power output can be produced at low cost next to baseload power source, and can respond quickly and flexibly to the situation of electricity demand. One example is natural gas.
3. Peaking Power Source: Power output can respond quickly and flexibly to the situation of electricity demand in spite of high cost. Examples include oil and pumped-storage hydropower.

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[24] Japan's Ministry of Economy, Trade and Industry (METI). Fifth meeting of the Long-term Energy Supply and Demand Outlook Subcommittee, Strategic Policy Committee, Advisory Committee for Natural Resources and Energy. March 30, 2015.
http://techon.nikkeibp.co.jp/english/NEWS_EN/20150405/412700/?ST=msbe

[25] Japan's hydroelectric power facilities are pumped storage.
http://www.fepc.or.jp/english/energy_electricity/location/hydroelectric/index.html

[26] http://techon.nikkeibp.co.jp/english/NEWS_EN/20150405/412700/?ST=msbe

[27] Fourth Strategic Energy Plan. Government of Japan, Ministry of Economy Trade and Industry. April 2014, p. 21.

South Korea

An economic analysis was conducted to determine if the South Korean coal fleet anticipated to be operating in 2030 may reasonably be expected to operate as baseload power plants (i.e., operating around the clock). The analysis utilized data forecasted for South Korea to evaluate the supply and demand conditions and power system resource mix forecasted for 2030, along with the country electric load shape presented in the Power Grid Study.[28]

Table 5 (below) summarizes the analysis by comparing total derated baseload capacity to the minimum load hour level forecast for 2030 during each season.

- The total derated baseload capacity includes renewable power, nuclear, and coal-fired power capacity. The capacity is adjusted (or derated) to reflect seasonally availability and operational capabilities of these plants.[29]
- The minimum load level is calculated with an estimate of peak demand for 2030 based on the forecasted supply of derated capacity required to meet the peak annual electrical demand plus a 10% reserve margin, along with the load shape statistics reported in the Power Grid Study.

Table 5 demonstrates that the minimum or lowest electrical demand level during the seasonal peak and off-peak periods is forecast to be higher than the total derated baseload capacity of the South Korean power system in 2030, with a small exception during the lowest load hour in the summer season.[30] This analysis indicates that coal-fired power plants can be expected to operate as baseload facilities for the vast majority of time, i.e. operating all hours of the day. As such, these coal-fired power plants will only operate a very small amount more, if any, when coal prices decrease.[31]

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[28]South Korean Ministry of Trade, Industry and Energy. "The 7th Basic Plan for Long-term Electricity Supply and Demand (2015 - 2029)." July 2015, pp. 42, 77. Data for 2029 was used as a proxy for 2030, as 2029 is the last forecast year.

[29] No adjustment was made to account for unplanned outages, which could further lower the derated baseload capacity.

[30] If the third lowest load hour is used for the summer off-peak period, the minimum electrical demand exceeds the derated baseload capacity. A coal-fired power plant is not typically operated in a manner that would shut down the plant for a single hour or two during the day.

[31] This analysis does not differentiate between coal-fired power plants using different types of coal, such as subbituminous and bituminous coal.

Table 5: Comparison of Minimum Electrical Demand to Derated Baseload Capacity (South Korea – 2030)

	South Korea			
	Winter		Summer	
	Peak	Off-Peak	Peak	Off-Peak
Minimum Electrical Demand Hour (GW)	98	90	83	77
Total Derated Baseload Capacity (GW)	82	79	82	79
Difference	17	11	2	(2)

The following discussion provides anecdotal evidence of how coal fired power plants operate in South Korea. According to the Energy Information Administration, baseload generation in South Korea stems mainly from coal and nuclear power, while peak demand is generally met by the country's liquefied natural gas (LNG) imports.[32] In addition, the South Korean power providers recognize that natural gas-fired power plants have operated as the marginal units in the past and are expected to do so in the future. Under South Korea's current power policy, coal-fired power plants and nuclear reactors run by state power utility (Korea Electric Power Corp., or KPX) provide electricity as "baseload generators." When power demand grows, KPX raises its power purchases from state-run and private generators that use more expensive fuel like LNG or oil.[33]

Taiwan

An electric load shape was not available for Taiwan to determine if the coal fleet anticipated to be operating in 2030 in Taiwan may reasonably be expected to operate as baseload power plants (i.e., operating around the clock). However, evidence suggests that the minimum or lowest electrical demand level for Taiwan is likely to be higher than the total derated baseload capacity. Comparing economic statistics from Japan and

[32] See https://www.eia.gov/beta/international/analysis.cfm?iso=KOR

[33] Dismal outlook for LNG in S Korea's power market as coal, nuclear gain favor: KPX. Platts. March 20, 2015. See http://www.platts.com/latest-news/natural-gas/seoul/dismal-outlook-for-lng-in-s-koreas-power-market-27227039 Electricity reserves fell to 5.2% in 2012 as several nuclear reactors were taken offline, while operating rates of gas-fired plants had jumped to 64.7%. Since then, however, electricity reserves have been on the rise to 5.5% in 2013 and 11.5% in 2014. "Operating rates of gas-fired plants are expected to further slip to 44.8% this year, 33.9% next year, 23.7% in 2019 and as low as 16.8% in 2022," Yoo said. Yoo attributed the lower rates to South Korea aggressively trying to minimize fuel costs.

Taiwan indicate that Taiwan has a relatively higher minimum electric load than Japan compared to the peak electric load.[34] In addition, the derated baseload capacity for Taiwan (including coal-fired capacity) is approximately the same percentage of the total system capacity as Japan.[35] Therefore, it is reasonable to expect that Taiwan's coal power plants are baseload in nature.

Conclusion:

The evaluation of electrical load shapes and coal use in baseload plants in Asian countries discussed above demonstrates that the elasticity of demand for coal in those countries is likely low. This conclusion is supported by the economic characteristics of their electricity generation portfolios, the electrical load shapes in these countries, and how these countries reliability operate their power systems. This means that coal-fired power plants can reasonably be expected to operate continuously around the clock. As such, they have limited opportunity to operate more if coal prices fall for various reasons, including as a result of the operation of the Project. Therefore, based on the analysis above, the Project is unlikely to cause coal-fired power plants to displace natural gas-fired power plants to any material degree.

C. Evaluation of Potential Induced Coal Consumption in Asia as a Substitute for other Fuel Types in Power Generation - SRMC

An economic analysis of the short-run marginal cost (SRMC) of coal-fired power plants relative to other competing fuels (i.e. natural gas-fired power plants) in the downstream power markets in the Pacific Basin countries could be studied to evaluate the potential impact of a forecasted change in global coal prices resulting from the Project on the SRMC of the fuels in each country's wholesale power systems. The purpose of the analysis is to evaluate the potential impact of the lower coal price from the Project on the dispatch rank order of the power plants in the system, to discern if the plants would

[34] As discussed above, Taiwan has a very large component of its electricity consumed by industrial customers. For example, in 2014, 53.8% of the electricity consumed occurred by industrial customers, which is even higher than Japan and Korea. Energy Supply and Demand Situation of Taiwan in 2014. Ministry of Economic Affairs of the Republic of China (MOEA), p. 7. See https://web3.moeaboe.gov.tw/ECW/english/content/wHandMenuFile.ashx?menu_id=1551

[35] Energy Supply and Demand Situation of Taiwan in 2014. Ministry of Economic Affairs of the Republic of China (MOEA). See https://web3.moeaboe.gov.tw/ECW/english/content/wHandMenuFile.ashx?menu_id=1610

operate more often (i.e., likely to be dispatched more frequently in advance of natural gas-fired power plants), thereby inducing coal demand and increasing GHG emissions, and evaluate the relative elasticity/inelasticity for the Pacific Basin study region.

Least-cost dispatch, also referred to as economic dispatch, is the power system approach to dispatching power plants (i.e., turning them on) over the course of a day based on each generating unit's SRMC. SRMC is the economic cost metric used to identify the rank order of the power plants to conduct the economic operations of a power system, with the lowest SRMC plants being dispatched first and higher SRMC plants being dispatched as needed, up until the point where supply meets demand. SRMC is the cost that accrues when a power plant produces more electricity. SRMC excludes any fixed costs from the construction, operation, and maintenance of the power plant.

The least-cost dispatch approach is necessary because electricity demand, also referred to as electrical load or consumption, varies over the days of the week and the hours of the day. The pattern of electrical consumption is generally low in the middle of the night, slowly rising in the morning, peaking in the middle of the day, and falling in the evening hours.[36] As energy consumption (i.e., demand) rises over the day, additional power plants are turned on to increase the supply of power. Similarly, as energy demand falls, power plants are turned off. Power system operations are sequenced to turn on the lowest-cost units first and only operate higher-cost units as needed.

Table 6 (below) summarizes the economic analysis of the SRMC of coal-fired power plants and natural gas-fired power plants in South Korea, Japan, and Taiwan.[37] The analysis was conducted for 2015 and 2030. The SRMC includes the delivered fuel cost and non-fuel variable operations and maintenance costs for coal- and natural gas-fired power plants' components. The SRMC were compared under a range of future forecasted delivered fuel prices and a range of efficiency ratings (also referred to as heat rates) to capture different power plant performance levels.[38]

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[36] The pattern of electrical consumption is referred to as an electrical load shape.

[37] We did not evaluate the potential induced coal consumption from bituminous coal, based on the analysis of EVA that demonstrates that subbituminous coal does not economically compete with bituminous coal. We assume no substitution for lower-cost nuclear power, which is continuously operated and has lower short-run marginal cost.

[38] A more efficient power plant is able to use lower quantities of coal (tons or British Thermal Units - BTUs) in order to produce the same quantity of electricity (kwhs). Thus, higher-efficiency power plants observe higher performance. An efficiency rating is reported on a percentage basis, with higher efficiencies representing superior performance. The power industry also relies on another measure of efficiency, referred to as the heat rate, which represents the amount of energy (BTU) used by a power plant to generate a single unit of power. This BTU/kwh metric represents the quantity of input fuel (BTU)

The results of the analysis show that the SRMC of coal-fired power plants is appreciably lower than the SRMC of natural gas-fired power plants. For example, in 2030 for Japan, the SRMC for subbituminous coal ranges from $49 - $64 per MWH, substantially below the SRMC for natural gas-fired power plants, which ranges from $101-$133 per MWH. Since coal-fired power plants have lower SRMC, any reduction in coal prices resulting from the Project will not cause the coal-fired power plants to be dispatched ahead of natural-gas fired power plants, and therefore no increase in coal demand will result.

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required to produce a single unit of power (kwh). Lower heat rates signify higher unit performance because less BTU of fuel is needed to produce a unit of power.

Table 6: Short Run Marginal Cost (SRMC): Comparison of Coal and Natural Gas Baseload Power Plants in Japan, South Korea, and Taiwan for 2015 and 2030[39]

Country/Date	Fuel & Plant Type	High Heat Rate (a)	Low Heat Rate (a)	Delivered Fuel Cost (b)	Non Fuel Variable O&M Cost (c)	Total SRMC Cost ($/MWh)	
		BTU/kwh	BTU/kwh	$/MMBTU	$/MWH	Low Heat Rate	High Heat Rate
2015							
Japan	Subbituminous Coal	7,935	9,749	$2.9	$15.0	$38	$43
Japan	Natural Gas (CC)	6,430	7,050	$11.2	$3.0	$75	$82
South Korea	Subbituminous Coal	7,935	9,749	$2.9	$6.6	$29	$35
South Korea	Natural Gas (CC)	6,430	7,050	$11.2	$5.0	$77	$84
Taiwan	Subbituminous Coal	7,935	9,478	$2.7	$2.5	$24	$29
Taiwan	Natural Gas (CC)	6,430	7,050	$10.7	$5.0	$74	$80
2030							
Japan	Subbituminous Coal	7,935	9,749	$4.3	$15.0	$49	$56
Japan	Subbituminous Coal	7,935	9,749	$5.0	$15.0	$55	$64
Japan	Natural Gas (CC)	6,430	7,050	$15.3	$3.0	$101	$111
Japan	Natural Gas (CC)	6,430	7,050	$18.5	$3.0	$122	$133
South Korea	Subbituminous Coal	7,935	9,749	$4.3	$6.6	$40	$48
South Korea	Subbituminous Coal	7,935	9,749	$5.0	$6.6	$46	$55
South Korea	Natural Gas (CC)	6,430	7,050	$15.3	$5.0	$103	$113
South Korea	Natural Gas (CC)	6,430	7,050	$18.5	$5.0	$124	$135
Taiwan	Subbituminous Coal	7,935	9,478	$4.1	$2.5	$35	$41
Taiwan	Subbituminous Coal	7,935	9,478	$4.8	$2.5	$41	$48
Taiwan	Natural Gas (CC)	6,430	7,050	$14.8	$5.0	$100	$109
Taiwan	Natural Gas (CC)	6,430	7,050	$18.0	$5.0	$121	$132

[39] a.) Energy Information Administration, International Energy Outlook 2016. Dong, N. and Baruya, P. IEA "Coal and Gas Competition in Power Generation in Asia." February 2015; b) International Energy Agency, World Energy Outlook 2015. Low oil price scenario and New Policies Scenario: NERA Economic Consulting, Macroeconomic Impacts of LNG Exports from the United States. 2012, p. 87, and Energy Ventures Analysis; c) Non Fuel Variable O&M = Variable Operations and Maintenance. Dong, N. and Baruya, P. IEA "Coal and Gas Competition in Power Generation in Asia." February 2015, and EIA, IEO 2016. Note the analysis reflects nominal dollars.

For these reasons, a reduction in coal prices that may result from the Project will not generally cause coal-fired power plants to operate more frequently in Japan, South Korea, and Taiwan, and is not likely to induce greater demand for coal. Therefore, the elasticity of demand for coal in Japan, South Korea, and Taiwan can reasonably be expected to be very low.

This lack of anticipated competition between coal- and natural gas-fired power plants in Japan, South Korea, and Taiwan is different than the U.S. experience. Recent evidence shows that coal-fired power plants are frequently competing with natural gas-fired power plants in U.S. wholesale power markets. This result occurs because of the relatively comparable SRMC that results from the very low costs of delivered coal and natural gas to U.S. power plants due to the abundant natural resources of both coal and natural gas, as well as reasonably low cost methods to transport the fuel within the U.S.[40] Japan, South Korea, and Taiwan have moderate costs of delivered coal (due to imports of coal from regional sources) and reasonably economic vessel transportation. However, these countries experience very high costs associated with delivered natural gas because they lack local natural resources and must rely on highly-complicated, capital-intensive, and costly processes to transport natural gas across long distances over the ocean. (This process requires liquefying natural gas from the source country, transporting it, and completing a regasification process at the destination.) All of these steps substantially increase the cost of the delivered natural gas to Japan, South Korea, and Taiwan.

D. Evaluation of Retail Customer Electricity Rates for Selected Countries in the Pacific Basin

The previous analysis demonstrates that coal-fired power plants will not likely operate more frequently, nor create an induced demand for coal (i.e. limited elasticity of demand responsiveness is likely). However, a reduction in the price of coal fuel may result from the Project. The following analysis evaluates the impact of the reduced coal fuel cost on the retail electricity rates in Japan and South Korea to determine if increased electricity demand can be expected from retail customers. Specifically, this analysis will evaluate if the lower retail electricity rates that could result from lower fuel costs would be likely to impact consumption of electricity (e.g., causing consumers to turn on more

[40] This competition between coal-fired and natural gas-fired power plants indicates that natural gas-fired power generation substitutes frequently for coal-fired power plants in the U.S. and can be expected to continue to do so in the future, particularly when a coal price decline results from the Project. Medium-Term Outlook for US Power: 2015 = Deepest De-carbonization Ever. *Bloomberg New Energy Finance.* April 8, 2015.

lights, run more appliances, etc.). Due to data limitations, no analysis was completed for Taiwan.

The following economic analysis was conducted to study the impact of a small reduction in coal prices from the Project on the final consumer electric rate in South Korea and Japan to evaluate the relative elasticity/inelasticity in demand. Specifically, an analysis of the total electricity revenues associated with the ultimate customers' (i.e., residential and industrial customers') consumption of electricity in each Asian country was conducted to determine the impact of a small change in the price of coal from the Project on the final retail purchase price charged to ultimate customers.

The retail price of electricity includes many charges which can generally be grouped into asset categories. These categories include: power generation facilities, transmission and distribution facilities, and other fees associated with promoting policy or other initiatives. These categories include capital expenditures, such as power plants and transmission lines, operational and maintenance expenses associated with labor and equipment, financing costs, administrative charges, and potentially a return on investment. The utility industry is a highly capital-intensive industry and therefore incurs substantial costs in providing electricity service to customers.

Japan

Table 7 (below) presents the results of the analysis of retail electricity rates for Japan. It shows that coal fuel is expected to comprise just 3.57% of the total electricity revenue forecast for Japan in 2030.

A 5% decrease in coal fuel prices could potentially result from the Project[41] which would result in a less than 2/10ths of 1 percent decrease (specifically .17%) in the total retail electricity revenue/rate to Japanese purchasers of electricity.[42] Therefore, for a $100 electricity bill, a 17-cent reduction is estimated to result from a 5% decrease in coal fuel prices.

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[41] The change in price of coal is anticipated to be negligible because the 44 MMT expected to be exported by the Project is a very small percentage of the hundreds of millions of tons of subbituminous coal in any given year for the global market. An illustrative 5% coal price decrease is used in this analysis, because the Draft EIS did not provide information on the coal price impact resulting from the Project. A smaller coal price decline will have even less impact than discussed in this memo. Draft EIS. *The SEPA Coal Market Assessment Technical Report*, p. 4-11.

[42] This analysis is conservative because it reduces all coal fuel-related costs, even fuel costs for coal types that are not impacted by the Project, and ancillary costs associated with the coal fuel, including transportation.

Table 7: Retail Customer Electricity Rates Analysis: Japan

	Industry	Household	Total Revenue
Price (USD/kWh)			
2013	$0.174	$0.242	
2030	$0.265	$0.368	
2030 Estimated Total Electricity Values			
Consumption (kWh)	251,136,000,000	729,864,000,000	981,000,000,000
Revenues (USD)	$ 66,491,163,513	$268,759,002,519	$335,250,166,033
2030 Estimated Coal Values			
Coal Generation (kWh)	65,295,360,000	189,764,640,000	255,060,000,000
Coal Generation Revenues (USD	$7,740,830,223	$22,496,787,837	$30,237,618,060
Fuel	$3,060,328,228	$8,894,078,912	$11,954,407,140
Percent Coal Fuel			3.57%
Coal Revenue (with 5% decrease)			$11,356,686,783
Revised Total Revenue			$334,652,445,676
Percent Coal Fuel (with 5% decrease)			3.39%
Impact of 5% decrease in coal fuel cost			-0.18%

Sources:

[A] Assumed yearly inflation from 2013 to 2030.

[B-C] "The Best Energy Mix for Japan." Institute of Energy Economics, Japan. June 4, 2015; pg. 5.

[D-E] "Japan and Korea Energy-Intensive Industries Share of Energy Consumption" Electrical Demand Memo MBT, pg 5

[F-G] "Japan's Likely 2030 energy mix: more gas and solar." Whitepaper, Bloomberg New Energy Finance. June 2, 2015; p

[H] JPY to USD conversion rate on May 13, 2013, sourced from www.oanda.com.

[I] "The Best Energy Mix for Japan." Institute of Energy Economics, Japan. June 4, 2015; pg. 21.

The economic analysis demonstrates that the impact of a small decline in the price of coal has a de minimis impact on the overall retail electricity bill, which is not likely to change consumer behavior. It is also not likely to materially increase electricity consumption and therefore increase coal-fired power generation. For these reasons limited induced demand for coal is likely, and a highly inelastic demand responsiveness is reasonable to assume.

South Korea

Table 8 (below) presents the results of the analysis of retail electricity rates for South Korea. It shows that coal fuel comprises approximately 12.58% of the total electricity revenue for South Korea.

Applying a 5% decrease in coal fuel prices that could potentially result from the Project[43] would result in approximately 6/10 of one percent decrease (specifically .63%) in the total retail electricity revenue/rate to South Korean purchasers of electricity.[44] Therefore, for a $100 electricity bill, a 63-cent reduction is estimated to result from a 5% decrease in coal fuel prices.

[43] As noted above with Japan, illustrative 5% coal price decrease is used in this analysis because the Draft EIS did not provide information on the coal price impact resulting from the Project. A smaller coal price decline will have even less impact than discussed in this memo. Draft EIS. *The SEPA Coal Market Assessment Technical Report*, p. 4-11.

[44] As noted above with Japan, this analysis is conservative, because it reduces all coal fuel related costs, even fuel costs for coal types that are not impacted by the Project, and ancillary costs associated with the coal fuel, including transportation.

Table 8: Retail Customer Electricity Rates Analysis: South Korea

	Industry	Household	Total Revenue
Price (USD/kWh)			
2007	$0.046	$0.068	
2035	$0.101	$0.149	
2035 Estimated Total Electricity Values			
Consumption (kWh)	314,976,000,000	501,024,000,000	**816,000,000,000**
Revenues (USD)	$ 31,807,473,158	$ 74,792,757,583	**$ 106,600,230,742**
2035 Estimated Coal Values			
Coal Generation (kWh)	123,155,616,000	195,900,384,000	**319,056,000,000**
Coal Generation Revenues (USD)	$ 13,088,825,155	$ 20,820,048,304	**33,908,873,460**
Fuel	$ 5,174,651,806	$ 8,231,181,888	**13,405,833,693**
Percent Coal Fuel			12.58%
Coal Revenue (with 5% decrease)			12,735,542,009
Revised Total Revenue			$105,929,939,057
Percent Coal Fuel (with 5% decrease)			12.02%
Impact of 5% decrease in coal fuel cost			-0.63%

Source

[A] Korea Energy Master Plan: Outlook & Policies to 2035, pg. 42

[B] http://www.inflation.eu/inflation-rates/south-korea/historic-inflation/cpi-inflation-south-korea.aspx

[C] Inflation rate based on A. and B.

[D] "o5. -Chinese-Taipei1" powerpoint. pg. 27
2007 exchange rate based on http://www.x-rates.com/average/?from=TWD&to=EUR&amount=1&year=2007

[E] Industry Price if 2007 industry:household price ratio is the same

[F] "o5. -Chinese-Taipei1" powerpoint. pg. 27
2007 exchange rate based on http://www.x-rates.com/average/?from=TWD&to=EUR&amount=1&year=2007

[G] "The Best Energy Mix for Japan." Institute of Energy Economics, Japan. pg. 5

[H] "Japan and Korea Energy-Intensive Industries Share of Energy Consumption" Electrical Demand Memo MBT, pg. 3

[I] Korea Energy Master Plan: Outlook & Policies to 2035, pg. 46

[J] "The 7th Basic Plan for Long-term Electricity Supply and Demand (2015-2029). pg. 6.

[K] www.oanda.com

The economic analysis demonstrates that the impact of a small decline in the price of coal has a de minimis impact on the overall retail electricity bill. This is not likely to change consumer behavior and increase electricity consumption and therefore increase

coal-fired power generation. For these reasons limited induced demand for coal is likely, and a highly inelastic demand responsiveness is reasonable to assume.

E. Evaluation of the Differences in Efficiencies of Coal-Fired Power Plants in the U.S. and Selected Countries in the Pacific Basin from the Project.

The Draft EIS does not address the differences in efficiencies between existing and planned power plants in the U.S. Japan, South Korea, and Taiwan that are expected from the Project (over the course of its operating life) to determine and the impact of efficiencies on the total coal consumed and resulting GHG emissions (i.e. will a power plant operating in the selected countries in the Pacific Basin produce more or less GHG emissions per unit of electricity produced).

As discussed in more detail below, the operational efficiency of the selected Asian countries' fleets of coal-fired power plants is expected to be superior to the U.S. coal-fired power plant fleet during the operating life of the Project. The reason is that the Asian countries' coal-fired power plant fleet comprises newer plants equipped with better technological capabilities that require a lower quantity of coal to produce a single unit of power (kilowatt hour or kwh). As such, on average an Asian country's coal-fired power plant that burns Powder River Basin (PRB) coal produces less GHG emissions than a U.S. coal-fired power plant, because the Asian country's coal-fired power plants produce more power per unit of coal input (BTUs).

Said differently, an offsetting reduction in coal consumption and emissions will result in Asia as a result of the Project because the Project will cause less PRB coal to be consumed in the U.S. That same coal being consumed in selected Asian countries will produce greater quantities of power compared to if it had been burned in the U.S.

Coal-Fired Power Plant Capacity by Type

In order to understand the relative efficiency of the coal-fired power plant fleets in selected Asian countries compared to the U.S., a review of the types of power plants in each county's existing fleet of coal-fired power plants is required. Table 9 (below) shows MW capacity estimates for 2015 for U.S. and selected Asian countries' coal-fired power plant fleets by type of plant, based on reports from the International Energy Agency (IEA). This table shows that the U.S. coal-fired power plant fleet is relatively less efficient than the newer fleet in selected Asian countries, particularly in Japan and South Korea. The majority of coal-fired power plants in South Korea and Japan are

either supercritical or ultra-supercritical (based on IEA estimates), and these power plants are generally newer due to the growing economies that increased electricity demand. Specifically, as Table 9 shows, within South Korea and Japan approximately 73% and 74%, respectively, of the coal-fired power plant fleets are supercritical or ultra-supercritical technology. By comparison, only approximately 27% of the U.S.'s coal-fired power plant fleet is considered either supercritical or ultra-supercritical technology.

Table 9: Capacity of Coal-Fired Power Plants by Type of Plant: U.S. and Selected Asian Countries[45] (2015 Estimate)

Country	Subcritical	Supercritical	Ultra-supercritical	Supercritical and Ultra-supercritical
US	246,832	89,503	672	337,007
China	531,384	173,549	92,653	797,586
South Korea	7,190	12,600	6,915	26,705
Japan	10,939	19,097	11,500	41,536
Percentage of Total (%)	**Subcritical**	**Supercritical**	**Ultra-supercritical**	**Supercritical and Ultra-supercritical**
US	73%	27%	0.2%	27%
China	67%	22%	12%	33%
South Korea	27%	47%	26%	73%
Japan	26%	46%	28%	74%

Japan, South Korea, and China continue to add higher efficiency coal-fired power plants that are supercritical and ultra-supercritical power plants to their power systems. This trend is likely to continue to increase the overall percentage of the higher efficiency power plants in the selected Pacific Basin countries compared to the U.S., because very few new coal-fired power plants are expected to be built in the U.S.

[45] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014. US, p 76; China, p 36; South Korea, p 70; Japan, p 51. http://www.usea.org/sites/default/files/072014_Upgrading%20the%20efficiency%20of%20the%20world's%20coal%20fleet%20to%20reduce%20co2%20emissions_ccc237.pdf

Coal-Fired Power Plant Efficiency Ratings

To compare the relative efficiency of the U.S. coal-fired power plant fleet to the selected Pacific Basin countries, the following table was developed to summarize efficiency ratings associated with different types of coal power plants. Table 10 (below) reports the efficiency rating estimates and heat rates by the type of coal-fired power plant for the coal-fired power plant fleets in the U.S. and the selected Pacific Basin countries, as reported by the IEA.[46]

Table 10: Efficiency Rating/Heat Rate for Coal-Fired Power Plants U.S. and Selected Asian Countries [47]

Country	Efficiency			Heat Rate		
	Subcritical	Supercritical	Ultra-Supercritical	Subcritical	Supercritical	Ultra-Supercritical
US	33%	38%	43%	10,339	8,979	7,935
Japan	35%	40%	43%	9,749	8,530	7,935
South Korea	35%	40%	43%	9,749	8,530	7,935
China	36%	40%	43%	9,478	8,530	7,935

An efficiency rating, which is reported on a percentage basis, represents the performance of the power plant such that a higher efficiency indicates superior performance. A more efficient power plant is able to use lower quantities of coal (i.e., tons or BTUs) in order to produce the same quantity of electricity (i.e., kwhs). Thus, higher efficiency power plants observe higher performance. The power industry also

[46] These efficiency ratings are based on the reporting by an IEA study and represent general efficiency ratings for each country and each type of plant based on numerous other research and studies. Actual operational performance can vary for any given power plant in any given country. In addition, standardization of power plant efficiencies and reporting is limited for a variety of reasons. Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014, pp. 18-9. http://www.usea.org/sites/default/files/072014_Upgrading%20the%20efficiency%20of%20the%20world's%20coal%20fleet%20to%20reduce%20co2%20emissions_ccc237.pdf

[47] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014, p. 14. http://www.usea.org/sites/default/files/072014_Upgrading%20the%20efficiency%20of%20the%20world's%20coal%20fleet%20to%20reduce%20co2%20emissions_ccc237.pdf

relies on another measure of efficiency, referred to as a heat rate, which represents the amount of energy (BTU) used by a power plant to generate a single unit of power (BTU/kwh). This metric represents the quantity of input fuel (BTU) required to produces a single unit of power (kwh). A lower heat rate indicates a superior performance, because fewer BTUs of fuel are needed to produce a single unit of power.

Table 10 indicates the following:

- U.S. coal-fired power plants are less efficient than those in the selected Asian countries, even for the same technology type.
- The efficiency rating for subcritical coal–fired power plants is 33% for the U.S., and ranges from 35-36% for the selected Asian countries.
- The efficiency rating for supercritical coal–fired power plants is equal to 38% for the U.S., compared to 40% for the selected Asian countries.
- All countries have the same efficiency rating for ultra-supercritical coal plants (equal to 43%).

The weighted average heat rate of the coal-fired power fleet can be calculated for each country by analyzing the efficiency rating statistics reported by the IEA for each type of coal-fired power plant in each country, along with the mix type of plants. Table 11 (below) reports the weighted average heat rate by type of coal-fired power plant for the U.S. and selected Asian countries based on proportion of coal-fired power plant capacity technologies.

Table 11: Weighted Average Heat Rate for the U.S. and Selected Asian Countries [48]

Country	Item	Subcritical	Supercritical	Ultra-supercritical	Weighted Average	Percent Difference From U.S.
US	MW %	73.2%	26.6%	0.2%		
	Heat Rate	10,339	8,979	7,935	9,973	
Japan	MW %	26.3%	46.0%	27.7%		
	Heat Rate	9,749	8,530	7,935	8,686	-15%
South Korea	MW %	26.9%	47.2%	25.9%		
	Heat Rate	9,749	8,530	7,935	8,704	-15%
China	MW %	66.6%	21.8%	11.6%		
	Heat Rate	9,478	8,530	7,935	9,092	-10%

[48] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014. Rates: US, p. 76; China, p. 36; South Korea, p. 70; Japan, p 51. Efficiencies, p. 19.

Table 11 shows that on average the U.S. fleet of coal-fired power plants is approximately 15% less efficient than the South Korean and Japanese coal-fired power plant fleets. [49] This implies that on average the South Korean and Japanese coal-fired power plant fleets each consume 15% less coal to generate the same level of power than the U.S. Therefore, South Korean and Japanese coal-fired power plants will each emit approximately 15% less CO_2 to generate the same output level of power than the U.S. when burning PRB-originating coal.[50] This table also shows that the U.S. coal-fired power plant fleet is approximately 10% less efficient than the Chinese fleet.

The future coal-fired power plant fleet in Asia is expected to improve efficiency ratings as more supercritical and ultra-supercritical coal-fired power plants are added to the power system. [51] In South Korea and Japan, the vast majority of recently built coal-fired power plants use supercritical and ultra-supercritical technologies.[52]

A sensitivity analysis was conducted to estimate the potential efficiency ratings that selected Asian countries' coal-fired power plants might observe in the future as compared to the U.S. In Table 12 (below), the future efficiency of the selected Asian countries' coal-fired power plant fleets was assumed to be comprised of 50% supercritical and 50% ultra-supercritical coal-fired power plants. This analysis also assumed that the U.S. maintains the historical mix of types of plants currently operating today. If these shifts occur, the selected Asian countries coal-fired power plant fleet would consume 21% less coal to generate the same level of power than U.S., and consequently would emit approximately 21% less CO_2 to generate the same level of power than the U.S.[53]

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[49] This comparison appears conservative, as the Energy Information Administration reports the average operating heat rate for the entire fleet of U.S. coal plants as greater than 10,400 btu/kwh for all years since 2009. http://www.eia.gov/electricity/annual/html/epa_08_01.html

[50] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014, p. 19.

[51] There is also the possibility that existing power plants would make efforts to improve the efficiency at existing power plants. This could occur in the Asian countries and the U.S.

[52] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014. US, p. 76; China, p. 36; South Korea, p. 70; Japan, p. 51. http://www.usea.org/sites/default/files/072014_Upgrading%20the%20efficiency%20of%20the%20world's%20coal%20fleet%20to%20reduce%20co2%20emissions_ccc237.pdf

[53] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014, p. 19.

Table 12: Sensitivity Analysis for Weighted Average Heat Rates: U.S. and Selected Asian Countries

(Assumes Selected Asian Countries Attain a 50% / 50% Mix of Supercritical/ Ultra-supercritical)[54]

Country	Item	Subcritical	Supercritical	Ultra-supercritical	Weighted Average	Percent Difference From U.S.
US						
	Mix %	73.2%	26.6%	0.2%		
	Heat Rate	10,339	8,979	7,935	9,973	
Japan						
	Mix %	0.0%	50.0%	50.0%		
	Heat Rate	9,749	8,530	7,935	8,232	-21%
South Korea						
	Mix %	0.0%	50.0%	50.0%		
	Heat Rate	9,749	8,530	7,935	8,232	-21%
China						
	Mix %	0.0%	50.0%	50.0%		
	Heat Rate	9,478	8,530	7,935	8,232	-21%

Taiwan

The previous tables do not directly summarize statistics for Taiwan. It appears that the current fleet of coal-fired power plants in Taiwan only burn bituminous coal, and if that is correct, Taiwan is not a likely potential buyer of PRB coal. However, if that is not the case (or circumstances change), and we assume that Taiwan's coal-fired power plant fleet mix includes subcritical, supercritical, and ultra-supercritical plants similar to China, the implication is that the U.S. coal-fired power plant fleet is approximately 10% less efficient than the current Taiwan coal-fired power plant fleet. This implies that on average, the Taiwan coal-fired power plant fleet would consume 10% less coal to generate the same level of power and produce 10% less GHG emissions, to the extent that PRB coal is delivered to Taiwan.

Furthermore, all currently proposed coal-fired power plants in Taiwan are ultra-supercritical coal plants.[55] As discussed above, these plants observe a heat rate

[54] A somewhat improved heat rate could occur for the U.S. if more subcritical power plants are retired as compared to supercritical.

approximately equal to 8,000 btu/kwh. If the future mix of coal plants in Taiwan approximates 50% supercritical and 50% ultra-supercritical technologies, and assuming the U.S. maintains the historical mix of types of plants currently operating today, then the Taiwan coal-fired power plant fleet will consume 21% less coal to generate the same amount of power, and these plants would emit approximately 21% less CO_2 than U.S. coal-fired power plants burning PRB coal.

The foregoing analysis of the relative efficiency of U.S. vs selected Asian countries' coal-fired power plants does not account for other factors that may affect emissions. These factors include whether there is perfect displacement (nothing gained or lost in the system from differences in transloading), transportation, heat content of coal, and others.

Potential for Further Advancements in Coal Plant Efficiency

Beyond the coal fleets discussed above, even more advanced coal plants are being developed. For example, an advanced ultra-supercritical coal plant being developed yields an efficiency of 50%, substantially improved from the supercritical and ultra-supercritical coal plants' efficiencies, which range from 38-43%.[56] In addition, efforts to develop carbon capture and sequestration (CCS) technology continues to be made and, if successful, coal plants with CCS observe the greatest reductions in CO_2 if utilized.[57] CCS technology is most suitable for larger, more efficient (i.e., younger) coal plants, which generally characterize the Asian power fleet as compared to the U.S. fleet.[58]

To the extent that the Asian countries rely on even more advanced coal plants, such as advanced ultra-supercritical coal plants, or apply CCS technology to its existing coal fleet through retrofitting or build new plants with this capability, and the U.S. does not do so to the same extent, the further efficiency-related benefits will result in less coal consumed in Asia and lower GHG emission per unit of power generated by a coal plant as compared to the U.S.

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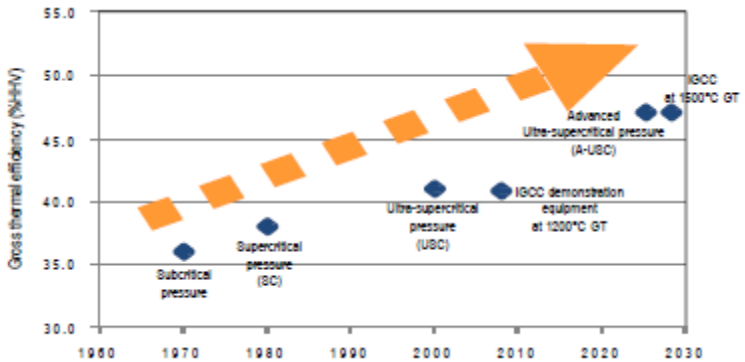
[55] IEA. Clean Coal Centre – HELE Perspectives for Selected Countries. September 2015, pp 17-18.
[56] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014, p. 19. Note: BTU/KWh, 1KWh = 3,412.
[57] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014, pp. 13-14.
[58] Barnes, I. "Upgrading the Efficiency of the World's Coal Fleet to Reduce CO_2 Emissions." International Energy Agency (IEA). July 2014, pp. 13-14.

Japan

The Japanese government planning forecasts for the energy sector include a heavy reliance on coal-fired power plants, along with a commitment to adoption of "efficient" coal technologies such as ultra-supercritical coal plants for its reasoning.[59] Japan discussed its historical performance increasing the efficiency of coal-fired thermal power generation facilities in its recent long-term energy supply and demand outlook as presented in Table 13 (below). In addition, Japan expects continued efficiency improvements in the future.

Table 13: Improved Efficiency of Coal-Fired Thermal Power Generation Japan[60]



South Korea

According to South Korea's *7th Basic Plan for Long-term Electricity Supply and Demand* (BPE):

- "Power generation technology should be developed using super critical CO_2 in far-sighted ways in order to support small-scale generation facilities and enhance efficiency."[61]
- "Replacement of Aged Facilities with Environmentally-friendly Facilities – Greenhouse gas emissions are now under control by allowing the aged coal-fired power plants to be replaced within the capacity only when they were upgraded for the environment. The aged power plants here mean the power plants that have been operating over 40 years since construction."[62]

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[59] Bloomberg Energy Finance. ENERGY – JAPAN – WHITEPAPER. June 2, 2015.
[60] Report on Analysis of Generation Costs, Etc. for Subcommittee on Long-term Energy Supply-demand Outlook May 2015. Power Generation Cost Analysis Working Group, p. 47.
[61] *7th Basic Plan for Long-term Electricity Supply and Demand (2015-2029).* South Korea, The Ministry of Trade, Industry and Energy. July 24, 2015, p. 47.
[62] *Id.*, p. 12.

Appendix A

Evaluation of the Role of Government Planning and Economic Decision-Making for Building Coal-Fired Power Plants in South Korea, Japan, Taiwan and China, Draft EIS Assumptions

Evaluation of the Role of Government Planning and Economic Decision-Making for Building Coal-Fired Power Plants in South Korea, Japan, Taiwan and China, Draft EIS Assumptions

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Overview/Background

The following Appendix provides an evaluation of the GHG emissions impact analysis for the Millennium Coal export terminal project (Project) with respect to the government planning role and economic considerations in the decision-making to build coal-fired power plants in South Korea, Japan, Taiwan, and China. Specifically, this memo will evaluate whether the impact of the Project is likely to cause a change in the decision-making to build a coal-fired power plant given the government planning processes it relies upon and economic evaluations of building new coal-fired power plants.

The Draft EIS relies on demand elasticity assumptions to calculate an induced level of coal consumption in the Pacific Basin based on an estimated forecast of the change in delivered coal prices resulting from the Project. The demand elasticity assumption attempts to estimate the increased coal consumption in the Pacific Basin resulting from lower international coal prices associated with the Project's exportation of coal. The Draft EIS elasticity assumptions range from .1 to 1.2, and average .4. They are based on eight studies of energy-specific demand elasticities identified through a literature search and used as inputs to the Draft EIS scenarios.[63]

Because the Draft EIS relies on an assumed elasticity of demand to quantify the induced coal consumption, using a large range of elasticity of demand values, the Draft EIS does not address the specific extent to which a coal plant will be built in South Korea, Taiwan, and Japan as a result of the Project and the implications for the relative elasticity/inelasticity of coal. If coal demand is induced, it means that either more coal is used as a result of increased operational levels at existing coal plants, or additional coal consumption will result from operating newly-built coal-fired power plants.[64]

This memo will analyze whether the impact of the Project is likely to cause a change in the decision-making to build a new coal-fired power plant in South Korea, Japan,

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[63] Draft EIS. *The SEPA Coal Market Assessment Technical Report*, p. 4-11.

[64] Coal that is anticipated to be exported from the Project, such as PRB-originating coal, is used in coal-fired power plants to generate electricity.

Taiwan, and China, with respect to the role of government planning upon which it relies, as well as the economic decision-making in selecting what types of power plants to build when additional sources of power supply are needed.

Conclusion:

The government planning role in the decision-making of building new coal-fired power plants in South Korea, Japan, Taiwan, and China is substantial. The selection of the type of power plants is generally predetermined by government entities and implemented by the energy sector. In China and Taiwan, the government role in planning the selection of power plant types is substantial while in South Korea and Japan, the government role is significant with some modest level of flexibility and input by constituents. For these reasons a small change in the price of coal will not likely have an impact on government planning decisions to build new coal-fired power plants.

An analysis of the economic decision-making of building a new coal-fired power plant in South Korea, Taiwan, and Japan demonstrates that it is not likely to change due to a small change in the price of coal that may result from the operation of the Project. Coal-fired power plants are very large, capital-intensive projects, which can cost $1 billion to $2 billion or more depending on the size and technology. A small change in the price of coal has no impact on the total capital cost and a de minimis impact on the total annual capital and operating costs.

For these reasons, no new coal-fired power plants are likely to be built based on government planning or economic considerations as a result of the Project, which is evidence of a zero elasticity of demand (associated with newly built power plants). This Appendix is separated into two chapters to discuss different aspects of the decision-making associated with building coal-fired power plants. Chapter 1 discusses the government planning role, and Chapter 2 discusses the economic considerations.

Chapter 1: Evaluation of the Role of Government Planning in the Decision-Making for Building Coal-Fired Power Plants

Chapter 1 will analyze whether the impact of the Project is likely to cause a change in the decision-making to build a new coal-fired power plant in South Korea, Japan, Taiwan, and China, with respect to the role of government planning upon which it relies when additional sources of power supply are needed.

Description of the Government Planning within the Energy Sector

The following discussion provides a high-level overview of the planned nature and non-market features and characteristics of the South Korea, Japan, Taiwan, and China energy industries and economies. The energy industries in these countries exhibit non-market features in the forms of government interventions and reliance on planning-based decision-making within the energy industry. Specifically, these countries generally conduct long-term planning processes to set forth the future power supply and resource mix of electric generating plants for each country. These policies are dictated by broad government policy goals that evaluate market and non-market features and provide policy requirements for implementation.

South Korea

The government of South Korea is heavily involved in energy industry planning, including a role in decision-making regarding the types of power plants that will be built.

The South Korea Ministry of Trade, Industry and Energy (MTIE) conducts long-term energy planning and creates a Basic Plan for Long-Term Electricity Supply and Demand (BPE) pursuant to Article 25 of the Electricity Business Act (EBA), which requires a stable supply and demand of electricity. The BPE is announced biennially and is reviewed and released by the Electricity Policy Review Board pursuant to Article 15 of the Electricity Business Decree after the consultation among the Ministries, the report to the National Assembly Standing Committee, and the public hearing.

The most recent plan, which is referred to as the 7th BPE, outlines the structure of power generation and load capacity, and forecasts demand for the period from 2015-2029. The plan includes the development of a long-term outlook for electricity supply and demand; plans for generation facilities, transmission facilities, and transformation facilities; electricity demand management; and an evaluation of the previous BPE.[65] Demand forecasts are based on factors such as GDP growth, predicted weather and climate patterns, consumer trends, market utility rates, input prices, population growth, and other factors.[66] These forecasts create a path which policy makers use to dictate the growth rate in the energy sector and subsequently decide on a strategy for the energy mix necessary to meet forecasted demand.[67]

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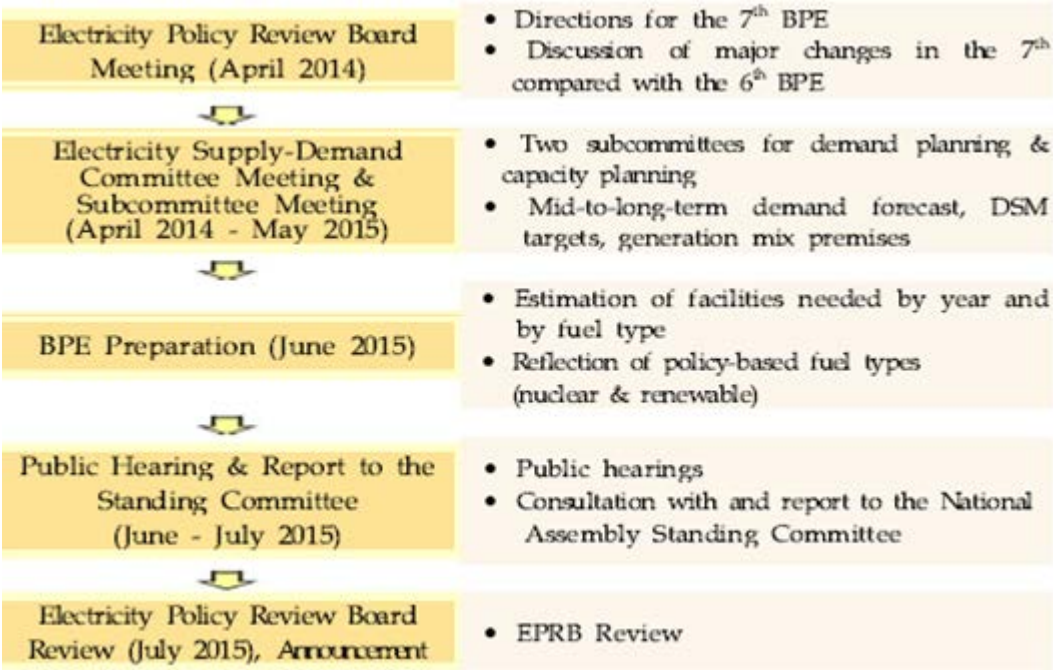
[65] *7th Basic Plan for Long Term Electricity Supply and Demand (2015-2029).* South Korean Ministry of Trade, Industry and Energy. July 2015, p. 1.
[66] *7th BPE (2015-2029)* at p. 15.
[67] *Id. at* pp. 7-8.

Figure 1 (below) outlines the planning procedures for the South Korean long-term electricity supply and demand planning.

Figure 1: South Korea Planning Procedures for Long Term Electricity Supply and Demand Forecasting [68]



Each energy plan must evaluate the recent historical power generation capacity and energy mix and develop future goals to ensure that the necessary capacity is available to meet peak demand. Further, political objectives are built into the energy plans. For example, certain policy goals are set regarding the development of power generation technology with supercritical CO_2 capabilities and other efforts to reduce carbon emissions. The 7th BPE states: "Replacement of Aged Facilities with Environmentally-friendly Facilities: Greenhouse gas emissions are now under control by allowing the aged coal-fired power plants to be replaced within the capacity only when they were upgraded for the environment. The aged power plants here mean the power plants that have been operating over 40 years since construction."[69] Earlier, the 6th BPE focused on boosting total capacity through the use of coal and LNG plants.[70]

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[68] *Id. at* p 2.

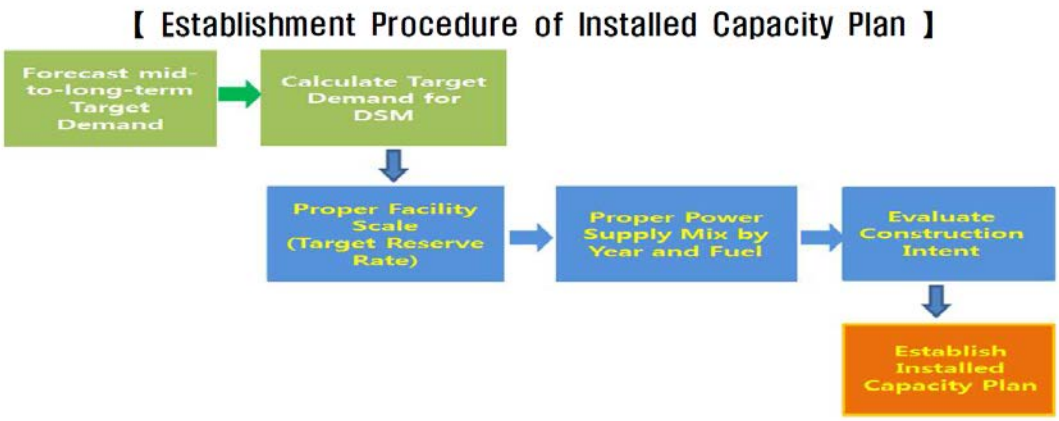
[69] *7th BPE (2015-2029) at* pp. 9, 12, 47.

[70] *6th Basic Plan for Long Term Electricity Supply and Demand (2013-2027).* South Korean Ministry of Knowledge Economy. February 2013, p. 32.

When additional generation capacity is deemed necessary, the MTIE conducts an assessment to determine the amount of additional capacity and the method by which that capacity will be delivered before tenders are disseminated to producers for construction of additional facilities. The final decisions are made by MTIE by awarding permits in line with the new generation capacity by year and by fuel.[71]

Figure 2 (below) outlines South Korea's planning procedures for making additions to power plant capacity.

Figure 2: South Korea's Planning Procedures for Power Plant Capacity Additions[72]



The primary power company operating in South Korea is the Korea Electric Power Corporation (KEPCO) which is a state-owned enterprise. The Korean Government and Korea Development Bank, also state owned, hold a 51.1% interest in KEPCO.[73]

The following Figure 3 sets forth the South Korea planned capacity outlook by fuel type.

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[71] According to the 7th BPE, "Intents for construction of thermal power plants were not surveyed because there was no need for new installations." Only one firm submitted an intention to construct two nuclear power plants. *7th Basic Plan for Long Term Electricity Supply and Demand (2015-2029).* South Korean Ministry of Trade, Industry and Energy. July 2015, pp. 24-25, 35.

[72] *7th Basic Plan for Long Term Electricity Supply and Demand (2015-2029).* South Korean Ministry of Trade, Industry and Energy. July 2015, p. 25.

[73] United States Securities and Exchange Commission Form 20-F Filing FY15. Korea Electric Power Corporation, p. 105.

Figure 3: South Korea's Planning Generation Mix Outlook[74]

7 Generation Mix Outlook

A. By Nominal Capacity

☐ Nationwide

[Unit: MW, %]

Year	Nuclear	Bituminous Coal	Anthracite	LNG	Oil	Pumped storage	Renewable	RCS	Total
2014	20,716	25,149	1,125	26,742	3,850	4,700	6,241	4,693	93,216
	22.2	27.0	1.2	28.7	4.1	5.0	6.7	5.0	100
2015	21,716	26,169	1,125	28,246	3,850	4,700	7,355	5,165	98,326
	22.1	26.6	1.1	28.7	3.9	4.8	7.5	5.3	100
2016	23,116	33,873	1,125	27,996	3,850	4,700	8,960	6,895	110,515
	20.9	30.6	1.0	25.3	3.5	4.3	8.1	6.2	100
2017	25,329	34,873	1125	32,496	3,850	4,700	10,462	7,646	120,481
	21.0	28.9	0.9	27.0	3.2	3.9	8.7	6.3	100
2018	26,729	34,873	725	33,616	3,795	4,700	13,416	7,684	125,538
	21.3	27.8	0.6	26.8	3.0	3.7	10.7	6.1	100
2019	26,729	35,873	725	34,567	3,795	4,700	15,052	8,199	129,640
	20.6	27.7	0.6	26.7	2.9	3.6	11.6	6.3	100
2020	26,729	36,913	725	35,567	3,795	4,700	17,273	8,479	134,181
	19.9	27.5	0.5	26.5	2.8	3.5	12.9	6.3	100
2021	28,129	42,713	725	35,567	2,595	4,700	18,920	8,969	142,318
	19.8	30.0	0.5	25.0	1.8	3.3	13.3	6.3	100
2022	30,929	43,293	725	35,567	2,595	4,700	20,523	8,969	147,301
	21.0	29.4	0.5	24.1	1.8	3.2	13.9	6.1	100
2023	32,329	43,293	725	33,767	2,595	4,700	22,141	8,969	148,519
	21.8	29.1	0.5	22.7	1.7	3.2	14.9	6.0	100
2024	32,329	43,293	725	33,767	1,195	4,700	23,825	8,969	148,803
	21.7	29.1	0.5	22.7	0.8	3.2	16.0	6.0	100
2025	32,329	43,293	725	33,767	1,195	4,700	26,098	8,969	151,076
	21.4	28.7	0.5	22.4	0.8	3.1	17.3	5.9	100
2026	33,829	43,293	725	33,767	1,195	4,700	27,845	8,969	154,323
	21.9	28.1	0.5	21.9	0.8	3.0	18.0	5.8	100
2027	35,329	43,293	725	33,767	1,195	4,700	29,469	8,969	157,447
	22.4	27.5	0.5	21.4	0.8	3.0	18.7	5.7	100
2028	36,829	43,293	725	33,767	1,195	4,700	31,055	8,969	160,533
	22.9	27.0	0.5	21.0	0.7	2.9	19.3	5.6	100
2029	38,329	43,293	725	33,767	1,195	4,700	32,890	8,969	163,868
	23.4	26.4	0.4	20.6	0.7	2.9	20.1	5.5	100

Japan

In 2002, Japan issued the Basic Act of Energy to ensure steady implementation of energy policy. Since that time, numerous strategic energy plans have been issued. Most recently, in April of 2014, Japan published the Fourth Strategic Energy Plan that outlined the country's long-term comprehensive and systematic energy policy through

[74] *7th BPE (2015-2029) at* p. 81.

2020.[75] This plan was deemed necessary to address current market conditions, including the effects of the Fukushima nuclear accident.[76] Japan, a resource scarce country, is required to import the majority of the fuels it uses to generate power. Therefore, one of Japan's main goals is to assess energy security and stability issues to limit the country's dependence on foreign fuel sources to meet its energy needs.

The Fourth Strategic Energy Plan describes its basic viewpoint on energy policy, which focuses on three principles: [77]

1. Energy Security: ensuring stable supply
2. Economic Efficiency: realizing low-cost energy supply by enhancing its efficiency on the premise of safety; and
3. Environment: initiating maximum efforts to pursue environment suitability.

In setting energy policy goals, Japan's Fourth Strategic Energy Plan identifies the energy sources' characteristic with the goal of achieving energy supply structure with stable supply, low cost, and environmental acceptability. The energy sources' definitions include: [78]

1. Base-load Power Sources: Power output can be operated stably and by low cost, regardless of day or night. Examples include geothermal energy, ordinary hydropower (run-of-river type), nuclear energy, and coal.
2. Intermediate Power Source: Power output can be produced at low cost next to base-load power source, and can respond quickly and flexibly to the situation of electricity demand. Examples include natural gas.
3. Peaking Power Source: Power output can respond quickly and flexibly to the situation of electricity demand in spite of high cost. Examples include oil and pumped-storage hydropower.

The energy policy goal set forth in the Fourth Strategic Energy Plan is focused on reducing carbon emissions, which requires a move away from coal-fired power. However, since coal remains a low-cost option, the Fourth Strategic Energy Plan indicated a need to rely on higher-efficiency technologies.[79] The Fourth Strategic Energy Plan also discussed Japan's plan to privatize the generation facilities and

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[75] Fourth Strategic Energy Plan. Government of Japan, Ministry of Economy Trade and Industry. April 2014, p 4.
[76] Japan's Fourth Strategic Energy Plan (2014) at p. 4.
[77] Japan's Fourth Strategic Energy Plan (2014) at p. 17.
[78] Japan's Fourth Strategic Energy Plan (2014) at p. 21.
[79] Japan's Fourth Strategic Energy Plan (2014) at pp. 23-25.

transmission systems in its power system, which would create a more robust and adaptable system to meet energy security and stability goals.[80]

Following the publication of the Fourth Strategic Energy Plan, The Ministry Trade and Industry (METI) established a Long Term Energy Supply and Demand Outlook in July 2015.[81] The Long Term Energy Supply and Demand Committee within METI was created and tasked with developing the Outlook.[82] The committee was held open to the public and included opportunities for public commentary into the process. [83] In June 2015, the cabinet of Japanese Prime Minister Shinzo Abe formally approved the Long Term Energy Supply and Demand Outlook, touting its greenhouse gas emission reduction target of 26% by 2030 (compared to 2013 levels), and articulating the requirements to restart the country's nuclear reactors.[84,85] The Outlook also requires increased efficiency of coal-fired power plants to increase performance consistent with achieving environmental goals.[86] This increased efficiency will likely be met with new higher-efficiency coal-fired power plants.[87]

Through the energy planning process described above, the Japanese government policy determines the types of energy sources that will be used in the future. Public and private energy firms are involved in implementation of the plan with final government approval.[88]

The following Figure 3 sets forth Japan's planned capacity outlook by fuel type presented in the Japanese Long Term Energy Supply and Demand Outlook. This graphic depicts the 2030 path from the current state of the energy sector to the 2030 planned generation mix outlook for Japan.

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[80] Japan's Fourth Strategic Energy Plan (2014) at pp. 40, 73.

[81] Long Term Energy Supply and Demand Outlook. Ministry of Economy Trade and Industry. July 2015, p. 1.

[82] After the Fourth Strategic Energy Plan was completed, the Long-term Energy Supply and Demand Subcommittee was created under the Strategic Policy Committee of the Advisory Committee for Natural Resources and Energy. This subcommittee was tasked to create the Long Term Energy Supply and Demand Outlook.

[83] Japan's Long Term Energy Supply and Demand Outlook (2015) at p. 1.

[84] Japan Adopts Plan to Cut GHG Emissions 26 Percent by 2030, Restart Nuclear Program. *BNA Bloomberg*. June 3, 2015.

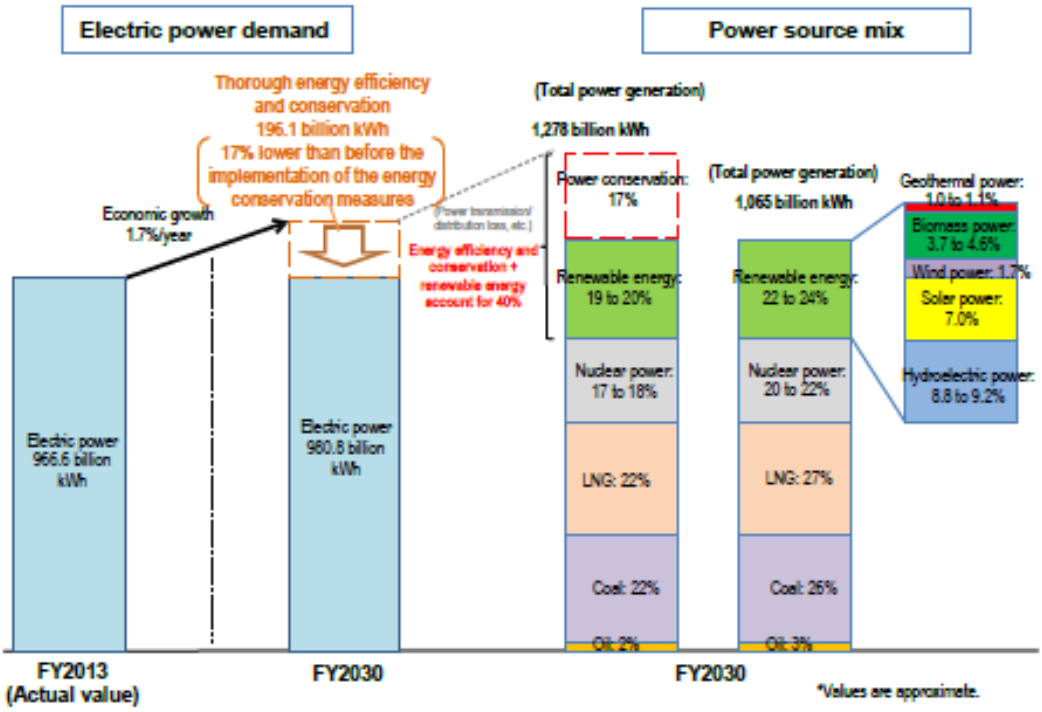
[85] Japan's Long Term Energy Supply and Demand Outlook (2015) at p. 11.

[86] *Id. at* p. 10.

[87] To meet the emissions target, analysts expect new coal-fired power plants to have technology that reduces emissions. Source: Japan's Reliance on Coal Poses Emission Cut Challenges. *BNA Bloomberg*. July 29, 2015.

[88] US EIA Country Overview: Japan. January 2015, p. 3.

Figure 4: Japan's Planning Generation Mix Outlook For 2030[89]



The Japanese power supply system is managed centrally by the General Electricity Utilities on a region-by-region basis.[90] The government has evaluated the structure and determined that it is unable to adequately respond to market demand. As a result, liberalization has been proposed as a means of creating a more robust, market-based system of cross-regional generation and transmission sectors. The liberalized system will be better suited to respond to changes in demand and market forces. The institutional revisions will be made in a three-step implementation process to be completed between 2018 and 2020.[91]

Japan's main electric utility, the Tokyo Electric Power Company (TEPCO), was nationalized in 2012 following the Fukushima accident. The Nuclear Damage

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[89] Long Term Energy Supply and Demand Outlook. Ministry of Economy Trade and Industry. July 2015, p. 8.

[90] Fourth Strategic Energy Plan. Government of Japan, Ministry of Economy Trade and Industry. April 2014, p. 60.

[91] *Id. at* p 61.

Compensation Facilitation Corporation became a 50.11% owner of TEPCO.[92] Nationalization can alter the decision-making process of managers as political objectives are introduced into corporate planning.[93]

Taiwan

Taiwan energy markets are largely autonomous from China and the Taiwanese government utilizes its own energy policies. The Taiwan Power Company is the primary utility company in Taiwan and is a state-owned enterprise, administered by the Bureau of Energy within the Ministry of Economic Affairs. Taiwan has a limited domestic supply of energy resources, including all fossil fuels, and therefore imports the majority of its energy fuels. Coal comprises 31% of Taiwan's total primary energy consumption in 2014.[94] Coal is set to remain in Taiwan's energy mix, given current market and political constraints resulting from nuclear energy being politically unpopular.[95]

The Taiwanese government has a long-standing policy of price intervention in its state-owned power companies to maintain stability in the domestic energy market and competitiveness in export industries.[96] For example, the Taiwanese government has consistently subsidized energy costs in an effort to maintain a competitive advantage in the global export and manufacturing markets, spending "NT$20 billion on fossil-fuel subsidies every year."[97] These policies have been somewhat loosened in recent years due to pressure to reduce carbon emissions while maintaining efficiency.

The New Energy Policy currently in effect has stated plans to "reduce nuclear energy dependence" in the wake of nuclear power plan accidents in Japan, while creating a "low-carbon green energy environment" for Taiwan.[98] Taiwan plans to achieve this

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[92] Notice of Change in the Largest Shareholder who is a Major Shareholder, and a Controlling Shareholder other than the Parent Company. Financial Accounting Standards Foundation. May 21, 2012, p. 2.

[93] Acceptance of Preferred Stock by the Nuclear Damage Liability Facilitation Fund. Press release. Tokyo Electric Power Company, July 31, 2012.

[94] Taiwan Profile. US Energy Information Administration. September 2015, p. 1.

[95] Taiwan's Energy Problem. *Asia Program Special Report*. Woodrow Wilson Center for Scholars, pp 1, 10.

[96] *Id.* at p. 11.

[97] Wei-han C. Nobel laureate criticizes energy policy, subsidies. *Taipei Times*. April 18, 2016. Accessed May 25, 2016. http://www.taipeitimes.com/News/taiwan/archives/2016/04/18/2003644231

[98] New Energy Policy of Taiwan. Bureau of Energy, Ministry of Economic Affairs. February 24, 2016. Accessed May 25, 2016. http://web3.moeaboe.gov.tw/ECW/english/content/Content.aspx?menu_id=969

policy through efficient use of energy and full exploration of renewable energy, thus stabilizing their power supply and reducing carbon emissions.[99]

Taiwan's Guideline on Energy Development identifies the country's priorities, including:

> "To ensure energy security and to satisfy people's basic needs, while taking into consideration of environmental protection and economic development, and promoting sustainable energy development under the principles of social justice and cross-generation fairness."[100]
>
> and
>
> "To ensure the balanced and stable energy supply and demand in the short, medium and long terms and to achieve the above-mentioned energy development goals, the Guideline has regulated the energy policies principles and strategies, which serve as the basis for general energy development planning. This Guideline serves as the guidance for national energy development, related energy policy, standards and action plans. "[101]

Moreover, on the basis of this guideline, "Assessment Standards for Energy Development and Use" and "Energy Development Policy" will be concluded to implement the preliminary management of energy and to plan the quantity of future energy supply, as well as to regulate the location and proportion of various energies.[102]

Taiwan's specific development prospects identified in the Guideline on Energy Development require the government to construct an energy supply and demand system that is safe, stable, efficient, and clean. It further requires the government to build an environment that helps energy-saving and carbon reduction. These requirements are intended to facilitate achievement of targets of energy saving and carbon reduction, and realization of sustainable development of energy in Taiwan.[103]

Taiwan's Guideline on Energy Development sets forth the requirement regarding supply side power generation resource development. Taiwan identified an energy

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[99] *Id.* at p. 2
[100] *Id.* at p. 1
[101] *Id.* at p. 1
[102] *Id.* at p. 1
[103] *Id.* at p.1

structure goal to use coal-fired power plants, with flexible adjustments, and to promote techniques to introduce clean coal and carbon reduction techniques, which will diminish carbon emission due to a reduction in coal use.[104]

China

The Chinese government is heavily involved in the energy industry planning process, including the decision-making regarding the types of power plants that will be built.

China's energy market is highly regulated and largely directed through government policy. The Chinese power market is heavily reliant on coal-fired power plants to generate electricity. For example, coal power generation comprised 69% of consumed energy in 2011.[105] While China's 2015 5-Year Plan laid out plans to address carbon emissions issues, coal is still likely to remain the primary source of generation for the near and middle term.[106]

The Chinese government's most recent Five-Year Plan included 58 gigawatts of nuclear generating capacity in operation by 2020. China will start building more nuclear power plants by 2020, with the goal of 150 gigawatts of nuclear power by 2030.[107] In addition, the Chinese government has prioritized the expansion of LNG and alternative energy sources to address carbon emissions issues. However, given China's rapid and continued growth, demand for energy will likely outpace current technological advancements.[108]

Evidence of controls inherent in the Chinese energy market is discussed by the U.S. Energy Information Administration:

> "On-grid (electricity sold by generators to the grid) and retail electricity prices are determined and capped by the NDRC [National Development and Reform Commission]. The NDRC also determines the price that coal companies should receive from power producers for a certain level of supplies."[109]

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[104] *Id.* at p. 4
[105] China Profile. U.S. Energy Information Administration, February 4, 2014, p. 3.
[106] *Id.*
[107] Follett A. China Will Literally Double the Amount of Nuclear Power. The Daily Caller. March 24, 2016. Accessed May 25, 2016. http://dailycaller.com/2016/03/24/china-literally-doubles-down-on-nuclear-power/#ixzz49fLxESGF
[108] US Energy Information Administration, China Profile, February 4, 2014, p. 33.
[109] China Profile. U.S. Energy Information Administration, February 4, 2014, p. 32.

The Chinese central government is integral to the decision-making process regarding opening new facilities. While private investors apply to build new facilities, the final approval is given by the central planners.[110]

China's central government in Beijing sets broad economic development goals, which are implemented by government officials in local governments (e.g., provincial, municipal, county, and township governments). Central government strategies are issued in the form of five-year plans, which outline economic development priorities for the next five years. The 13th Five-Year Plan was announced in 2015 and outlines policy for the period from 2016 to 2020.[111] The term "plan" suggests the use of detailed directives. However, in practice, five-year plans lack detailed implementation guidelines and instead set broad goals for the national economy. In the last two five-year plans, innovation was prioritized as a central element of China's development goals. Local governments account for 70% of government spending,[112] and face considerable fiscal responsibilities in financing a wide range of government programs, including infrastructure, healthcare, and education.

Chapter 2: Evaluation of Economic Decision Making for Building Coal-fired Power Plants for South Korea, Taiwan and Japan

Chapter 2 will analyze whether the impact of the Project is likely to cause a change in the decision-making to build a new coal-fired power plant in South Korea, Japan, Taiwan, and China, with respect to the economic decision-making in selecting what types of power plants to build when additional sources of power supply are needed.

Details of the Economic Analysis of Building Coal Power Plants

We conducted research and an economic analysis of the decision-making for building coal plants in South Korea, Taiwan, and Japan. The purpose of the research was to gather data to analyze and evaluate the capital costs and operational cash flows of coal-fired power plants compared to other types of similarly-capable power plants, and to determine the potential impact on the economics of coal-fired power plants if a small price decline in the coal commodity purchases occurs as a result. The analysis evaluates

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[110] China's Energy Markets: Anhui, Chongqing, Henan, Inner Mongolia, and Guizhou Provinces. US EPA Coalbed Methane Outreach Program, p. 68.

[111] China's 13th Five-Year Plan (2016-2020). *China's Policy Think Piece Series Issue No. 3*. Fung Business Intelligence Centre. November 2015.

[112] Landry. *Decentralized Authoritarianism in China: The Communist Party's Control of Local Elites in the Post-Mao Era.* Cambridge: Cambridge University Press, 2008. p. 3.

whether a relatively small decline in coal prices (e.g., 5%)[113] that could result when the Project is operating would change the economic business decision-making, such that a coal-fired power plant would be more likely to be built instead of a power plant relying on another fuel type (such as natural gas or nuclear power plants).

This analysis focuses on coal-fired, nuclear, and natural gas-fired power plants because these types of power plants have the substantial economic scale necessary to generate larger quantities of electricity. They also have the ability to provide operational services around the clock. Because of these factors, these types of power plants are likely to be considered as relevant options if traditional baseload generating capacity is needed.

For this research, we investigated government sector resources, electricity industry organizations, and other publicly available sources to identify available data.

The following discussion provides background on the capital expenditures required to build coal-fired power plants. It also summarizes the economic analysis of total capital and operational costs from building a new coal-fired power plant, nuclear power plant, and natural gas-fired power plant in South Korea, Taiwan, and Japan. Further, it evaluates of the impact on the economic decision-making, if any, as a result of a small change in coal prices that may result from the operation of the Project.

Capital Expenditures from New Coal-Fired Power Plants

Baseload power plants, such as coal-fired power plants, are very large, complicated energy infrastructure projects with substantial capital costs required to build the facility. The total capital cost of the power plant is a consideration in making a decision regarding the type of power plant to build.

As Table 1 (below) illustrates, capital expenditures needed to build new supercritical coal power plants in various countries are reported to range from approximately $600/kw to over $2,500/kw (in U.S. dollars). These estimated capital costs per unit of capacity translate to $1.2B to $5.0B for a 2,000mw supercritical coal plant.[114]

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[113] An illustrative 5% coal price decrease is used in this analysis because the Draft EIS did not provide information on the coal price impact resulting from the Project. A smaller coal price decline will have even less impact than discussed in this memo. Draft EIS. *The SEPA Coal Market Assessment Technical Report*, p. 4-11.

[114] Different types of coal plants will have different levels of costs, with higher capital costs for more complicated power plants that utilize additional technologies and capabilities.

Table 1: Capital Costs Estimates for New Power Plants[115]

	Low	Medium	High
$2010/KW	$600	$1,000	$2,500
MW	2,000	2,000	2,000
Total Cost ($1,000)	$1,200,000	$2,000,000	$5,000,000

A change in the price of coal fuel that may result from the operation of the Project has no impact on the total capital cost of a large coal-fired power plant in South Korea, Taiwan, and Japan.

Economic Analysis of Total Operational and Capital Costs of New Power Plants

This economic analysis evaluates the total economic cost of the baseload power plants (coal, nuclear, and natural gas) in South Korea, Taiwan, and Japan. The economic cost items include all of the costs required to build and operate the power plant over a reasonable economic life of the asset. The power plant asset assumed typical size and efficiency levels of new power plants. The cost to build the plant includes the equipment costs associated with the power plant and the construction-related costs to build the facility. The operational costs of the power plant include fuel commodity and delivery costs, fixed and variable operations and maintenance costs, financing-related costs associated with debt and equity financing, and taxes and other related fees.

The total economic cost over the asset life is evaluated on an average annual basis for each type of baseload power plant (coal, nuclear, and natural gas). An additional total economic cost is calculated for the coal-fired power plant, with a revised coal fuel price reflective of a 5% lower coal commodity cost. The purpose is to evaluate if the relative economic costs of coal-fired power plants compared to natural gas-fired and nuclear power plants has materially changed as a result of a 5% reduction in the coal commodity cost.

The following discussion provides the results and conclusions of the economic analyses conducted for South Korea, Taiwan, and Japan.

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[115] *High-Efficiency, Low-Emissions (HELE) Perspectives for Selected Countries*. International Energy Agency, Clean Coal Centre. September 2015.
http://www.minerals.org.au/file_upload/.../HELE_perspectives_for_selected_countries.pdf

South Korea

For South Korea, the economic analysis evaluating the total economic cost of the baseload power plants (coal, nuclear, and natural gas) relied on information on the capital and operating costs of baseload power plants from South Korea's most recent long-term electricity supply and demand plan.[116] Delivered fuel costs data was derived from government agencies such as the IEA, as well as coal price data supplied by Energy Venture Analysis. Non-fuel operations and maintenance costs and other power plant performance assumptions were based on technology-specific inputs reported by the EIA or other relevant industry sources.

Table 2 (below) shows that a 5% reduction in the coal fuel costs has an approximate 3% reduction in the total annual operational and capital costs for a coal plant in South Korea. This result reflects a de minimis impact on the total economic cost of the coal-fired power plant, which does not materially change the relative total economic cost of coal-fired power plants compared to other fuel types. Therefore, the overall economic decision to build a coal-fired power plant as compared to other fuel types has not changed.

Table 2: Annual Capital and Operations Costs for Baseload Power Plants for South Korea, With and Without a 5% Decrease in Coal Fuel Cost

Plant Type	Coal-fired power plant	Natural Gas Combined Cycle power plant	Nuclear power plant
Capital Cost ($/KW)	**$837**	$912	$1,641
Capital Costs & 5% lower coal price ($/KW)	**$837**	$912	$1,641
Total Operations Costs w/capital repayment ($/KW)	**$393**	$640	$384
Total Operations Costs w/capital repayment & 5% lower coal price ($/KW)	**$381**		
Percent Change	**-3.0%**		

[116] *7th BPE (2015-2029)* at pp. 39, 81.

Taiwan

For Taiwan, the economic analysis evaluating the total economic cost of the baseload power plants (coal, nuclear, natural gas) relied on information on the capital costs of baseload power plants based on estimated capital costs for a supercritical coal-fired power plant, and a nuclear power plant in China and South Korea and estimates of capital costs for natural gas-fired power plants as a proxy due to data limitations.[117,118,119] Delivered fuel costs data was derived from government agencies such as the IEA, as well as coal price data supplied by Energy Venture Analysis. Non-fuel operations and maintenance costs and other power plant performance assumptions were based on technology-specific inputs reported by the EIA or other relevant industry sources.

Table 3 (below) shows that a 5% reduction in the coal fuel costs has an approximate 3.3% reduction on the total annual operational and capital costs for a coal-fired power plant in Taiwan. This result reflects a de minimis impact on the total economic cost of the coal-fired power plant, which does not materially change the relative total economic cost of coal-fired power plants compared to other fuel types. Therefore, the overall economic decision to build a coal-fired power plant as compared to other fuel types has not changed.

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[117] *High-Efficiency, Low-Emissions (HELE) perspectives for Selected Countries*. International Energy Agency, Clean Coal Centre. September 2015.
http://www.minerals.org.au/file_upload/.../HELE_perspectives_for_selected_countries.pdf

[118] *7th Basic Plan for Long Term Electricity Supply and Demand (2015-2029).* South Korean Ministry of Trade, Industry and Energy. July 2015, pp 39, 81.

[119] What Does it Cost to Build a Power Plant? - ILAR - University, p. 12.
http://ilar.ucsd.edu/assets/001/503883.pdf

Table 3: Annual Capital and Operations Costs for Baseload Power Plants for Taiwan, With and Without a 5% Decrease in Coal Fuel Cost

Plant Type	Coal-fired power plant	Natural Gas Combined Cycle power plant	Nuclear power Plant
Capital Cost ($/KW)	**$679**	$912	$2,037
Capital Costs & 5% lower coal price ($/KW)	**$679**	$912	$2,037
Total Operations Costs w/capital repayment ($/KW)	**$346**	$616	$390
Total Operations Costs w/capital repayment & 5% lower coal price ($/KW)	**$335**		
Percent Change	**-3.3%**		

Japan

For Japan, the economic analysis evaluating the total economic cost of the baseload power plants (coal, nuclear, and natural gas) relied on information on the capital and operating costs of baseload power plants from Japan's long-term planning documents. These documents conducted an analysis that could be used to compare the total economic cost of different types of baseload power plants considered on an annual basis for the year 2030.

Table 4 (below) shows that a 5% reduction in the coal fuel costs has an approximate 2% reduction on the total annual operational and capital costs for a coal plant in Japan. This result reflects a de minimis impact on the total economic cost of the coal-fired power plant, which does not materially change the relative total economic cost of coal-fired power plants compared to other fuel types. Therefore, the overall economic decision to build a coal-fired power plant as compared to other fuel types has not changed.

Table 4: Annual Capital and Operations Costs* for Baseload Power Plants for Japan, With and Without a 5% Decrease in Coal Fuel Cost[120]

	Coal Plant	Coal Plant (with 5% coal fuel price decline)	Natural Gas Combined Cycle	Nuclear Power	Gas Cogeneration
Fuel Cost	5.10	4.85	10	1.5	
Capital Costs	2.10	2.10	1	3.1	1.1
Other Costs	5.70	5.70	2.4	5.7	12.7
Total Cost	*12.90*	*12.65*	*13.4*	*10.3*	*13.8*
Percent Diff from Coal			3.9%	-20.2%	7.0%
Percent Diff from Coal (less 5%)		-2.0%	6.0%	-18.5%	9.1%

**Expressed in yen/kwh*

Conclusion:

The evaluation of government planning roles in the decision-making of building new coal-fired power plants in South Korea, Japan, Taiwan, and China provides evidence of the substantial role of government planning in the selection of new power plants. The selection of the type of power plants is generally predetermined by government entities and implemented by the energy sector. For this reason, a small change in the price of coal will not likely have an impact on government planning decisions to build new coal-fired power plants.

The evaluation of the economic decision-making involved in selecting the specific type of power plant to build in South Korea, Taiwan, and Japan shows that a modest 5% fuel coal price reduction that could result from the project has a de minimis impact on the total annual capital and operations costs (less than or equal to 3%), and no impact on the total substantial capital expenditures associated with building a new coal-fired power plant. Consequently, the economics of business decision-making of the selection of the type of power plant to be built is not likely to change as a result of the Project.

[120] Report on Analysis of Generation Costs, Etc. for Subcommittee on Long-term Energy Supply-demand Outlook. May 2015, p. 13.

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June 13, 2016

TO: Millennium Bulk Terminal - Longview

FROM: Seth Schwartz

RE: Heat Content of Indonesia Coals

Summary and Conclusions

EVA was retained by Millennium Bulk Terminal ("MBT-Longview") to review the assumptions made by ICF regarding the relative heat content of the coal which would be exported through MBT-Longview compared to the heat content of the coal which would be displaced from other countries. Our review was based upon ICF's summary of modeling assumptions for the MBT-Longview Coal Market Analysis and supplemented with a review of ICF's draft SEPA EIS reports (Coal Market Assessment and Greenhouse Gas Emissions Technical Reports). Based upon this review, we have reached the following conclusions:

1. ICF erroneously assumes (without any supporting documentation) that the heat content of subbituminous coal exported from Indonesia (which is the only source of subbituminous coal in ICF's model other than the PRB coal exported through MBT-Longview) has a much higher heat content than PRB coal. As a result of this erroneous assumption, ICF projects that it will require greater quantities of coal shipped through MBT-Longview to replace the same heat content of Indonesian coal. This assumption results in higher GHG emissions for the same amount of electricity generated from coal, from both coal combustion and transportation via rail, truck, and ocean vessels.
2. ICF's coal market model projected that coal exports through MBT-Longview would shift from 100% PRB subbituminous coal in the early years (through 2030) to both PRB and bituminous coal from the Uinta Basin (in the 2040 model year), with no explanation of why this change would happen.
3. ICF's coal market model assumed that subbituminous coal exports from MBT-Longview would displace both subbituminous and bituminous coal consumption in Asian markets, with no analysis supporting this assumption. ICF did not address the ability or inability of Asian customers to switch from bituminous to subbituminous coal.

This memorandum is intended to address conclusion #1 above, and to provide accurate information on the heat content of Indonesian subbituminous coal.

Heat Content of Coal Assumed by ICF

Although ICF was not explicit about all of the coal sources that it considered in its model, it appears ICF only considered coals for the Asian market from the United States (PRB subbituminous and Uinta bituminous), Indonesia (bituminous and subbituminous), Australia (bituminous) and China (bituminous and lignite). The heat contents of these coals are listed in ICF's Modeling Assumptions document, and the same list is in the GHG Technical Report. It is reproduced below, but EVA has added the columns with Btu per pound and kcal/kg, calculated from the heat content in MMBtu per ton.[1]

Source	Coal Type	Heat Content (MMBtu/ton)	CO_2 (lb/MMBtu)	Heat Content (Btu/pound)	Heat Content (kcal/kg)
PRB – WY	Sub	17.6	214.3	8,800	4,889
PRB – MT	Sub	18.6	215.5	9,300	5,167
Uinta – CO	Bit	21.5	209.6	10,750	5,972
Uinta – UT	Bit	23.4	209.6	11,700	6,500
Australia	Bit	24.1	205.3	12,050	6,694
Indonesia	Bit	23.7	205.3	11,850	6,583
Indonesia	Sub	19.44	212.7	9,720	5,400
China	Bit	20.88	205.3	10,440	5,800
China	Lig	9.79	215.4	4,895	2,719

ICF did not provide an accurate citation for the assumed heat content and emission factors for international coals. In the SEPA GHG Technical Report, there is no source provided at all for Table 31, where the heat contents are listed. The Modeling Assumptions document provides the following citation for this table: "Source: EPA Base Case IPM v5.13 for domestic coals and EIA CO_2 Emission Factors for Coal study for international coals (1994, B.D. Hong and E. R. Slatick)." Virtually the same reference is listed in the SEPA Coal Market Assessment Technical Report: "Hong, B.D. and E.R. Slatick. 1994. EPA Base Case IPM® v5.13 for Domestic Coals and EIA CO_2 Emissions Factors for Coal Study for International Coals. Energy Information Administration, *Quarterly Coal Report*: 1–8." However, the link to the referenced article shows that the 1994 article, which is still available on the EIA website, shows no information at all about the heat content of any coal (domestic or international).[2] The only information in the article relevant to the table is the carbon dioxide emission factors for U.S. coals. The emission factors relied upon by ICF do not match the factors provided in the referenced article and all of the emission factors used by ICF overstate (are greater than) the emission factors for U.S. coals from Wyoming, Montana, Colorado and Utah, as reported by EIA.

Further, the heat contents for U.S. coals that the Draft EIS references in the SEPA Coal Market Assessment Technical Report have different values that do not match the heat contents listed in the table above. ICF provided the coal supply curves and the price forecasts for U.S. coals in its IPM model on Table 12, with Utah Uinta coal at 11,500 Btu per pound (not 11,700), Colorado Uinta coal

[1] ICF Modeling Assumptions, coal characteristics, and ICF SEPA GHG Technical Report, Table 31.
[2] http://www.eia.gov/coal/production/quarterly/co2_article/co2.html

at 11,780 Btu (not 10,750), Montana PRB coal at 9,100 Btu (not 9,300 Btu), and Wyoming coal at 8,800 Btu.[3]

Thus, it is impossible to state what heat contents the Draft EIS used in its analysis and the source of the heat contents. The assumption that low heat content U.S. PRB coal would displace coals with higher heat content (subbituminous and bituminous) from other countries (Indonesia and Australia) is the key factor in ICF's conclusion that "coal consumption in the Pacific Basin would increase in all scenarios. The exported coal has a lower heat content than the coal that it displaces, and thus, more coal must be consumed to achieve the same electric power output."[4] Because of the higher GHG emission rate assumed by ICF for U.S. coals (which is a function of the lower heat content), the increase in CO_2 emissions is largely due to the assumption that U.S. coals exported through MBT-Longview would have lower heat content than the coals produced in Indonesia and Australia which it would displace. This assumption is simply not supported by the materials cited in the Draft EIS itself or supporting technical reports.

Heat Content of Indonesian Coals

Indonesia has rapidly become the world's largest exporter of thermal (also called "steam") coal (coal burned for its heat content, rather than coal used in steel-making), which is the type of coal that will be exported through MBT-Longview (U.S. metallurgical coals are produced only in Appalachia). ICF understates the importance of Indonesia in its Coal Market Assessment, ranking countries by their total coal exports in 2012, not just their thermal coal.[5] Because Australia exports large amounts of metallurgical coal, it is not nearly as important as ICF represents in the analysis of MBT-Longview's coal exports. A more accurate ranking of thermal coal exporters is shown below.

Major Steam Coal Exporters – 2012-2014 (million metric tons)[6]

Country	2012	2013	2014
Indonesia	384.3	424.3	408.2
Australia	159.2	182.1	194.6
Russia	112.5	117.5	132.0
Colombia	81.7	79.0	78.8
South Africa	75.3	74.0	76.0

The coals produced and exported from Indonesia cover a wide range of heat content, ranging from high-rank bituminous coals (with high heat content), to very low-rank lignite (with low heat content). The range of quality can be seen from the "marker" price published monthly by the Indonesian Ministry of Energy and Mineral Resources. The government publishes marker prices for every major Indonesian grade of coal exported in order to establish the price on which the payment of government royalties is calculated.[7] The marker price for each coal is known as the HPB ("Harga Patokan Batubara") and is published for 82 separate coal brands marketed by

[3] ICF SEPA Coal Market Assessment Technical Report, page 4-5.
[4] ICF SEPA Coal Market Assessment Technical Report, page 7-2.
[5] ICF SEPA Coal Market Assessment Technical Report, Table 10, page 3-2.
[6] International Energy Agency, "Coal Information 2015", Table II.10.
[7] See https://www.minerba.esdm.go.id/.

Indonesian coal exporters. The coal quality ranges from a high of 7,000 kcal/kg (12,600 Btu per pound) to a low of 2,995 kcal/kg (5,391 Btu).[8] The government lists nine coals classified as lignite (2,995–4,200 kcal/kg), 17 coals classified as subbituminous (4,400–5,400 kcal/kg), 16 coals classified as lower-rank bituminous (5,500–5,765 kcal/kg), and 41 coals classified as higher-rank bituminous (5,900–7,000 kcal/kg).

Given this range of Indonesian coal quality, it is difficult to select a single specification as the "typical" heat content for the exports of Indonesian subbituminous and bituminous coals as the reference coal for calculating changes in coal burn and GHG emissions. However, it is clear that the quality selected by ICF is at the very top of the range for subbituminous coal (5,400 kcal/kg, or 9,720 Btu/pound) and near the top of the range for bituminous coal (6,583 kcal/kg, or 11,850 Btu/pound). The effect of this assumption is to overstate the size of any GHG impact in the Pacific basin, from both coal combustion and coal transportation.

In order to determine a reasonable estimate of the heat content of Indonesian coal exports, EVA has performed a study of the largest Indonesian coal mines and exporting coal companies to calculate the average heat content of Indonesian coal. EVA identified the nine largest Indonesian coal producers, including all companies that produced or sold at least 10 million metric tons in any year from 2013 to 2015. All of these producers operate on the island of Kalimantan, the major source of Indonesian coal.[9] The data sources included company financial and marketing reports available on their websites, with data on sales by brand or production by mine, where applicable (some companies blend coal from different mines to meet the quality specification for a brand that is sold in the export market). At this time, not all companies have reported their sales and production for the full year of 2015. The data was supplemented by information from the Indonesian Coal Book, published by Petromindo.com, where necessary.

The largest Indonesian coal producers covered by this analysis sold and produced a total of 261 million tonnes in 2013, compared to total Indonesian coal production of 421.5 million tonnes.[10]

Largest Indonesian Coal Producers

	Sales/Production (mm tonnes)		
	2013	**2014**	**2015**
Adaro Energy	52.2	55.7	50.8
Kaltim Prima Coal	53.4	52.3	
Kideco	37.3	40.4	39.0
Arutmin	28.9	32.3	
ITM	29.4	29.1	28.5
Berau Coal	23.5	24.2	
Sakari Resources	11.2	9.8	
Bayan Resources	13.7	9.6	
Harum Energy	11.6	7.0	3.6
	261.2	**260.4**	**121.9**

[8] The conversion factor is kcal/kg times 1.8 = Btu/pound.
[9] This analysis excluded the state-owned company PT Bukit Asam (PTBA), which operates in Sumatra and principally supplies domestic customers.
[10] Pertromindo.Com, "Indonesian Coal Book 2014/2015," page 6.

The list of coal sales and production for each company by mine and brand is shown below. The heat content is stated in kcal/kg on a gross, as-received ("GAR") basis, which is the standard used for U.S. coals as well.[11]

Heat Content and Sales of Indonesian Coal by Mine and Brand

			Heat	Sales/Production (mm tonnes)		
Company	**Mine/Brand**	**Coal Type**	**kcal/kg**	**2013**	**2014**	**2015**
Adaro Energy	E4000	Subbituminous	4,000	9.6	6.6	2.5
Adaro Energy	E4900	Subbituminous	4,900	8.4	30.8	34.1
Adaro Energy	E5000	Subbituminous	5,000	34.1	18.3	14.3
Arutmin	Asam Asam	Subbituminous	4,750	8.4	7.6	
Arutmin	Batulicin	Bituminous	6,200	5.9	7.3	
Arutmin	Kintap	Subbituminous	4,750	7.8	8.6	
Arutmin	Mulia	Subbituminous	4,750	3.7	8.1	
Arutmin	Satui	Bituminous	6,400	2.0	0.2	
Arutmin	Senakin	Bituminous	6,300	1.1	0.5	
Bayan Resources	GBP	Bituminous	7,000	3.5	2.6	
Bayan Resources	PIK	Subbituminous	4,650	2.1	0.8	
Bayan Resources	Tabang	Subbituminous	4,100	2.2	1.9	
Bayan Resources	TSA/FKP	Bituminous	5,950	2.7	2.2	
Bayan Resources	WBM	Bituminous	6,400	3.2	2.1	
Berau Coal	Binungan	Subbituminous	4,740	8.0	9.3	
Berau Coal	Lati	Subbituminous	4,960	10.4	9.9	
Berau Coal	Sambarata	Bituminous	5,780	5.1	5.0	
Harum Energy	Mahakam Sumber Jaya	Bituminous	5,750	9.9	6.6	3.6
Harum Energy	Santan Batubara	Bituminous	5,377	1.7	0.4	-
Indo Tambangraya Megah	Bharinto	Bituminous	6,600	1.6	2.5	2.8
Indo Tambangraya Megah	Indominco	Bituminous	6,150	15.1	15.0	13.3
Indo Tambangraya Megah	Jorong	Subbituminous	5,300	1.3	1.3	1.3
Indo Tambangraya Megah	Kitadin-Embalut	Bituminous	5,800	1.0	1.3	1.2
Indo Tambangraya Megah	Kitadin-Tandung-Mayang	Bituminous	6,700	2.4	1.8	2.5
Indo Tambangraya Megah	Trubaindo	Bituminous	6,900	7.8	7.2	7.3
Kaltim Prima Coal	Bengalon	Bituminous	5,700	7.9	8.4	
Kaltim Prima Coal	Sangatta	Bituminous	6,700	45.5	43.9	
Kideco	Roto Middle	Subbituminous	4,730	3.8	4.3	3.0
Kideco	Roto North	Subbituminous	5,470	3.4	3.0	3.4
Kideco	Roto South	Subbituminous	4,870	15.8	15.9	13.6
Kideco	Samarangau	Subbituminous	4,430	13.8	16.7	18.5
Kideco	Susubang	Subbituminous	5,120	0.5	0.5	0.5
Sakari Resources	Jembayan	Subbituminous	5,500	8.2	6.8	
Sakari Resources	Sebuku	Bituminous	6,000	3.0	3.1	
				261.0	**260.4**	**121.8**

[11] Gross heat content is the higher heating value ("HHV") and as-received means the coal quality for the coal quantity delivered. Sometimes, coal heat content is also specified on a "net" basis ("NAR"), which is the lower heating value (this excludes the heat lost through vaporization of water), or on an air-dried basis ("GAR"), which excludes surface moisture.

The average heat content of Indonesian subbituminous and bituminous coal mines listed above is shown below. The average heat content for subbituminous coal is about 4,820 kcal/kg, equal to 8,676 Btu/pound. This heat content is lower than the heat contents for U.S. PRB coals that are likely to be exported through MBT-Longview (Montana – 9,300 Btu; Wyoming – 8,800 Btu). It is much lower than the heat content for Indonesian subbituminous coal assumed by ICF (5,400 kcal/kg, equal to 9,720 Btu/pound). The average heat content for Indonesian bituminous coal is about 6,365 kcal/kg (11,457 Btu/pound), which is similarly much lower than ICF's assumption of 6,583 kcal/kg (11,850 Btu/pound).

Average Heat Content for Indonesian Coal

	2013	2014	2015
MM Tonnes			
Bituminous	119.4	110.1	30.7
Subbituminous	141.6	150.4	91.1
Average kcal/kg			
Bituminous	6,364	6,377	6,354
Subbituminous	4,820	4,813	4,813

Other Sources for Typical Indonesian Coal Heat Content

There are coal industry trade publications that produce price indexes for coals traded in the world market. Each price index is for a country of origin and a coal quality typical of coal exported from that country. While these price indexes do not cover every coal exported from each country, they are intended to be benchmark prices that producers and consumers can use for transactions.

Two of the sources of Pacific Basin coal prices cited by ICF in its analysis are IHS McCloskey and Platts.[12] These companies publish regular assessments of coal prices for a variety of coals sold in the international market. Both companies publish marker prices for Indonesian coal exported to the world market. The heat contents for the Indonesian coals published by McCloskey and Platts are shown below:

Indonesian Coal Market Price Specifications[13]

	IHS McCloskey			Platts		
Coal Type	**kcal/kg**	**Basis**	**GAR**	**kcal/kg**	**Basis**	**GAR**
Bituminous	6,000	NAR	6,300	5,900	GAR	5,900
Bituminous	5,500	NAR	5,775			
Subbit.	4,700	NAR	4,935	5,000	GAR	5,000
Subbit.	4,200	GAR	4,200	4,200	GAR	4,200
Subbit.	3,800	GAR	3,800	3,800	GAR	3,800

[12] ICF SEPA Coal Market Assessment Technical Report, Figure 14, page 3-8.

[13] The kcal/kg specification is published by IHS McCloskey and Platts on either a gross or net basis as shown. The NAR specification is converted to a GAR equivalent using a factor of 1.05. Sources: IHS Energy Thermal Coal and Petcoke Marker Price Methodology and Specifications, May 2016, and Platts Coal Methodology and Specifications Guide, May 2016.

As shown, the heat content specifications used by both publications for Indonesian subbituminous coal range from 3,800 to 5,000 kcal/kg on a GAR basis (6,840–9,000 Btu/pound). These specifications are much lower than the 5,400 kcal/kg (9,720 Btu/pound) assumed for Indonesian subbituminous coal in the ICF analysis. Similarly, the marker price heat content for Indonesian bituminous coals range from 5,775 to 6,300 kcal/kg, much lower than the 6,583 kcal/kg assumed by ICF.

Other market experts recognize that the recent large growth in coal supply from Indonesia is from low-rank subbituminous coals with heat contents much lower than assumed by ICF. The presentation by Dr. Bart Lucarelli of Stanford University's Institute for International Studies referenced the development of major Indonesian low-rank coal deposits (Adaro – Wara, Kideco – SM, and Arutmin – Ecocoal) with heat contents ranging from 4,000 to 4,221 kcal/kg GAR.[14] The U.S. Department of Energy, National Energy Technology Laboratory ("NETL") also considers the heat content of Indonesian subbituminous coal to be comparable or less than the heat content of U.S. PRB coals which it would compete with in the Asian market.

Conclusions

ICF erroneously assumed that the coals exported through MBT-Longview would have lower heat content than the coals they would displace in the Pacific Basin, because ICF assumed both that Indonesian subbituminous coal would have heat content at the top of the range for subbituminous coal (thus higher than U.S. PRB coal) and that U.S. PRB coal would displace bituminous coal in the Pacific Basin. Neither of these assumptions was supported by any documentation. These false assumptions are the primary driver of ICF's conclusion that GHG emissions from coal combustion in the Pacific Basin would increase under all scenarios[15] because the assumed lower heat content of coal exported through MBT-Longview requires more coal to be consumed at higher GHG emission rates to generate the same amount of electricity. Further, the mistaken assumption that MBT-Longview coals would have lower heat content also has the effect of overstating ICF's calculation of GHG emissions from coal transportation.

[14] Lucarelli. 2011, p. 37.
[15] ICF SEPA Greenhouse Gas Emissions Technical Report, page 3-9.

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June 12, 2016

TO: Millennium Bulk Terminal - Longview

FROM: Seth Schwartz

RE: Carbon Coefficients of U.S. and Indonesian Coals

Summary and Conclusions

EVA was retained by Millennium Bulk Terminal ("MBT-Longview") to review the assumptions made by ICF regarding the relative carbon coefficients[1] of the U.S. coal which would be exported through MBT-Longview compared to the carbon coefficients of the coal which would be displaced from other countries. Our review was based upon ICF's summary of modeling assumptions for the MBT-Longview Coal Market Analysis and supplemented with a review of ICF's draft SEPA EIS reports (Coal Market Assessment and Greenhouse Gas Emissions Technical Reports). Based upon this review, we have reached the following conclusions:

1. ICF assumed that the carbon coefficients of the U.S. subbituminous and bituminous coals which would be exported through MBT-Longview were significantly greater than the coals which it would displace in the Asian market. This assumption results in an increase in GHG emissions due to the proposed action even if there were no induced demand for coal, simply by substituting higher-emitting U.S. coal for lower-emitting Asian coal.
2. ICF did not provide accurate sources for its assumed carbon coefficients. ICF provided only one referenced source for its assumption of the carbon dioxide emission factors for coal, yet this source had lower carbon coefficients for U.S. coals than assumed by ICF and had no carbon coefficients for international coals at all.[2] ICF also referenced itself in its model assumptions used for the EPA Base Case IPM v5.13, yet this also references the same source. There is no documentation of the carbon coefficients for international coals at all.
3. ICF asserts that "[t]he carbon content varies by rank (i.e., bituminous, subbituminous, and lignite) and by the source region of the coal; however, the data by region is incomplete."[3] While it is logical that the carbon coefficient varies by rank, because of the ratio of carbon to

[1] Measured as the carbon dioxide emission factor in pounds of CO_2 per million Btu of coal heat content.
[2] Hong, B.D. and E.R. Slatick. 1994.
[3] ICF SEPA Coal Market Assessment Technical Report, page 4-12.

hydrogen in the coal, there is no reason to believe that it varies by "source region" of the coal. ICF makes no attempt to explain why this would be true and it is counter to the assumptions that the Energy Information Agency ("EIA") and the Environmental Protection Agency ("EPA") make regarding U.S. coals.

4. In fact, this study concludes that ICF assumed carbon coefficients for U.S. coals which are higher than documented by EIA in its sole referenced source. Further, an independent analysis of the carbon coefficients of the producing U.S. coal mines in the Powder River Basin and Uinta Basin (which are the coals that could be exported through MBT-Longview) demonstrates that the actual carbon coefficients are less than assumed by ICF and less than the comparable subbituminous Indonesian coals which this coal would displace.
5. ICF does not make clear that it assumed that U.S. coals would be higher-emitting coal than their Asian counterparts and that this assumption would result in GHG emission impacts due to the proposed action. ICF briefly stated that "GHG emissions from coal combustion include those associated with market effects [and] … also reflect coal substitution, which is driven by the difference in carbon content between Powder River Basin coal, Uinta Basin coal, and coals produced in the Pacific Basin."[4]
6. ICF's flawed assumption that U.S. coals have higher carbon coefficients than other Asian coals accounted for 42% of the total increase in GHG emissions from coal combustion under the 2015 Energy Policy Scenario.

This memorandum is intended to address the lack of foundation for the critical assumption of carbon coefficients for U.S. and Pacific Basin coals (one of two main inputs) and to provide better data for these carbon coefficients.

ICF's Inaccurate and Inadequate References for Carbon Coefficients

As ICF states, "To estimate the CO_2 emissions from coal combustion, two main inputs are required. These inputs are (1) the amount of coal consumed in trillion Btu and (2) the carbon content, in pounds per million Btu, of the coal being consumed."[5] ICF assumed that the carbon content of U.S. coals exported through MBT-Longview would be higher than the Pacific Basin coals which these coals would displace.[6] Because of this assumption, ICF concluded that MBT-Longview would result in increased CO_2 emissions even if there were no increase in coal combustion in the Pacific Basin due to exports from MBT-Longview.

ICF's assumptions as to the heat content and carbon emission coefficients are shown below.[7] These carbon coefficients are presented by ICF in multiple documents, including "Coal Market Analysis, Modeling Assumptions" at Coal Characteristics, SEPA Greenhouse Gas Emissions Technical Report at Table 31, and SEPA Coal Market Assessment Technical Report at Table 17.

[4] ICF SEPA Greenhouse Gas Emissions Technical Report, page 2-32.
[5] ICF SEPA Coal Market Assessment Technical Report, page 4-12.
[6] *Ibid.*
[7] The columns showing heat content in Btu/pound and in kcal/kg are calculated from the mmBtu/ton and shown for convenience.

Source	Coal Type	Heat Content (MMBtu/ton)	CO_2 (lb/MMBtu)	Heat Content (Btu/pound)	Heat Content (kcal/kg)
PRB – WY	Sub	17.6	214.3	8,800	4,889
PRB – MT	Sub	18.6	215.5	9,300	5,167
Uinta – CO	Bit	21.5	209.6	10,750	5,972
Uinta – UT	Bit	23.4	209.6	11,700	6,500
Australia	Bit	24.1	205.3	12,050	6,694
Indonesia	Bit	23.7	205.3	11,850	6,583
Indonesia	Sub	19.44	212.7	9,720	5,400
China	Bit	20.88	205.3	10,440	5,800
China	Lig	9.79	215.4	4,895	2,719

ICF did not provide an accurate citation for the assumed carbon emission factors for domestic or international coals. In the SEPA GHG Technical Report, there is no source provided at all for Table 31, which merely references the ICF SEPA Coal Market Technical Report. The Modeling Assumptions document provides the following citation for this table: "Source: EPA Base Case IPM v5.13 for domestic coals and EIA CO_2 Emission Factors for Coal study for international coals (1994, B.D. Hong and E. R. Slatick)." Virtually the same reference is listed in the SEPA Coal Market Assessment Technical Report: "Hong, B.D. and E.R. Slatick. 1994. EPA Base Case IPM® v5.13 for Domestic Coals and EIA CO_2 Emissions Factors for Coal Study for International Coals. Energy Information Administration, *Quarterly Coal Report*: 1–8."

However, the link to the referenced article shows that the EIA 1994 article by Hong & Slatick (which is still available on the EIA website) shows no information at all about the carbon emission factors of international coal.[8] The carbon emission factors relied upon by ICF do not match the factors provided in the referenced article and all of the emission factors used by ICF are greater than the emission factors for U.S. coals from Wyoming, Montana, Colorado and Utah reported by EIA.[9]

Further, the carbon emission factors for U.S. coals which ICF used in the SEPA analysis have different values from the carbon emission factors used by EPA for calculating CO_2 emissions from coal combustion,[10] which is based upon EIA emission factors.[11] Both EPA and EIA use one common emission factor for U.S. coals by rank and do not differentiate by the coal location. Neither EPA nor EIA provide emission factors for international coals.

The carbon coefficients used by ICF in the Draft EIS are much different from the factors which it references from EIA and EPA, as shown below. ICF has assumed much higher carbon coefficients for U.S. coals than stated in the published references, which resulted in greater GHG emission impacts in the Draft EIS.

[8] http://www.eia.gov/coal/production/quarterly/co2_article/co2.html
[9] Hong, B.D. and E.R. Slatick. 1994.
[10] [5]U.S. EPA, AP 42, Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s11.pdf.
[11] U. S. Energy Information Administration, Documentation for Emissions of Greenhouse Gases in the United States 2008, DOE/EIA-0638 (2006), October 2008, Table 6-2, p. 183.

			CO2 Factor (lb/mmBtu)		
Basin	State	Coal Type	Draft EIS	EIA 1994	EIA 2008
PRB	WY	Subbituminous	214.3	212.7	214.2
PRB	MT	Subbituminous	215.5	213.4	214.2
Uinta	CO	Bituminous	209.6	206.2	205.6
Uinta	UT	Bituminous	209.6	204.1	205.6
Indonesia		Subbituminous	212.7		
Australia		Bituminous	205.3		
Indonesia		Bituminous	205.3		

As shown above, ICF assumed that the CO_2 emission factor for Indonesian coals, expressed in pounds per mmBtu, would be 212.7 for subbituminous coal and 205.3 for bituminous coal. ICF assumed the same emission factor for both Australian and Indonesian bituminous coal (not varying the carbon coefficient with the location in Asia, as it did in the United States). By using these emission factors, ICF assumed that U.S. coal exported through MBT-Longview would result in increased GHG emissions of 2.1% for bituminous coal or 0.8% - 1.3% for subbituminous coal, <u>even if the same amount and rank of U.S. coal were substituted for Pacific Basin coal</u>.

Carbon Coefficients for U.S. Coals

EVA has performed a study of the carbon coefficients for U.S. coal, based upon actual coal mine quality provided by the mines which are the largest producers of coal in the Powder River and Uinta Basins. While there is a range of coal quality among the different mines, the average coal quality is very consistent with the original 1994 EIA study.[12] These carbon coefficients are significantly lower than those assumed by ICF in the Draft EIS for all of the U.S. coal types.

[12] Hong, B.D. and E.R. Slatick. 1994.

Carbon Coefficients for U.S. Coals[13]

Basin	State	Type	Company	Mine	2015 Prod. mm tons	As-Received Quality Carbon	As-Received Quality Btu/lb	CO2 lb/mmBtu
PRB	MT	Sub	Cloud Peak	Spring Creek	17.0	54.10%	9,350	212.2
PRB	MT	Sub	Lighthouse Resources	Decker	3.0	53.50%	9,500	206.5
PRB	WY	Sub	Alpha Coal West	Belle Ayr	18.3	49.74%	8,600	212.1
PRB	WY	Sub	Alpha Coal West	Eagle Butte	19.7	48.03%	8,334	211.3
PRB	WY	Sub	Arch Coal	Black Thunder	99.5	51.10%	8,903	210.5
PRB	WY	Sub	Arch Coal	Coal Creek	7.8	47.44%	8,329	208.9
PRB	WY	Sub	Cloud Peak	Antelope	35.2	51.67%	8,800	215.3
PRB	WY	Sub	Cloud Peak	Cordero Rojo	22.9	49.22%	8,400	214.9
PRB	WY	Sub	Peabody	NARM	109.3	51.62%	8,800	215.1
Uinta	CO	Bit	Arch Coal	West Elk	5.1	64.29%	11,406	206.7
Uinta	CO	Bit	Bowie Resources	Bowie #2	1.0	67.78%	12,110	205.2
Uinta	UT	Bit	Bowie Resources	Dugout Canyon	0.8	66.08%	11,804	205.3
Uinta	UT	Bit	Bowie Resources	Skyline	4.4	64.75%	11,569	205.2
Uinta	UT	Bit	Bowie Resources	Sufco	6.0	60.90%	10,761	207.5
Averages								
PRB	MT	Sub			20.0	54.01%	9,372	211.3
PRB	WY	Sub			312.7	50.84%	8,751	213.1
Uinta	CO	Bit			6.1	64.88%	11,524	206.5
Uinta	UT	Bit			11.2	62.77%	11,150	206.5
					349.9			

The Montana PRB coal has slightly lower CO_2 emission factors than Wyoming PRB (211.3 vs. 213.1) due to its higher rank (heat content averaging 9,372 Btu/pound compared to 8,751 Btu). As ICF itself states, "Wyoming coalfields have produced about 91% of Power River Basin coal, with the remaining 9% produced in Montana. However, because Montana coal has a higher heat content, it is more likely to be exported."[14] Thus, the U.S. subbituminous coal which is likely to be exported through MBT-Longview has a carbon coefficient of only 211.3 pounds per mmBtu, 1.9% less than the value of 215.5 pounds per mmBtu assumed by ICF in the Draft EIS.

Carbon Coefficients for Indonesian Coals

Indonesia has rapidly become the world's largest exporter of thermal (also called "steam") coal, which is coal burned for its heat content, rather than coal used in steel-making. This type of thermal coal will be exported through MBT-Longview (U.S. metallurgical coals are only produced in Appalachia). ICF understates the importance of Indonesia in its Coal Market Assessment, because it ranks countries by their total coal exports in 2012, not just their thermal coal.[15] Because Australia

[13] 2015 coal production data from the U.S. Mine Safety and Health Commission at www.msha.gov/drs; coal quality data provided directly from U.S. coal producers.
[14] ICF SEPA Coal Market Assessment Technical Report, page 2-4.
[15] ICF SEPA Coal Market Assessment Technical Report, Table 10, page 3-2.

exports large amounts of metallurgical coal, it is not nearly as important in the analysis of MBT-Longview's coal exports as presented by ICF.[16]

There is a wide range of coal quality exported from Indonesia, including bituminous, subbituminous and lignite coals. Each coal has a specific coal quality, but there are general Indonesia coal quality specifications which are quoted and traded in the market. There are coal industry trade publications which produce price indexes for coals traded in the world market. Each price index is for a country of origin and a coal quality typical of coal exported from that country.

Two of the sources of Pacific Basin coal prices cited by ICF in its analysis are IHS McCloskey and Platts.[17] These companies publish regular assessments of coal prices for a variety of coals sold in the international market. Both companies publish marker prices for Indonesian coal exported to the world market. The heat content for the Indonesian coals, published by McCloskey and Platts is shown below:

Indonesian Coal Market Price Specifications[18]

	IHS McCloskey			Platts		
Coal Type	**kcal/kg**	**Basis**	**GAR**	**kcal/kg**	**Basis**	**GAR**
Bituminous	6,000	NAR	6,300	5,900	GAR	5,900
Bituminous	5,500	NAR	5,775			
Subbit.	4,700	NAR	4,935	5,000	GAR	5,000
Subbit.	4,200	GAR	4,200	4,200	GAR	4,200
Subbit.	3,800	GAR	3,800	3,800	GAR	3,800

The Indonesian subbituminous and bituminous coals traded in the world market have lower heat content than U.S. coal with the same rank which would be exported through MBT-Longview and, as a result, are likely to have higher carbon emission coefficients than U.S. coal (more CO_2 emitted per the same amount of heat produced), not lower coefficients, as assumed by ICF. As a result, there would be lower GHG emissions from the substitution of U.S. coal exports through MBT-Longview, not higher emissions, as assumed by ICF.

The detailed coal quality data for operating Indonesian mines needed to calculate the carbon emission coefficients is not as readily available in the market as it is for U.S. coals. The data needed include the heat content (expressed in Btu/pound or kcal/kg) and the ultimate analysis, which provides the carbon content of the coal. The CO_2 emission factor in pounds per mmBtu can be determined by multiplying the carbon content by 36,670 divided by the heat content in Btu/pound.[19]

The United States Geological Survey ("USGS") managed the World Coal Quality Inventory to collect and analyze a global set of samples of mined coal during a time period from 1995 to 2006.

[16] International Energy Agency, "Coal Information 2015", Table II.10.
[17] ICF SEPA Coal Market Assessment Technical Report, Figure 14, page 3-8.
[18] The kcal/kg specification is published by IHS McCloskey and Platts on either a gross or net basis as shown. The NAR specification is converted to a GAR equivalent using a factor of 1.05. Sources: IHS Energy Thermal Coal and Petcoke Marker Price Methodology and Specifications, May 2016 and Platts Coal Methodology and Specifications Guide, May 2016.
[19] Hong, B.D. and E.R. Slatick. 1994 at 11.

The data set provides complete analyses of coal quality from 1,580 samples from 57 countries.[20] The coal quality data provide both the carbon content and the heat content, enabling the calculation of the CO_2 emission factor, using the formula provided by Hong and Slatick as described above. The individual mine coal quality and the simple average (not all production data is available) are shown below.

Indonesian Coal Quality Specifications[21]

					As-Received Quality		CO2
Country	**State**	**Type**	**Company**	**Mine**	**Carbon**	**Btu/lb**	**lb/mmBtu**
Indonesia	Sumatra	Bit			73.16%	13,203	203.2
Indonesia	Sumatra	Sub			50.69%	8,610	215.9
Indonesia	Sumatra	Bit			62.37%	11,326	201.9
Indonesia	Kalimantan	Sub			48.38%	8,302	213.7
Indonesia	Kalimantan	Bit	Kaltim Prima	Sangatta	57.47%	10,049	209.7
Indonesia	Kalimantan	Bit	Arutmin	Senakin	63.69%	11,683	199.9
Indonesia	Kalimantan	Sub	Adaro Energy	Envirocoal	51.89%	9,000	211.4
Indonesia	Kalimantan	Sub	Arutmin	Ecocoal	45.04%	7,598	217.4
Averages							
Indonesia		Sub			49.00%	8,377.5	214.6
Indonesia		Bit			64.17%	11,565.3	203.7

The average CO_2 emission factor for the Indonesian subbituminous coals in this data base is higher than the average emission factor assumed by ICF in the Draft EIS (214.6 pounds per mmBtu vs. 212.7 pounds per mmBtu) and is higher than the emission factors for U.S. subbituminous coals (211.3 – 213.1 pounds per mmBtu). The emission factors for Indonesian bituminous coals show a wide range; while the simple average is less than the emission factor for Uinta Basin coals, the difference is not statistically significant.

[20] Chemical Analyses in the World Coal Quality Inventory, Version 1, available at http://pubs.usgs.gov/of/2010/1196/.
[21] World Coal Quality Inventory data at http://energy.usgs.gov/Coal/AssessmentsandData/WorldCoalQualityInventory.aspx#3906272-data.

Significance of ICF's Assumption of Coal Carbon Coefficients

ICF's assumption that U.S. coals that would be exported through MBT-Longview have higher carbon coefficients than the Pacific Basin coals which they would displace has a major impact on ICF's conclusion that MBT-Longview will result in increased GHG emissions from coal combustion in the Pacific Basin. In the 2015 Energy Policy Scenario, ICF concludes that the increased GHG emissions in the year 2028 from "coal substitution" (U.S. coal replacing the same amount of Pacific Basin coal, in total mmBtu) will be 1,171,889 metric tons, which is greater than the increased GHG emissions from "induced demand" (the increased use of coal in the Pacific Basin due to lower coal prices), which would be only 867,958 metric tons. For the full 20-year period (2018 – 2038), the increased GHG emissions from coal substitution in ICF's flawed analysis are predicted to be 42% of the total increased emissions in the Pacific Basin (8,856,189 out of 21,262,771 total metric tons).[22]

This analysis shows that carbon emission coefficients from subbituminous coal exported through MBT-Longview are likely to be ***lower*** than the Indonesian subbituminous coal that it would displace in the Pacific Basin, not ***higher*** as erroneously assumed by ICF. Thus, the impact of "coal substitution" due to coal exports through MBT-Longview is likely to ***reduce*** GHG emissions in the Pacific Basin, not increase emissions as projected by ICF.

[22] ICF SEPA Greenhouse Gas Emissions Technical Report, Table 47, page 3-9.

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June 12, 2016

TO: Millennium Bulk Terminal-Longview

FROM: Seth Schwartz

RE: Substitution of Subbituminous Coal for Bituminous Coal in Asia

Summary and Conclusions

EVA was requested by Millennium Bulk Terminal ("MBT-Longview") to review the results of ICF's model forecasting the impacts of substitution of U.S. coals for Asian coals in the Pacific Basin market due to exports from MBT-Longview. Our analysis was based upon a review of ICF's Draft SEPA EIS reports (Coal Market Assessment and Greenhouse Gas Emissions Technical Reports). Based upon this review, we have reached the following conclusions:

1. While acknowledging that boilers that were designed for bituminous coal may not be able to use subbituminous coal, ICF assumed that subbituminous coal could substitute for bituminous coal up to 30% of the total thermal coal imports by country. ICF provided no basis for this assumption.
2. ICF's model projected that all of the coal exports through MBT-Longview would be shipped to Japan, and that all of these exports would be subbituminous Powder River Basin (PRB) coal through at least 2028.
3. There is already a large market price discount for subbituminous coal from Indonesia compared to bituminous coal, so customers have the economic incentive to maximize their use of subbituminous coal already.
4. The imports of subbituminous coal to Japan are only 7% of the total in 2015 (by weight). This implies that the power plants in Japan are not able to switch to U.S. PRB coal up to 34% of total imports (by weight), as projected by ICF's model.
5. ICF did not disclose sufficient detail on the model results, including coal origin, destination, and prices, for a proper understanding and critique.

This memorandum is intended to address the lack of basis for ICF's model assumptions and results. Key conclusions are:

1. A more reasonable model result would be that MBT-Longview exports of subbituminous coal would substitute for Indonesian subbituminous coal, not bituminous coal from Indonesia and Australia. There are large volumes of Indonesian subbituminous (and lignite) exports in the market today, which already sell at a discount.
2. The importance of this unsupported and incorrect assumption is that GHG emissions are predicted to be higher in the 2015 Energy Scenario by allowing U.S. subbituminous coal to substitute for Asian bituminous coal.
3. In particular, ICF projects that all of the coal from MBT-Longview will be delivered to Japan, whose existing plants only consume a limited amount of subbituminous coal due to coal quality limitations. Subbituminous coal provides only 7% (by weight, even less by heat content) of the 2015 thermal coal imports to Japan, while ICF's model projects this will jump to 34% by weight due to exports from MBTL.

ICF Did Not Disclose Its Model Results in Sufficient Detail to Evaluate Coal Substitution

ICF recognized that "coal plants designed to burn bituminous coal have boilers that are too small to burn 100% subbituminous coal. However, bituminous coal plants are typically able to mix some subbituminous coal along with the bituminous coal they consume."[1] Because the GHG emission rate of subbituminous coal is significantly higher than for bituminous coal in ICF's input assumptions, the substitution of subbituminous coal for bituminous coal is a critical factor in predicting the GHG emissions from coal substitution.

ICF states that:

1) It limited the subbituminous coal consumption in the countries of Japan, South Korea, Taiwan and Hong Kong to no more than 30% of the coal consumed in trillion Btu;[2]
2) Depending on the scenario, most or all of the projected coal exports through MBT-Longview are subbituminous coals;[3] and,
3) A large share of the predicted increase in GHG emissions is due to coal substitution rather than induced coal demand.[4]

ICF's Model Substitutes U.S. Subbituminous Coal for Asian Bituminous Coal

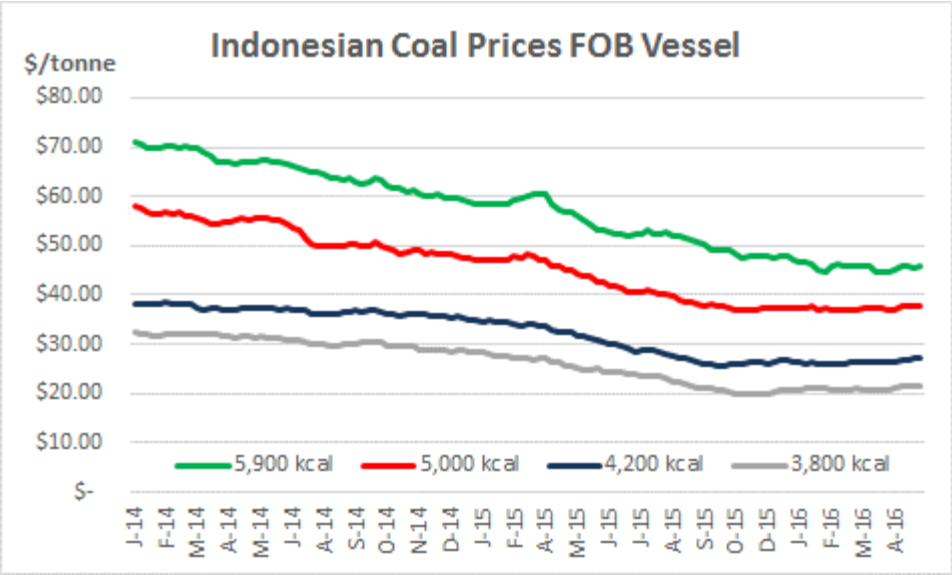
While the Draft EIS did not provide sufficient model results to quantify how much bituminous coal is projected to be replaced by subbituminous coal, it is clear that this shift is occurring from the summary data. In the Energy Policy Scenario, all of the MBT-Longview exports are projected to be shipped to Japan, because it is the closest destination. The exports are 44 mm metric tpy for every model year (2025, 2030 and 2040).[5] The total coal imports to Japan are projected to be 129 mm tons in 2025, declining to 125 mm in 2030 and 116 mm in 2040. Through 2028, all of the exports

[1] ICF SEPA Coal Market Assessment Technical Report, page 4-12.
[2] *Ibid.*
[3] ICF SEPA Greenhouse Gas Emissions Technical Report, pages 4-2 to 4-6.
[4] *Id.* at page 3-9.
[5] ICF SEPA Coal Market Assessment Technical Report, Table 81, page 6-53

through MBT-Longview are projected to be subbituminous PRB coal.[6] Thus, PRB coal exports to Japan are projected at the maximum amount of subbituminous coal allowed by ICF at 30% of total coal consumption (34% by weight).

Imports of Subbituminous Coal Are Already Incented by Price

ICF's model projects that the increased supply of U.S. subbituminous coal through MBT-Longview will create an economic incentive for customers (primarily in Japan) to switch from bituminous coal to subbituminous coal at lower cost. However, there is a large difference in the market price for bituminous and subbituminous coals in the Pacific Basin in the current market. The difference is greater than simply the difference in the heat content and reflects the limitations that customers have in using subbituminous coal. The published market prices for Indonesian coals with different heat contents (bituminous 5,900 kcal/kg, subbituminous 5,000 and 4,200 kcal, and lignite 3,800 kcal) are shown below.[7]



Even with this economic incentive, the share of Indonesian subbituminous coal to Japan is only 7% of total thermal coal imports by weight (even lower by heat content). The total 2015 thermal coal imports to the Asian countries selected by ICF in its model are shown below. While 59% of thermal coal imports to Hong Kong are subbituminous coal from Indonesia, only 7% of Japan's imports are lower-cost subbituminous coals. This is evidence of the limitations on switching from bituminous coal to subbituminous coal in Japan, which would restrict the amount of PRB coal exports through MBT-Longview and the resulting price impacts in the Pacific Basin, which would also reduce the amount of induced coal demand.

[6] ICF SEPA Greenhouse Gas Emissions Technical Report, Table 55, page 4-2.
[7] Platts *Coal Trader International* weekly prices.

Thermal Coal Imports to Pacific Basin Countries, 2015 (million metric tons)[8]

Origin Country	China	Hong Kong	Japan	South Korea	Taiwan
Bituminous Coal					
Australia	43,537,806	224,998	94,350,433	37,589,437	31,092,244
Canada	-	153,870	2,621,240	3,387,761	1,299,745
China	-	64	566,413	791,551	328,056
Indonesia	28,115,448	3,226,703	22,158,776	13,556,762	15,431,751
Mongolia	1,618,332	-	3	28	-
Russia	9,780,372	934,184	11,503,973	16,584,380	7,466,105
South Africa	-	-	77,670	166,999	1,003,558
United States	425	-	2,290,336	1,226,190	320
Other	59,687	-	252,692	-	416,511
	83,112,070	**4,539,819**	**133,821,536**	**73,303,108**	**57,038,290**
Subbituminous & Lignite					
Indonesia	45,416,019	6,621,207	10,138,256	20,394,311	9,465,671
Other	2,835,023	-	-	-	-
	48,251,041	**6,621,207**	**10,138,256**	**20,394,311**	**9,465,671**
Total	**131,363,111**	**11,161,026**	**143,959,792**	**93,697,419**	**66,503,961**
Sub & Lignite	37%	59%	7%	22%	14%

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Memorandum: Review of Approaches for Significance and Mitigation

Prepared For:

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Executive Summary

This memorandum evaluates the approaches adopted in the Millennium Bulk Terminals-Longview Draft Environmental Impact Statement (Draft EIS) to assess GHG emissions and climate change under the State Environmental Policy Act (SEPA) framework.

The Draft EIS has not reliably identified any climate change effects on Washington State attributable to the Project based on the SEPA framework. The Draft EIS is largely silent on this issue and forms its conclusions principally based on the Project's GHG emissions. While it states that the Project's GHG emissions represent a significant impact, the Draft EIS does not show how these impacts have been determined or establish a causation link between the Project's GHG emissions and the supposed environmental impacts in Washington State that would not otherwise occur under the No Action Alternative.

The Draft EIS's conclusions are contradictory in that it also separately determines that climate change impacts on the No-Action Alternative would be the same as those on the Project, a tacit acknowledgment that climate change effects are the same irrespective of the operation of the Project.

The Draft EIS also avoids any discussion or acknowledgement that it is not possible - with any degree of confidence - to attribute potential local or state-level climate change impacts to project-level GHG emissions given the scale, complexity, and uncertainty inherent in current modeling and data analytical techniques.

The Draft EIS has relied on the use of GHG emissions as a representation of climate risk but does not offer context or support for adopting this approach and its conclusions are unsubstantiated. Furthermore, it has significantly overestimated the total net emissions and has used inapplicable regulatory drivers as emissions thresholds as a basis for determining significance.

The mitigation approach of the Draft EIS is unsupported and contradictory because it is not possible to attribute local or state-level climate change impacts to project-level GHG emissions, rendering the mitigation measures unnecessary and inappropriate. Consistent with SEPA, mitigation must be linked to adverse environmental impacts that would not otherwise occur in the absence of a proposed action. The Draft EIS does not describe what is being mitigated or what the mitigation measures are attempting to address.

1.0 INTRODUCTION

Millennium Bulk Terminals-Longview, LLC (MBT-Longview) retained Environmental Resources Management, Inc. (ERM) for expert consulting services related to potential greenhouse gas (GHG) emissions and climate change impacts associated with the proposed MBT-Longview export facility (Project) located in Longview, Washington.

This memorandum discusses and critiques the approaches adopted in the Millennium Bulk Terminals Draft Environmental Impact Statement (Draft EIS) (Ecology and Cowlitz County 2016) to assess GHG emissions and climate change.

2.0 STATE ENVIRONMENTAL POLICY ACT

Under the State Environmental Policy Act (SEPA), a primary purpose of an environmental impact statement (EIS) is to provide an impartial discussion of significant environmental impacts and present mitigation measures that avoid or minimize identified adverse environmental impacts. The identified adverse environmental impacts must be attributable to a proposed action, and would not occur in the absence of the proposed action.

With respect to GHG emissions and climate change, determining impacts is complex. A proposed action may directly or indirectly[1] emit GHGs; however the emissions themselves do not constitute the impact. Instead, the potential for adverse impacts is manifested through potential changes in climate.

Considering this functional relationship, an EIS must identify adverse impacts to the environment attributable to climate change, and proposed action-level emissions must be determined to be the cause of these adverse impacts. If not, there can be no determination made on the impact of the proposed action because the assessment is inconclusive and speculative.

3.0 DETERMINATION OF IMPACTS

3.1 Draft EIS Conclusions

The Draft EIS does not identify or sufficiently demonstrate any adverse climate change impacts on Washington State attributable to the Project. In fact, the Draft EIS is largely silent on this issue, and forms its conclusions principally based on the Project's GHG emissions. The Draft EIS concludes that the GHG emissions are significant impacts;[2] however these conclusions are unsubstantiated and unreliable, for the following reasons:

i. The Draft EIS does not identify and describe the nature of the stated impacts, including:
   - How the GHG emissions themselves are considered impacts?
   - What the actual impacts are – in what shape or form are these impacts manifesting themselves?
   - The specific effects these impacts would cause on Washington State.

ii. The Draft EIS offers no evidence or supporting logic as to how it has established the causation link between the Project's GHG emissions and the supposed impacts. The Draft EIS uses inapplicable regulatory thresholds as a basis for determining the significance of the GHG emissions, but this is unlinked to impacts.

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[1] Direct GHG emissions are those emissions from sources that are under the ownership or control of the entity responsible for the proposed action. Indirect GHG emissions are emissions that are a consequence of the activities of the proposed action, but occur at sources owned or controlled by another entity. A lifecycle approach to GHG emissions involves assessing all direct and indirect GHG emissions across the lifecycle of the proposed action.

[2] The Draft EIS concludes that "*…the emissions are considered to be significant impacts. The climate change impacts resulting from this increase to greenhouse gases would persist for a long period of time, beyond the analysis period and are considered permanent and, while global in nature, would affect Washington State*." (see section 5.8.1.6, page 5.8-16, Draft EIS). In addition, the Draft EIS concludes that the "*emissions attributable to operations of the Proposed Action (MBT-Longview) under the Energy Policy Scenario are considered adverse and significant.*" (see section 5.8.1.6, page 5.8-16 to 5.8-17, Draft EIS).

iii. The Draft EIS's conclusions are contradictory. Section 5.8.2.5 of the Draft EIS determines that climate change impacts on the No-Action Alternative would be the same as those on the Project.[3] This implies that climate change effects are the same irrespective of the operation of the Project.

iv. Where future potential climate change effects in Washington State are described in the Draft EIS (in section 5.8.2), there is no linkage of these effects to the Project. The Draft EIS presents this commentary with no specific statement or conclusion that these climate change effects are due to, or in part attributable to, the Project. In fact, section 5.8.2 references publications and information sources that pre-date the Draft EIS and is specifically focused on assessing the future climate change effects *on the* Project, rather than assessing the effects *from the* Project.

3.2 Inherent Difficulties Linking Project-level GHG Emissions to Climate Change

It is not possible with any degree of confidence to attribute potential project-level GHG emissions to any local climate change impacts consistent with SEPA. This is due to both the nature of the functional relationship between GHGs and climate change, and also the level of resolution available from modeling and analytical approaches in use today.

Functional relationship between GHGs and climate change

Changes in the Earth's climate depend on the balance between energy entering and leaving the Earth's system, and a number of both natural and human factors can affect the energy balance,[4] including changes in:

- The amount of energy from the sun reaching the Earth;
- The reflectivity of Earth's atmosphere and surface; and
- GHG[5] concentrations which affect the amount of heat retained by Earth's atmosphere, i.e. the greenhouse effect.

All three of these factors occur at a global level. In the case of GHG concentrations, while the emission of GHGs can occur at a local level, the functional linkage between climate change effects and the concentration of GHGs happens as a global phenomenon, as follows:

1. GHG emissions may occur at a local level, whether through a natural event, or through a human-induced activity;
2. The local-level GHG emissions contribute to the overall global atmospheric concentration of GHGs;

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[3] Section 5.8.2.5, page 5.8-33, Draft EIS.

[4] See https://www3.epa.gov/climatechange/science/causes.html for a more detailed description.

[5] GHGs comprise a number of different gases, such as carbon dioxide, methane, nitrous oxide (N2O), and chlorofluorocarbons (CFCs), as well as water vapor and ozone. Many of these can result from both natural and human activities, and when assessed for a proposed action, the emissions attributable to human activities are typically calculated. Carbon dioxide equivalent (CO_2e) is a measure used to compare the emissions from various greenhouse gases based upon their global warming potential, and CO_2e is commonly used as a metric to sum GHG emissions.

3. The global concentration of GHGs results in a warming effect, by absorbing long-wave energy emitted from the Earth's surface, preventing its immediate escape from the Earth's system, and then re-emitting this energy, warming the Earth's surface and lower atmosphere.
4. The warming effect causes the temperature of the surface to increase, which then causes changes to the drivers of the global climate patterns as a whole; and
5. The climate is changed globally, with differential changes of temperature, precipitation, storm intensity, wind profiles, and other effects experienced in different regions across the Earth.

The substantial differences in the magnitude between local level GHG and the global GHG concentrations contributes to the difficulty of seeking to understand and assess potential climate change impacts of project-level activities. For example:

- Typical project-level emissions can be of the order of thousands or millions of metric tons of CO_2e;
- Global annual emissions are at the level of billions of metric tons of CO_2e;[6] and
- The global carbon dioxide concentration recorded in March 2016 was 404 parts per million (ppm) (NOAA/ESRL 2016), which equates to 3,153 billion metric tons (giga tons or Gt) carbon dioxide.[7]

As described above, the differences in scale between GHG emissions at a local level and the climate change impacts driven by the overall global atmospheric concentration of GHGs create a natural disjunction between localized effects resulting from the global accumulation of GHGs over the course of many decades. This disjunction is reflected in the uncertainties inherent in current climate change modeling.

Resolution of Modeling and Analytical Approaches

Linking project-level emissions to climate change effects is not possible based upon current scientific, meteorological, and statistical methods and models. General Circulation Models (GCMs) are the best available tools for simulating the response of the global climate system to increasing GHG concentrations. GCMs are built and run at a global level, and are used to project future changes in climate on the basis of differing GHG emissions scenarios. GCMs are complicated numerical models representing physical processes in the atmosphere, ocean, cryosphere and land surface, and they are at a scale that is too large to allow individual project assessments.

For example, the latest Intergovernmental Panel on Climate Change (IPCC) projections assume a series of cumulative GHG emission scenarios ranging from 510 to 7,010 Gt CO_2,[8] compared to the Draft EIS estimate of total lifecycle GHG emissions for the Project's life span (2018–2038) of 0.038 Gt (37,590,823 metric tons) of CO_2e.[9] The Draft EIS emissions represent between 0.007 to 0.0005% of the IPCC emission scenarios, which is non-detectable in the GCMs recognizing the inherent uncertainty. Furthermore, the projected climate change

[6] Annual global GHG emissions reached 49.5 billion metric tons (giga tons or Gt) of CO_2e in the year 2010 (IPCC 2014a).

[7] Conversion using Common Conversion Factors from the Carbon Dioxide Information Analysis Center (http://cdiac.ornl.gov/pns/convert.html#3). Accessed May 30, 2016.

[8] Table SPM.1, page 13, IPCC 2014b.

[9] Taken from Table 5.8-8 of the Draft EIS.

effects that the GCMs generate are relatively small compared to the global GHG emission scenarios. The IPCC cumulative GHG emission scenarios ranging from 510 to 7,010 Gt CO_2 project temperature changes of the range 1.5 to 4.8 degrees Celsius.[10] The GCMs would not be able to detect statistically significant temperature changes attributable to the Draft EIS GHG estimates which are 4-5 orders of magnitude less.[11] GCMs cannot be run to assess differences attributable to a single project.

Future climate is determined as a function of these physical interacting processes, and while man-made GHG emissions are external to the climate system, they modify how it behaves. Future climate is shaped by the Earth's response to man-made GHG contributions, along with internal variability inherent in the climate system. The range of GCMs provide differing representations of the Earth's response to man-made contributions and of natural climate variability. Ensembles of GCMs, simulating the response to a range of different scenarios, map out a range of possible future projections, and help provide understanding on associated uncertainties. For example, the IPCC latest projections have been assembled from up to 39 different GCMs.[12] The diversity of various modeling options for the climate system represents a positive aspect of climate modeling, and results in a range of climate change projections at global and regional scales. This diversity provides a basis for quantifying uncertainty in the projections. This uncertainty is inevitable and reflects the complexity of the climate system and the fact that different GCMs have different strength and weaknesses. Other sources of uncertainty stem from GCMs' structural limitations in that they are not built in a 'bottom up' manner which assumes a universe of projects. Rather, they are top-down models which assume different future emissions trajectories based on different GHG emissions scenarios.

Downscaling is a strategy for generating regional data from GCMs. The intent of downscaling is to link global scale projections and regional dynamics to generate regionally specific projections. The global scale at which GCMs are constructed means they create uncertainty when outputs are used to assess local level effects. Downscaling still relies on the primary GCM data and therefore outputs remain estimations, and the process of downscaling adds an additional tier of uncertainty. If more localized impacts are then to be assessed from the downscaled outputs, a further level of assessment is needed to link the downscaled climate responses to local physical or ecological processes, further adding uncertainty to the projections. Therefore, while GCM and downscaled climate change projections represent the best projections currently available, they need to be viewed and used with caution in light of the associated uncertainty.

For these reasons, it is not possible to determine the climate change impacts attributable to local level GHG emissions.

3.3 Summary

The Draft EIS has not reliably identified any climate change effects attributable to the Project under the SEPA framework. While it states that the Project's net GHG emissions represent a significant impact, the Draft EIS

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[10] Table SPM.1, page 13, IPCC 2014b.

[11] Orders of magnitude are used to make approximate comparisons between numbers. Numbers that differ by one order of magnitude differ in quantity by about ten times. Numbers that differ by two orders of magnitude differ by a factor of about 100, etc.

[12] Figure TS.5, page 58, IPCC 2014c.

fails to explain how these impacts have been determined or establish a causation link between the Project's GHG emissions and the supposed environmental impacts in Washington State that would not otherwise occur under the No Action Alternative. The Draft EIS's conclusions are also contradictory in that they separately conclude climate change impacts on the No-Action Alternative would be the same as those on the Project, tacitly acknowledging that climate change effects are the same irrespective of the operation of the Project. Because it is not possible - with any degree of confidence - to attribute potential local or state-level climate change impacts to project-level GHG emissions given the scale, complexity and uncertainty inherent in current modelling and data analytical techniques, the Draft EIS, or any EIS for that matter, cannot reliably identify local climate change impacts attributable to GHG emissions from the Project.

4.0 USING GHG EMISSIONS AS A REPRESENTATION OF CLIMATE IMPACTS

As described in section 3.0, the Draft EIS has not demonstrated any climate change impacts that are attributable to the Project under the requirements of SEPA and is largely silent on this issue. Instead, the Draft EIS appears to be relying on the principle of using GHG emissions as a representation of climate risk and forms its conclusions principally in relation to the Project's GHG emissions. This approach is also unsubstantiated and inconclusive, as discussed below.

4.1 Overestimation of Project GHG Emissions

The Draft EIS presents a lifecycle assessment of GHG emissions attributable to the Project and presents total net GHG emissions[13] as shown in Table 1.

TABLE 1 DRAFT EIS TOTAL NET EMISSIONS[14]

Period	Emissions (metric tons of CO2e) for 2015 Energy Policy[15]
Annual Emissions, 2028	3,231,025
Total Emissions, 2018–2038	37,590,823

These presented emissions significantly overestimate the total net emissions attributed to the Project for the following reasons:

- The Draft EIS's coal market analysis contains a number of fundamental problems which result in an overestimation of the lifecycle GHG emissions attributable to the Project as follows:

[13] The lifecycle assessment of GHG emissions attributable to the Project is intended to identify the net incremental GHG emissions. This means that GHG estimates should account for emissions attributable to the Project, as well as those emissions that will be reduced or removed as a consequence of the Project (i.e. offsets).

[14] Taken from Table 5.8-8 of the Draft EIS.

[15] The 2015 Energy Policy scenario is selected in the Draft EIS as the preferred scenario for the GHG analysis.

- It assumes elasticity of demand which implies additional coal demand in the Pacific basin would be induced by the Project, which in turn would increase the GHG emissions attributable to the Project. This assumption is unsubstantiated and unreliable.
- It incorrectly assumes that heat contents of Asian coals are higher than coal to be imported through the Project, thereby assuming more United States (U.S.) imported coal is required to displace Asian coal.
- It incorrectly assumes that the CO_2 content of Asian coals is lower than coal to be exported through the Project, thereby assuming more emissions associated with U.S. coal that displace Asian coal.
- It assumes that a U.S. policy instrument (namely, the Clean Power Plan) eliminates any U.S. coal market dynamics attributable to the Project, such as coal displacement by natural gas.

- The Draft EIS does not account for potential GHG offsets linked to rail transportation attributable to a reduction in current U.S. coal transportation (due to substitution by natural gas) and a reduction in Indonesian land and barge transport (due to displacement). The Draft EIS may overestimate rail emissions by up to 50%.

The level of overestimation of the total net lifecycle emissions attributed to the Project could be as high as an order of magnitude. Correcting the erroneous assumptions in the Draft EIS would likely result in negligible net or negative GHG emissions from Pacific basin coal combustion, potentially as low as a negative 60,000,000 metric tons of CO_2e emissions. Instead, the Draft EIS assumes between 50-55%[16] of the net GHG emissions are due to end-use combustion. In sum, the Draft EIS has not presented a reliable assessment and determination of the GHG emissions attributable to the Project.

4.2 Use of Inappropriate Threshold for Determining Significance

Using GHG emissions as a representation for climate risk is sometimes adopted in recognition of the complexity and uncertainty with trying to determine causation between GHG emissions and climate effects. The Draft Council on Environmental Quality (CEQ) guidance (CEQ 2014) recognizes this challenge and recommends using GHG emissions as a representation. However, the Draft CEQ Guidelines remain in draft form, and have not been legally adopted, and must therefore be acknowledged within this context. Furthermore, it is noted that the guidelines are not consistently applied by agencies on projects, and where they are used, differing interpretations have been applied.

The Draft EIS concludes that the GHG emissions attributable to the Project are significant, based on GHG thresholds from inapplicable regulations[17] as follows:

- Draft Washington State Clean Air Rule.
- Draft CEQ Guidelines.

[16] The net annual GHG emissions and total net emissions associated with combustion have been summed from the 2015 Energy Policy values from Table 5.8-5 of the Draft EIS, and the percentage determined by dividing by the respective total net emissions shown in Table 5.8-8.

[17] Section 5.8.1.6, page 5.8-16, Draft EIS.

- United States Environmental Protection Agency's (U.S. EPA) Tailoring Rule (40 Code of Federal Regulations [CFR] Parts 51, 52, 70 et al.).

The Draft EIS states that "*(t)hese standards provide guidance on assessing significance of various levels of greenhouse gas emissions*" and concludes that the average annual amount of emissions for operations (broken down for initial and full operations)[18] "*….exceeds various intensity considerations that are proposed in federal and state regulations and guidance*."[19] In turn, the Draft EIS concludes that the "*emissions attributable to operations of the Proposed Action (MBT-Longview) under the Energy Policy Scenario are considered adverse and significant.*"[20]

There are four primary concerns with the Draft EIS's approach to determining significance by using GHG emissions as a representation of risk and compared to thresholds, as follows:

1. ***The projected total net GHG emissions have been significantly overestimated***

   As noted in Section 4.1, the projected emissions are significantly overestimating the total net emissions attributed to the Project, and this level of overestimation could be as high as an order of magnitude. The scenarios evaluated and assumptions applied by the Draft EIS each provided a very different estimate for GHG values, making clear that there is great uncertainty in predicting a GHG value.

2. ***Inappropriate emissions thresholds***

   The Draft EIS assesses significance by comparing the average annual net emissions with the levels established by inapplicable federal and state regulations and guidance. Specifically, the draft Washington State Clean Air Rule establishes a compliance threshold of 100,000 metric tons of CO_2e per year, the U.S. EPA's Tailoring Rule applies to facility sources that emit more than 75,000 short tons of CO_2e per year, and the Draft CEQ Guidance identifies a threshold of 25,000 metric tons of CO_2e per year. Use of these stated thresholds to determine significance is inappropriate because none were established from a risk or significance basis. Rather, they represent thresholds above which regulatory requirements are activated. In the case of the Draft CEQ guidance, the 25,000 metric tons of CO_2e per year is provided as a reference point "*for purposes of disclosure and not a substitute for an agency's determination of significance under NEPA*".[21] The Draft EIS's statement that the threshold standards provide guidance on assessing significance is incorrect.

3. ***Use of different emissions boundaries and criteria***

   The Draft EIS assessed the net lifecycle emissions associated with the Project against the regulations and guidance described above. Not only are these thresholds inapplicable, they also apply to different

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[18] Table 5.6-9, page 5.8-16, Draft EIS.

[19] Section 5.8.1.6, page 5.8-16, Draft EIS.

[20] Section 5.8.1.6, page 5.8-16 to 5.8-17, Draft EIS.

[21] Part III, Section D, page19, CEQ's Revised Draft Guidance on the Consideration of Greenhouse Gas Emissions and the Effect of Climate Change on NEPA Reviews, published in December 2014.

conditions and boundaries. For example, the Draft Washington State Clean Air Rule, which has been withdrawn and now reissued, is intended to apply only to certain sources in Washington State. The Project is not one of these sources. Similarly, the U.S. EPA Tailoring Rule also applies to facility-level emissions rather than lifecycle emissions.

In addition, the boundary conditions also vary. Both regulatory thresholds apply to direct GHG emissions within the facility boundary, whereas the Draft EIS GHG emissions include both direct (within the Project boundary) emissions and indirect emissions from rail and other transportation. This comparison approach is misleading, as it is not using a like-for-like basis.

4. Differing conclusions from other Washington State EISs

Environmental review of other similar projects in Washington State are reaching vastly different climate change conclusions, including project analyses prepared by the same consulting firm, ICF International. For example, both the Tongue River Railroad and Westway Expansion project draft EIS's offer starkly different approaches and conclusions to the GHG and climate change analysis without any evidence as to why.

In the case of Tongue River Railroad project, the determination of significance (using GHG emissions as a representation of risk) compared to the Draft EIS is contradictory when considering the stated order of magnitude of GHG emissions. The Draft EIS concludes that the emissions attributable to the Project are adverse and significant, for approximately 37.6 million metric tons of CO_2e for the 2018-2038 period and an average annual net emissions, when fully operational, of 3.2 million metric tons of CO_2e.[22] Conversely, the Tongue River Draft EIS calculates net GHG emissions to range from a reduction of 1.7 million metric tons of CO_2e to an increase of 81 million metric tons of CO_2e and concludes that "…impacts *from the net annual life-cycle emissions would range from a negligible positive impact to a minor adverse impact.*"[23] The difference in magnitude of GHG emissions between the two projects is starkly different, but accompanied by apparently inverse significance conclusions.

For the Westway Expansion Project (Ecology 2015), a full lifecycle GHG analysis has not been performed because "*Determination of the incremental increases in GHG emissions relative to the no-action alternative is complex and depends on numerous relatively unpredictable factors. The relative contribution of the proposed action to the net change in CO_2 emissions would depend on whether the proposed action results in increased demand for crude oil or displaces other crude oil consumed by end users (which depends, in part, on the source and final destination for the oil), what type of crude oil is being transported (i.e., which emissions factors are used), and what the end use is (e.g., combustion versus development of other products)*." In other words, the complexity and unpredictability of the market forces and lifecycle GHG emissions is used as a reason for not performing a full lifecycle analysis. Performing such an assessment would be too speculative.

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[22] Table 5.8-9, page 5.8-16, Draft EIS.

[23] Section 5.2, pages 5.2-2, Tongue River Railroad Draft EIS (STB 2015).

4.3 Absence of Context for Emissions Comparisons

The Draft EIS also provides an "Emissions in Context" section.[24] This notes that the emissions associated with the Project within Cowlitz County in 2028 are comparable to adding 8,100 passenger cars to the road each year and would be less than 0.05% of Washington State's total annual emissions in 2012. Similarly, it also noted that the Project's annual emissions in 2028 in Washington State would be less than 0.4% of the state's total annual emissions in 2012. This approach through comparison is not providing any further context for understanding emissions, and may also be misleading in the absence of further discussion and context in relation to the selected comparison numbers. Some examples include:

- The comparison with number of cars in Cowlitz County is just a different surrogate representation of emissions, but it provides no meaning or understanding in terms of significance. No baseline is provided (such as current car levels in the County) or commentary on what threshold is being adopted as the basis for a significance determination.
- Comparing the emissions as a percentage of state emissions is misleading because the boundary conditions as to how state level emissions are determined will be different compared to the Draft EIS analysis.
- It is erroneous to compare projected 2028 emissions values to 2012 benchmarks, given the significant time difference and the fact that the situation and context for 2028 is not currently known.

In conclusion, the "Emissions in Context" section of the Draft EIS offers no substantive conclusions or additional context as to whether the Project will cause adverse environmental impacts.

5.0 MITIGATION

The Draft EIS describes four measures[25] for MBT-Longview to implement in order to mitigate GHG emissions, including fuel efficiency training, anti-idling policies, electric car usage, and mitigation of 50% of the GHG emissions attributable to the Project.

Mitigation is the avoidance, minimization, rectification, compensation, reduction, or elimination of adverse environmental impacts. The mitigation approach is unsupported and contradicted by the fact that the Draft EIS does not identify any adverse climate change impacts attributable to the Project that would not otherwise occur, as described in Section 3.0. Under SEPA, mitigation must be linked to adverse environmental impacts that would not otherwise occur in the absence of a proposed action and must be roughly proportional in nature and extent to the impacts. The failure to identify adverse environmental impacts attributable to the Project renders these mitigation measures unnecessary and inappropriate.

Additional concerns have been noted in connection with the fourth mitigation measure to mitigate 50% of the emissions attributable to the Project:

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[24] Section 5.8.1.6, pages 5.8-18 to 5.8-20, Draft EIS.

[25] Section 5.8.1.8, page 5.8-21, Draft EIS.

- There is no discussion or description of what impact the mitigation would address (e.g. there is no discussion of what adverse environmental impacts in Washington State would be mitigated by reducing emissions, nor what a reduction in emissions would achieve, even assuming that GHG emissions are an appropriate representation of climate change impact).
- The justification appears to be arbitrary. The rationale for using Washington State regulations, namely RCW 80.70 and RCW 80.80, is inappropriate. The Draft EIS actually acknowledges that "*Washington State standards will not apply to these facilities…*"[26] These state regulations are focused on mitigating GHG emissions not from coal terminals but from new thermal power plants (by 20%) and new power generation based on the performance of natural gas-fired plants, respectively. The Draft EIS states that if the coal was used for power plants in the state, then mitigations between 20% and approximately 55% of gross emissions would be required. The rationale for the mitigation measure is therefore based on a twofold transference of responsibility – once from power plants in the state to power plants in other countries, and then from those power plants to the domestic terminal through which some of their coal passed. This is not consistent with the intent of the state regulations; the burden of compliance with a regulation targeting in-state power plants is being applied to a sector of the coal supply chain serving coal to a different country.
- The proposed offset mitigation value for initial operations of 693,723 metric tons of CO2e and for operations at maximum capacity of 1.27 million metric tons CO2e per year is based on net GHG emissions that are significantly overestimated (see Section 4.1).
- The emissions apportioned for mitigation include GHG emissions that occur outside of MBT-Longview's control and far outside of the state.

6.0 CONCLUSION

The Draft EIS has not reliably identified any new climate change effects on Washington State attributable to the Project based on the SEPA framework. Therefore, there is no basis in SEPA for requiring mitigation.

The Draft EIS forms its conclusions principally based on the Project's GHG emissions, which have been used as a representation of climate risk. While it states that the Project's GHG emissions represent a significant impact, the Draft EIS does not explain how these impacts have been determined or establish a causation link between the Project's GHG emissions and the supposed environmental impacts in Washington State that would not otherwise occur under the No Action Alternative. The Draft EIS also avoids any discussion or acknowledgement that it is not possible - with any degree of confidence - to perform project level modeling that reliably attributes potential local or state-level climate change impacts to project-level GHG emissions given the scale, complexity, and uncertainty inherent in current modeling and data analytical techniques.

[26] Section 5.8.1.8, page 5.8-21, Draft EIS.

7.0 REFERENCES

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