# APPENDIX R

## Comments on the Draft EIS and Responses

## (continued)

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Submitted by
Jerry Havens, Distinguished Professor Emeritus
Department of Chemical Engineering, University of Arkansas
April 1, 2019

Regarding the
**DRAFT ENVIRONMENTAL IMPACT STATEMENT**
**FOR THE**
**JORDAN COVE ENERGY PROJECT**
Docket Nos. CP17-494-000 and CP17-495-000
March 2019

My comments, directed simultaneously to FERC and PHMSA,
are not to be attributed to the University of Arkansas.

**COMPUTER MODEL USED TO PREDICT LNG EXPORT TERMINAL VAPOR CLOUD EXPLOSION HAZARDS HAS NOT BEEN APPROVED BY PHMSA - PREDICTED EXPLOSION OVERPRESSURES APPEAR SERIOUSLY UNDERESTIMATED**

These comments are intended to notify FERC, PHMSA, and the public of critically important developments regarding our expanding knowledge of the risk of cascading fire and unconfined vapor cloud explosion (UVCE) accidents that could occur at the Jordan Cove Export Terminal (JCET). The comments are an expansion on my earlier ones to the Public Workshop on Liquified Natural Gas Regulations Website on July 28, 2016, September 22, 2018, October 2, 2018, and December 3, 2018 - all of which I stand by. They are also intended as a response to the joint news release of August 31, 2018 by PHMSA and FERC, entitled " FERC, PHMSA Sign MOU to Coordinate LNG Reviews", from which I quote - "The MOU establishes a framework for coordination between FERC and PHMSA to process LNG applications in a timely and expeditious manner while ensuring decision-makers are fully informed on public impacts". I trust these comments will be helpful to the decision-makers in fully informing the public.

My concerns remain essentially the same as commented to FERC in January 2015 by James Venart and myself[1]. I believe that Government is failing to adequately provide for the risks of potentially devastating Unconfined Vapor Cloud Explosions (UVCEs) of heavier-than-methane hydrocarbons at the JCET. IND2-1

I remain concerned that the predictions of explosion overpressures (determining explosion damage) presented in the 2015 JCET DEIS were an order of magnitude (factor 10) too low. Such overpressures are not conservative enough to indicate the real hazard that exists, as evidenced by numerous confirmed occurrences of devastating UVCEs involving the same heavy hydrocarbons in similar conditions.

My review of the March 2019 JCET DEIS did not disclose any detailed predictions of vapor cloud explosion (VCE) overpressure for design spills of heavy hydrocarbons. However, I did locate on the FERC Website a report entitled "Facility Siting Hazard Analysis", dated October 2, 2018, which

[1] UNITED STATES LNG TERMINAL SAFE-SITING POLICY IS FAULTY, Comments submitted to FERC by Jerry Havens and James Venart, January 14, 2015, Docket No. CP13-483.

# INDIVIDUALS

## IND2 Jerry Havens, page 1 of 8

IND2-1 USDOT PHMSA reviewed the application and has issued a Letter of Determination on the Project's compliance with the siting requirements of 49 CFR 193, Subpart B. This determination also addresses compliance with NFPA 59A, section 2.1.1(d) for overpressure considerations from vapor cloud explosions. While 49 CFR §§ 193.2057 and 193.2059 provide specific parameters and computer models for thermal radiation and flammable vapor dispersion exclusion zones from each LNG container and LNG transfer system, the overpressure hazards from flammable vapor cloud explosions have been considered by Jordan Cove as the applicable factors to the site in accordance with NFPA 59A (2001), section 2.1.1(d). The requirements in NFPA 59A (2001) do not provide specific models or details to calculate the overpressure hazards from flammable vapor cloud explosions. FERC staff recognizes the importance of using suitable hazard models in its supplemental guidance document for Resource Reports 11 for LNG Projects, and application of uncertainty factors to account for potential underpredictions that may occur when compared against experimental data. The two primary models used to evaluate vapor cloud explosions, PHAST and FLACS, have been validated against a number of experimental data that do not indicate the under-predictions being represented. As such, an uncertainty factor of 2 was implemented in FLACS results. In addition, we note that FLACS has been shown to be one of the few models to more closely replicate overpressures in incidents with large flame propagation distances, such as Buncefield. FERC staff also note that many of the cited incidents that resulted in large damaging overpressures had initiating events that the preliminary engineering design and layers of protection proposed or recommended in Jordan Cove would prevent or mitigate. For example, many of the cited incidents include overfill events that did not have adequate or adequately managed overfill protection, had insufficient alarm and shutdowns initiated by hazard detection devices, had insufficient ignition controls that allowed vapors to disperse into buildings in a confined area that ignited and may have contributed to the overpressures. We evaluated the facilities to ensure there would be adequate overfill protections, sufficient alarm and shutdown capabilities, including those initiated by hazard detection, sufficient ignition controls, including alarm and shutdown of HVAC and combustion air intakes to prevent ignition in confined areas, in addition to many other layers of protection. We also recognize that DOT PHMSA and FERC continually seek to improve the evaluation of hazard models and assumptions used as inputs into the models in siting and in evaluation of layers of protection. Also, see IND2-7.

presents a collection of hazard footprints for overpressure, calculated with FLACS, predicted to result from design spills of heavier-than-methane hydrocarbons at the JCET[2]. The collection of calculations presented in that report presents a picture very similar to that presented in the 2015 DEIS. The overpressures presented therein still appear to be significantly lower than those reported for numerous incidents that have occurred with the same materials, in similar amounts and in similar conditions. I cannot determine to what extent these newer predictions have been utilized in the 2019 DEIS, but I am very concerned that such predictions as these might be approved by FERC in the FEIS - repeating the approval of similar predictions prepared for FERC with the same mathematical model (FLACS) in 2015. If that were to happen, I believe a serious error affecting public safety will be the result, because the unrealistically low damage predictions could be used again by FERC as a basis to dismiss the UVCE hazard at the JCET. Continued dismissal of the UVCE hazard would be a very serious error. If the magnitude of the possible overpressures are estimated using actual data (experience) available for UVCEs (rather than predicted with the FLACS theoretical model), the VCE hazard would be clearly indicated as a serious major hazard at the JCET[3]. *UVCEs at numerous similar heavy hydrocarbon handling/storage facilities have resulted in destruction of the facilities as well as injuries and deaths beyond the plant boundaries.*

IND2-1 cont.

**Contrasting LNG Import and Export Terminal Siting Regulations**

I want to state here that if either PHMSA or FERC believes that anything I present is in error I request that I be notified immediately. I will make any corrections as necessary, and I will alter my comments, as necessary, as well. My goal is to ensure that the science-based tools that are used for hazard evaluation in the regulations are applied correctly. I am very concerned that failure to ensure proper, validated, use of mathematical models for UVCE hazard evaluation could result in devastating UVCEs that, in addition to public endangerment, could cripple the industry.

IND2-2

In order to most effectively explain my concerns, I think it helpful to provide a very brief history of the LNG regulations. The provisions of 49 CFR 193. Liquefied Natural Gas Facilities: Federal Safety Standards were developed by PHMSA to govern the siting of LNG peak shaving terminals and import terminals. It has been accepted practice to identify for these two types of terminals only two principal hazards; pool fire hazards and vapor dispersion hazards. A third hazard, Unconfined Vapor Cloud Explosion (UVCE), is generally considered negligible for Import Terminals. This policy is based on the generally accepted fact that import terminals handle and store primarily LNG with methane contents sufficiently high that the LNG can be assumed to be pure methane. Given the very low propensity for explosion of unconfined methane-air clouds, UVCEs at LNG import terminals have historically been neglected as a hazard. As a consequence the present Regulation, 49 CFR 193, does not mandate the consideration of UVCE hazards.

With the advent of LNG export terminals in the United States the requirements for safe siting of LNG terminals have changed importantly. That is because the export terminals typically remove and store large quantities of heavier-than-methane hydrocarbons from the incoming natural gas feed stream. Furthermore, the removal of those heavy hydrocarbons typically requires the use of

[2] https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20181116-5198
Click on "Facility Siting Hazard Analysis" and download

[3] https://primis.phmsa.dot.gov/meetings/MtgHome.mtg?mtg=111 Atkinson, G., Vapor Cloud Explosion (VCE) Historical Review, PHMSA Public Workshop on Liquefied Natural Gas (LNG) Regulations, Washington DC, 19 May 2016.

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IND2-2 See comment response IND2-1.

large quantities of refrigerant gases that are heavier-than-methane hydrocarbons. The storage and handling of large quantities of these heavier-than- air hydrocarbons results in a new primary hazard - vapor cloud explosions of the heavy hydrocarbon materials that could follow accidental release.

I have been involved in the development of 49 CFR 193 from its beginning in the early 1980s. My principal involvement has been as an author/evaluator of the DEGADIS model for use in predicting LNG vapor cloud dispersion. DEGADIS is approved by PHMSA for use in predicting the requirements for vapor cloud dispersion exclusion zones for LNG Import Terminals. During the last decade, and coincident with the advent of LNG Export Terminals in the United States, additional vapor dispersion models have been approved by PHMSA for use by LNG terminal companies seeking siting approval.

My comments here are restricted to the FLACS model. The FLACS model is an example of what is known as a computational fluid dynamics (CFD) model. I generally support the use of CFD models for vapor dispersion predictions because they are appropriate for dealing with complexities not catered for by simpler models such as DEGADIS. Accordingly, I supported the approval by PHMSA of the FEM3A model developed by the Lawrence Livermore National Laboratory (LLNL) and I supported the request for PHMSA approval of FLACS for vapor dispersion use. I do not object to FLACS' approval, which PHMSA granted, for vapor dispersion prediction. IND2-3

**FLACS has not been Evaluated or Approved by PHMSA for Explosion Prediction**

This is the crux of the matter. There are now four mathematical models approved by PHMSA for vapor dispersion prediction, in order of the time approved; DEGADIS, FEM3A, FLACS, and PHAST. All four were required by PHMSA to be subjected to evaluation of their performance in demonstrating suitable agreement with experimental data available from a collection of field and wind tunnel tests of vapor dispersion.

FLACS (FLame ACceleration Simulator) is a commercial Computational Fluid Dynamics (CFD) software used extensively for atmospheric dispersion modeling and explosion modeling in the field of industrial safety and risk assessment[4]. FLACS has been subjected to the written protocol provided by PHMSA and approved by PHMSA for vapor dispersion predictions required by 49 CFR 193. PHMSA has not completed development of a written protocol for the evaluation of FLACS for explosion prediction. Consequently, FLACS has not been formally evaluated for explosion prediction and has not received approval for the evaluation of UVCE hazards (read explosion overpressures) by PHMSA.

Although it appears that a process for developing a written protocol for evaluation of FLACS for application to the prediction of overpressures was requested by PHMSA to be funded following the LNG Regulation Workshop of 2016[5], I can find no evidence that the required protocol has been completed. It appears that the plans announced at the LNG Workshop of 2016 for a required updating of 49 CFR 193 to cater for the new hazards that will be present at export terminals are currently at a standstill. The only conclusion I am able to reach is that the newly announced JCET DEIS appears to me likely to utilize predictions of explosion overpressures for the heavier-than-methane hydrocarbon design spills selected for analysis that have not been approved by PHMSA. Such a failure to adequately address the risk of UVCEs would mean that potential risks of cascading

[4] https://en.wikipedia.org/wiki/FLACS

[5] https://primis.phmsa.dot.gov/rd/mtgs/111616/WG%205%20Report-Out.pdf – See GAP #4

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IND2-3 See comment response IND 2-1. In addition, FLACS overpressure modeling results submitted by Jordan Cove has applied a safety margin of 2. Therefore the overpressures modeled in FLACS were analyzed to 1/2 psi instead of 1 psi to account for model uncertainties.

violent explosions that could destroy the plant as well as extend dangers to the public beyond the facility boundary are effectively being ignored. IND2-3 cont.

**PHMSA Contracted for Expert Evaluation of the Risk of Unconfined Vapor Cloud Explosions**

Simultaneously with my comments to FERC in 2015 I notified PHMSA of my concerns. I have also filed a total of four comments (to date) on PHMSA's LNG Regulation Workshop site. Further, there have been a series of important developments subsequent to my 2015 comments to FERC, the results of which I think are critically important to consider now.

PHMSA contracted with the British Health and Safety Laboratories (HSL) to prepare the report "Review of Vapour Cloud Explosion Incidents"[6]. Quoting excerpts from the Executive Summary of that report:[7]

> "This review of major vapor cloud incidents has been jointly commissioned by the US Pipeline and Hazardous Materials Safety Administration (PHMSA) and the UK Health and Safety Executive (HSE). The primary objective was to improve understanding of vapor cloud development and explosion in order to examine the potential for these hazards to exist or develop at LNG export plants that store substantial quantities of these flammable gases for use in the liquefaction process or as a by-product from the liquefaction …
>
> This review has not found any historical records of LNG (methane) vapor cloud explosions in open areas with severity sufficient to cause secondary damage to tanks and pipes and consequently rapid escalation of an incident from a minor process leak to a major loss of inventory.
>
> On the other hand some LNG sites (especially export sites) also hold substantial amounts of refrigerant gases and blends containing ethane, propane, ethylene and iso-butane. Higher hydrocarbons may also be produced and stored on LNG export sites as by-products of gas condensation. There are numerous examples of Vapor Cloud Explosions (VCEs) in open areas involving these higher molecular weight materials and the storage and use of higher molecular weight hydrocarbons on LNG export sites which may, if not managed adequately, introduce an additional set of incident scenarios in which VCEs trigger rapid escalation of loss of containment. (emphasis added)
>
> This study involves a review of 24 major VCE incidents focusing on source terms, cloud development and explosion mechanics. The incidents studied are split between permanent fuel gas (C2-C4 (e.g. LPG) and volatile liquids C4-C6 (e.g. gasoline). The source terms for leaks of gases and liquids are different but once a stable current of cold heavy vapor forms, the subsequent development of LPG and gasoline clouds are similar…
>
> An important finding from the review is that a high proportion of vapor cloud incidents occurred in nil/low wind conditions. By the term "nil/low wind" we mean a wind that was so weak close to the ground that it only detrained (stripped away) a small proportion of the vapor accumulating around the source … Rather than being picked up and moved downwind, the vapor flow in this case was gravity driven; spreading out in all directions and or following any downward slopes around the source.
>
> In many of the cases examined, 50% (12/24), there is clear evidence from the well-documented transport of vapor in all directions and/or meteorological records that the

[6] https://primis.phmsa.dot.gov/meetings/MtgHome.mtg?mtg=111

[7] HSL Report on PHMSA LNG Regulation Workshop site.

**IND2 continued, page 5 of 8**

vapor cloud formed in nil/low wind conditions. In a further 21% (5/24), the pattern of vapor suggests nil/low wind conditions but there is insufficient data available to be sure … incidents in nil/low wind conditions apparently make up the majority of historical records of the most serious VCEs … In nil/low wind conditions the cloud continues to grow throughout the time that the tank takes to empty… The maximum area covered by the flammable cloud is typically several hundred times greater in nil/low winds condition than in light winds.

The implication of this type of analysis is that if the density of ignition sources is constant and quite low in the area around the tank the chances of ignition in nil/low wind conditions would be hundreds of times greater for a given release. This illustrates why nil/low wind conditions dominate records of major vapor cloud incidents even though the weather frequency is low. Losses of containment in nil/low wind conditions are also particularly dangerous because a highly homogeneous cloud can be formed that may spread by gravitational slumping (without significant dilution) for hundreds of meters… A very large cloud that is all close to the stoichiometric ratio increases the risk of flame acceleration to a high pressure regime capable of seriously damaging storage and process facilities, when compared with clouds that are entraining air because of wind-driven dilution. This is because fundamental burning rates fall off rapidly for concentrations away from the stoichiometric. Once a high pressure regime is established explosions are not confined to congested areas of a site. In many of the cases reviewed almost all the footprint of the cloud was exposed to pressures in excess of 2000 mbar (29 psi). In at least one case the cloud detonated, causing extremely severe damage over the area covered by the cloud)." (emphasis added)

**PHMSA Conducted a Public Workshop on Liquefied Natural Gas (LNG) Regulations**

The Workshop was conducted in Washington, DC in May 2016. Quoting excerpts from PHMSA's Statement of Mission (from the Workshop Website):

"Historically, most LNG facilities were peak shavers built to liquefy and store natural gas to be degasified and injected back into the pipeline during periods of peak demand … However, due to the recent abundance of domestic shale gas, LNG export terminals are now being constructed that liquefy vast volumes of natural gas. These facilities require significantly greater quantities of refrigerants to liquefy the natural gas than the amount typically used at peak shavers… Most refrigerant gases and blends used at the export facilities contain ethane, propane, ethylene, and iso-butane and are referred to as heavy hydrocarbons. These gases are similar to gases that have resulted in VCEs at petrochemical facilities…

The understanding of VCEs is evolving. PHMSA recognizes that significant quantities of heavy hydrocarbons present different risks than methane and seeks to better understand that risk. Prior to investigative work on the Buncefield accident, the prevailing understanding was that vapor clouds formed outdoors were unlikely to explode if ignited. Today it is understood that VCEs involving higher hydrocarbons have occurred in outside areas. This paper advances our understanding further. PHMSA sponsored the "Review of Vapour Cloud Explosion Incidents" report with the primary objective to improve the scientific understanding of vapour cloud development and explosion in order to more

reliably assess hazards at large Liquid Natural Gas (LNG) export facilities… The aim of reviewing the particular incidents in this report is the extensive forensic evidence available that provides the information needed to study how the vapor cloud formed and ignited, the amount of overpressure exerted, and other information about the mechanism of VCE. This research was performed by the Health and Safety Laboratory (HSL) under a subcontract with the Oak Ridge National Laboratory, a United States Department of Energy (DOE) facility, and was supported by the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (DOT PHMSA and DOE) and the United Kingdom Health and Safety Executive (HSE). The research's objective was to improve understanding of vapor development and explosions in order to more reliably assess hazards and safety measures at facilities that contain significant quantities of heavy hydrocarbons…

The technical review of the report was performed by uncompensated subject matter experts… The purpose of this independent review was to provide candid and critical comments to make the report as sound as possible… The review, comments, and draft manuscript remain confidential to protect the integrity of the deliberative process. The panel reviewed multiple drafts of the report, held several conference calls, and convened a meeting on May 17th (2016) in Washington, D.C. A presentation about the draft report was given at a public meeting, PHMSA's Public Workshop on LNG Regulations, on May 19th, 2016, in Washington, D.C. …" (emphasis added)

**The 2018 PHMSA /FERC MEMORANDUM OF UNDERSTANDING**

IND2-4

PHMSA is responsible for developing the regulations that specify the means of ensuring public safety in siting LNG terminals. The applicable regulation is 49 CFR 193, Liquefied Natural Gas Facilities: Federal Safety Standards. The present regulation was developed in the early Eighties to regulate LNG peak shaving and import terminals. Consequently, the present PHMSA regulation does not address the "new" hazards of vapor cloud explosions of heavier-than-methane hydrocarbons that are present in large quantities at LNG export terminals. So, during the period following my comments to FERC in 2015 on the UVCE hazard, and until very recently, I failed to understand why the 2015 JCET DEIS included an address of the UVCE hazard (not required by 49 CFR 193) by presenting the extensive predictions of explosion overpressure for heaver-than-methane hydrocarbon/air clouds that could be formed following accidental release at JCET. I remain uncertain why that action was taken, but I am increasingly concerned that the UVCE hazards present in the operation of LNG export terminals are effectively being ignored. My concern is that the order-of-magnitude-too-low predictions of the overpressures used by FERC to evaluate the VCVE hazard in the environmental impact statements for the JCET might result in the continued dismissal of the importance of this hazard for the JCET.

IND2-5

On August 31, 2018, the Federal Energy Regulatory Commission (FERC) and the Hazardous Materials Safety Administration within the U.S. Department of Transportation announced the signing of an agreement to coordinate the siting and safety review of FERC-jurisdictional LNG facilities. Quoting therefrom:

**"The Memorandum of Understanding (MOU) establishes a framework for coordination between FERC and PHMSA to process LNG applications in a timely and expeditious manner while ensuring decision-makers are fully informed on public safety impacts. The MOU provides that PHMSA will review LNG project applications to determine whether a proposed facility complies**

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IND2-4 USDOT PHMSA has considered potential incidents, such as vapor cloud explosions and toxic releases in its Part 193, Subpart B determination. As described in section 4.13.1.2 of the final EIS, section 2.1.1 of NFPA 59A (2001) as incorporated by 49 CFR 193: factors applicable to the specific site with a bearing on the safety of plant personnel and the surrounding public must be considered, including an evaluation of potential incidents and safety measures incorporated into the design or operation of the facility. Also, see comment response IND2-1 and IND2-3.

IND2-5 The August 31, 2018 MOU states that USDOT PHMSA would issue a Letter of Determination prior to the issuance of the final EIS, however a change in schedule is allowable upon notification to FERC. Section 4.13.1.2 of the final EIS provides additional details on the USDOT PHMSA's Letter of Determination for this Project.

**with the safety standards set forth in PHMSA's regulations, and that PHMSA will issue a letter to FERC stating its findings regarding such compliance. FERC will then consider PHMSA's compliance findings in its decision on whether a project is in the public interest."** (emphasis added)

IND2-5 cont.

It is my understanding that the JCET DEIS issued in 2019 does not state that FERC received an LOD (letter of determination) from PHMSA that presented its findings regarding compliance with the safety standards set forth in its regulations. It is further my understanding that the FERC/PHMSA MOU effectively requires PHMSA to issue such an LOD by the time the FEIS is completed.

My review of the Reliability and Safety section of the DEIS disclosed no direct reference to the UVCE hazard. It is as if the problem had either been decided as lacking further need of address or that some further address might be forthcoming by the time the EIS is completed.

IND2-6

I respectfully request that I be provided an answer to the following question: Given PHMSA's announcement in 2016 at the Public Workshop on LNG Regulation that 49 CFR 193 appeared to require updating to cater for the new (UVCE) hazards that attend Export Terminal operations, why has that announcement not led to any further analysis and evaluation in the 2019 JCET DEIS?

Unless that question can be answered satisfactorily, it appears that critical safety recommendations by PHMSA requiring changes to 49 CFR 193, backed up by extensive advice from the scientific expert community, are being ignored.

**Who Required the UVCE Hazard to be Addressed in the 2015 JCET DEIS?**

IND2-7

The only government source I have found for guidance regarding calculations of overpressure required to be presented in the 2015 JCET DEIS is in "Guidance Manual for Environmental Report Preparation, Volume II, LNG Facility Resource Reports 11 & 13 Supplemental Guidance, DRAFT, December 2015", prepared by FERC. Section 13.H.3, "Hazard Analysis Reports" of that draft appears to be the source of the requirement for explosion overpressure that appeared in the 2015 JCET Environmental Impact Statements. The requirement for explosion overpressures remains in the Guidance Manual for Environmental Report Preparation, FINAL, dated February 2017.

It is my understanding that the Draft FERC document providing guidance to JCET for providing VCE overpressure calculations was not based on the requirements of 49 CFR 193. It appears that FERC may have recognized the need to evaluate the UVCE hazards that could attend the operation of the JCET, and that those hazards should be considered in the JCET DEIS. I have no information about why FERC included the requirement to address UVCE hazards in their Guidance Document for preparation of Environmental Impact Statements. In any case, the "requirement" in FERC's Guidance Manual for Environmental Reports appears to demonstrate FERC's awareness of the importance of addressing the UVCE hazard.

The fact remains that the predictions of overpressure that were provided for the JCET DEIS in 2015 were stated therein to be made with the FLACS model, and although FLACS is approved for vapor dispersion calculations required by 49 CFR 193, it is my understanding that FLACS still has not been either evaluated or approved by PHMSA for explosion overpressure determination. If this is the case, then a major course-correction seems required, because comparisons of those (order-of-magnitude-too-low) overpressure predictions with documented measurements of overpressure data for a large number of UVCE events involving the same hydrocarbons, in similar amounts, and in similar atmospheric conditions, will demonstrate that the predictions utilized in the JCET environmental impact statements are in serious error.

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IND2-6 USDOT PHMSA's Letter of Determination summarizes the governing hazard scenarios for overpressure modeling. In addition, the evaluation of vapor cloud explosions and its potential direct, or indirect through cascading damage, impact the safety or reliability of the facilities is described in section 4.13.1.5 of the final EIS.

IND2-7 As described in section 4.13.1.2 of the final EIS, DOT PHMSA regulations incorporate NFPA 59A (2001) for siting requirements. NFPA 59A (2001) requires consideration of factors applicable to the specific site with a bearing on the safety of plant personnel and the surrounding public must be considered, including an evaluation of potential incidents and safety measures incorporated into the design or operation of the facility. USDOT PHMSA has considered potential incidents, such as vapor cloud explosions and toxic releases in its Part 193, Subpart B Letter of Determinations to FERC. FERC staff primarily conducted the evaluation of this modeling prior to the 2018 MOU, and it was described in its NEPA documents. Since the issuance of the 2018 MOU, DOT PHMSA has been responsible for issuing a Letter of Determination indicating whether a project's preliminary design would comply with its siting requirements. In addition, as noted in section 4.13.1.5, FERC evaluates potential hazards and incident history when evaluating the reliability and safety in its engineering reviews, including its assessment of the various layers of protection proposed in the design. FERC staff may also make recommendations on the engineering design and layers of protection to mitigate the potential of a vapor cloud explosion from directly or indirectly through cascading damage, impacting the public. Also, see comment responses IND 2-1, IND 2-3, and IND 2-4.

**IND2 continued, page 8 of 8**

If this problem is not addressed, it appears likely that such errors accompanied by FERC's approval thereof will ignore the scientific expert advice that resulted from the PHMSA Workshop conducted in 2016. The effect will be to ignore extensive accident experience that demonstrates the potential for cascading explosions that could destroy the plant and possibly extend damages to the public beyond the facility boundary. IND2-7 cont.

**CONCLUSIONS**

**49 CFR 193 Liquefied Natural Gas Facilities: Federal Safety Standards does not currently provide for adequate consideration of the hazards of Unconfined Vapor Cloud Explosion (UVCE) hazards that attend LNG Export Terminals handling and storing large quantities of heavier-than-methane hydrocarbons.**

**PHMSA conducted the Public Workshop on Liquefied Natural Gas (LNG) Regulations in Washington, DC, 19 May 2016. The principal purpose of the Workshop was stated to be the intention to address the need for updating 49 CFR 193 in order to cater for any new hazards that could be involved in siting LNG Export Terminals. The Workshop clearly identified the UVCE hazard as being the most important hazard present at Export Terminals that was not currently addressed adequately by 49 CFR 193.**

**PHMSA initiated a program to address the needs for changes in the regulation to provide for UVCE hazards. It appears that no progress has been forthcoming.**

**The new Draft Environmental Impact Statement (DEIS) for the Jordan Cove Export Terminal, just issued, continues to seriously underestimate vapor cloud explosion overpressures (damage) that could occur following credible releases of heavy hydrocarbons at the JCET site. The latest predictions that I am aware of appear to be an order of magnitude lower than are indicated by physical evidence of numerous documented UVCEs that have occurred worldwide with the potential to cause injuries and deaths to persons and result in destruction of the facility.**

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# Comments on the Draft Environmental Impact Statement for the Jordan Cove Energy Project

Docket Nos. CP17-494-000 and CP17-495-000

## Proposed Route v. Blue Ridge Variation

## Submitted by Mark Sheldon

**June 2019**

## Contents

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## Introduction

Our comments on the Jordan Cove Energy Project Draft Environmental Impact Statement of 2019 (DEIS) are limited to one issue: The DEIS recommendation that the Pacific Connector Gas Pipeline location be moved from the Proposed Route to the Blue Ridge Variation.

The Blue Ridge Variation is a 15.2-mile-long alternative route located between about MPs 11 and 25 of the 14.0-mile-long Proposed Route.

The comparison of the Blue Ridge Variation v. the Proposed Route was analyzed in detail in DEIS Appendix F.9 which was prepared by the Bureau of Land Management (BLM). The rationale for the DEIS recommendation that the pipeline should be located on the Blue Ridge Variation is given in DEIS Chapter 3, pp. 3-20 – 3-21.

**The DEIS sets forth the criteria that are used in determining if an alternative would be preferable** (DEIS p. 3-2):

1.) "Technically and economically feasible, reasonable, and practical;"
2.) **"Offer a significant environmental advantage over the proposed action; "**(emphasis added)
3.) "Have the ability to meet the objectives of the Project".

The DEIS rationale for recommending the Blue Ridge Variation reiterates these standards (DEIS p. 3-20). Criteria Nos. 1 and 3 are not disputed in the DEIS or in our comments.

Criterion No. 2 is at the heart of the DEIS rationale for recommending the Blue Ridge Variation and is at the heart of our comments.

In using "significant environmental advantage" as a criterion for selecting alternatives, the DEIS must adhere to the National Environmental Policy Act definition of significantly.

"*Significantly* as used in NEPA *requires* consideration of both *context and intensity*" (emphasis added). (40 CFR 1508.27)

Context means that the significance of an action must be analyzed in several contexts such as society as a whole, *the affected region*, the affected interests and the locality (*emphasis added*) (40 CFR 1508.27 (a)).

Intensity refers to the severity of the impact (40 CFR 1508.27(b)).

The DEIS analysis and rationale fails to include the context and intensity of the numbers used in comparing the impacts of the Blue Ridge Variation and Proposed Route. Utilizing information from official BLM documents and BLM data bases, our comments provide the context and intensity for the key numbers used in the DEIS rationale.

**IND284 continued, page 4 of 64**

Utilizing official BLM data and scientific literature, including that which is cited in the DEIS rationale for favoring the Blue Ridge Variation, our analysis shows that the DEIS analytical assumptions regarding the late-successional old growth (LSOG) forest found along the Proposed Route are false and without basis. These assumptions, which we show in these comments to be false, are fundamental to the DEIS rationale for recommending the Blue Ridge Variation,

In addition to the criterion that an alternative must offer a significant environmental advantage, the DEIS rationale for recommending the Blue Ridge Variation also states that when making an alternative determination an attempt is made to "balance the overall impacts".

Our detailed comments using factual information authoritatively demonstrate that the Blue Ridge Variation would not offer a significant environmental advantage and would not balance overall impacts compared to the Proposed Route. Since the facts used in our analysis are from the DEIS and official Bureau of Land Management (BLM) documents and BLM data bases, our facts cannot be refuted or dismissed. Applicable case law requires that the choice made by an agency must fit the facts found.

Our comments provide compelling authoritative evidence (facts) that the significant environmental advantage and overall balance of impacts is all on the side of the Proposed Route.

We urge the Federal Energy Regulatory Commission to retain the Proposed Route as the location for the Pacific Connector Gas Pipeline for the reasons we present in here.

## Data

All facts used in our analysis and comments are from the 2019 JCEP DEIS and appendices, BLM-provided map displaying Marbled Murrelet and Northern Spotted Owl habitat in the vicinity of the Proposed Route, BLM-provided map displaying forest stands 80 years old and older in the vicinity of the Proposed Route, BLM's Forest Operations Inventory (FOI), BLM's 2016 Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS), 2015 JCEP FEIS and appendices, and Pembina Corporation-provided map and alignment sheets displaying the location of the Proposed Route. (JCEP FEIS 2015 and BLM's PRMP/FEIS 2016 and appendices are incorporated by reference.) The only exception to these official government sources of data is information regarding private landowners. Sheldon Planning, LLC. was commissioned to obtain information regarding affected private landowners. Utilizing Coos County plats, aerial photographs, and pipeline location maps, Sheldon Planning developed a list of private landowners whose property would be crossed by the Blue Ridge Variation and their immediately adjacent neighbors. Sheldon Planning then contacted the private landowners by phone and by door to door visits to find out first-hand how the individual landowner would be affected by the Blue Ridge Variation.

IND284-1



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IND284-1 The discussion of the Blue Ridge Variation has been updated in the final EIS. See section 3.4.2.2.

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## DEIS rationale for Blue Ridge Variation.

The DEIS concluded that the Blue Ridge Variation would result in a significant environmental advantage and an overall balance of impacts compared to the Proposed Route. (DEIS p. 3-21).

This DEIS conclusion was "based primarily on the variation's ability to reduce long-term to permanent impacts to particularly valuable LSOG habitat affected by the Proposed Route". (emphasis added) (DEIS p. 3-21). IND284-2

The DEIS rationale for favoring the Blue Ridge Variation states that "the primary trade-offs between the Proposed Route and the variation are between terrestrial (e.g. LSOG forest and MAMU stands habitat) and aquatic resources (e.g. waterbody crossings and anadromous fish habitat), as well as public and private lands." (emphasis added) (DEIS p. 3-20).

Although listed in Table 3.4.2.2-1, the DEIS rationale for favoring the Blue Ridge Variation is silent regarding coho and green sturgeon critical habitat. Note: Table 3.4.2.2-1 erroneously gives the number of green sturgeon critical habitat streams crossed by both routes as zero. The correct number of green sturgeon critical habitat streams crossed by the Blue Ridge Variation is three. (74 FR 52346). IND284-3

National Environmental Policy Act (NEPA) analysis requires trade-offs. In considering trade-offs and reaching a conclusion, federal agencies cannot be arbitrary and capricious and cannot abuse discretion. In other words, the conclusion made must fit the facts found. Our comments authoritatively and factually demonstrate that the DEIS conclusion that the Blue Ridge Variation would result in a significant environmental advantage and overall balance of impacts does not fit the facts found. In reality, the facts emphatically support the opposite conclusion, i.e. the Proposed Route would result in a significant environmental advantage and would more than balance impacts.

NEPA also requires that an agency "objectively evaluate" alternatives (40 CFR 1502.14(a). The Federal Energy Regulatory Commission (FERC) delegated the analysis of the Proposed Route v. Blue Ridge Variation to the BLM. The BLM prepared DEIS Appendix F.9 "Blue Ridge Variation Comparison with Proposed Route" and the discussion and rationale for recommending the adoption of the Blue Ridge Variation in DEIS Chapter 3, pp. 3-20 – 3-24. Appendix F.9 states; "BLM has prepared this appendix (F.9) to ensure the FERC Draft Environmental Impact Statement (DEIS) provides a comparison of these alternatives in a manner that satisfies BLM's NEPA requirements as a cooperating agency. The comparison will enable BLM to determine which alternative is environmentally preferable and disclose to the public and decision maker the environmental impacts of the Proposed Route and the Blue Ridge Variation alternatives." (emphasis added). IND284-4 IND284-5

MARK SHEDON COMMENTS PAGE 6

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IND284-2 Comment noted.

IND284-3 Comment noted.

IND284-4 BLM prepared appendix F.9 to provide a comparison of the two alternative routes. Revisions have been made to Section 3 and Appendix F.9 that are incorporated into the final EIS.

IND284-5 BLM will select and disclose an agency proposed action and preferred alternative in the final EIS. The environmentally preferable alternative would be disclosed in the BLM Record of Decision. FERC should Identify the environmentally preferable alternative but no agency is required to select that alternative. BLM is required to identify our "preferred alternative" which is not necessarily the environmentally preferable.

The delegation to the BLM by the lead agency (FERC) of the analysis of the Proposed Route v. Blue Ridge Variation is consistent with NEPA regulations. (40 CFR 1501.6 and 40 CFR 1501.6(b)(3)). As a cooperating agency providing analysis and recommendations, the BLM is required by NEPA to "rigorously explore and objectively evaluate" the alternatives. BLM has a vested interest in the outcome of the analyses, that is, moving the Pacific Connector pipeline location off of BLM-administered lands. Because the BLM has a vested interest in the outcome of the analyses, the BLM has an obligation to be scrupulously objective.

As we reviewed for comment the BLM's analysis and recommendations regarding the Proposed Route v. Blue Ridge Variation, one by one, we encountered mistakes. A complete discussion of these errors is included in our detailed comments further on in this document.

An incomplete list of BLM errors includes:

IND284-6

- that no green sturgeon critical habitat would be crossed by the Blue Ridge Variation
- failure to consider coho and green sturgeon critical habitat in its rationale for favoring the Blue Ridge Variation
- the amount of LSOG that would be removed by the Proposed Route was order of magnitude overstated
- the LSOG that would be removed by the Proposed Route was incorrectly characterized as "particularly valuable"
- simply cataloging the number of acres of LSOG that would be removed without analyzing or disclosing the actual impacts
- the amount of marbled murrelet habitat that would be removed by the Proposed Route was order of magnitude overstated
- the amount of northern spotted owl nesting roosting foraging habitat that would be removed by the Proposed Route was order of magnitude overstated
- it was very clearly implied that the Proposed Route would impact more habitat in a northern spotted owl home range when in fact no habitat exists in the area of the of the home range crossed by Proposed Route or the Blue Ridge Variation.
- failure to consider a very long list of adverse impacts to water and fish resources that would occur if the Blue Ridge Variation were implemented
- failure to consider a very long list of impacts of geologic hazards and soil resources if the Blue Ridge Variation were implemented
- failure to observe FERC and Pacific Connector policy to locate the pipeline on ridgetops to avoid impacts to water and fish resources, geologic hazards, and steep slopes.

Some mistakes are expected in complex environmental analyses. If errors in environmental impact statements would not materially change analytical conclusions and the choice among alternatives, they are not of consequence. If errors are somewhat random and do



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IND284-6 Comment noted. These summary bullets are addressed in subsequent responses.

not favor one alternative over another, they are not of consequence. In our careful examination of BLM's analysis and discussion of the Blue Ridge Variation v. the Proposed Route, we found that all of the errors made favored the Blue Ridge Variation. The errors substantively change analytical conclusions and subsequent choice among the alternatives. We did not find one error in the BLM analysis that favored the Proposed Route.

We do not speculate as to how this situation came about, however; one must question the objectivity of the analysis. Regardless of the origins of these errors, they are fatal to the BLM's finding that the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route.

A cooperating agency, in this case the BLM, may provide environmental analyses for an environmental impact statement. Nevertheless, under NEPA regulations, the lead agency in this case the FERC, is ultimately responsible for objective analysis of alternatives, in an EIS. A cooperating agency may make recommendations to the lead agency. Nevertheless, under NEPA regulations, the lead agency is responsible for the ultimate decisions

IND284-7

It is our belief that the Federal Energy Regulatory Commission will find our factual and authoritative comments to be compelling and therefore, conclude that the Proposed Route would result in a significant environmental advantage compared to the Blue Ridge Variation and would balance overall impacts.



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IND284-7 BLM has specific jurisdictional responsibilities for granting rights-of-way across Federal lands under the Mineral Leasing Act as described in Section 1 of the final EIS. FERC is the lead Federal Agency for preparation of the NEPA document, however, the BLM, and other cooperating Agencies retain decision-making responsibility under their respective authorities.

**IND284 continued, page 9 of 64**

## Summary of Comparison of impacts

Following is a summary of the resources and impacts that must be considered when making a determination that the Blue Ridge Variation would result in a significant environmental advantage and provide an overall balance of impacts.

Detailed discussion of these resources and impacts along with full documentation and references follows this summary. In addition, the ultimate conclusion considering the overall impacts of the many resources in their totality is given on page 54 of these comments.

Late-Successional Old Growth (LSOG) Habitat

(LSOG is the DEIS conclusion's primary basis for favoring the Blue Ridge Variation)

- Based on BLM's Forest Operations Inventory and maps, actual LSOG removed by Proposed Route would be 22 acres v. DEIS 41 acres.
- LSOG analysis utilizing the simplistic metric of 80 years and older in the DEIS is flawed and misleading.
- Application of BLM's current, sophisticated, and state-of-the-art approach for evaluating forest stands by structural stage shows that almost all of the LSOG stands affected by the Proposed Route lack structural complexity and structural legacies. The scientific literature holds that structural complexity is a surrogate for functionality.
- Only 3.1 acres of structurally complex forest would be removed by the Proposed Route.
- The few structurally complex stands affected by the Proposed route are highly fragmented, relatively small, and so irregular in shape that they have no interior habitat. Scientific literature holds that the presence of interior habitat is a critical metric of forest stand functionality.
- The development stage of the LSOG that would be removed by the Proposed Route is between canopy closure and culmination of mean annual increment which has the least biological diversity of any forest development stage. Therefore, the affected LSOG cannot be "particularly valuable" as characterized by the DEIS rationale for favoring the Blue Ridge Variation.
- None of the forest stands affected by the Proposed Route have functionality, either because they lack structural complexity and/or lack interior habitat. Therefore, the affected LSOG cannot be "particularly valuable" as characterized in the DEIS rationale for favoring the Blue Ridge Variation,
- The number of acres of LSOG or structurally complex forest that would be removed is inconsequential.
- Context: As of 2013 there are 860,528 acres of mature and structurally complex stands with structural legacies. As of 2063 there will be 1,072,105 such acres (PRMP/FEIS p. 1656)
- LSOG habitat will be reduced by 43,164 acres on lands over which the BLM' has jurisdiction in the area of its Resource Management Plan (RMP) during the first decade (2016-2026) of the RMP's implementation (PRMP/FEIS p. 1655). Thus, BLM determined that short-term reductions in LSOG habitat are acceptable in the context of long-term increases. Therefore, the amount of LSOG habitat that would be removed by the Proposed Route is inconsequential.

IND284-8

There is no significant environmental advantage to the Blue Ridge Variation in regards to LSOG habitat.

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IND284-8 Comment noted. See response to Comments 284-17, 39, and 71 below for specific responses.

Marbled Murrelet (MAMU) Habitat

- The DEIS asserts that the Blue Ridge Variation would remove 3 acres of MAMU habitat while the Proposed Route would remove 32.2 acres. These numbers are in error.
- Analysis of BLM's Forest Operations Inventory data, BLM-provided MAMU habitat map, and Pembina maps and alignment sheets of the Proposed Route indicates that the Blue Ridge Variation would remove 0 acres of MAMU habitat while the Proposed Route would remove 5.4 acres
- The magnitude of the number of acres of MAMU habitat removed is inconsequential in either case.
- Context: These acres occur in the context of 493,434 acres of MAMU nesting habitat and 885,590 acres of MAMU habitat-capable acres on lands over which the BLM has jurisdiction in the area of its Resource Management Plan (RMP). In addition, there are 6,638,960 acres of MAMU habitat-capable acres within BLM's Resource Management Plan planning area, i.e. all lands within the Resource Management Plan area regardless of jurisdiction.
- There is no MAMU critical habitat, i.e. habitat essential for the conservation of the species, in the vicinity of either the Blue Ridge Variation or the Proposed Route

IND284-9

There is no significant environmental advantage to the Blue Ridge Variation in regards to MAMU habitat.

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IND284-9 Comment noted. See response to Comments 284-41 through 284-47 below for specific responses.

Northern spotted owl (NSO) Nesting Roosting Foraging (NRF) Habitat

- No NSO high NRF habitat would be removed.
- No NRF habitat within an NSO home range would be removed
- The difference between the two routes in the amount of NRF habitat that would be removed as stated by the DEIS (15 acres) is inconsequential.
- By using a BLM-provided NSO habitat map in conjunction with a Pembina-provided map and alignment sheets of the Proposed Route location, along with BLM's Forest Operation Inventory, we determined that the amount of NRF habitat removed by the Proposed Route right-of-way, including TEWAS, would be approximately 5.3 acres.
- The magnitude of the total amount of NRF habitat that would be removed by the Proposed Route is inconsequential in either case.
- Context: BLM-administered lands in the PRMP planning area currently supports 860,200 acres of Mature Multi-layered Canopy and Structurally Complex forest which is a good approximation of NRF habitat
- BLM analysis of NSO habitat does not use a broad number of acres of habitat as a metric, but rather the number of small and large NSO habitat blocks within the range of the NSO. There are no NSO habitat blocks in the area of the Blue Ridge Variation or the Proposed Route. (PRMP/FEIS p. 928-986).
- There is no NSO critical habitat, i.e. habitat essential for the conservation of the species, in the vicinity of either the Blue Ridge Variation or the Proposed Route.

IND284-10

There is no significant environmental advantage to the Blue Ridge Variation in regards to NSO habitat.

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**IND284 continued, page 12 of 64**

IND284-10 Comment noted. See response to Comments 284-48 through 284-55 below for specific responses.

Water and Fish Resources

Below is a comparison of impacts to 19 different water and fish resources. All nineteen comparisons favor the Proposed Route v. the Blue Ridge Variation.

The DEIS states that the pipeline would be located on ridgelines where feasible to avoid waterbody crossings (DEIS p. 2-59). The Blue Ridge Variation would violate this policy. IND284-11

- Coho Salmon and Green Sturgeon Critical (essential) Habitat Crossed[1] IND284-12
  Blue Ridge Variation: 10 streams (7 coho, 3 green sturgeon[2])
  Proposed Route: 4 streams
- Anadromous Fish-bearing Streams Crossed
  Blue Ridge Variation: 18 known or assumed streams
  Proposed Route: 4 known streams
- Essential Fish Habitat Crossed[3]
  Blue Ridge Variation: 14 streams
  Proposed Route: 4 streams
- Resident Fish bearing streams
  Blue Ridge Variation: 12 known or assumed
  Proposed Route: 6 assumed
- Streams with Aquatic ESA Species or Habitat Present Crossed
  Blue Ridge Variation: 14 known or assumed
  Proposed Route: 4 known
- Impacts to Riparian Areas
  Blue Ridge Variation: 103 acres
  Proposed Route: 50 acres

[1] The text of the DEIS discussion of trade-offs considered in its determination that the Blue Ridge Variation would result in a significant environmental advantage does not even mention the critical habitat that would be adversely impacted by the Blue Ridge Variation.
[2] For the 3 green sturgeon critical habitat streams which are omitted in the DEIS, see 74 FR 52346
[3] JCEP FEIS 2015, Appendix Q p. 3-77



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IND284-11 Location of pipelines, and other facilities is an effective design methodology to avoid waterbody crossings. However, this is not a policy of either FERC or the BLM. The statement "where feasible" remains accurate: There is no policy violation.

IND284-12 Comment noted. See response to Comments 284-57 through 284-51 below for specific responses.

- Stream Crossing Risk to Bank and Bed Stability[4]
  Blue Ridge Variation: 6 high risk streams, 21 moderate risk streams
  Proposed Route: 0 high risk streams, 3 moderate risk streams

- Impacts to BLM Riparian Reserves[5]
  Blue Ridge Variation: 16 acres
  Proposed Route: 14 acres

IND284-12
cont.

- Domestic Water Sources Impacted
  Blue Ridge Variation: 2
  Proposed Route: 0

- Domestic Water Source within the construction right-of-way
  Blue Ridge Variation: one spring
  Proposed Route: 0

- Water Quality Limited Streams Crossed
  Blue Ridge Variation: 5 streams
  Proposed Route: 1 stream

- Wetlands Crossed
  Blue Ridge Variation: 35 acres; 0.3-acre long-term restoration required
  Proposed Route: 13 acres; 0 long-term restoration required

- Floodplains Crossed
  Blue Ridge Variation: 2.3 miles
  Proposed Route: 1.0

- Shallow Groundwater
  Blue Ridge Variation: 2.2 miles of shallow groundwater
  Proposed Route: 1.0 mile of shallow groundwater

[4] See DEIS Appendix F.9
[5] Impacts under either route within each fifth-field watershed equates to less than one percent of Riparian Reserves managed by BLM in these watersheds (DES Appendix F.9, p. 3-13, Table 3.2.4.3-2. This contradicts DEIS rationale DEIS chapter 3, p. 3-20

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- Waterbodies Crossed
  Blue Ridge Variation: 1 major waterbody, 9 intermediate, 56 minor
  Proposed Route: 0 major, 7 intermediate, 0 minor

- Perennial Streams Crossed
  Blue Ridge Variation: 41
  Proposed Route: 4

- Intermittent Streams Crossed
  Blue Ridge Variation: 23
  Proposed Route: 4

- Total Streams Crossed
  Blue Ridge Variation: 64
  Proposed Route: 8

IND284-12 cont.

Compared to the Proposed Route, the Blue Ridge Variation would impact 2.5 times the number of critical habitat streams, 4.5 times the number of anadromous fish-bearing streams, 3.5 times the number of essential fish habitat streams, 2 times the number of fish bearing streams, 3.5 times the number of streams with ESA species or habitat present, 7.4 times the number of waterbodies, 2 times the number of riparian acres, 9 times the number of moderate to high risk stream crossings, 1.1 times the number of riparian reserves, 2 times the number of domestic water sources, 5 times the number of water quality limited streams, 2.7 times the number of wetland acres, 2.3 times the number of floodplain acres, 2.2 times the number of shallow groundwater miles, 9.4 times the number of waterbody crossings, ten times the number of perennial streams crossed, 5.8 times the number of intermittent streams crossed, 8 times the total number of streams crossed.

The adverse impacts that the Blue Ridge Variation would have on water and fish resources are indisputably order of magnitude greater than the Proposed Route.

There would be a very significant environmental advantage to the Proposed Route in regards to water and fish resources.

Geological and Soil Resources

Below is a comparison of 13 different geological and soil resources. All 13 comparisons favor the Proposed Route v. the Blue Ridge Variation.

The DEIS states that the pipeline would be located on ridgelines where feasible to avoid geologic hazards, steep slopes, and to reduce erosion potential. (DEIS p. 2-59). Adoption of the Blue Ridge Variation would violate this policy. IND284-13

"Pacific Connector has worked to avoid landslides along the proposed route. Ridgetops are generally considered to be stable and therefore an attempt has been made to route the vast majority of the pipeline along ridgetops." (DEIS p. 4-21). Adoption of the Blue Ridge Variation would nullify this statement.

"Pacific Connector selected its proposed route to avoid existing landslides and areas susceptible to landslides." (DEIS p. 4-21). Adoption of the Blue Ridge Variation would nullify this statement. IND284-14

"All known hazardous landslides thought to pose a risk to the pipeline have been avoided through routing." (DEIS p. 4-21). Adoption of the Blue Ridge Variation would nullify this statement.

- Rapidly Moving Landslide Crossed
  Blue Ridge Variation: 1 (MP 18.1 – 18.2)[6]
  Proposed Route: 0

- Landslide prone areas crossed DEIS Data
  Blue Ridge Variation: 5 landslides, 7,137 feet (1.4 miles)
  Proposed Route: 2 landslides, 3,267 feet (0.6 mile)

- Landslide hazards crossed[7]
  Blue Ridge Variation: 3,257 feet
  Proposed Route: 1,088 feet

- Alluvial valley segments with potential for earthquake-induced liquefaction[8]
  Blue Ridge Variation: 4
  Proposed Route: 2

IND284-15

[6] JCEP FEIS 2015 p. 4-272
[7] DEIS Appendix F.9, p. 3-20, LiDAR data, GeoEngineers 2015
[8] DEIS Appendix F.9, p. 3-19 - 27



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IND284-13 Location of pipelines, and other facilities is an effective design methodology to avoid geologic hazards, steep slopes, and to reduce erosion potential. However, this is not a policy of either FERC or the BLM. There is no policy violation.

IND284-14 Adoption of the Blue Ridge Variation would reduce the risk of landslides.

IND284-15 List of bullets repeated in comment 284-64 where detailed response will be provided, additional responses on this topic is provided in responses 284-64 through 67.

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- High water table
  Blue Ridge Variation: 2.2 miles, 44 acres
  Proposed Route: 1.6 miles, 26 acres

- Prime Farmland
  Blue Ridge Variation: 3.9 miles, 74 acres
  Proposed Route: 1.9 miles, 31 acres

- Soils with high or severe erosion potential
  Blue Ridge Variation: 7.7 miles, 116 acres
  Proposed Route: 6.5 miles, 92 acres

- Steep Slopes
  Blue Ridge Variation: 7.7 miles, 116 acres
  Proposed Route: 5.4 miles, 74 acres

- Potential structural damage to hydric soils (wet and poorly drained)
  Blue Ridge Variation: 2.2 miles, 41 acres
  Proposed Route: 1.3 miles, 21 acres

- Soils with poor revegetation potential
  Blue Ridge Variation: 7.7 miles, 116 acres
  Proposed Route: 6.7 miles, 92 acres

- Soils highly susceptible to compaction
  Blue Ridge Variation: 14.4 miles, 227 acres
  Proposed Route: 12.8 miles, 182 acres

- Soils having restrictive layer (shallow, lithic)
  Blue Ridge Variation: 8.4 miles, 129 acres
  Proposed Route: 7.1 miles, 101 acres

IND284-15
cont.

Compared to the Proposed Route, the Blue Ridge Variation would impact a rapidly moving landside, cross 2.2 times the length of landslide prone areas, cross 3.0 times the length of landslide hazards, cross 2 times the number of areas with earthquake-induced liquefaction potential, cross 1.7 times the acres with high water table, cross 2.4 times the number of acres of prime farmland, cross 1.3 times the number of acres of soils with high or severe erosion potential, cross 1.6 times the number of acres of steep slopes, cross 2.0 times the number of

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acres with potential structural damage to hydric soils, cross 1.3 times the number of acres of soils with poor revegetation potential, cross 2.5 times the number of acres with soils highly susceptible to compaction, and cross 1.3 times the number of acres with shallow, lithic soils with a restrictive layer.

The adverse impacts of the Blue Ridge Variation regarding geological and soil resources are indisputably order of magnitude greater than the Proposed Route.

There would be a very significant environmental advantage to the Proposed Route in regards to geologic hazards and soil resources.

Private Landowners and Eminent Domain

The DEIS concluded that the Blue Ridge Variation was environmentally preferable to the Proposed Route. In its rationale for this conclusion, the DEIS dismisses the impacts to private landowners in a few sentences (DEIS p. 3-20, 3-21).

IND284-16

- The Proposed Route would cross 33 private landowner parcels with 5 homes compared to 50 landowner parcels with 21 homes crossed by the Blue Ridge Variation. (The DEIS uses the numbers 24 private landowners on the Proposed Route; 53 private landowners on the Blue Ridge Variation with reference to only one home which is within 50 feet of the construction right-of-way.)
- The Proposed Route would have willing landowners and no eminent domain issues while on the Blue Ridge Variation 17 landowners have expressed their intention to legally resist right-of-way acquisition by Pacific Connector.
- The 17 landowners along the Blue Ridge Variation are all intervenors. The 17 landowner intervenors along the Blue Ridge Variation represent 30% of the 54 total landowners who have intervened along the 157 miles of privately-owned lands crossed by the PCGP. (This number of total landowner intervenors was current as of March 2016.)
- The Blue Ridge Variation would place the pipeline approximately 90 percent on private land while the Proposed Route would place the pipeline approximately 54 percent on Federal lands with the remaining portion located almost entirely on managed timber lands.
- In the discussion of its Certificate Policy Statement in its March 11, 2016 Order Denying Applications for Certificate to Pacific Connector Gas Pipeline, the FERC stated that; "The Commission's goal is to give appropriate consideration to . . . . the unneeded exercise of eminent domain". Locating the PCGP on the Proposed Route would exactly conform with the FERC's Certificate Policy Statement to avoid the unneeded exercise of eminent domain.

There would be a very significant environmental advantage to the Proposed Route in regards to private landowners.

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IND284-16 Comment noted. Sections 4.7 and 4.9 address impacts on land use and socioeconomics.

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## Detailed Comments

Following are detailed comments of the resources and impacts that must be considered when making a determination whether the Blue Ridge Variation would result in a significant environmental advantage and provide an overall balance of impacts compared to the Proposed Route.

The DEIS analysis and rationale fails to include the context and intensity of the numbers used in comparing the impacts of the Blue Ridge Variation and Proposed Route. Utilizing information from official BLM documents and BLM data bases, our comments provide the context and intensity for the key numbers used in the DEIS rationale.

IND284-16 cont.

Utilizing official BLM data and scientific literature, including that which is cited in the DEIS rationale for favoring the Blue Ridge Variation, our analysis shows that the DEIS analytical assumptions regarding the LSOG forest found along the Proposed Route are false and without basis. Among the assumptions which we factually show to be false and which are fundamental to the DEIS rationale for favoring the Blue Ridge Variation are the number of acres of LSOG and the value of the LSOG that would be removed by the Proposed Route.

In addition to the criterion that an alternative must offer a significant environmental advantage, the DEIS rationale for recommending the Blue Ridge Variation also states that when making an alternative determination an attempt is made to "balance the overall impacts".

Our detailed comments using factual information authoritatively demonstrate that the Blue Ridge Variation would not offer a significant environmental advantage and would not balance overall impacts compared to the Proposed Route. Since the facts used in our analysis are from the DEIS and official Bureau of Land Management (BLM) documents and BLM data bases, our facts cannot be refuted or dismissed. Applicable case law requires that the choice made by an agency must fit the facts found.

Our comments provide compelling authoritative evidence (facts) that the significant environmental advantage and overall balance of impacts is all on the side of the Proposed Route.

LSOG, Late-Successional Old Growth Forest (80 years old and older)

- The DEIS asserts that the Proposed Route would remove 41 acres of LSOG habitat.
- BLM's Forest Operations Inventory does not make acre reductions for existing roads and therefore by accounting for those situations in which the Proposed Route would be located on an existing road, the actual acres of LSOG removed would be 22 acres
- The BLM LSOG analysis utilizing the simplistic metric of 80 years and older in the DEIS is fundamentally flawed and misleading.
- Application of BLM's current, sophisticated, science-based, and state-of-the-art approach for evaluating forest stands by structural stage shows that most of the LSOG stands affected by the Proposed Route lack structural complexity which is a surrogate for functionality
- Only 3.1 acres of structurally complex forest would be removed by the Proposed Route.
- The few structurally complex stands actually affected by the Proposed route are highly fragmented, relatively small, and so irregular in shape that they have no interior habitat which is a critical metric of their functionality.
- The development stage of the LSOG that would be removed by the Proposed Route is between canopy closure and culmination of mean annual increment which has the least biological diversity of any forest development stage. Therefore, the affected LSOG cannot be "particularly valuable" as characterized by the DEIS rationale for favoring the Blue Ridge Variation.
- None of the forest stands affected by the Proposed Route have functionality, either because they lack structural complexity and/or lack interior habitat. Therefore, the affected LSOG cannot be "particularly valuable" as characterized in the DEIS rationale for favoring the Blue Ridge Variation,
- The number of acres that would be removed is inconsequential as seen in context of: As of 2013 there are 860,528 acres of mature and structurally complex stands with structural legacies. As of 2063 there will be 1,072,105 such acres (PRMP/FEIS p. 1656)
- LSOG habitat will be reduced by 43,164 acres on lands in BLM's Resource Management Plan over which it has jurisdiction during the first decade (2016-2026) of its implementation (PRMP/FEIS p. 1655). Thus, BLM determined that short-term reductions in LSOG habitat are acceptable in the context of long-term increases.

IND284-17

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IND284-17 Section 3 of the final EIS has been revised to reflect the revised and updated analysis presented in Appendix F.9 to the final EIS. Responses to Comments 284-18 through 39 describe the methods and/or analytical effort that supports these changes to the final EIS.

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Acres of LSOG that would be removed along the Proposed Route

The DEIS gives the total number of acres of LSOG removed by the Pacific Connector pipeline right-of-way on the Proposed Route as 41 acres while the Blue Ridge Variation would remove 9 acres of LSOG for a difference between the two routes of 32 acres. Since the DEIS conclusion that the Blue Ridge Variation would result in a significant environmental advantage "is based primarily on the variation's ability to reduce long-term to permanent impacts on particularly valuable LSOG habitat by the Proposed Route" (DEIS p. 3-21), it is imperative to have an accurate number of impacted acres of LSOG and a full understanding of the specific LSOG stands impacted in order to make a reasoned choice among the two alternative routes.

Therefore, we have very carefully examined the accuracy of the number of acres of LSOG that would be impacted.

Our tools included:

1. An accurate contour map and alignment sheets with the location of the Proposed Route which we received from the Pembina Corporation with the location of the Proposed Route.
2. The BLM's geospatial data base; Forest Operations Inventory. The Forest Operations Inventory provides an accurate contour map with the location of forest stands, their birthdate, age class, stand description, and acreage.
3. An on-the-ground field examination of the surveyed and staked Pacific Connector pipeline location; visiting each unit identified as LSOG by the Forest Operations Inventory that would be impacted by the Proposed Route.

Our methodology, analysis and findings:

We used BLM's Forest Operations Inventory to locate stands that fit the LSOG definition of 80 years old or older. We field verified the data and found no substantive discrepancies regarding stand age and stand condition as described in the Forest Operations Inventory.

By carefully matching the location of the pipeline as shown by the Pembina Corporation map and alignment sheets and the location of the LSOG stands as shown by BLM's Forest Operations Inventory, we determined that approximately 3.6 miles of the Proposed Route would either border or cross an LSOG stand.

Assuming a 95-foot pipeline right-of-way, the 3.6 miles would result in 41 acres of LSOG removed. This exercise revealed the assumption used in the DEIS when determining the number of impacted acres of LSOG to be 41.

The 41 acres of LSOG removed, however, is a highly inaccurate number because of the coarse analytical assumption applied that the Pacific Connector pipeline would remove LSOG in a 95-

IND284-18

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IND284-18 An updated analysis of impacts to LSOG on BLM lands has been incorporated into Section 3 and Appendix F.9 of the final EIS that ensures that BLM lands allocated as District Designated Reserves (DDR) is not considered as habitat in the analysis of impacts to LSOG habitat. In addition, the BLM used its current Forest Operations Inventory (FOI) to identify and analyze impacts to LSOG and Complex LSOG habitat based on BLM field review by biologists assigned to BLM's Coos Bay District.

foot path in all instances. This is very much in error. Only In those instances where the pipeline location would cross through a forest stand is the 95-foot wide assumption valid. IND284-18 cont.

Most of the Proposed Route, however, would be located on existing roads. In the situations in which the pipeline is located on an existing road, the surface area of the road would need to be deducted from the impacted LSOG acres. IND284-19

BLM's GIS layers assume that existing roads are on average 45 feet wide. In BLM's GIS, the 45-foot width multiplied by the length of a road results in acres of what is called a District Designated Reserve. These acres are deducted from the various BLM land use allocations wherein they are found.

Importantly, however, there is no deduction of acreage for roads in the Forest Operations Inventory. In our analysis, we manually applied BLM's 45-foot width where the pipeline right-of-way was located on an existing road.

In some instances, the pipeline-road location crosses through a LSOG stand. In these situations, the area of the existing road would need to be deducted from the assumed acres that would be removed. Thus, 45 feet would be deducted from the 95-foot right-of-way (resultant 50 feet). The length of the road crossing through the LSOG stand multiplied by 50, then divided by 43,560 square feet in an acre would give acres of LSOG removed.

In some instances, the pipeline road location borders the edge, or one side of a LSOG stand. In these instances, a different deduction would need to be made. Assuming the centerline of the road to be the border of the LSOG unit identified by the Forest Operations Inventory, the deduction would be 25 feet (1/2 of the 50 feet assumed where LSOG exists on both sides of the road). Here the length of the road bordering the LSOG unit multiplied by 25, then divided by 43,560 square feet in an acre would give acres of LSOG removed.

Conclusion: This very careful analysis using the Pembina Corporation developed map and alignment sheets, and data from BLM's Forest Operations Inventory, along with field visits to units, yielded a revised figure of approximately 22 acres of LSOG that would be removed by the Proposed Route. Our analysis also looked at the area that would be occupied by temporary extra work areas (TEWAS).

The flawed analysis of the DEIS which failed to account for the 59 percent of the Proposed Route where the pipeline would be located on an existing road resulted in a substantive error of (41 acres v. 22 acres) in estimating the amount of LSOG that would be removed by the Proposed Route. IND284-20

NEPA regulations require a consideration of context and intensity when making a determination such as of whether the Blue Ridge Variation would result in a significant environmental advantage.



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IND284-19 Under BLM's new RMP, the FOI makes a distinction between roads and adjacent forest lands. As stated in the previous response, roads are included as mappable units in the FOI as DDR; therefore not considered in the impact analysis for LSOG and MAMU/NSO habitat on BLM lands. The calculation and analysis of impacts to LSOG and Complex LSOG Habitat is provided in Appendix F.9 of the final EIS and summarized in Section 3.

IND284-20 See response to comment IND284-19.

The context of the number of acres of LSOG that would be removed if the Proposed Route would be implemented (22) is that there are currently 860,528 acres of mature and structurally complex stands with structural legacies. As of 2063 there will be 1,072,105 such acres (PRMP/FEIS p. 1656). Mature and structurally complex stands are used here as an approximation of LSOG. This is necessary because the BLM does not use forest classification of LSOG in their analysis or data base.

IND284-21

Understanding of the intensity represented by the 22 acres that would be removed by the Proposed Route is gained by the information that the LSOG habitat will be reduced by 43,164 acres on lands over which the BLM has jurisdiction in the area of its Resource Management Plan (RMP) during the first decade of the RMP's implementation (2016 to 2026). (PRMP/FEIS p. 1655). Thus, BLM determined that short-term reductions in LSOG habitat are acceptable in the context of long-term increases.

IND284-22

**LSOG Analysis Adequacy – Forest Stand Structural Complexity Analysis**

The DEIS Chapter 3 and Appendix F.9 "Blue Ridge Variation Comparison with the Proposed Route" employs the forest classification of Late-Successional Old Growth Forest or LSOG. LSOG is defined in the DEIS as forest stands that are 80 years old or older. Appendix F.9 was prepared by the BLM (Appendix F.9 p. 1-2).

The use of the LSOG metric of 80 years old or older was used in the very broad (25 million acres) FEMAT Report of 1993. The use of LSOG was largely dictated by the limited data available regarding Pacific Northwest forest stands under various jurisdictions extending from the Canadian border to northern California. The BLM discarded the use of LSOG analysis over ten years ago in its Western Oregon Plan Revision PRMP/FEIS of 2008 for a more sophisticated and meaningful approach using stand structure as a metric of assessing forest stands. The BLM was able to adopt this sophisticated analysis because of BLM's highly detailed and data-rich geospatial data base for forest stands. Stand structure-based analysis by the BLM has continued and was used in BLM's PRMP/FEIS 2016 which encompassed the area of the Proposed Route and Blue Ridge Variation. *Western Watersheds Project v. Kraayenbrink*, 620 F.3d 1187, 1206-07 (9th Cir. 2010) (*amended* 632 F.3d 472 (9th Cir. 2011)) (EIS is not adequate) ("*See Earth Island Inst. v. Hogarth,* 494 F.3d 757, 763-64 (9th Cir.2007) (explaining that we generally defer to an agency's expertise in the methodology of the agency's studies but a result that is not rationally connected to the best available scientific evidence receives no such deference).").

IND284-23

The DEIS asserts that the Blue Ridge Variation would affect 32 fewer acres of LSOG than the Proposed Route (41 v. 9). (DEIS p. 3-20)

The National Environmental Policy Act (NEPA) requires that agencies shall rigorously explore and objectively evaluate all reasonable alternatives. A simple display and comparison of acres



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IND284-21 The use of LSOG, defined as stands 80+years old, throughout the draft EIS is an appropriate metric of comparison because this data is available for almost all forest land ownerships crossed by the proposed pipeline. The BLM maintains additional stand information in FOI that was utilized to assess the acres of mature and structurally complex stands in the development of the Resource Management Plans. In the final EIS, Appendix F.9 has been updated to incorporate FOI and recent site visit observations for BLM-managed parcels. Similar data was not available for other ownerships crossed by the Proposed Route and Blue Ridge Variation. The main body of the final EIS retains the use of LSOG because this is the most appropriate metric for use within the entire project area. The 860,528 acres of mature and structurally complex stands identified in the PRMP/FEIS is applicable to the entire western Oregon planning area. For this reason, it is not an appropriate value for assessing the context of environmental effects of the Blue Ridge Variation as disclosed in appendix F.9.

IND284-22 The 43,164 acres of mature and structurally complex stands identified in BLM's PRMP/FEIS is applicable to the entire western Oregon planning area. For this reason it is not an appropriate value for assessing and comparing the intensity of environmental effects of the Blue Ridge Variation with the Proposed Route on BLM lands.

IND284-23 See response to Comment IND284-22.

that are key to a reasoned choice among alternatives does not meet this NEPA standard or case law which requires agencies to take a "hard Look" in their analysis. The DEIS conclusion, that the Blue Ridge Variation would result in a significant environmental advantage when compared to the Proposed Route, "is based primarily on the variation's ability to reduce long-term to permanent impacts on *particularly valuable LSOG habitat*" (emphasis added) (DEIS p. 3-21). Therefore, it is important to understand more about the LSOG in question than a simple display of acres. IND284-24

The LSOG analysis in the DEIS is fundamentally misleading and far too simplistic to provide for an informed and reasoned choice among the alternatives. Since there is no missing information such as limited BLM data that would preclude more meaningful analysis, the simplistic LSOG analysis in the DEIS does not meet the legal requirement for agencies to take a "hard look".

BLM's current Resource Management Plan is based on the PRMP/FEIS of 2016. Both this BLM PRMP/FEIS and BLM's previous PRMP/FEIS of 2008 completely abandon analysis based on LSOG 80 years and older as a meaningful metric. The term LSOG is found nowhere in these 2,000-page documents. *Northern Plains Resource Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1086-87 (9th Cir. 2011) (EIS is not adequate for a 130–mile railroad line in southeastern Montana) ("... the Board relied on stale data during the environment impact analysis process ... and failed to properly update the data with additional studies and surveys. We hold that such faulty reliance does not constitute the 'hard look' required under NEPA"); *National Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 733 (9th Cir. 2001) (National Park Service NEPA document for approval of more cruise ships into Glacier Bay NP is not adequate) (""general statements about 'possible' effects and 'some risk' do not constitute a 'hard look' absent a justification regarding why more definitive information could not be provided') (citing *Neighbors of Cuddy Mountain v. United States Forest Serv.*, 137 F.3d 1372, 1380 (9th Cir .1998)) ("The Park Service's statement of reasons does not provide a convincing explanation as to why the requisite information could not be obtained"). IND284-25

BLM's current analytical approach is based on consensus scientific literature that analyzes the value of older forest stands in terms of old-growth characteristics or components. These characteristics or components include a multi-layered, multi-species canopy, old, large overstory trees some with broken tops and other indications of old and decaying wood (decadence), bole and root cavities, numerous large snags, shade-tolerant tree species in the understory, heavy accumulations of wood including large logs on the ground, a lush understory shrub layer, etc. (Franklin and Spies, 1999). IND284-26

BLM's current, sophisticated and science-based analytical approach evaluates the development of these old forest characteristics and categorizes forest stands by structural stages (PRMP/FEIS 2016, p. 318 and Appendix C). The BLM labels forest stands exhibiting these old forest characteristics as structurally complex. The scientific literature states that the existence of



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IND284-24 See response to comment IND284-2.

IND284-25 See response to Comments IND284-18, 19 and 21.

IND284-26 See response to Comment IND284-21.

structural components is a surrogate for the functionality of old forest stands (North, Franklin, et al. 1999).

The DEIS rationale for favoring the Blue Ridge Variation characterizes the 41 acres that would be removed by the Proposed Route as "particularly valuable LSOG habitat". In support of this characterization, the DEIS references section 4.4.2-1 in the DEIS and two scientific papers (Bingham and Sawyer 1991; Spies and Franklin 1996). The DEIS referenced discussion in 4.4.2-1, and scientific literature, including the papers cited in the DEIS rationale as well as BLM's current, state-of-the-art analytical approach for evaluating forest stands totally refutes the DEIS label of "particularly valuable LSOG habitat" which is used as the primary basis for the DEIS conclusion to favor the Blue Ridge Variation. IND284-27 IND284-28

The DEIS states that the Proposed Route would remove 41 acres of LSOG habitat. Our analysis, described above in "Acres of LSOG that would be removed along the Proposed Route" shows that these acres are order of magnitude miscalculated because there was no deduction of acres where the Pacific Connector pipeline would follow an existing road when impacting LSOG stands. The actual number of LSOG acres that would be removed by the Proposed Route is 22 acres. IND284-29

The 22 acres of impacted LSOG occur along approximately 3.6 miles of the Proposed Route. Of these 3.6 miles, only ¾ of a mile would impact structurally complex forest stands (in this case, stand birthdate: 1880). IND284-30

The stands along the remaining 2.9 miles are 80 years old (birthdate 1940) with the exception of approximately 600 feet of road which borders a 100-year-old stand (birthdate: 1920). According to the stand descriptions in BLM's Forest Operations Inventory and our field verification, none of these stands, including the 100-year-old stand, are structurally complex. They have none of the structural characteristics of functional older forests with the exception of large trees (20 to 30 inches DBH per BLM Forest Operations Inventory). See Figure 1. These stands barely even qualify for LSOG given the metric of 80 years old and older. Because these stands lack structural complexity and, therefore, functionality, they do not constitute particularly valuable LSOG habitat. IND284-31



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IND284-27 Major revisions to the rationale supporting the Blue Ridge Variation have been incorporated into section 3 of the final EIS which is a summary of the analysis and comparison provided in appendix F.9 of the final EIS. See response to Comment 284-2 for additional information.

IND284-28 See response to Comments IND284-2 and 27.

IND284-29 See response to Comments IND284-18, 19 and 21.

IND284-30 Appendix F.9 has been updated to incorporate FOI and recent site visit observations for BLM-managed parcels. These updates provide additional information regarding stand complexity. Similar data was not available for other ownerships crossed by the Proposed Route and Blue Ridge Variation. The main body of the FEIS retains the use of LSOG because this is the most appropriate metric for use within the entire project area.

IND284-31 See response to comment IND284-30.

*Figure 1 Photo in the vicinity of MP 20, Typical 1940 LSOG stand along the Proposed Route lacking structural complexity; no canopy layering in the understory, no snags, no large down wood, no decadence (dead tops or cavities)s, no lush herbaceous understory, no biological diversity.*

As attested by BLM's Forest Operations Inventory and an on-the-ground inspection by a forester of over thirty years' experience, these 80 to100-year-old stands along the Proposed Route are at the stage of development between closure of canopy to the culmination of mean annual increment. The scientific literature holds that of all the stages of forest development, closure of canopy to the culmination of mean annual increment has the least biological diversity (Franklin and Spies 1983). Once again, these stands are not "particularly valuable".

IND284-32

The application of BLM's current methodology for analyzing forest stands by structural stage results in a far more accurate, realistic and more meaningful picture of functional and valuable older forests that would be removed under the Proposed Route compared to the simplistic 80 years old and older LSOG analysis. The application of BLM's current analytical approach and BLM's Forest Operation Inventory stand descriptions which we field verified reveals that the amount of structurally complex forest that would be removed by the Pacific Connector pipeline along the Proposed Route is only 3.1 acres. The Proposed Route would be located on an existing road bordering these stands which would minimize the impacts. The 3.1 acres that would be removed by the Proposed Route would be on the edge of these stands and would not increase their fragmentation.



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IND284-32 See response to Comments IND284-2, 24, and 30.

Furthermore, the few structurally complex forest stands that would actually be affected by the Pacific Connector pipeline are highly fragmented, relatively small, and so irregular in shape that they have no interior habitat which is an important metric of their functionality. In Douglas fir forests, a patch size of approximately 124 acres (50 hectares) and approximately 2,300 feet wide is needed for functional interior habitat (Franklin, J.F. 1992 and Chen, Franklin, Spies 1992). According to BLM's Forest Operations Inventory, the scattered stands in question are 12.4 acres, 16. 5 acres, 12.3 acres, 3.0 acres, and 70.1 acres. None of the stands in question come even close to meeting the criteria for functional interior habitat. Because these stands have no functional interior habitat, they cannot meet a definition of "particularly valuable LSOG habitat" which is given as the primary basis for the recommendation of the Blue Ridge Variation. IND284-33

BLM's Forest Operations Inventory stand descriptions, BLM-provided maps, our on-the-ground field verification of the stand descriptions, the DEIS referenced discussion at 4.4.2-1, the scientific literature including that which was cited in the DEIS rationale for favoring the Blue Ridge Variation, all come together to completely refute the DEIS characterization of the LSOG that would be removed by the Proposed Route as "particularly valuable LSOG habitat". None of the LSOG stands have functional interior habitat, and except for the minor exceptions noted above, none of the LSOG stands are structurally complex. IND284-34

Finally, the lands and forest stands in this analysis are administered by the BLM. The DEIS analysis of the Blue Ridge Variation and the Proposed Route (DEIS p.3-20 -3-24 and Appendix F.9) was prepared by the BLM. These are BLM lands, BLM forests, and BLM analysis; then why was the simplistic, flawed and misleading LSOG 80 years old or older metric used in the DEIS analysis rather than BLM's current sophisticated, science-based analysis that has been employed by the BLM for over ten years? The term "LSOG" is not to be found in any of the current supporting BLM planning documents or environmental impact statements. Since the BLM does not use LSOG to describe any of its forests in its underlying planning documents, we have had to extrapolate and interpolate BLM data to understand current levels of existing "LSOG" forest on BLM-administered lands. In fact, when making various inquiries to BLM resource specialists regarding these matters, there were several times when we were required to define LSOG for the specialists, as they were unfamiliar with the term. LSOG analysis is most definitely not BLM analysis.

Conclusion: The BLM did no analysis of the LSOG that would be affected by the Proposed Route or the Blue Ridge Variation. The BLM simply cited the number of acres of LSOG that would be removed by the Proposed Route (41). Our analysis shows that the actual number of acres of LSOG that would be removed is 22 acres. In addition, the acres removed would be along existing roads, in a narrow linear manner on the edge of the forest stands. Therefore, the stand would not be fragmented and the effects would be minimized. IND284-35



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IND284-33 See response to Comment IND284-2, 18, 19, and 21.

IND284-34 See response to Comments IND284-2, 18, 19, and 21.

IND284-35 See response to Comments IND284-2, 18, 19, and 21.

Our analysis shows that only 3.1 acres of structurally complex forest would be removed by the Proposed Route. In addition, the acres removed would be along an existing road, in a narrow linear manner on the edge of the forest stands. Therefore, the stand would not be fragmented and the effects would be minimized. IND284-36

Our analysis shows that with a few minor exceptions, the LSOG that would be removed by the Proposed Route lacks structural complexity and consequently lacks functionality. Therefore, this LSOG cannot be "particularly valuable" as characterized by the DEIS. IND284-37

Our analysis shows that with a few minor exceptions, the development stage of the LSOG that would be removed by the Proposed Route is between canopy closure and culmination of mean annual increment which has the least biological diversity of any forest development stage. Therefore, this LSOG cannot be "particularly valuable". IND284-38

Our analysis shows that because of their small size and irregular shape, none of the LSOG forest stands in question have functional interior habitat. Therefore, this LSOG cannot be "particularly valuable". IND284-39

The DEIS conclusion that the Blue Ridge Variation would result in a significant environmental advantage was based primarily on the variation's ability to reduce impacts on "particularly valuable LSOG habitat affected by the Proposed Route". (DEIS 3-21). Our analysis shows that DEIS conclusion is without basis.

The finding of our fact-based analysis which complies with NEPA requirements is that there would be no significant environmental advantage to the Blue Ridge Variation compared with the Proposed Route in regard to LSOG habitat.



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IND284-36 See response to Comments IND284-18, 19, and 30.

IND284-37 See response to Comments IND284-2, 18, 19, and 21.

IND284-38 Culmination of mean annual increment (CMAI) is a frequently utilized indicator of tree growth curves used in the forest management industry. It is not an indicator utilized by BLM for assessment of habitat quality, therefore it was not used in the comparison of the proposed route and the Blue Ridge Variation in the final EIS or the current version of appendix F.9.

IND284-39 See response to Comments IND284-2 and 30.

Marbled Murrelet (MAMU) Habitat

- The DEIS asserts that the Blue Ridge Variation would remove 3 acres of MAMU habitat while the Proposed Route would remove 32.2 acres. These numbers are in error.
- Analysis of BLM's Forest Operations Inventory data, BLM MAMU habitat map, and Pembina maps and alignment sheets of the Proposed Route indicates that the Blue Ridge Variation would remove 0 acres of MAMU habitat while the Proposed Route would remove 5.4 acres
- The magnitude of the number of acres of MAMU habitat removed is inconsequential in either case
- These acres occur in the context of 493,434 acres of MAMU nesting habitat and 885,590 acres of MAMU habitat-capable acres on lands over which the BLM has jurisdiction in the area of its Resource Management Plan (RMP).
- In addition, there are 6,638,960 acres of MAMU habitat-capable acres within BLM's Resource Management Plan planning area, i.e. all lands within the Resource Management Plan area regardless of jurisdiction.
- There is no MAMU critical habitat, i.e. essential for the conservation of the species, in the area of either the Blue Ridge Variation or the Proposed Route

IND284-40

The supporting rationale for the DEIS conclusion that the Blue Ridge Variation would result in a significant environmental advantage when compared to the Proposed Route includes the assertion that the Blue Ridge Variation compared to the Proposed Route would reduce the number of affected occupied and presumed occupied) MAMU stands (3 and 14, respectively) as well as acres of suitable MAMU habitat removed (3 and 32.2, respectively, for a difference of approximately 29 acres) (DEIS p.3-20, 3-23).[9] Since these numbers are included in the DEIS rationale for favoring the Blue Ridge Variation, it is imperative to have an accurate number of impacted acres of MAMU habitat in order to make a reasoned choice among the two routes.

Therefore, we have very carefully examined the accuracy of the number of acres of MAMU habitat that would be impacted.

Our analytical tools included:

1. A large-scale (3 inches = 1 mile), detailed map which we received from the BLM that displays MAMU occupied forest stands and MAMU suitable habitat in the area of the Proposed Route.

[9] In this analysis, we reference the MAMU habitat data set forth in DEIS Chapter e, Table 3.3.2.2-1 since this is the data cited in the DEIS rationale for favoring the Blue Ridge Variation. This data differs from that found in DEIS Appendix F.9, Table 3.7.1-1.



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IND284-40 Comment noted. List summarizes Comments IND284-41 to IND284-46.

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2. An accurate contour map which we received from the Pembina Corporation that displayed the location of the Proposed Route
3. The alignment sheets for the Proposed Route which we received from the Pembina Corporation.
4. The BLM's geospatial data base, Forest Operations Inventory. The Forest Operations Inventory provides an accurate contour map with the location of roads, forest stands, their birthdate, their age class, stand description and acreage.
5. An on-the-ground field examination of the surveyed and staked Pacific Connector pipeline location, visiting each unit identified as MAMU habitat by the BLM map and all stands identified as LSOG by the Forest Operations Inventory that would be affected by the Proposed Route.

Methodology, analysis and findings:

MAMU suitable habitat that would be affected by the Proposed Route that is not designated occupied through protocol surveys was presumed occupied in our analysis, consistent with BLM practice. We only had one such forest stand. The occupied habitat displayed on our BLM-provided map coincides with older forest stands with a birthdate of 1880 as identified by BLM's Forest Operation Inventory. By using the BLM map in conjunction with the map and the alignment sheets which we received from the Pembina Corporation, and BLM's Forest Operation Inventory, we were able to carefully calculate the number of MAMU occupied acres and presumed occupied acres that would be removed by the Proposed Route. We used the same deduction of acres for roads here as we did in our analysis of impacts to LSOG. The amount of MAMU habitat that would be removed by the Proposed Route right-of-way, including TEWAS, would be approximately 3.1 acres of occupied and 2.3 acres of presumed occupied for a total of 5.4 acres. IND284-41

The BLM-provided map does not show any MAMU occupied or suitable habitat along the Blue Ridge Variation. IND284-42

The BLM map does not show any MAMU occupied habitat or suitable habitat along the Proposed Route other than the 1880 stands. There are other occupied and suitable habitat stands shown on the map in the general area but the nearest such stand is at least ¼ mile from the Proposed Route and so would not be impacted. BLM's Forest Operations Inventory and our on-the-ground verification reveals that there is one 1880 stand along the Proposed Route which the BLM map did not identify as occupied or suitable habitat. We inquired of the BLM and they affirmed that the map they had given us was accurate, although subject to field verification. For analytical purposes, given our own field verification, we decided to treat this 1880 stand as a presumed occupied stand. Based on the Forest Operations Inventory which we confirmed by field checking the relevant stands, the other stands along the Proposed Route are approximately 80 years old and do not have the characteristics necessary for MAMU suitable habitat (large, moss covered branches, mistletoe, and other platforms). In as much as BLM's IND284-43

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IND284-41 See response to Comments IND284-2 and 30.

IND284-42 The map the commenter refers to was provided by the BLM; however, it is not part of the FERC record for this project. Regardless, as shown on table 3.4.2.2-1 of the final EIS, there is 3.0 acres of suitable MAMU habitat that would be removed under the Blue Ridge Variation. This table also illustrates that there is no occupied or potential MAMU nest sites on BLM lands that would be impacted under the Blue Ridge Variation.

IND284-43 See response to Comments IND284-30 and 42.

data indicates that there is no other occupied or suitable habitat along the Proposed Route, we cannot account for the remaining 26.8 acres of the 32.2 acres of total occupied and presumed occupied habitat that the DEIS Table 3.4.2.2-1 asserts would be removed by the Proposed Route. Our analysis indicates that these DEIS numbers are in error. IND284-43 cont.

The DEIS asserts in its rationale for favoring the Blue Ridge Variation that the Variation would remove 29 acres less suitable MAMU habitat than the Proposed Route. Our analysis as explained above indicates that the Blue Ridge Variation would, in fact, only remove approximately 5.4 acres less MAMU habitat than the Proposed Route. IND284-44

These acres occur in the context of 493,434 acres of MAMU nesting habitat and 885,590 acres of MAMU habitat-capable acres within BLM's Resource Management Plan decision area, i.e. those lands for which the BLM has jurisdiction. In addition, there are 6,638,960 acres of MAMU habitat-capable acres within BLM's Resource Management Plan planning area, i.e. all lands within the Resource Management Plan area regardless of jurisdiction. Given this context, the number of acres of MAMU habitat that would be removed by the Proposed Route is inconsequential. IND284-45

We should note that there is no MAMU critical habitat anywhere in the vicinity of the Proposed Route or Blue Ridge Variation. IND284-46

Importantly, a detailed examination of the Proposed Route in relation to the MAMU habitat reveals that the Proposed Route would occupy existing ridgetop roads that border the MAMU stands. The few acres of MAMU habitat that would be removed by the Proposed Route occur in a linear fashion along the side or edge of the MAMU habitat stands. If one must unavoidably remove acres of habitat from an existing stand, the least impacting would be that which occurs in this instance. The few acres removed would not fragment or materially change the shape or size of the stand. The Proposed Route would only affect the edge of the MAMU habitat stands. IND284-47

The DEIS comparison of the impacts to MAMU habitat of the Proposed Route v. the Blue Ridge Variation is substantively flawed because 1.) It merely catalogs the acres that would be removed and provides no discussion, exposition or analysis of the effects as required by the National Environmental Policy Act; and 2.) The number of acres of MAMU habitat used in the comparison is considerably in error.

The DEIS merely states that the Proposed Route would remove acres of MAMU habitat but does not analyze or describe the actual effects to the MAMU stands. The National Environmental Policy Act requires that an EIS "Rigorously explore and objectively evaluate all reasonable alternatives" (40 CFR 1502.14(a)), and requires that an EIS take a "hard Look" (Western North Carolina Alliance v. North Carolina Dept. of Transportation (4th Circuit 2003)). A simple statement that the Proposed Route would remove a certain number of acres of MAMU habitat does not meet the requirements to "rigorously explore" or to take a "hard look". "Hard look requires that the statement must not merely catalog environmental facts but also explain



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IND284-44 See response to Comment IND284-30.

IND284-45 The 493,434 acres of MAMU nesting habitat and 885,590 acres of MAMU habitat-capable acres identified in the PRMP/FEIS is applicable to BLM lands within the entire western Oregon planning area. For this reason it is not an appropriate value for assessing the intensity of environmental effects of the Blue Ridge Variation as disclosed in appendix F.9.

IND284-46 Comment noted

IND284-47 See response to Comments IND284-2, 18, 19 and 21. As illustrated in Table 3.4.2.2-1 of the final EIS, the proposed route would have a direct impact on 3 occupied and 1 potentially occupied MAMU sites (10.4 acres) on BLM lands with an additional indirect impact on 34.3 acres of MAMU nesting habitat on BLM lands.

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fully its course of reasoning." (Friends of Boundary Waters Wilderness v. Dombeck (8th Circuit 1999)).

In addition, the DEIS comparison of impacts to MAMU habitat of the Proposed Route versus the Blue Ridge Variation does not include consideration of context and intensity (40 CFR 1508.27) which is required when making a finding of "significance", i.e. that the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route.

Because of these substantive violations of the National Environmental Policy Act, the DEIS flawed analytical conclusion that the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route is in error, without basis and arbitrary and capricious.

Our analysis using BLM-provided maps and BLM's Forest Operations Inventory data, corrects these deficiencies in the DEIS analysis.

The finding of our fact-based analysis which complies with NEPA requirements is that there would be no significant environmental advantage to the Blue Ridge Variation compared with the Proposed Route in regard to MAMU habitat.

Northern Spotted Owl

Impacts to Northern Spotted Owl Home Range

- No NSO habitat would be removed within the NSO home range by either the Proposed Route or the Blue Ridge Variation
- Construction and the permanent pipeline right-of-way would be in the context of two existing well-traveled public roads within the home range

IND284-48

The DEIS in its supporting rationale for its conclusion that the Blue Ridge Variation would result in a significant environmental advantage when compared to the Proposed Route included the fact that the Blue Ridge Variation would cross 0.47-mile less of NSO home range (0.75-mile v. 1.22 miles). The home range in question lies within the 1.5-mile radius circle centered on owl activity center #42310 which is located just north of the Coos River. The area of the home range discussed in in this section lies south of the Coos River.

A mere display of number of miles does not constitute a rigorous exploration and hard look as required by NEPA regulations and case law. The National Environmental Policy Act requires that an EIS "Rigorously explore and objectively evaluate all reasonable alternatives" (40 CFR 1502.14(a)), and that an EIS take a "hard Look" (Western North Carolina Alliance v. North Carolina Dept. of Transportation (4th Circuit 2003)). A simple statement that the Proposed Route and Blue Ridge Variation would occupy a certain number of miles within an NSO home range does not meet the requirements to "rigorously explore" or to take a "hard look". "Hard look requires that the statement must not merely catalog environmental facts but also explain fully its course of reasoning." (Friends of Boundary Waters Wilderness v. Dombeck (8th Circuit 1999)).

In this instance, the difference in the mileage crossing the home range is meaningless because neither the Blue Ridge Variation or the Proposed Route would impact any NSO habitat within the home range. The stand-alone number of miles without explanation is fundamentally misleading.

In the 2015 JCEP FEIS, there existed within the portion of this NSO home range south of the Coos River a privately owned 40-year-old Douglas fir stand of approximately 45 acres with an average DBH of 10 to 12 inches. This stand may have been considered potential NSO dispersal habitat that would have been affected by the Proposed Route. In 2015-2016, however, this stand was harvested. Consequently, there is no NSO habitat south of the Coos River that is within 1.5 miles of owl activity center #42310 and within the area of either the Proposed Route or the Blue Ridge Variation.

IND284-49

There are no public lands south of the Coos River that is within 1.5 miles of this owl activity center. Consequently, there is not only no current NSO habitat, but there will be no NSO habitat in this area in the future



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IND284-48 There is one NSO home range within 1.23 miles of the Proposed Route and more than 16 acres of NSO nesting habitat would be directly affected on BLM lands. About 60 acres of NSO nest habitat on BLM lands would be indirectly impacted irrespective of the fact both county and BLM roads exist in close proximity to this NSO home range. While there is one NSO home range within 0.75 miles of the Blue Ridge Variation, there would be no direct or indirect effect to NSO nesting or NRF habitat on BLM lands.

IND284-49 See response to Comment IND284-48.

In addition, there are two existing well-traveled public roads within 1.5 miles of the owl activity center #42310. Therefore, construction activity will create little change in ambient noise. IND284-50

There is no environmental advantage whatsoever resulting from the fact that the Blue Ridge Variation would cross 0.47-mile less of NSO home range.

Sidebar: In almost all of the DEIS comparisons of the Blue Ridge Variation and the Proposed Route, the DEIS consistently throws around numbers without explanation of their meaning, and without providing context and intensity. The DEIS apparently expects this to pass for analysis. In some instances, numbers actually speak for themselves. The DEIS, however, apparently expects the numbers to speak for themselves in just about every instance. Where numbers are a key and primary basis for an analytical conclusion or choice among alternatives, a simplistic cataloging of acres is inadequate and violates NEPA regulations. The case of comparing miles of NSO home range crossed by the Blue Ridge Variation and the Proposed Route is a prime example. The number of miles given in the comparison are absolutely meaningless. There is no NSO habitat within the home range that is anywhere near the Blue Ridge Variation or the Proposed Route. There are no impacts on either route, period. This DEIS analysis, like so many others in the comparison of the Blue Ridge Variation and the Proposed Route is fallacious. I might also add, infuriating. Now that I have that off my chest, let us continue.

Impacts to NSO Nesting Roosting Foraging (NRF) Habitat

- No high NRF habitat would be removed by the Proposed Route
- The DEIS asserts that the NRF habitat removed by the Blue Ridge Variation compared to the Proposed Route is 8.8 acres and 23.8 acres, respectively. A difference of 15 acres. IND284-51
- The number of NRF acres asserted by the DEIS that would be removed by the Proposed Route is in error
- Hard analysis of BLM-provided habitat map and BLM data reveals the NRF habitat removed by the Blue Ridge Variation compared to the Proposed Route is 0 acres and 5.3 acres, respectively. A difference of 5.3 acres.
- The amount of NRF habitat that would be removed in either case is inconsequential.
- BLM-administered lands in the PRMP planning area currently supports 860,200 acres of Mature Multi-layered Canopy and Structurally Complex forest (NRF habitat) (PRMP/FEIS 2016, p. 984).
- None of the NRF stands in question have functional interior habitat. IND284-52
- No NSO critical habitat would be affected.

The DEIS in its supporting rationale for its conclusion that the Blue Ridge Variation would result in a significant environmental advantage stated that the Blue Ridge Variation would remove 15 acres less of high NRF and NRF habitat. DEIS Table 3.4.2.2-1, p. 3-23 sets forth that the Blue Ridge Variation would remove 8.8 acres of high NRF and NRF habitat while the Proposed Route would remove 23.8 acres of high NRF and NRF habitat. The DEIS is misleading here because it clearly implies that some unspecified portion of the 23.8 acres consists of high NRF. As IND284-53



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IND284-50 See response to Comment IND284-48. Section 2 of the final EIS has been revised to include timing restrictions necessary to protect MAMU and NSO nesting habitat on BLM lands. These restrictions would apply to all BLM lands affected by either the Proposed Route or the Blue Ridge Variation.

IND284-51 Comment noted. List summarizes Comments IND284-52 to IND284-55 below.

IND284-52 As illustrated in Table 3.4.2.2-1 of the final EIS, the Proposed Route would have a direct effect on 1.4 acres of NSO NRF habitat and indirectly impact 11.4 acres of NRF habitat on BLM lands based on FOI data and filed review by BLM biologists. No NSO NRF habitat on BLM lands would be impacted under the Blue Ridge Variation.

IND284-53 Appendix F.9 has been updated to incorporate FOI and recent site visit observations for BLM-managed parcels. These updates provide additional information regarding stand complexity that supports the recommendations presented in Section 3 of the final EIS with respect to the Blue Ridge Variation.

explained below, no high NRF even exists in the vicinity of the Proposed Route or Blue Ridge Variation. In addition, the overall number of acres removed as set forth in Table 3.4.2.2-1 cannot be reconciled with other available BLM data.

IND284-53 cont.

BLM's PRMP/FEIS 2016 defines high NRF NSO habitat as "older, more structurally complex forest as described in Recovery Action 32: "These high-quality spotted owl habitat stands are characterized as having large diameter trees, high amounts of canopy cover, and decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees" (USDI FWS 2011, p. III-67).

We received a map from the BLM that displays NRF habitat in the area of the Proposed Route, however, the map does not identify high NRF. The NRF habitat displayed by the BLM map coincides with the older forest stands (birthdate 1880) in the area as identified by BLM's Forest Operation Inventory. The only stands where habitat would be removed by the Proposed Route that come close to meeting the high NRF definition are these 1880 stands located in T25S, R12W, Section 33; and T26S, R12W, Sections 4, 15. According to BLM's Forest Operations Inventory, these particular 140-year-old stands have an average diameter breast height (DBH) of 20 to 30 inches. According to the scientific literature, it is unlikely that these stands would qualify as high NRF. The literature indicates that stands begin to exhibit the characteristics of valuable foraging habitat between 150 and 200 years old with a DBH equal to or greater than 80 cm (31.5 inches). (North, Franklin, et al. 1999).

IND284-54

Furthermore, these 1880 forest stands are highly fragmented, relatively small, and so irregular in shape that they have no interior habitat which is an important metric of the functionality of the forest habitat. In Douglas fir forests, a patch size of approximately 124 acres (50 hectares) and approximately 2,300 feet wide is needed for functional interior habitat (Franklin, J.F. 1992 and Chen, Franklin, Spies 1992). According to BLM's Forest Operations Inventory, the scattered stands in question are 12.4 acres, 16. 5 acres, 12.3 acres, 3.0 acres, 70.1 acres. None of the stands in question come even close to meeting the criteria for functional interior habitat, and therefore, would not qualify as high NRF.

By using the BLM-provided habitat map in conjunction with the map and alignment sheets which we received from the Pembina Corporation that displays the location of the Proposed Route, along with BLM's Forest Operation Inventory, we were able to carefully calculate the amount of NRF habitat that would be removed by the Proposed Route. Our analysis accounted for the instances in which the Proposed Route would be located on an existing road, similar to our methodology used in our analysis of LSOG. The actual amount of NRF habitat removed by the Proposed Route right-of-way, including TEWAS, would be approximately 5.3 acres.

In every instance where the Proposed Route would affect NRF habitat, BLM-provided habitat maps and BLM's Forest Operations Inventory show that the pipeline would be located on an existing road adjacent to the NRF habitat stands. In other words, the 5.3 acres removed by the



**IND284 continued, page 36 of 64**

IND284-54 See response to Comment IND284-53. Table 3.4.2.2-1 of the final EIS summarizes the analysis presented in Appendix F.9 of the final EIS with respect to effects on interior forest habitat for the Proposed Route and the Blue Ridge Variation. Overall, the Proposed Route would have a direct effect on 125 acres of interior forest habitat (BLM and private/state lands combined) while the Blue Ridge Variation would have a direct effect on 33 acres (BLM and private/state lands combined). Indirectly, effects on interior forest habitat for the Proposed Route would be greater than for the Blue Ridge Variation.

Proposed Route would be a small linear strip along the edge of the NRF habitat. If one must unavoidably remove acres of habitat from an existing stand, the least impacting would be that which occurs in this instance. The few acres removed do not fragment or materially change the shape or size of the stand. The Proposed Route would only affect the edge of the NRF habitat stands.

IND284-54 Cont.

The BLM map does not show any NRF habitat along the Proposed Route other than the 1880 stands. There are other NRF stands in the general area but the nearest such stand is at least ¼ mile from the Proposed Route and so would not be impacted. BLM's Forest Operations Inventory and our on-the-ground verification reveals that the other stands along the Proposed Route are approximately 80 years old and do not have the characteristics or legacy components necessary for NRF habitat. Because the BLM map and our on-the-ground verification shows no NRF habitat along the Proposed Route other than the 1880 stands, we cannot ascertain the location of the remaining 18.5 acres of the 23.8 acres of total NRF habitat that the DEIS Table 3.4.2.2-1 asserts would be removed by the Proposed Route. Our analysis shows the DEIS number of acres of NRF habitat that would be removed by the Proposed Route is in error and that the correct number is 5.3 acres.

The number of acres in either case is inconsequential when taken in context. BLM-administered lands in the PRMP planning area currently supports 860,200 acres of Mature Multi-layered Canopy and Structurally Complex forest which is a good approximation of NRF habitat (PRMP/FEIS 2016, p. 984).

IND284-55

The finding of our fact-based analysis which complies with NEPA requirements is that there would be no significant environmental advantage to the Blue Ridge Variation compared with the Proposed Route in regard to NSO NRF habitat.



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IND284-55 The 860,200 acres of mature and structurally complex stands identified in the PRMP/FEIS is applicable to the entire western Oregon planning area. For this reason it is not an appropriate value for assessing the intensity of environmental effects of the Blue Ridge Variation as disclosed in appendix F.9.

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IND284-56 Comment noted. List summarizes Comments IND284-57 to IND284-61 below.

Water and Fish Resources

The DEIS concluded that the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route. In its rationale for this conclusion, the DEIS states; "We also acknowledge the concerns expressed by the NMFS (National Marine Fisheries Service), and the COE (US Army Corps of Engineers) regarding increased impacts on waterbodies, threatened and endangered aquatic species, and adjacent riparian vegetation . . . "(DEIS p. 3-21). The DEIS rationale briefly dismisses the impacts to these resources. The DEIS two-page text of its discussion of the trade-offs considered in its conclusion that the Blue Ridge Variation would result in a significant environmental advantage does not even mention the critical habitat that would be impacted by the Blue Ridge Variation.

The DEIS states that the pipeline would be located on ridgelines where feasible to avoid waterbody crossings (DEIS p. 2-59). The Blue Ridge Variation would violate this policy.

Below is a comparison of impacts to 19 different water and fish resources. All nineteen comparisons favor the Proposed Route v. the Blue Ridge Variation.

- Coho Salmon and Green Sturgeon Critical (essential) Habitat Crossed
  Blue Ridge Variation: 10 streams (7 coho, 3 green sturgeon[10])
  Proposed Route: 4 streams

IND284-56

- Anadromous Fish-bearing Streams Crossed
  Blue Ridge Variation: 18 known or assumed streams
  Proposed Route: 4 known streams

- Essential Fish Habitat Crossed[11]
  Blue Ridge Variation: 14 streams
  Proposed Route: 4 streams

- Resident Fish bearing streams
  Blue Ridge Variation: 12 known or assumed
  Proposed Route: 6 assumed

[10] For the 3 green sturgeon critical habitat streams which are omitted in the DEIS, see 74 FR 52346

[11] JCEP FEIS 2015, Appendix Q, p. 3-77

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- Streams with Aquatic ESA Species or Habitat Present Crossed
  Blue Ridge Variation: 14 known or assumed
  Proposed Route: 4 known

- Impacts to Riparian Areas
  Blue Ridge Variation: 103 acres
  Proposed Route: 50 acres

- Stream Crossing Risk to Bank and Bed Stability[12]
  Blue Ridge Variation: 6 high risk streams, 21 moderate risk streams
  Proposed Route: 0 high risk streams, 3 moderate risk streams

- Impacts to BLM Riparian Reserves[13]
  Blue Ridge Variation: 16 acres
  Proposed Route: 14 acres

- Domestic Water Sources Impacted
  Blue Ridge Variation: 2
  Proposed Route: 0

- Domestic Water Source within the construction right-of-way
  Blue Ridge Variation: one spring
  Proposed Route: 0

- Water Quality Limited Streams Crossed
  Blue Ridge Variation: 5 streams
  Proposed Route: 1 stream

- Wetlands Crossed
  Blue Ridge Variation: 35 acres; 0.3-acre long-term restoration required
  Proposed Route: 13 acres; 0 long-term restoration required

IND284-56
cont.

[12] DEIS Appendix F.9
[13] Impacts under either route within each fifth-field watershed equates to less than one percent of Riparian Reserves managed by BLM in these watersheds (DES Appendix F.9, p. 3-13, Table 3.2.4.3-2. This contradicts DEIS rationale DEIS chapter 3, p. 3-20

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- Floodplains Crossed
  Blue Ridge Variation: 2.3 miles
  Proposed Route: 1.0

- Shallow Groundwater
  Blue Ridge Variation: 2.2 miles of shallow groundwater
  Proposed Route: 1.0 mile of shallow groundwater

- Waterbodies Crossed
  Blue Ridge Variation: 1 major waterbody, 9 intermediate, 56 minor
  Proposed Route: 0 major, 7 intermediate, 0 minor

- Perennial Streams Crossed[14]
  Blue Ridge Variation: 41
  Proposed Route: 4

- Intermittent Streams Crossed[15]
  Blue Ridge Variation: 23
  Proposed Route: 4

- Total Streams Crossed F.9
  Blue Ridge Variation: 64
  Proposed Route: 8

IND284-56
cont.

Although all of the 19 resource impacts compared above are important, before discussing the impacts in their totality, critical habitat and floodplains require specific comments.

Critical habitat: The Blue Ridge Variation would cross ten critical habitat streams; 7 coho and 3 green sturgeon[16]. The context of the impacts on critical habitat has to do with the designation of "critical habitat" itself. These streams were designated as critical habitat for coho salmon and green sturgeon under the Endangered Species Act by the National Marine Fisheries Service (NMFS). This means that, by law, these streams have been determined to be "essential for the conservation of the species". The DEIS rationale for favoring the Blue Ridge Variation v. the Proposed Route states that a primary trade-off was between terrestrial and aquatic resources. There is no critical habitat for terrestrial species anywhere on or near the Proposed Route. The choice made must fit the facts found. The impacts from burying a 36-inch pipeline in 10 coho

[14] DEIS Appendix F.9, p. 3-67
[15] DEIS Appendix F.9, p. 3-67
[16] 74 FR 52346

and green sturgeon critical habitat streams must outweigh the relatively minor impacts to terrestrial habitat as described in our comments on LSOG, MAMU, and NSO.

Floodplains: The Blue Ridge Variation would cross 2.3 miles of floodplains compared to 1.0 miles of floodplains that would be crossed by the Proposed Route. Executive Order EO 11988 (10 CFR 1022) requires federal agencies *to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains* and to *avoid direct and indirect support of floodplain development wherever there is a practicable alternative*." (emphasis added). Executive Order 11988 requires that floodplains should be avoided "to the extent possible" and "wherever practicable" or in other words, where feasible, workable, or doable. All of these terms and words describe the Proposed Route. Therefore, the decision to locate the pipeline on the Blue Ridge Variation is contrary to Executive Order 11988. See generally, *Communities Against Runway Expansion v. Federal Aviation Administration*, 355 F.3d 678, 688-89 (D.C. Cir. 2004) (analysis under an Executive Order (environmental justice in this case), once present in a NEPA document, is subject to arbitrary and capricious standard of review). IND284-57

In addition to being contrary to Executive Order 11988, the Draft Environmental Impact Statement violates NEPA requirements because the analysis and comparison of the Proposed Route versus the Blue Ridge Variation fails to discuss floodplains other than mention the number of miles of floodplains crossed. (DEIS NEPA requires that an EIS: discuss impacts in proportion to their significance (40 CFR 1502.2(b)); rigorously explore and objectively evaluate all reasonable alternatives (40 CFR 1502.14(a)), discuss any adverse effects which cannot be avoided (40 CFR 1502.16), contain a reasonably thorough discussion of significant aspects of environmental consequences, and that the agency takes a hard look. (Communities Against Runway Expansion v. Federal Aviation Administration (D.C. Circuit 2004)). IND284-58

Impacts to water and fish resources considered in their totality: DEIS Table 3.4.2.2-1 "Comparison of Blue Ridge Variation with the Proposed Route" provides comparative data for multiple resources. The DEIS rationale for its conclusion that the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route did not cite any data that was not contained in Table 3.4.2.2-1. Table 3.4.2.2-1 includes data for only 6 different water and fish resources.

The story and comparison of water and fish resources is incomplete in the table. By laboriously working through the massive DEIS and appendices, we were able to bring forward much more information relevant to a complete understanding and true comparison of impacts to water and fish resources. The results of this effort are the 19 different water and fish resources in the above comparison. We brought forward all relevant information that we could find. Every one of the comparisons favor the Proposed Route over the Blue Ridge Variation. IND284-59



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IND284-57 Section 3.3.3.2 of the final EIS has been revised to include a discussion of floodplain impacts consistent with the requirements of NEPA and Executive Order (EO) 11988. While Appendix F.9 has been revised to expand the metrics available for comparing the Proposed Route with the Blue Ridge Variation, it does not provide a specific comparison of this topic since there are no floodplains on BLM land subject to the Blue Ridge Variation. The analysis presented in section 4.03 and Appendix F.9 of the final EIS support agency recommendations presented in Section 3 of the Final EIS and is not contrary to Executive Order 11988.

IND284-58 See response to Comment IND284-77.

IND284-59 In addition to substantial revisions and enhancements to Appendix F.9 presented in the final EIS, A comprehensive comparison table has been added in a new conclusionary section of this appendix. Rationale in Section 3 has been revised to clarify that indicators summarized in Appendix F.9 were considered by the agencies and those carried forward in Table 3.4.2.2.1 provide the basis of comparison necessary to support the recommendation related to the Blue Ridge Variation.

The DEIS states that the primary trade-offs between the Proposed Route and the Blue Ridge Variation are between terrestrial and aquatic resources, (as well as public and private lands). (DEIS p. 3-20). Therefore, ignoring so much essential information regarding water and fish resources is fatal to the DEIS conclusion that the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route.

Except for the comparison of impacts to coho and green sturgeon critical habitat, one might conclude that any single one of the 19 comparisons would not be persuasive in altering the DEIS conclusion to favor the Blue Ridge Variation, however, the 19 taken in their totality are compelling. The NEPA required context for these impacts is that taken together they paint a picture of significant adverse impacts. With the totality of these impacts, it is impossible to conclude that the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route. The conclusion made must fit the facts found.

It would be disingenuous to contend that the information in our 19 comparisons was contained in the DEIS and therefore was considered. This information was scattered about and sometimes buried in the massive DEIS. It was a difficult and laborious process to find it. Because it was not brought forward into Table 3.4.2.2-1, the information is essentially unavailable to the public and decision maker. To reinforce this point, the DEIS rationale for favoring the Blue Ridge Variation did not cite a single number that was not contained in Table 3.4.2.2-1. IND284-60

The failure to address such a large amount of important information in the DEIS discussion of trade-offs is a violation of NEPA. *Colorado Environmental Coalition v. Dombeck, 185 F .3d 1162 1173-74 (10th Cir. 1999)* (Such discussion must be "reasonably complete" in order to properly evaluate the severity of the adverse effects" of a proposed project prior to making a final decision. *Methow Valley,* 490 U.S. at 352, 109 S. Ct. 1835, *see also Holy Cross,* 960 F .2d at 1523.

Included in the DEIS rationale for favoring the Blue Ridge Variation is the assertion that the impacts to LSOG would be long-term or permanent, while impacts to aquatic resources might be mitigated. Such a rationale fails to objectively evaluate the alternatives. The DEIS rationale includes the acknowledgement that "some permanent unmitigated effects on waterbodies and anadromous fish would occur in the form of the permanent loss of mature riparian areas associated with affected watersheds." (DEIS p. 3-20). There would be unmitigated permanent adverse impacts on the Blue Ridge Variation as well as the Proposed Route. Selectively weighing relevant information in reaching a conclusion is a violation of the National Environmental Policy Act requirement to: "objectively evaluate all reasonable alternatives" (40 CFR 1502.14(a)).

The DEIS rationale for favoring the Blue Ridge Variation states that; "We attempt to balance overall impacts" (DEIS p. 3-21). The 19 comparisons of impacts to water and fish resources IND284-61



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IND284-60 See response to Comment IND284-59.

IND284-61 See response to Comment IND284-59.

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show that the implementation of the Blue Ridge Variation would not balance overall impacts. There is no parallel on the Proposed Route to the long list of adverse impacts that would result if the Blue Ridge Variation were to be implemented. IND284-61 cont.

Compared to the Proposed Route, Blue Ridge Variation would impact 2.5 times the number of critical habitat streams, 4.5 times the number of anadromous fish-bearing streams, 3.5 times the number of essential fish habitat streams, 7.4 times the number of waterbodies, 2 times the number of riparian acres, 9 times the number of moderate to high risk stream crossings, 2 times the number of domestic water sources, 5 times the number of water quality limited streams, 2.7 times the number of wetland acres, and 2.3 times the number of floodplain miles.

The adverse impacts of the Blue Ridge Variation on waterbodies are unquestionably order of magnitude greater than the Proposed Route.

There would be a very significant environmental advantage to the Proposed Route compared to the Blue Ridge Variation in regards to water and fish resources.

Geological and Soil Resources

Below is a comparison of 13 different geological and soil resources. All 13 comparisons favor the Proposed Route v. the Blue Ridge Variation.

The DEIS states that the pipeline would be located on ridgelines where feasible to avoid geologic hazards, steep slopes, and to reduce erosion potential. (DEIS p. 2-59). Adoption of the Blue Ridge Variation would violate this policy. IND284-62

"Pacific Connector has worked to avoid landslides along the proposed route. Ridgetops are generally considered to be stable and therefore an attempt has been made to route the vast majority of the pipeline along ridgetops." (DEIS p. 4-21). Adoption of the Blue Ridge Variation would nullify this statement.

"Pacific Connector selected its proposed route to avoid existing landslides and areas susceptible to landslides." (DEIS p. 4-21). Adoption of the Blue Ridge Variation would nullify this statement.

"All of the moderate and high hazard deep-seated landslides identified along the alignment were avoided where feasible during final route selection." (DEIS p. 4-22). Adoption of the Blue Ridge Variation would nullify this statement.

"All known hazardous landslides thought to pose a risk to the pipeline have been avoided through routing." (DEIS p. 4-22). Adoption of the Blue Ridge Variation would nullify this statement. IND284-63

Landslide prone areas crossed[17] IND284-64

- Blue Ridge Variation: 5 landslides, 7,137 feet (1.4 miles)
- Proposed Route: 2 landslides, 3,267 feet (0.6 mile)
  BRV 218 % more than PR

- Landslide hazards crossed[18]
  Blue Ridge Variation: 3,257 feet
  Proposed Route: 1,088 feet
  BRV 300 % more than PR

- Rapidly Moving Landslide Crossed
  Blue Ridge Variation: 1 (MP 18.1 – 18.2)[19]
  Proposed Route: 0

[17] DEIS Table 3.4.2.2-1, p. 3-21
[18] DEIS Appendix F.9, p. 3-20, LiDAR data, Geoengineers 2015
[19] JCEP FEIS, p. 4-272, GeoEngineers 2013e.

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IND284-62 See response to Comment IND284-11.

IND284-63 See response to Comment IND284-14.

IND284-64 Comment noted. List summarizes Comments IND284-65 to IND284-67.

- Alluvial valley segments with potential for earthquake-induced liquefaction[20]
  Blue Ridge Variation: 4
  Proposed Route: 2

- High water table
  Blue Ridge Variation: 2.2 miles, 44 acres
  Proposed Route: 1.6 miles, 26 acres

- Prime Farmland
  Blue Ridge Variation: 3.9 miles, 74 acres
  Proposed Route: 1.9 miles, 31 acres

- Soils with high or severe erosion potential
  Blue Ridge Variation: 7.7 miles, 116 acres
  Proposed Route: 6.5 miles, 92 acres

- Steep Slopes
  Blue Ridge Variation: 7.7 miles, 116 acres
  Proposed Route: 5.4 miles, 74 acres

- Potential structural damage to hydric soils (wet and poorly drained)
  Blue Ridge Variation: 2.2 miles, 41 acres
  Proposed Route: 1.3 miles, 21 acres

- Soils with poor revegetation potential
  Blue Ridge Variation: 7.7 miles, 116 acres
  Proposed Route: 6.7 miles, 92 acres

- Soils highly susceptible to compaction
  Blue Ridge Variation: 14.4 miles, 227 acres
  Proposed Route: 12.8 miles, 182 acres

IND284-64
cont.

[20] DEIS Appendix F.9, pp. 3-19 – 3-27

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- Soils having restrictive layer (shallow, lithic)
  Blue Ridge Variation: 8.4 miles, 129 acres
  Proposed Route: 7.1 miles, 101 acres

IND284-64 cont.

All of the above 13 comparisons favor the Proposed Route v. the Blue Ridge Variation.

DEIS Table 3.4.2.2-1 "Comparison of Blue Ridge Variation with the Proposed Route" provides comparative data for multiple resources. The DEIS rationale for its conclusion that the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route did not cite any data that was not contained in Table 3.4.2.2-1. Table 3.4.2.2-1 includes data for only one geological resource (landslide prone areas) and no data for soils resources. Geologic hazards and soil resources were not even mentioned in the text of the DEIS rationale for favoring the Blue Ridge Variation.

IND284-65

The story and comparison of geological and soil resources is incomplete in the table. By laboriously working through the massive DEIS and appendices, we were able to bring forward much more information relevant to a complete understanding and true comparison of impacts to geological and soil resources. The results of this effort are the 13 different geological and soil resources in the above comparison. We brought forward all relevant information that we could find. Every one of the 13 comparisons favor the Proposed Route over the Blue Ridge Variation.

Except for the landslide hazards and rapidly moving landslide, one might conclude that any single one of the 13 comparisons would not be persuasive in altering the DEIS conclusion to favor the Blue Ridge Variation, however, the 13 taken in their totality are compelling. The NEPA required context for these impacts is that taken together they paint a picture of significant adverse impacts. With the totality of these impacts, it is impossible to conclude that the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route. The conclusion made must fit the facts found.

It would be disingenuous to contend that the information in our 13 comparisons was contained in the DEIS and therefore was considered. This information was scattered about and sometimes buried in the massive DEIS. It was a difficult and laborious process to find it. Because it was not brought forward into Table 3.4.2.2-1, the information is essentially be unavailable to the public and decision maker. To reinforce this point, the DEIS rationale for favoring the Blue Ridge Variation did not cite a single number that was not contained in Table 3.4.2.2-1.

IND284-66

The failure to address such a large amount of important information in the DEIS discussion of trade-offs is a violation of NEPA. *Colorado Environmental Coalition v. Dombeck, 185 F .3d 1162 1173-74 (10th Cir. 1999)* (Such discussion must be "reasonably complete" in order to properly evaluate the severity of the adverse effects" of a proposed project prior to making a final

IND284-67

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IND284-65 See response to Comment 284-59. Appendix F.9 as revised provides information on additional soil and geological information, but comparison of metrics such as soil type or characteristics do not suggest a clear difference in environmental effects between the Proposed Route and the Blue Ridge Variation. Therefore, those metrics were not carried forward in Section 3 of the final EIS.

IND284-66 See response to Comment IND284-59.

IND284-67 See response to Comment IND284-59.

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decision. *Methow Valley,* 490 U.S. at 352, 109 S. Ct. 1835, *see also Holy Cross,* 960 F .2d at 1523.

Compared to the Proposed Route, the Blue Ridge Variation would impact a rapidly moving landside, cross 2.2 times the length of landslide prone areas, cross 3.0 times the length of landslide hazards, cross 2 times the number of areas with earthquake-induced liquefaction potential, cross 1.7 times the acres with high water table, cross 2.4 times the number of acres of prime farmland, cross 1.3 times the number of acres of soils with high or severe erosion potential, cross 1.6 times the number of acres of steep slopes, cross 2.0 times the number of acres with potential structural damage to hydric soils, cross 1.3 times the number of acres of soils with poor revegetation potential, cross 2.5 times the number of acres with soils highly susceptible to compaction, and cross 1.3 times the number of acres with shallow, lithic soils with a restrictive layer.

The adverse impacts of the Blue Ridge Variation regarding geologic hazards and soil resources are indisputably order of magnitude and dramatically greater than the Proposed Route.

There would be a very significant environmental advantage to the Proposed Route compared to the Blue Ridge Variation in regards to geologic hazards and soil resources.

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Private Landowners and Eminent Domain

The DEIS concluded that the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route. Although the DEIS rationale for favoring the Blue Ridge Variation states that one of the primary trade-offs between the Proposed Route and Blue Ridge Variation are impacts to private lands, it dismisses the impacts to private landowners in a few sentences (DEIS p. 3-20 - 3-21). Below is the information that the DEIS dismissed in its rationale for favoring the Blue Ridge Variation. IND284-68

The DEIS rationale for favoring the Blue Ridge Variation states that "the primary trade-offs between the Proposed Route and the variation are between terrestrial (e.g. LSOG forest and MAMU stands habitat) and aquatic resources (e.g. waterbody crossings and anadromous fish habitat), as well as public and private lands." (emphasis added) (DEIS p. 3-20).

- The Proposed Route would cross 33 private landowner parcels with 5 homes compared to 50 landowner parcels with 21 homes crossed by the Blue Ridge Variation. (The DEIS uses the numbers 24 private landowners on the Proposed Route; 53 private landowners on the Blue Ridge Variation with reference to only one home which is within 50 feet of the construction right-of-way.)
- The centerline of the Proposed Route would come within 95 feet of 37 private landowner parcels containing 6 homes compared to 69 private landowner parcels containing 30 homes within 95 feet of the Blue Ridge Variation. (95 feet from the centerline is equivalent to 50 feet from the construction right-of-way.)
- The centerline of the Proposed Route would come within 300 feet of 47 private landowner parcels containing 10 homes compared to 82 private landowner parcels containing 41 homes within 300 feet of the Blue Ridge Variation.
- The Proposed Route would have willing landowners and no eminent domain issues while on the Blue Ridge Variation 17 landowners have expressed their intention to legally resist right-of-way acquisition by Pacific Connector. In fact, certain landowners have expressed their intention to bring coffee and donuts to the construction crews if the pipeline is located on the Proposed Route.
- These 17 landowners along the Blue Ridge Variation are all intervenors. The 17 landowner intervenors along the Blue Ridge Variation represent 30% of the 54 total landowners who have intervened along the 157 miles of privately-owned lands crossed by the PCGP. (This number of total landowner intervenors was current as of March 2016.)
- The Blue Ridge Variation would place the pipeline approximately 90 percent on private land while the Proposed Route would place the pipeline approximately 54 percent on Federal lands. The remaining portion of the Proposed Route would be located almost entirely on managed timber lands.

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IND284-68 Section 7(h) of the Natural Gas Act grants Certificate holders the ability to utilize eminent domain to acquire a right-of-way across private lands. If the Commission issues Pacific Connector a Certificate, it would convey eminent domain authority. The proposed Jordan Cove LNG terminal, which has sought authorization under Section 3 of the NGA, would not have eminent domain authority.

- In the discussion of its Certificate Policy Statement in its March 11, 2016 Order Denying Applications for Certificate to Pacific Connector Gas Pipeline, the FERC stated that; "The Commission's goal is to give appropriate consideration to . . . . the unneeded exercise of eminent domain". Locating the PCGP on the Proposed Route would exactly conform with the FERC's Certificate Policy Statement to avoid the unneeded exercise of eminent domain. Locating the PCGP on the Blue Ridge Variation would fly in the face of FERC's policy statement.

IND284-68 cont.

"The Fifty-foot Rule": The DEIS uses 50 feet from the construction right-of-way as a threshold for developing a site-specific mitigation plan for a residence. More than this, however, the DEIS uses the 50-foot threshold as a measure of substantive impacts. The DEIS rationale for favoring the Blue Ridge Variation states; "However, we note that although many additional private parcels are affected by the variation, only one residence is located within 50 feet of the construction right-of-way." (DEIS p. 3-21). The DEIS obviously considers the fact that only one residence is located within 50 feet of the construction right-of-way, somehow offsets the fact that more than double the number of private parcels and double the miles of private lands would be crossed by the Blue Ridge Variation. The DEIS provides no rationale for the 50-foot standard. This standard for which no reasons or rationale are given is arbitrary and capricious, and an abuse of discretion. The fact that this unexplainable standard was used as part of the DEIS rationale for favoring the Blue Ridge Variation begs that a more meaningful metric supported by reason and logic be found.

IND284-69

Sheldon Planning, LLC. was commissioned to address this issue. Utilizing Coos County plats, aerial photographs, and pipeline location maps, Sheldon Planning developed a list of private landowners whose property would be crossed by the Blue Ridge Variation and their immediately adjacent neighbors. The identified residents were then contacted by phone and visited in their homes to learn how the pipeline would affect them personally and their property. The ready response by over 100 landowners immediately exposed the fallacy that the Blue Ridge Variation would only substantively impact one residence as indicated by the "50-foot rule".

Further evidence that more than one residence would be substantively impacted as indicated by the "50-foot Rule" is attested by the robust participation of landowners along the Blue Ridge Variation in the FERC and EIS process. Seventeen of the private landowners that would be impacted by the Blue Ridge Variation are intervenors. Over 100 private landowners along the Blue Ridge Variation have commented on the DEIS. Some of the letters may have similarity as the neighbors have shared information and talked with each other, however, their letters are not form letters or of "cut and paste" composition. These many private landowners have no agenda other than the impacts that the Blue Ridge Variation would have on their property. Their agenda does not include stopping the construction of Pacific Connector. Their agenda does not include the fact that the pipeline would be built by a Canadian Company. Their



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IND284-69 18CFR 380.12 requires applicants to identify by milepost all residences and buildings within 50 feet of the proposed pipeline construction work space. In our experience, residences within 50 feet of construction activities may experience acute impacts from construction activities.

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agenda does not include fracking, greenhouse gasses, or climate change. Their motivation stems solely from impacts to their property, all of which would go away if the pipeline is located on the Proposed Route. Such active participation by almost 100 percent of landowners along the Blue Ridge Variation is de facto evidence that the "50-foot Rule" for identifying impacts to private residences is most decidedly and fundamentally flawed.

Inadequate Analysis: The DEIS rationale for favoring the Blue Ridge Variation specifically acknowledges that the Blue Ridge Variation "would more than double the number of private parcels (DEIS: 24 to 53) and miles of private lands crossed (DEIS: 6.46 to 13.76)." Where numbers are a key and primary basis for an analytical conclusion or choice among alternatives, a simplistic cataloging of acres is inadequate and violates NEPA regulations.

IND284-69 cont.

Careful analysis of Coos County plats, aerial photographs, pipeline route location maps and on-the-ground visits to the private parcels, has revealed that the DEIS number of affected private landowners to be in error. In addition, the DEIS only provides the number of private parcels that would be crossed by the respective routes. The DEIS fails to provide the very important information regarding how many homes are associated with the private parcels. The actual numbers are: The Proposed Route would cross 33 private landowner parcels with 5 homes compared to 50 landowner parcels with 21 homes crossed by the Blue Ridge Variation. (The DEIS uses the numbers 24 private landowners on the Proposed Route; 53 private landowners on the Blue Ridge Variation with no reference to the total number of affected homes.)

The DEIS only counted as impacted the number of private parcels which would be crossed by the pipeline route and the number of residences within 50 feet of the construction right-of-way (95 feet from the centerline of the pipeline location). Our analysis of Coos County plats and aerial photographs documented specific examples in which this methodology resulted in private parcels being counted in the number of "affected" landowners where the home or relevant feature is a mile from the centerline, and parcels being excluded from the same count where the home or relevant feature is within 300 feet of the centerline.

We conducted a sensitivity analysis to better determine the number of private landowners who would be affected by the Blue Ridge Variation and the Proposed Route. This sensitivity analysis shows that the simplistic metric used by the DEIS of only acknowledging impacts to the number of parcels crossed and the residences within 50 feet of the construction right-of-way dramatically underestimates the actual impacts to private landowners.

Crossed by the pipeline right-of-way

- Blue Ridge Variation: 50 landowner parcels with 21 homes
- Proposed Route: 33 landowner parcels with 5 homes

Within 95 feet of right-of-way centerline

- Blue Ridge Variation: 69 landowner parcels with 30 homes
- Proposed Route: 37 landowner parcels with 6 homes

IND284-69 cont.

Within 300 feet right-of-way centerline

- Blue Ridge Variation: 82 landowner parcels with 41 homes
- Proposed Route: 47 landowner parcels with 10 homes

In addition, one must go beyond a simple cataloging of numbers. A mere display of the number of private parcels crossed or miles of private lands crossed does not constitute a rigorous exploration and hard look as required by NEPA regulations and case law. The National Environmental Policy Act requires that an EIS "Rigorously explore and objectively evaluate all reasonable alternatives" (40 CFR 1502.14(a)), and that an EIS take a "hard Look" (Western North Carolina Alliance v. North Carolina Dept. of Transportation (4th Circuit 2003)). A simple statement that the Blue Ridge Variation and Proposed Route would cross a certain number of private parcels or cross a certain number of miles of private lands does not meet the requirements to "rigorously explore" or to take a "hard look". "Hard look requires that the statement must not merely catalog environmental facts but also explain fully its course of reasoning." (Friends of Boundary Waters Wilderness v. Dombeck (8th Circuit 1999)). IND284-70

The public and agency decision maker are left to speculate on the actual impact that these numbers might represent. For instance, impacts to a landowner might range from a change in the visual setting of their property, or a disruption in their irrigation system at a key time and subsequent loss of crops, forage, orchards or vineyards. Disruptions could include the financial and logistical difficulty in having to temporarily move livestock. A simple display of numbers is inadequate to the great importance of a full understanding of impacts to private landowners.

Negotiating a right-of-way or the exercise of eminent domain will require having a dialogue with private landowners. A dialogue with landowners to make an accurate and realistic assessment of impacts that goes beyond a display of numbers and beyond a desktop analysis is every bit as needed. Ownership patterns, land use patterns, and demographics all combine to make each rural neighborhood unique. We have engaged in such a dialogue with residents through Sheldon Planning LLC.

Following are descriptions of impacts as seen by the residents.

The neighborhood of Alderwood Lane and Skyline Lane reports that there are 25 to 50 houses to the east of the Blue Ridge Variation location and in the 0.5 square mile area between the Blue Ridge Variation and Catching Slough to the east and Old Wagon Road to the north. There are only a few small roads that service this area. There are no alternate routes in and out. The construction of the pipeline along the Blue Ridge Variation would have a major adverse impact on this residential area.



**IND284 continued, page 51 of 64**

IND284-70 Number of parcels crossed is not the only factor considered in our analysis. In addition to number of parcels crossed, we assess the type of land use, and proximity to residences and buildings, as well as environmental factors such as waterbodies, wetlands, habitat, wildlife, threatened and endangered species, and topography. We also assess the permanence of these impacts.

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There is only one way in to the neighborhood of Old Wagon Road on to the Shellhammer Road including the area between Isthmus Slough and Catching Slough or between Highway 101 and Catching Slough. There are about 30 homes in the quarter-square-mile area. Although all of these homes are not classified as affected by the DEIS, they are all serviced by the same system of winding, narrow roads. Even a small change in the accessibility along these roads would have a significant impact on residents. For example, a bridge closure would result n detours of more than 40 miles one way for residents of this area. This not only be a major inconvenience, but would result in lost income.

IND284-70 cont.

One resident reported that the Blue Ridge Variation would be located through about 1.5 miles of pastureland before turning south towards Stock Slough neighborhood. This is prime farmland with a very fragile irrigation system. While this particular resident's farm is about 2.000 feet from the Blue Ridge Variation location, the 1.5 miles of pastureland that the pipeline would run through is adjacent to her property and would alter the irrigation system. At best she hopes the impacts would be temporary during construction, however, at worst the impacts would permanently affect the operation of the farm by ever-so-slightly altering the drainage flow. This farm raises cattle and in order for this operation to succeed, grass needs to grow in the pasture. This requires a working irrigation system. The irrigation systems are not self-contained but are inter-connected with surrounding properties. The system is fragile and very susceptible to failures, obstructions or winter storms. The Blue Ridge Variation poses a significant threat to the operation of the farm.

One resident reported that the Blue Ridge Variation would cross the corner of his property approximately 600 feet from his home. This property is located in the neighborhood between Old Wagon Road and Coos Sumner Lane. There are at least 30 homes in the half-square-mile constituting this neighborhood. This person's property and that of his neighbors is accessed by a single, narrow road that would be used during construction of the Blue Ridge Variation. Even temporary blockages of this road that would create significant hardships for the entire neighborhood.

Impacts to private landowners and the exercise of eminent domain is perhaps the most key issue faced by the construction of the Pacific Connector pipeline. The FERC so recognizes this as evidenced by the amount of analysis given the landowner-initiated alternative route now known as the Proposed Route. The DEIS spends approximately 112 pages in its analysis and discussion of the Proposed Route v. the Blue Ridge Variation. In contrast, the DEIS discusses 10 alternatives in 10 pages, 18 variations and sub-variations in 21 pages, LNG site alternatives in 6 pages, pipeline alternatives in 2 pages, and system alternatives in 4 pages for a grand total of 43 pages. Apparently the DEIS believes that the Proposed Route v. the Blue Ridge Variation is over 2 ½ times more important than all other alternatives and variations combined. Despite this importance, the DEIS dismissed the impacts on private landowners along the two routes by citing a few numbers without discussion or consideration of what the numbers actually mean.

**IND284 continued, page 53 of 64**

NEPA requires that an EIS: discuss impacts in proportion to their significance (40 CFR 1502.2(b)); rigorously explore and objectively evaluate all reasonable alternatives (40 CFR 1502.14(a)), discuss any adverse effects which cannot be avoided (40 CFR 1502.16), contain a reasonably thorough discussion of significant aspects of environmental consequences, and that the agency takes a hard look. (Communities Against Runway Expansion v. Federal Aviation Administration (D.C. Circuit 2004)) (emphasis added).

IND284-70 cont.

The failure to address the actual impacts to private landowners is a violation of NEPA. *Colorado Environmental Coalition v. Dombeck, 185 F .3d 1162 1173-74 (10th Cir. 1999)* (Such discussion must be "reasonably complete" in order to properly evaluate the severity of the adverse effects" of a proposed project prior to making a final decision. *Methow Valley,* 490 U.S. at 352, 109 S. Ct. 1835, *see also Holy Cross,* 960 F .2d at 1523.

The high number of private landowner parcels adversely affected would be resolved by implementation of the Proposed Route.

The specific adverse impacts described by the residents themselves would be resolved by implementation of the Proposed Route.

The unneeded exercise of eminent domain would be resolved by implementation of the Proposed Route.

## Summary Conclusion

Our comments factually demonstrate the DEIS conclusions that:

1. the Blue Ridge Variation would result in a significant environmental advantage compared to the Proposed Route, and that
2. the Blue Ridge Variation would balance overall impacts

are arbitrary and capricious, an abuse of discretion and without basis.

Our comments factually and authoritatively demonstrate that, in reality, the Proposed Route would result in a significant environmental advantage compared to the Blue Ridge Variation, and that the Proposed Route would more than balance overall impacts.

In support of our conclusions is the following list of 66 facts, analytical results, findings, and comparisons derived from our close examination of the DEIS; BLM documents, maps, and data base; Pembina Corporation maps and alignment sheets; information gathered by Sheldon Planning LLC; and the scientific literature.

- Based on BLM's Forest Operations Inventory and maps, actual LSOG removed by Proposed Route would be 22 acres v. DEIS 41 acres.
- LSOG analysis utilizing the simplistic metric of 80 years and older in the DEIS is flawed and misleading.
- Application of BLM's current, sophisticated, science-based, and state-of-the-art approach for evaluating forest stands by structural stage shows that almost all of the LSOG stands affected by the Proposed Route lack structural complexity and structural legacies. The scientific literature holds that structural complexity is a surrogate for functionality.
- Only 3.1 acres of structurally complex forest would be removed by the Proposed Route.
- The few structurally complex stands affected by the Proposed route are highly fragmented, relatively small, and so irregular in shape that they have no interior habitat. Scientific literature holds that the presence of interior habitat is a critical metric of forest stand functionality.
- The development stage of the LSOG that would be removed by the Proposed Route is between canopy closure and culmination of mean annual increment which has the least biological diversity of any forest development stage. Therefore, the affected LSOG

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IND284-71

**IND284 continued, page 54 of 64**

IND284-71 See response to Comment IND284-59.

cannot be "particularly valuable" as characterized by the DEIS rationale for favoring the Blue Ridge Variation.

IND284-71 cont.

- None of the forest stands affected by the Proposed Route have functionality, either because they lack structural complexity and/or lack interior habitat. Therefore, the affected LSOG cannot be "particularly valuable" as characterized in the DEIS rationale for favoring the Blue Ridge Variation.
- The number of acres that would be removed is inconsequential.
- Context: As of 2013 there are 860,528 acres of mature and structurally complex stands with structural legacies. As of 2063 there will be 1,072,105 such acres (PRMP/FEIS p. 1656)
- LSOG habitat will be reduced by 43,164 acres on lands in BLM's Resource Management Plan (RMP) over which it has jurisdiction during the first decade of the RMP's implementation (PRMP/FEIS p. 1655). Thus, BLM determined that short-term reductions in LSOG habitat are acceptable in the context of long-term increases. Therefore, the amount of LSOG habitat that would be removed by the Proposed Route is inconsequential.
- The DEIS asserts that the Blue Ridge Variation would remove 3 acres of MAMU habitat while the Proposed Route would remove 32.2 acres. These numbers are in error.
- Analysis of BLM's Forest Operations Inventory data, BLM-provided MAMU habitat map, and Pembina maps of the Proposed Route indicates that the Blue Ridge Variation would remove 0 acres of MAMU habitat while the Proposed Route would remove 5.4 acres
- The magnitude of the number of acres of MAMU habitat removed is inconsequential in either case.
- Context: These acres occur in the context of 493,434 acres of MAMU nesting habitat and 885,590 acres of MAMU habitat-capable acres on lands over which the BLM has jurisdiction in the area of its Resource Management Plan (RMP). In addition, there are 6,638,960 acres of MAMU habitat-capable acres within BLM's Resource Management Plan planning area, i.e. all lands within the Resource Management Plan area regardless of jurisdiction.

- There is no MAMU critical habitat, i.e. habitat essential for the conservation of the species, in the vicinity of either the Blue Ridge Variation or the Proposed Route
- No NSO high NRF habitat would be removed.
- No NSO habitat within an NSO home range would be removed
- The difference between the two routes in the amount of NRF habitat that would be removed as stated by the DEIS (15 acres) is inconsequential.
- By using a BLM-provided NSO habitat map in conjunction with a Pembina-provided map of the Proposed Route location, along with BLM's Forest Operation Inventory, we determined that the amount of NRF habitat removed by the Proposed Route right-of-way, including TEWAS, would be approximately 5.3 acres.
- The magnitude of the total amount of NRF habitat that would be removed by the Proposed Route is inconsequential in either case.
- Context: BLM-administered lands in the PRMP planning area currently supports 860,200 acres of Mature Multi-layered Canopy and Structurally Complex forest which is a good approximation of NRF habitat
- BLM analysis of NSO habitat does not use a broad number of acres of habitat as a metric, but rather the number of small and large NSO habitat blocks within the range of the NSO. There are no NSO habitat blocks in the area of the Blue Ridge Variation or the Proposed Route. (PRMP/FEIS p. 928-986).
- There is no NSO critical habitat, i.e. habitat essential for the conservation of the species, in the vicinity of either the Blue Ridge Variation or the Proposed Route.
- The DEIS states that the pipeline would be located on ridgelines where feasible to avoid waterbody crossings. The Blue Ridge Variation would violate this policy.
- Coho Salmon and Green Sturgeon Critical (essential) Habitat Crossed
  Blue Ridge Variation: 10 streams (7 coho, 3 green sturgeon[21])
  Proposed Route: 4 streams

IND284-71 cont.

[21] For the 3 green sturgeon critical habitat streams which are omitted in the DEIS, see 74 FR 52346

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- Anadromous Fish-bearing Streams Crossed
  Blue Ridge Variation: 18 known or assumed streams
  Proposed Route: 4 known streams

- Essential Fish Habitat Crossed[22]
  Blue Ridge Variation: 14 streams
  Proposed Route: 4 streams

- Resident Fish bearing streams
  Blue Ridge Variation: 12 known or assumed
  Proposed Route: 6 assumed

- Streams with Aquatic ESA Species or Habitat Present Crossed
  Blue Ridge Variation: 14 known or assumed
  Proposed Route: 4 known

- Impacts to Riparian Areas
  Blue Ridge Variation: 103 acres
  Proposed Route: 50 acres

- Stream Crossing Risk to Bank and Bed Stability[23]
  Blue Ridge Variation: 6 high risk streams, 21 moderate risk streams
  Proposed Route: 0 high risk streams, 3 moderate risk streams

- Impacts to BLM Riparian Reserves[24]
  Blue Ridge Variation: 16 acres
  Proposed Route: 14 acres

- Domestic Water Sources Impacted
  Blue Ridge Variation: 2
  Proposed Route: 0

IND284-71
cont.

[22] JCEP FEIS 2015, Appendix Q p. 3-77
[23] See DEIS Appendix F.9
[24] Impacts under either route within each fifth-field watershed equates to less than one percent of Riparian Reserves managed by BLM in these watersheds (DES Appendix F.9, p. 3-13, Table 3.2.4.3-2. This contradicts DEIS rationale DEIS chapter 3, p. 3-20

- Domestic Water Source within the construction right-of-way
  Blue Ridge Variation: one spring
  Proposed Route: 0

- Water Quality Limited Streams Crossed
  Blue Ridge Variation: 5 streams
  Proposed Route: 1 stream

- Wetlands Crossed
  Blue Ridge Variation: 35 acres; 0.3-acre long-term restoration required
  Proposed Route: 13 acres; 0 long-term restoration required

- Floodplains Crossed
  Blue Ridge Variation: 2.3 miles
  Proposed Route: 1.0

- Shallow Groundwater
  Blue Ridge Variation: 2.2 miles of shallow groundwater
  Proposed Route: 1.0 mile of shallow groundwater

- Waterbodies Crossed
  Blue Ridge Variation: 1 major waterbody, 9 intermediate, 56 minor
  Proposed Route: 0 major, 7 intermediate, 0 minor

- Perennial Streams Crossed (F.9 p. 3-67)
  Blue Ridge Variation: 41
  Proposed Route: 4

- Intermittent Streams Crossed- F.9
  Blue Ridge Variation: 23
  Proposed Route: 4

- Total Streams Crossed F.9
  Blue Ridge Variation: 64
  Proposed Route: 8

IND284-71
cont.

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- The DEIS states that the pipeline would be located on ridgelines where feasible to avoid geologic hazards, steep slopes, and to reduce erosion potential. (DEIS p. 2-59). Adoption of the Blue Ridge Variation would violate this policy.

IND284-71

- The DEIS states that "Pacific Connector has worked to avoid landslides along the proposed route. Ridgetops are generally considered to be stable and therefore an attempt has been made to route the vast majority of the pipeline along ridgetops." (DEIS p. 4-21). Adoption of the Blue Ridge Variation would nullify this statement.

- The DEIS states that "Pacific Connector selected its proposed route to avoid existing landslides and areas susceptible to landslides." (DEIS p. 4-21). Adoption of the Blue Ridge Variation would nullify this statement.

- The DEIS states that "All of the moderate and high hazard deep-seated landslides identified along the alignment were avoided where feasible during final route selection." (DEIS p. 4-22). Adoption of the Blue Ridge Variation would nullify this statement.

- The DEIS states that "All known hazardous landslides thought to pose a risk to the pipeline have been avoided through routing." (DEIS p. 4-22). Adoption of the Blue Ridge Variation would nullify this statement.

- Rapidly Moving Landslide Crossed
  Blue Ridge Variation: 1 (MP 18.1 – 18.2)[25]
  Proposed Route: 0

- Landslide prone areas crossed DEIS Data
  Blue Ridge Variation: 5 landslides, 7,137 feet (1.4 miles)
  Proposed Route: 2 landslides, 3,267 feet (0.6 mile)

- Landslide hazards crossed[26]
  Blue Ridge Variation: 3,257 feet
  Proposed Route: 1,088 feet

[25] JCEP FEIS 2015 p. 4-272
[26] DEIS Appendix F.9, p. 3-20, LiDAR data, GeoEngineers 2015

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- Steep Slopes
  Blue Ridge Variation: 7.7 miles, 116 acres
  Proposed Route: 5.4 miles, 74 acres

- Alluvial valley segments with potential for earthquake-induced liquefaction[27]
  Blue Ridge Variation: 4
  Proposed Route: 2

- High water table
  Blue Ridge Variation: 2.2 miles, 44 acres
  Proposed Route: 1.6 miles, 26 acres

- Prime Farmland
  Blue Ridge Variation: 3.9 miles, 74 acres
  Proposed Route: 1.9 miles, 31 acres

- Soils with high or severe erosion potential
  Blue Ridge Variation: 7.7 miles, 116 acres
  Proposed Route: 6.5 miles, 92 acres

- Potential structural damage to hydric soils (wet and poorly drained)
  Blue Ridge Variation: 2.2 miles, 41 acres
  Proposed Route: 1.3 miles, 21 acres

- Soils with poor revegetation potential
  Blue Ridge Variation: 7.7 miles, 116 acres
  Proposed Route: 6.7 miles, 92 acres

- Soils highly susceptible to compaction
  Blue Ridge Variation: 14.4 miles, 227 acres
  Proposed Route: 12.8 miles, 182 acres

- Soils having restrictive layer (shallow, lithic)
  Blue Ridge Variation: 8.4 miles, 129 acres
  Proposed Route: 7.1 miles, 101 acres

IND284-71
cont.

[27] DEIS Appendix F.9, p. 3-19 - 27

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- Crossed by the pipeline right-of-way
  Blue Ridge Variation: 50 private landowner parcels with 21 home
  Proposed Route: 33 private landowner parcels with 5 homes

- Within 95 feet of right-of-way centerline
  Blue Ridge Variation: 69 private landowner parcels with 30 homes
  Proposed Route: 37 private landowner parcels with 6 homes

- Within 300 feet right-of-way centerline
  Blue Ridge Variation: 82 private landowner parcels with 41 homes
  Proposed Route: 47 private landowner parcels with 10 homes

- The Proposed Route would have willing landowners and no eminent domain issues while on the Blue Ridge Variation 17 landowners have expressed their intention to legally resist right-of-way acquisition by Pacific Connector.

- The 17 landowners along the Blue Ridge Variation are all intervenors. The 17 landowner intervenors along the Blue Ridge Variation represent 30% of the 54 total landowners who have intervened along the 157 miles of privately-owned lands crossed by the PCGP. (This number of total landowner intervenors was current as of March 2016.)

- The Blue Ridge Variation would place the pipeline approximately 90 percent on private land while the Proposed Route would place the pipeline approximately 54 percent on Federal lands. The remaining portion of the Proposed Route would be located almost entirely on managed timber lands.

- In the discussion of its Certificate Policy Statement in its March 11, 2016 Order Denying Applications for Certificate to Pacific Connector Gas Pipeline, the FERC stated that; "The Commission's goal is to give appropriate consideration to . . . . the unneeded exercise of eminent domain". Locating the PCGP on the Proposed Route would exactly conform with the FERC's Certificate Policy Statement to avoid the unneeded exercise of eminent domain.

IND284-71
cont.

**We have brought forth an immense amount of important information in our comments.**

**We have shown that the number of acres of LSOG forest, structurally complex forest, MAMU habitat and NSO habitat that would be removed by the Proposed Route would be miniscule.**

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We have shown that whether one accepts our well-supported numbers or retains the DEIS numbers in this regard, the numbers of acres that would be removed are inconsequential.

We have shown that for almost all of the LSOG forest, structurally complex forest, MAMU habitat, and NSO habitat that would be affected, the Proposed Route would be located on existing roads that border these stands, and thus the impacts would be minimized.

We have shown that the LSOG in question lacks structural complexity, lacks functional interior habitat, and is at the forest stage of development that has the least biological diversity. We have given compelling evidence that the LSOG in question is most definitely not "particularly valuable" as characterized by the DEIS.

We have shown that in regards to impacts to water resources, fish resources, geological resources, and soil resources the significant advantages to the Proposed Route v. the Blue Ridge Variation are overwhelming.

We have shown that the Proposed Route would essentially eliminate impacts to private landowners and eliminate the need to exercise eminent domain.

In their totality and in their sum, the 66 points in the above summary overwhelmingly and emphatically demonstrate that compared to the Blue Ridge Variation:

1. The Proposed Route would result in a significant environmental advantage,
2. The Proposed Route would balance over all impacts, and
3. The Proposed Route would be environmentally preferable

The Comparison and trade-offs of various natural resources and human issues is not a simple matter, however, the magnitude of the advantages of the Proposed Route are telling.

***The facts are clear. The facts are compelling. The choice made must fit the facts found. The choice made must be to retain the Proposed Route as the location of the Pacific Connector Gas Pipeline.***

*Sincerely,*
*Mark Sheldon with:*

*Michael & Rene Collins*
*Coos County Sheep Co.*
*James R. & Archina J. Davenport*
*Victor C. & Arianne Y. Elam*
*Ronald L. & Molly A. Foord*
*Daniel S. & Anna M. Fox*
*Fred Messerle & Sons, Inc*
*Randal B. & Kelly A. Hoffine*
*Leatherman Land & Timber Co.*
*John and Mary Muencrath Trust 12-22-11*
*Edgar Maeyens, Jr.*
*William H. McCarthy, Et Al*
*David L. & Emily J. McGriff*
*Curtis J. & Melissa R. Pallin*
*Solomon Joint Living Trust*
*Paul M. & Eura M. Washburn*
*Wright Loving Trust*

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## Biographical Sketch of Contributors

**Mark Sheldon**

Mark is a long-time resident and landowner along the Blue Ridge Variation. As a stakeholder, he has been an active intervenor in the Jordan Cove Energy and Pacific Connector Gas Pipeline environmental impact statement process. Mark has engaged Phil Hall, Hailey Sheldon, and Owen Schmidt as consultants in commenting on the Jordan Cove Energy and Pacific Connector Gas Pipeline environmental impact statement.

**Phil Hall**

Phil holds a bachelor's degree in forestry and a bachelor's degree in conservation from North Carolina State University. Phil is also a graduate of Forest Engineering Institute at Oregon State University. Phil has 43 years of experience in almost every aspect of forestry, forest engineering, and natural resource management. Phil's engineering experience includes the construction of over one hundred miles of forest roads. Phil has extensive NEPA and land use planning experience which has taken him to twenty-two BLM offices, sixteen National Forests, two Indian Reservations, ten states and Washington, D.C. in various capacities, including interdisciplinary team lead, program/project lead, NEPA trainer, expert witness in litigation, and consultant. At the national level his NEPA and natural resource work has included the Department of Interior, Department of Agriculture, Justice Department, Executive Office of the President (Council of Environmental Quality), and Senate hearings. Phil completed a thirty-year career with the Bureau of Land Management in 2006. Since retiring from the Bureau, Phil has worked for Mason, Bruce and Girard Natural Resource Consultants, and as a self-employed Natural Resource Consultant.

**Hailey Sheldon**

Hailey Sheldon holds a Master's Degree in Public Administration and a Bachelor's Degree in Political Science. Her firm, Sheldon Planning, LLC. Specializes in political organization and outreach. She has over 10 years of experience conducting both qualitative and quantitative surveys for political candidates, private businesses, universities, and non-profits. Located in Coos Bay, Oregon, her firm often facilitates public participation in the crafting of policy related to coastal land-use. She is a long-time resident of Coos Bay and daughter of the author, Mark Sheldon.

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**Owen Schmidt**

Owen L. Schmidt, BA, MA, JD, has more than 32 years' service with the Federal Government. He served as Senior Counsel with the U.S. Department of Agriculture, Office of the General Counsel in Portland, Oregon, where he advised USDA agencies in Washington and Oregon. He was also a Special Assistant United States Attorney in the District of Oregon. Before joining USDA he was an attorney for the Bonneville Power Administration, where he joined the legal staff after several years as an Environmental Specialist. Mr. Schmidt received his J.D. from Northwestern School of Law of Lewis & Clark College (1977), and a B.A. (1969) and M.A. (1973) in biology from St. Cloud State University, Minnesota. He is a frequent author and lecturer on the National Environmental Policy Act. He was the Editor of Oregon Birds, a quarterly journal of Oregon Field Ornithologists, for 14 years (1985-99), and is a long-time member of the Oregon Bird Records Committee.