

1 have testified before state and federal commissions on these matters. I have performed
2 economic impact assessments of new infrastructure developments in a range of contexts,
3 including biofuels production facilities to new airport capacity. My work has appeared in
4 both academic and industry journals such as the *Journal of Environmental Economics and*
5 *Management*, the *Electricity Journal*, and *Public Utilities Fortnightly*, and in publications
6 associated with institutions such as the AEI-Brookings Joint Center for Regulatory
7 Studies and the Harvard Regulatory Policy Program.

8 5. I received a Bachelor of Arts in physics from Wesleyan University, a
9 Masters in City Planning, Environmental Policy and Planning from the Massachusetts
10 Institute of Technology, and a Ph.D. in Public Policy from Harvard University. Since
11 receiving my doctorate degree, I have worked with several economic consulting firms,
12 including National Economic Research Associates, Inc., LECG, LLC and now Analysis
13 Group (“AGI”). My professional experience and qualifications are summarized in my
14 curriculum vitae, which is included as Attachment A.

15 6. Based on my professional experiences and training, I have developed an
16 expertise in socioeconomic impacts of industrial facilities.

17 7. I have reviewed relevant portions of the ASC, as well as the Draft
18 Environmental Impact Statement (“DEIS”) and key comments thereto, including the
19 Marten Letter¹ and Johnson Review² to form my opinions and testimony.

20 8. I have been asked to address two issues. First, I summarize my analysis of
21 the anticipated socioeconomic impacts of the Project, including the primary impacts based
22

23 ¹ Marten Law, Comments on Draft Environmental Impact Statement, Tesoro-Savage Energy Distribution
Terminal, Docket EF-131590, January 21, 2016.

24 ² Johnson Economics, “Tesoro Savage Vancouver Energy Distribution Terminal DEIS Independent
Review,” January 20, 2016.

1 on IMPLAN analysis and secondary impacts arising from activity associated with Project
2 operations, including a statistical analysis of property values impacts. Findings reported
3 in my testimony reflect information provided in reports that were included in preliminary
4 draft environmental impact statement materials, with the exception of the statistical
5 analysis, which reflects new research. In this section, I also address comments provided
6 by certain parties (Marten Law and Johnson Economics) regarding my analyses. Second,
7 I assess the DEIS developed by the Washington Environmental Facility Site Evaluation
8 Council's ("EFSEC") consultant, Cardno, Inc. ("Cardno").

9 **I. PROJECT SOCIOECONOMIC IMPACTS**

10 9. In this section, I summarize my findings regarding the Project
11 socioeconomic impacts. These include the primary economic impacts of the Project's
12 construction and operation on the region's economy. In addition, I consider secondary
13 economic impacts that may arise from activities associated with the Project, notably
14 potential impacts that changes in rail traffic frequency (to the extent there are any) may
15 have on property values, road traffic delays, and rail system congestion and delays. By
16 considering both the positive primary impacts and secondary impacts, which could be
17 positive or negative, my analysis considers the "net" impacts of the Project's construction
18 and operation; likewise the DEIS considers wide range of impacts, both positive and
19 negative, from the Project's development.

20 10. I have prepared several figures and tables to illustrate my statements in this
21 testimony. These can be found in the Figures and Tables attached hereto as Attachment
22 B, incorporated herein by reference.

23 11. My opinions and conclusions related to the socioeconomic impacts of the
24 Project are largely contained in three reports, Todd Schatzki and Bruce Strombom,
25 "Assessment of Vancouver Energy Socioeconomic Impacts: Primary Economic Impacts,"

1 July 28, 2014 (“Primary Impacts Report”), attached hereto as Attachment C, Todd
2 Schatzki and Bruce Strombom, “Assessment of Vancouver Energy Socioeconomic
3 Impacts: Secondary Economic Impacts,” September 5, 2014 (“Secondary Impacts
4 Report”), attached hereto as Attachment D, and Todd Schatzki and Bruce Strombom,
5 “Assessment of Vancouver Energy Socioeconomic Impacts: Statistical Analysis of
6 Potential Property Value Impacts from Vancouver Energy” May 13, 2016 (“Property
7 Value Impacts Report”), attached hereto as Attachment E, all of which are incorporated
8 herein by reference.

9 **A. Primary Economic Impacts**

10 12. Primary economic impacts reflect the changes in economic activity from
11 the Project’s construction and operations, and include increased income for local workers,
12 increased profits for local business owners and increased tax revenue streams for local
13 government. These impacts arise due to the direct employment and local business activity
14 from the Project’s construction and operation, as well as the spillover effects as this direct
15 activity ripples through the region’s economy. Impacts are estimated over a regional
16 geographic area comprised of the 10 counties closest to the Project. Further details on this
17 analysis are available in the Primary Impacts Report.

18 13. Economic impacts are evaluated through comparison between a “policy
19 case” in which the Project is developed and a “base case” in which the Project is not
20 developed. Comparison between this base case and the policy case provides a measure of
21 the Project’s “stand alone” impact. Because the Project would result in new economic
22 activity, this results in positive economic impacts to the region.

1 14. The primary economic impacts associated with an alternative industrial
2 activity are not explicitly analyzed.³ In principle, an alternative Port of Vancouver
3 (“Port”) use could result in impacts that are larger or smaller than those from the Project
4 depending on a range of factors.⁴ While alternative uses are not considered, one factor
5 suggesting that the Project would have greater impacts than an alternative use is that,
6 based on an assessment by the Port, a crude-by-rail facility would provide the Port with
7 greater revenue streams than other uses.⁵ Revenues to the Port result in positive economic
8 impacts to the regional economy because these revenues would be used to either increase
9 operations at the Port or increase investment by the Port in the region, both of which
10 would create positive economic impacts. Thus, all else equal, the Project would provide
11 greater regional impacts than alternatives, assuming the Port was correct in its assessment
12 that the Project provides the largest revenue streams to the Port.

13 **i. Overview of IMPLAN**

14 15. The primary impacts of the operation and construction of the Project on the
15 regional economy are estimated using the IMPLAN model.⁶ The IMPLAN model

16 _____
17 ³ In practice, it is highly likely that if the Project were not developed that another business operation would
18 take its place and use the parcels and resources planned for use by the Project. The impacts of the Project
19 relative to such an alternative Port use would depend critically on the particular type of business and the
20 details of its operations that would be developed in place of the Project. Because, based on communications
21 with the Port, there is no preferred or likely secondary use of Port resources if the Project is not developed, I
22 do not attempt to independently identify and model alternative uses. Personal communication with the Port
23 of Vancouver personnel.

24 ⁴ These factors include labor requirements during construction and operations, use of goods and services
25 from Vancouver and other regional businesses, tax revenues to local government, and other factors.

⁵ I understand that the decision by the Port to pursue a crude-by-rail terminal through a competitive
solicitation was made after analysis of various alternative uses that considered compatibility with the
particular configuration of available parcels within the Port, potential revenue streams to the Port, and other
factors. Personal communication with the Port of Vancouver personnel.

⁶ IMPLAN stands for “IMPact analysis for PLANning.” It is a social accounting/input-output (I/O) model
designed to replicate the structure and functioning of the economy in a specific geographic area.
Input/output (I/O) models draw on long-standing, well-established, and broadly accepted methodologies to
estimate how a change in economic activity impacts a regional economy based on data-driven estimates of

1 estimates local economic impacts arising from changes in economic activity and is based
2 on detailed region- and sector-specific data from the U.S. Commerce Department's
3 Bureau of Economic Analysis. This model provides highly detailed estimates specific to
4 the geographic region and industries being analyzed. IMPLAN is widely used for
5 economic impact assessments in the public and private sectors.

6 16. The IMPLAN analysis reflects the direct impacts of the new economic
7 activity from the Project's construction and operation. The estimated impacts also reflect
8 the indirect and induced impacts, as the direct effects of Project construction and
9 operation flow through the regional economy.⁷ Thus, estimated economic impacts reflect
10 the many layers of economic activity that would be created with construction and
11 operation of the Project.

12 17. A number of economic metrics can be evaluated using IMPLAN. My
13 analysis focuses on four metrics:

- 14 • *Employment* – the total number of jobs created or lost;
- 15 • *Labor Income* – the total change in income to employees that results from the
16 economic activity;
- 17 • *Tax Revenue* – the total change in revenues received by state and local
18 governments; and
19

20
21 how this change ripples through the economy. IMPLAN estimates are based on census data collected from
22 businesses by the Bureau of Economic Analysis ("BEA"), U.S. Department of Commerce. For further
23 information on IMPLAN or input/output models, see <https://implan.com>.

24 ⁷ *Direct* impacts reflect the immediate impacts of the new project on employment. *Indirect* economic
25 activity arises because various phases of the Project's development – plant construction and subsequent
operations – create new demand for local goods and services, which in turn leads to new jobs in these
sectors. *Induced* economic activity arises from increases in spending on general goods and services made
by workers with new earned income.

- 1 • *Value Added* – the total change in the value added to the economy from the
2 new economic activity.⁸ In practice, value added reflects new “value” created
3 by the economic activity to labor (in the form of labor income), government (in
4 the form of tax revenues) and business owners (in the form of “profits”).⁹
5 Consequently, both labor income and tax revenue, which are reported
6 separately, are components of value added.¹⁰

7 **ii. Data and Assumptions**

8 18. Information on the Project’s construction and operations were provided to
9 me by Tesoro-Savage. This information includes: employment during construction and
10 operations phases; construction costs and annual operations costs, both disaggregated into
11 various categories of expenditures; schedules for the timing of the Project’s construction;
12 and schedules for plant operations, including assumptions about throughput levels over
13 time.¹¹ Expenditures were assigned into appropriate IMPLAN sector categories, based on
14 assumptions about the character of the economic activity associated with each category of
15 spending. Further details on the assumptions and data used in estimating the Project’s
16 primary impacts are provided in the Primary Impacts Report.¹²

17
18 ⁸ This value reflects new gross economic output net of the cost of non-labor inputs used in creating this
19 output.

20 ⁹ Note that value added and gross output are not equal. Value added represents the remaining portion of
21 gross output after accounting for input costs. Thus, one dollar of direct spending does not translate into one
22 dollar of value added.

23 ¹⁰ Estimates for value added reported below understate the likely value added because they do not reflect
24 certain tax revenue estimates that I make outside the IMPLAN analysis. Further discussion of the tax
25 estimates is provided below.

¹¹ Cost information relied on are initial estimates, provided for the purposes of this economic analysis.
 Actual costs may differ from those shown in this testimony.

¹² The Comment Letter and Johnson Review both suggest that the modeling provided in the DEIS and the
 Primary Impacts Report “provides no information regarding the assumptions or inputs to the model.”
 Marten Letter, page 10. These comments appear to ignore the vast amount of information provided in the
 Primary Impacts Report regarding assumptions and methods, particularly Section III, titled “Data and

1 19. The Project's construction and operations will occur over a multi-year time
2 frame, with an initial construction period and subsequent operations period. Figure 1
3 summarizes the timeline assumed in my analysis for Project construction and operations.
4 Construction of the Project will potentially occur in two phases. For purposes of this
5 analysis, Phase I construction was assumed to start December 1, 2014 and last
6 approximately 12 months.¹³ After Phase I construction is complete, the Project will have
7 the capacity to serve two to three trains per day. Phase II construction was assumed to
8 start January 1, 2016 and last approximately 6 months. Upon completion of Phase II
9 construction, the Project will have the capacity to serve up to four trains per day, its
10 maximum capacity.¹⁴ Phase I construction costs total approximately \$150 million, while
11 Phase II construction costs total approximately \$60 million. The labor employed in Phase
12 I of construction is summarized in Table 1 (see Attachment B).

13 20. The Project's operations will begin after completion of Phase I
14 construction, which, for purposes of this evaluation, was assumed to be in 2016. It is
15 assumed that during 2016, the Project would receive up to two or three trains per day
16 based on Phase I capacity, with volumes increasing to four trains by the end of the year

17 Assumptions," This section lays out in significant detail the assumptions and data used to support the
18 analysis, including, for example, Table 2, which provides the specific IMPLAN activity types used, the
19 IMPLAN sectors modeled, and the dollar values input into the IMPLAN model for the annual operations at
the project.

20 ¹³ The time line for construction and operations assumed in my analysis reflected development planning at
the time of the Primary Impacts Report. Although this schedule has been delayed, this delay does not affect
21 the findings of my analysis. In effect, the delay shifts all economic activity to the point in time when the
construction and operations activity occur, but does not meaningfully change the magnitude or nature of
22 these impacts.

23 ¹⁴ If construction was consolidated into one phase, this would not have a meaningful effect on my overall
conclusions. Expected economic impacts would depend on the specific details of the construction activity
24 under a consolidated one-phase development (as opposed to two phases) and the change in operations,
including whether there would be an operation start-up phase. However, I would not expect the economic
25 impacts under a one-phase development process to meaningfully differ from those arising from a two-phase
development process.

1 upon completion of Phase II. Consequently, I have modeled a one-year operations “start-
2 up” period during 2016 in which deliveries to the Project average two trains per day.

3 21. I assume that once Phase II construction is completed, the Project will
4 operate at full capacity of four trains per day in 2017 and all subsequent years. I assume
5 that the Project will operate for 14 years at full capacity, which includes the initial ten year
6 lease period and an additional five year lease period. The actual length of the Project’s
7 operations is uncertain at present. Plant operations could be as short as ten years, the
8 length of the initial lease with the Port, or could continue up to an additional ten years due
9 to the two five year lease options. The assumption of a 15 year operating term reflects a
10 balance between these potential outcomes.¹⁵ Table 2 summarizes start-up and full build-
11 out expenditures. The direct labor employed at the Project is summarized in Table 3 (see
12 Attachment B).

13 22. Lease and fees paid to the Port of Vancouver are modeled as a separate set
14 of direct activities, with the quantity of expenditures based on pro-rata shares of activities
15 in the Port of Vancouver’s 2014 final budget.¹⁶ For example, the portion of the lease and
16 fee payments assumed to be spent on capital project investment at the Port is based on the
17 percentage of the current budget devoted to capital project investment.

18 23. Johnson Economics raises a number of concerns regarding the data and
19 methods used in the IMPLAN analysis, resulting in the broad claim that impacts are
20 overstated.¹⁷ The individual points raised by Johnson Economics are either without merit
21

22 ¹⁵ To the extent that the actual operations extend for a twenty year period, the primary economic impacts
23 would be larger than those estimated, reflecting the additional five years of Project operations.

24 ¹⁶ Available at <http://www.portvanusa.com/assets/2014-FINAL-Budget-111213.pdf>, accessed April 15,
25 2014.

¹⁷ For example, “The Primary Economic Impacts Analysis included in [the Primary Impacts Report]
overstates positive impacts.” Johnson Review, p. 2.

1 or indicate misunderstanding by Johnson Economics about IMPLAN and the analysis
2 performed. Thus, the broad claim regarding overstatement of benefits is without merit.

3 24. First, Johnson Economics suggests that analysis of a 16-year construction
4 and operations period is “inconsistent” with the lease with the Port.¹⁸ As described above,
5 this is plainly incorrect, since it includes a one year construction period and 15-year
6 operations period. Moreover, this period strikes a reasonable balance between the
7 minimum and maximum operating period of 10 and 20 years, respectively, as provided for
8 in the lease.

9 25. Second, Johnson Economics states that impacts are overstated as a result of
10 using off-site employment as a direct impact.¹⁹ Because direct impacts reflect any
11 immediate impacts of the Project so long as they occur within the study area, the fact that
12 some impacts were on-site and some were off-site is immaterial to whether or not they are
13 defined as “direct” within IMPLAN.²⁰ Therefore, the Johnson Review (and Marten
14 Letter) statements that economic benefits are overstated as a result of off-site employment
15 being modeled as direct impacts are incorrect.

16 26. Third, Johnson Economics makes a number of comments regarding
17 modeling of the Port lease payments. Johnson Economics claims that there is a “double
18 count” in the treatment of Port lease payments.²¹ This is incorrect. As shown in Table 2
19 of the Primary Impacts Report, the Port of Vancouver lease payments and fees are a

20 _____
21 ¹⁸ Johnson Review, p. 4

22 ¹⁹ “The analysis also appears to adopt the application’s use of off-site related employment as direct
23 employment, which overstates the impacts of the Project. This overstates impacts, as it incorrectly
24 categorizes indirect impacts as direct impacts.” Johnson Review, p. 4.

25 ²⁰ This was described in the Primary Impacts Report, p. 6: “Direct impacts reflect the immediate impacts of
the new project on employment. In this case, direct impacts reflect workers hired during facility construction
and employees needed to operate the Project on an on-going basis. All of this economic activity is new to
the region and thus creates incremental employment and economic effects.”

²¹ Johnson Review, p. 5.

1 separate line item within the annual operations modeled distinct from any other operations
2 costs.²² Johnson Economics also claims that the approach taken to modeling the impacts
3 is “somewhat unusual,” but does not draw any inferences from its assertion.²³ As an
4 independent public agency, the Port would be expected to fully spend additional revenues
5 through either expanded operations or investment in new operations within Vancouver.
6 Moreover, this spending would occur locally because of the Port’s mission to provide
7 “economic benefit to our community”.²⁴ The IMPLAN analysis simply implements this
8 logic by assuming that this new revenue is spent in proportion to the current mix of
9 spending. Finally, Johnson Economics also claims that “we may question if the revenue
10 streams to a public agency will have the same proportional impact as private sector
11 income,”²⁵ but offers no explanation of or support for the claim. Within IMPLAN, there
12 is no distinction between the impact of spending by public and private entities, and,
13 moreover, it is unclear why such a difference would exist. Further, Johnson Economics
14 discounts the fact that, because the Port is a public agency, payments to the Port would
15 likely be spent locally, whereas profits earned by a private entity might be spent outside
16 the region.

17 27. Fourth, Johnson Economics claims that the assumption that all construction
18 labor comes from Clark County overstates benefits, and, on this basis, reduces
19 construction period economic impacts by 50 percent. This conclusion and proposed
20

21 ²² These payments represent \$19.17 million and \$44.86 million (start-up and full build-out, respectively) of
22 the \$46.54 (start-up) and \$99.24 million (full build-out) in total operation costs, and are modeled separately
23 from the General Operating Expenses and Property Tax expenses shown in Table 2.

24 ²³ “The analysis also appears to adopt the application’s use of off-site related employment as direct
25 employment, which overstates the impacts of the facility. This overstates impacts, as it incorrectly
categorizes indirect impacts as direct impacts.” Johnson Review, p. 4.

²⁴ Port of Vancouver, “Frequently Asked Questions,” accessed April 28, 2016.

²⁵ Johnson Review, p. 5.

1 adjustment are incorrect. The IMPLAN analysis is performed for a multi-region area
2 including all counties surrounding Clark County within a one hour commute of the
3 Project.²⁶ Because these counties are within a one-hour commute of the Project, it is
4 reasonable to assume that all or almost all construction labor would reside within this
5 region. However, within this large area, the specific residence of construction workers
6 will have little effect on the overall estimated impacts.²⁷

7 **iii. Results: Estimated Primary Economic Impacts of the Project**

8 28. Table 4 summarizes the expected primary economic impacts from the
9 Project, while Figures 2 to 4 illustrate the annual values, broken out into direct, indirect,
10 and induced impacts (see Attachment B).²⁸ In total, the combined effects of the
11 construction and operations of the Project yield an average of over 1,000 jobs annually
12 over the assumed 16-year construction and operation period, totaling over 17,000 job-
13 years over this period. Other cumulative impacts include nearly \$1.6 billion in labor
14 income, and over \$2.0 billion in economic value added to Clark County and the
15 surrounding area. On a present value basis, these nominal impact estimates correspond to
16 about \$890 million in labor income and about \$1.2 billion in economic value added.

17 29. These total impacts reflect the combined effect of direct, indirect, and
18 induced effects. The direct employment impacts in Clark County of Phase I construction
19 are expected to be 239 jobs for the one-year construction period, while these impacts are
20

21 ²⁶ See Primary Impacts Report, pp. 7-8.

22 ²⁷ The difference in impact – which could be positive or negative – would be driven by slightly different
23 spending patterns for the construction workers between individual counties within the study area.

24 ²⁸ Annual results are presented in nominal terms, while cumulative impacts are presented in both nominal
25 terms (i.e., the sum of annual values) and as the net present value as of 2014 in 2014 dollars. The net
present values reflect the use of a 7 percent discount rate, consistent with guidance provided by the Office of
Management and Budget (“OMB”). OMB, Circular No. A-94 Revised, October 29, 1992.

1 expected to be 81 jobs for the six-month Phase II construction period.²⁹ Phase I
2 construction is expected to also lead to \$23 million in economic value added, while Phase
3 II is expected to lead to \$8 million in economic value.³⁰

4 30. During the Project's operations, direct employment impacts are expected to
5 average 616 jobs annually over the assumed 15-year operational period (totaling 8,925
6 jobs over the period). The estimated direct employment impacts of the on-going operation
7 of the Project include three components: labor on-site at the Project, jobs associated with
8 other direct Project operational activities (i.e., expenditures on goods and services), and
9 lease payments and fees to the Port of Vancouver. The direct labor specific to on-site
10 Project operations is expected to be 91 jobs annually for the start-up period, and 176 jobs
11 annually for each year of the remaining years over the 15-year operational period studied.
12 This employment specific to on-site operations at the Project represents 28 percent of total
13 direct employment (2,555 of the 9,245 total direct job-years).³¹

14 31. Other direct impacts over the 15-year operational period assumed for this
15 assessment include \$1.1 billion in labor income (\$76 million annually on average), and
16 \$1.2 billion in economic value added (\$83 million annually on average). Like the
17 employment impacts, these impacts reflect both the direct labor at the Project as well as
18
19

20 ²⁹ Job impacts are measured in "full-time" positions, which could reflect full-time jobs or an equivalent
21 quantity of part-time jobs (e.g., two half-time jobs being equivalent to one full-time job).

22 ³⁰ Due to the approach taken to analyzing construction phase economic benefits, economic value added from
23 direct impacts during this phase only those arising from labor income. Other value added components
(taxes and business profits) are included in the indirect and induced category of benefits. (This method is
24 known as "analysis-by-parts" in IMPLAN. For more information, please see the IMPLAN website and
25 associated documentation.)

³¹ A job-year reflects one job held for one year, and provides a metric for measuring employment over
multiple years. In this case, total on-site employment equals one year of start-up employment (91 jobs) plus
14 years of full build-out operations (176 jobs) – that is, 91 jobs + 14 years * 176 jobs = 2,555 jobs-years.

1 the direct activities created by the Project including lease payments and fees to the Port of
2 Vancouver.

3 32. Indirect and induced impacts to the ten-county area of study of Phase I
4 construction yield 792 jobs during the one-year construction period, \$39 million in labor
5 income, and \$66 million in economic value added, while Phase II construction impacts
6 yield 317 jobs over the six month period, \$16 million in labor income, and \$27 million in
7 economic value added.

8 33. During the Project's operations, the indirect and induced employment
9 impacts are expected to result in 449 jobs on average, totaling 6,728 jobs over the
10 assumed 15-year Project operation period. Over the assumed 15-year period, indirect and
11 induced labor income is expected to be \$382 million, while indirect and induced value
12 added is expected to be \$709 million.

13 iv. Tax Revenues Impacts

14 34. Taxes generated by the Project include several forms of payments to state
15 and local governments. These include sales tax, business and occupation ("B&O") tax,
16 property taxes on both the Project and other supporting businesses, and other taxes, such
17 as payments for temporary disability insurance and business license fees. Table 5
18 summarizes estimated tax impacts from the Project (see Attachment B).

19 35. In total, the construction of the Project is expected to have a one-time tax
20 impact of over \$22 million to state and local governments, and the annual operation of the
21 Project is expected to have a recurring annual impact of approximately \$7.8 million once
22 the Project is operating at full capacity. Sales tax increases represent the largest portion of
23 both construction and operations phases. Sales taxes represent nearly 80 percent of
24 construction phase total increases (\$17.6 million of \$22.1 million) and over 40 percent of
25 operations phase total increases (\$3.2 million of \$7.9 million at full build-out). Property

1 taxes are the second largest tax component, representing 12 percent of construction phase
2 tax increases and 39 percent of operations phase tax increases.

3 **B. Secondary Socioeconomic Impacts**

4 36. Secondary impacts reflect impacts to existing or potential new economic
5 activity from development and operation of the Project, including activities associated
6 with the Project's operations, such as the transportation of crude oil by rail to the Project.
7 Secondary Project impacts could arise from changes in rail traffic as a consequence of
8 trains delivering crude oil to the Project. My testimony explicitly considers several
9 potential impacts from changes in rail traffic, to the extent such exist, including:

- 10 • Dis-amenity, such as noise and aesthetic impacts, from increased rail
11 traffic;
- 12 • Increased road congestion at at-grade rail crossings; and
- 13 • Increased congestion on the rail system.

14 37. Secondary socioeconomic impacts should be evaluated through comparison
15 between a "policy case" in which the Project is developed and a "base case" in which the
16 Project is not developed. Likely secondary impacts depend, in part, on the difference
17 between rail traffic between these two cases. I understand that, based on comments
18 provided by BNSF, that there is not anticipated to be any meaningful change in rail traffic
19 as a consequence of the Project.³² Among the many factors affecting rail traffic through
20 Vancouver in the absence of the Project are alternative uses of the Port and alternative
21 modes by which crude oil is delivered to West Coast petroleum refineries. To the extent
22 that the parcel currently assigned to the Project would be used for another activity that

23 _____
24 ³² BNSF Railway Company, Comments in Response to Publication of Draft Environmental Impact
25 Statement; Tesoro Savage Vancouver Energy Distribution Terminal, January 21, 2016 (hereafter, "BNSF
Railway Comments").

1 would involve rail transport, the incremental rail traffic from the Project would only
2 reflect the difference between traffic associated with the Project and traffic associated
3 with the alternative use. In addition, rail traffic would depend on the route and mode (e.g.,
4 rail or ship) taken by crude oil that West Coast refineries would use to replace the crude
5 oil supplies they would have received from the Project.³³ In spite of these factors, I
6 evaluate potential incremental increases in rail traffic of zero and four unit trains per day.

7 **i. Dis-amenity Impact on Local Development and Economic**
8 **Activity from Increased Rail Traffic**

9 38. Increased rail traffic potentially has an adverse impact on local
10 development and economic activity in any area near rail lines because of the dis-amenity
11 of rail traffic (e.g., noise, vibration, odor, and visual impact). All things being equal,
12 residents or businesses may prefer to locate at a distance from rail lines to avoid these dis-
13 amenities and other impacts from rail traffic, such as delays at road crossings, which can
14 impose delay costs. On the other hand, proximity to rail can provide benefits, particularly
15 when it provides better access to passenger rail systems for households or certain
16 commercial businesses (e.g., office space) or improved access to freight transportation for
17 industries and certain commercial businesses (e.g., warehousing).³⁴ However, given these
18 (and other) countervailing factors, it may be difficult to estimate, with any precision, what
19 might be the positive or negative impacts attributed to changes in rail traffic on that rail
20

21 ³³ For example, in the Base Case (with no Project), if crude supplies destined for West Coast refineries are
22 still delivered via a rail through Vancouver, then the Project would have no incremental impact on crude rail
23 traffic through Vancouver.

24 ³⁴ For example, see Wardrip, Keith, "Public Transit's Impact on Housing Costs: A Review of the
25 Literature," Insights from Housing Policy Research, Center for Housing Policy, August 2011; Debrezion,
Ghebreegziabiher, Eric Pels and Piet Rietveld, "The Impact of Railway Stations on Residential and
Commercial Property Value: A Meta-analysis," Journal of Real Estate Financial Economics 35: 161-180,
2007.

1 line, particularly in a situation in which the presence of the rail line predates proximate
2 land uses.

3 39. In my analysis, I evaluate the potential impact of increased rail traffic on
4 property values using two approaches. One approach is a literature survey of existing
5 statistical analyses of the impact of rail traffic on property values. The second approach is
6 original research on the change in property values in Vancouver, Washington since the
7 announcement of the Project. The literature search was referenced in the Secondary
8 Impacts Report. The original research on changes in property values in Vancouver,
9 Washington since the announcement is work that I have completed subsequently, and is
10 attached to this testimony as Attachment E.

11 a. Hedonic Analysis of Property Value Impacts

12 40. One approach to evaluating the economic impact of a particular land use is
13 to analyze how proximity to the land use of interest affects real estate values. From an
14 economic standpoint, the market value of a residential property reflects the attributes of
15 the property (the parcel size, the size of the house, the quality of construction, the number
16 of bedrooms, etc.), its location, attributes of the neighborhood and its proximity to other
17 land uses (e.g., parks, schools, major roads, rail lines). The value of properties for
18 commercial and industrial use would reflect a different set of attributes relevant to those
19 types of uses. Economists have used a statistical approach called hedonic analysis to
20 estimate how each of these attributes affect property values.³⁵ Hedonic analysis uses
21 information about the actual prices paid for properties and the actual property attributes to
22
23

24 ³⁵ Freeman, A. Myrick III. *The Measurement of Environmental and Resource Values, Theory and*
25 *Methods*," Resources for the Future: Washington, D.C.

1 determine how variations in property values are explained by differences in property and
2 location attributes.

3 41. Research using hedonic analysis has evaluated how proximity to rail lines
4 affects property values. Because the Project may affect the number of trains that travel
5 along the existing rail line, I performed a literature search to identify studies that evaluated
6 the impact of variation in rail traffic on property values. While there are many studies that
7 estimate the impact of proximity to a rail line on property values, I was only able to
8 identify two reliable studies that evaluated the impact of changes in in the level of rail
9 traffic.³⁶ Both of these studies evaluated general rail traffic, not traffic involving specific
10 commodities (e.g., crude oil). Each study estimates the impacts of changes in rail traffic
11 on single-family residences, with one study examining impacts in Los Angeles (Futch)³⁷
12 and the other in Cleveland (Simons and El Jaouhari).³⁸ Using the parameter estimates
13 provided in these studies, I have estimated the expected impact of additional rail traffic on
14 property values in Vancouver assuming that operation of the Project increases rail traffic
15 past residences by four trains per day, which is the Project's maximum potential impact
16 given the assumed routing. Tables 6 and 7 (see Attachment B) report estimated impacts.³⁹

17
18
19 ³⁶ My analysis only considers studies that do not use reliable statistical methods. In particular, I do not
20 consider estimates developed through subjective "opinion" rather than empirical analysis. For example, the
21 Eastman Company has stated that impacts from the Gateway Pacific Project, with increased traffic of 18
22 trains daily in some areas, would range from 5 to 20 percent for single-family residences, 5 to 15 percent for
23 multi-family residences, and 5 to 10 percent for commercial properties. On a per-train basis, these impacts
24 are significantly higher than those derived from actual market transactions in the studies I evaluate. The
25 Eastman Company, "Increased Coal Train Traffic and Real Estate Values," October 30, 2012.

³⁷ Futch, Michael, "Examining the Spatial Distribution of Externalities: Freight Rail Track and Home
Values in Los Angeles," November 11, 2011.

³⁸ Simons, Robert A. and Abdellaziz El Jaouhari, "The Effect of Freight Railroad Tracks and Train Activity
on Residential Property Values," *The Appraisal Journal* Summer 2004, pp. 223-233.

³⁹ To the extent that actual increases in rail traffic are smaller than four trains per day, the resulting impacts
would be proportionately smaller.

1 42. Table 6 provides estimated property value impacts based on Futch for
2 varying distances from the rail corridor (see Attachment B). Assuming an increase in rail
3 traffic of four trains per day, single-family residential properties near the rail line could be
4 reduced by 0.85 to 1.49 percent within one-third mile of the rail line (across the
5 specifications). From one-third to two-third of a mile from the rail line, the estimated
6 impact is smaller, ranging from 0.59 to 0.69 percent, and from two-thirds of a mile to one
7 mile are smaller still (0.37 to 0.67 percent).

8 43. Table 7 provides estimated property value impacts based on Simons and El
9 Jaouhari for 1999 (see Attachment B). Estimated impacts range from 0.0 to 1.07 percent
10 for distances up to 750 feet from the rail (which is approximately one-seventh of a mile,
11 thus considerably shorter than the distance evaluated by Futch). In addition to the results
12 in Table 7 for 1999, the authors also estimate similar values based on data from 1996. In
13 this year, the authors find that the relationship between the level of rail traffic and
14 property values is not statistically different from zero at any distance for any property size.

15 44. Based on existing empirical research analyzing the impact of changes in
16 the volume of rail traffic on property values, I find that the additional rail traffic from the
17 development of the Project, to the extent any exists, would be expected to reduce
18 residential property values near the existing rail lines by 0 percent to at most 1.5 percent,
19 with impacts diminishing as distance from the rail line increases. While there are
20 differences between the circumstances of the Project on Vancouver and Washington State
21 and the circumstances considered in these studies, the best available research indicates
22 that the Project is unlikely to have significant impacts, if any, on property values due to
23 increased volume of rail traffic.

1 45. In the context of the many economic factors that affect real estate values,
2 these potential changes in property values are small.⁴⁰ To provide some context, Figure 5
3 provides a price index for homes in the Portland, Oregon area. Since 2000, housing prices
4 have varied dramatically, first increasing by over 80 percent through August 2007, then
5 declining by 30 percent (from August 2007 prices) through March 2012, and then
6 increasing by nearly 50 percent since this low in March 2012. Thus, compared to the
7 magnitude of price fluctuations in recent years, an impact of at most 1.5 percent (and
8 potentially much lower or even non-existent) is relatively small in comparison.

9 46. Moreover, the property value impact associated with the assumed dis-
10 amenity must be balanced against other potential impacts to property values, particularly
11 potential appreciation in property values due to the improved economic conditions from
12 the Project's construction and operations. Such appreciation is to be expected given the
13 increase in employment and labor income anticipated from the Project's construction and
14 operations, which can result in greater demand for housing. Past economic research has
15 established that there is a strong empirical relationship between property values and
16 economic conditions, such as employment and labor income.⁴¹ Thus, it would be
17 reasonable to assume that the improved economic conditions arising from the Project that

18
19 ⁴⁰ As discussed earlier, the Johnson Economics study does not explain the mechanism by which an increase
20 in rail traffic is expected to lead to a reduction in the size of the Waterfront project. Consequently we
21 cannot comment directly on the reasonableness of that assumed process or the economic logic upon which
22 the assumption is based. However we would expect a potential price variance on the order of one percent to
23 be well within the normal range of forecasting uncertainty for a multi-year development project such as the
24 Waterfront project. Given that, it seems highly implausible on its face that the increase, if any, in rail traffic
25 from operation of the Project could necessitate a reduction in the size of the Waterfront project of 30
percent.

⁴¹ Jesse M. Abraham & Patric H. Hendershott, "Patterns and determinants of metropolitan house prices,
1977 to 1991", Federal Reserve Bank of Boston, Conference Series, 36: 18-56, 1992; Capozza, Dennis, et
al., "Determinants of Real House Price Dynamics," NBER Working Paper #9262, October 2002; Quigley,
John, "Real Estate Prices and Economic Cycles," *International Real Estate Review* 2(1): 1-20, 1999.

1 were estimated in Section I of my testimony would tend to increase property values, all
2 else equal, and that these changes would tend to partially, fully or more than fully offset
3 any adverse impacts from any dis-amenity arising from any change in rail traffic.⁴²

4 b. Impact of Announcement of the Project on Property Values in
5 Vancouver

6 47. I performed a statistical analysis to test whether the announcement of the
7 Project's development has had an impact on property values in Clark County. This
8 statistical analysis uses the same hedonic framework as the Futch analysis and Simons and
9 El Jaouhari analysis evaluated in the previous section. The analysis considers whether
10 information about the Project's potential development has affected property values. This
11 impact could arise due to any factor that would make it less desirable for current and
12 potential homeowners to live nearby to the rail line, including dis-amenity of potential
13 increases in rail traffic, the perceived risk of crude oil trains, or any other factor. While
14 the Project has not been constructed and no increases in rail traffic have yet occurred,
15 there has been much information available to real estate market participants through
16 substantial press coverage about these facilities and the potential for increased rail traffic.
17 Because property markets will adjust for new information about factors that would impact
18 future property values, I would expect to observe some change in property values if the
19 Project were to result in significant future impacts. Attachment E to my testimony
20 provides greater detail on the assumptions, data, and results of this analysis.

21
22 _____
23 ⁴² The DEIS found that immediate impacts on the supply of housing would likely be negligible because the
24 "Portland-Vancouver MSA is likely capable of supplying most, if not all, of the experienced labor necessary
25 for Project construction." DEIS Section 3.13.3.1. This conclusion suggests that the Project would not lead
to shortages of housing, but not preclude some appreciation in property values given the additional income
to the region.

1 48. The statistical analysis tests whether the announcement of the Project has
2 had an impact on the discount (or premium) to properties nearby to the rail lines. Assume
3 that otherwise identical properties within 250 feet of the rail line on average sell at a lower
4 price (a “discount”) compared to properties further from the rail line. If this discount after
5 the announcement is larger (and statistically different) from the discount before the
6 announcement, then this is an indication that the announcement has led to a decline in
7 property values. For example, suppose that being within 250 feet of the rail line (on
8 average) reduces property values by 0.75 percent before the announcement. If, after the
9 announcement, this discount is 1.0 percent, then the difference in the estimated impact
10 0.25 percent (= 1.0 percent – 0.75 percent) can be attributed to the Project’s
11 announcement.

12 49. The development of the Project has occurred in a series of steps, with
13 various milestones occurring over time. The potential for the Project first became public
14 knowledge on April 22, 2013 when the Port of Vancouver announced that Tesoro and
15 Savage Corporations had formed a joint venture to develop the Project, subject to
16 approval by the Port’s Commissioners and the approval of regulatory agencies.⁴³ I use
17 this date as the starting point of potential impacts. Since this time, there was substantial
18 news coverage of the Project’s development in the press, along with significant attention
19 to marine energy terminals generally, in light of proposals for other facilities in
20 Washington State.⁴⁴

21 _____
22 ⁴³ <http://www.portvanusa.com/news-releases/tesoro-and-savage-announce-joint-venture-to-construct-and-operate-crude-by-rail-unloading-and-marine-loading-facility-at-port-of-vancouver-usa/>

23 ⁴⁴ See, e.g., “Tesoro-Savage: Opposition to oil terminal premature,” The Columbian, March 24, 2014,
24 available at: <http://www.columbian.com/news/2014/mar/25/tesoro-savage-executives-opposition-oil-terminal-p/>; “Proposed oil terminal would be biggest in volume,” The Columbian, November 24, 2014,
25 available at: <http://www.columbian.com/news/2014/nov/24/proposed-oil-terminal-biggest-volume-vancouver/>; “Public comment ends Friday for nation’s largest proposed oil terminal,” Oregon Public

1 50. Because the Project has not yet received regulatory approvals, there is the
2 possibility that it may not clear these hurdles and thus may not be developed. Thus, from
3 the standpoint of a homeowner that might find it more undesirable to live near the rail line
4 when the Project is in operation, the Project creates the potential for diminution in value,
5 although this is not a certainty. While such an outcome is uncertain, the homeowner
6 would nonetheless be expected to place a lower value on the property once the
7 information about the possibility is known. This outcome reflects two economic
8 principles. First, information about factors that will change the value that homeowners
9 place on owning the property in the future – when the Project is actually in operation –
10 will impact the market value of the property today, as soon as the information is known.⁴⁵
11 Second, even if there is uncertainty about whether impacts to value will occur, market
12 prices will adjust to account for the risk that such impacts will occur.⁴⁶ Thus, to the extent
13 that the Project would lead to adverse impacts to property values, I would expect to
14 observe such impacts in market prices today, adjusted for the probability that such adverse
15 impacts may not occur.

18 Broadcasting (OPB), January 22, 2016, available at: <http://www.opb.org/news/article/public-comment-ends-friday-for-largest-proposed-oil-terminal/>.

19 ⁴⁵ This is true of any property or asset in which market value reflects a stream of future benefits, such as
20 publicly trade share prices that reflect the future profits from the underlying firms. In the case of real estate
21 values, these future benefits reflect the value homeowners place on living in a given property. To the extent
22 that information about the property becomes known that would positively or negatively affect this value in
the future, it will affect the real estate price that people are willing to pay for the property today. For
example, see MacKinlay, Craig, “Event Studies in Economics and Finance,” *Journal of Economic
Literature* 25(1): 13-39, 1997.

23 ⁴⁶ In this regard, the potential for the Project to be developed is not different than the potential for an
24 accident to occur or environmental contamination to arise from nearby hazardous facilities. For example,
see Palmquist, Raymond and V. Kerry Smith, “The Use of Hedonic Property Value Techniques for Policy
and Litigation,” *International Yearbook of Environmental and Resource Economics*, Volume VI, August 10,
2001.

25
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1 51. The statistical analysis evaluates all residential property transactions within
2 Clark County from 2007 to present through April 2015. This sample period includes
3 approximately 24 months of data in which the market had information about the
4 development of the Project. My sample includes over 41,000 property transactions. I
5 control for multiple factors, listed in Table 8, that would lead to variation in the price for
6 an individual property, including property characteristics, property location, when the
7 transaction occurred, the distance from the rail line, and the time period after the
8 development of Project was announced.

9 52. Tables 9 and 10 summarize my results (see Attachment B). These tables
10 report two impacts. The first column shows the estimated impact of proximity to the rail
11 line on property values; the second column shows the change in this impact since the
12 announcement of the development of the Project. (Thus, the net impact of proximity to
13 the rail line after the Project's announcement is the sum of the values in these two
14 columns.) Tables 9 and 10 test two different models for the relationship between
15 proximity to the rail and property values. Table 9 provides estimates of the percentage
16 difference in property values for each of four discrete distance bandwidths as compared to
17 properties beyond the one mile rail corridor. Table 10 assumes that impact diminishes
18 with distance from the rail, with the impact varying continuously as an arithmetic function
19 of the property's distance to the rail.

20 53. The results in Table 9 indicate that properties within 250 feet of the rail sell
21 at a discount (-4.56 percent). However, this impact is not statistically significant – that is,
22 from a statistical standpoint, the estimate cannot be distinguished from zero.⁴⁷ In Table 9,

23 _____
24 ⁴⁷ That is, from a statistical standpoint, we cannot assume that the estimated value is any different than zero.
25 In these tests, I consider a statistical confidence level of 10 percent. (Technically, this means that zero is
within the range of possible values at a 90 percent probability.) A standard benchmark for statistical

1 estimates that are statistically significant have stars to the right of the estimated
2 coefficient, with the number of stars indicating the level of statistical significance.⁴⁸

3 54. Properties that are 250 to 1000 feet from the rail sell at a premium (+2.69
4 percent), although this estimate also is not statistically significant. Beyond 1000 feet up to
5 one mile, properties sell at a premium of +4.31 or +5.36 percent, which is statistically
6 significant.

7 55. The test of whether the Project's announcement has had an impact on
8 property values depends on the estimated coefficients in the second column. If these
9 estimated values are statistically different from zero, this would indicate that the Project's
10 announcement has had an impact of property values. The estimated change in
11 discount/premium to proximity to the rail ranges from -1.47 percent to +4.65 percent.
12 However, none of these estimated changes in the discount/premium are statistically
13 significant. This result is consistent with the conclusion that the Project has had no impact
14 on property values to date irrespective of distance from the rail.

15 56. Table 10 reports results assuming that the impact of proximity to the rail
16 varies continuously as the distance from the rail increases (based on a quadratic and
17 logarithmic function) (see Attachment B for more details). Here, I find that there is no
18 statistically significant relationship between property prices and distance from the rail.
19 More importantly, I also find that there is no statistically significant change in these
20 relationships after the announcement of Project. Thus, the analysis results are again
21
22

23 significance is a 5 percent confidence level. Thus, testing against a 10 percent confidence interval is biased
24 in favor of finding a statistically significant effect. Pindyck, Robert and Daniel Rubinfeld, *Econometric
Models & Economic Forecasts*, third edition, McGraw-Hill: New York, 1991.

25 ⁴⁸ The notes provide further details on this notation.

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1 inconsistent with the conclusion that the Project has had a (statistically significant) impact
2 on property values in the Vancouver market area that was the subject of this study.

3 57. I also consider the possibility that the impact on local property values from
4 potential development of the Project has varied over time. To consider this possibility, I
5 test for a difference between the impact of proximity to the rail in each quarter since the
6 announcement against the pre-announcement average impact. Figure 6 shows the results
7 of this analysis (see Attachment B). The change in impact has varied by quarter, with a
8 negative change as large as 15 percent and a positive change as high as 36 percent.
9 However, most importantly, the vast majority (26 of 32) of the estimated impacts in
10 Figure 6 are not statistically significant, and only one of the 10 negative values are
11 statistically significant.⁴⁹ These results do not suggest any consistent, statistically
12 significant change in the impact of proximity to the rail over time since the Project's
13 announcement. Thus, again, the results are inconsistent with the conclusion that the
14 Project has had a statistically significant negative impact on property values.

15 58. In addition to the results reported in Tables 9 and 10 and Figure 6, tests
16 were performed under a range of alternative assumptions to test the robustness of our
17 results. These sensitivities are described in Attachment E. In all cases, my results are
18 consistent with the conclusion that the Project has not adversely affected property values
19 in close proximity to the rail.

20 59. Thus, the analysis finds across the many statistical tests that there is no
21 association between the announcement of the Project and the sale price of properties
22 located nearby to the rail line that would deliver crude supplies to the Project. Because
23

24 ⁴⁹ While some effects may appear large, the results suggest that in some quarters at some distances from the
25 rail that there is a wide variance in the estimated values.

1 the Project has not yet been constructed and deliveries of crude supplies have not yet
2 begun, it is possible that the full impact of the Project has not yet been felt. However,
3 because property markets will adjust for new information about factors that would impact
4 future property values, I would expect to observe some change in property values if the
5 Project were to result in a large and significant impacts in the future. Consequently, my
6 results are inconsistent with the conclusion that the Project would result in a significant
7 adverse impact on property values in the Vancouver area.

8 **C. Johnson Economics Assessment of Impacts to Property Values**

9 60. The Johnson Review includes an analysis of potential property value
10 impacts from the Project. The analysis includes multiple flaws that render its findings
11 wholly unreliable.

12 61. Johnson Economics performs a review of existing literature that considers
13 “similar impacts” to those from the Project. This review is flawed in several respects.
14 First, the review includes studies that evaluate the impact of proximity to a railroad line,
15 suggesting that proximity to the rail line is a “similar impact” to that arising from the
16 Project. This is clearly not the case, as the rail line already exists and, at worse, the
17 Project would increase rail traffic in Vancouver from current levels of approximately 28
18 trains per day.⁵⁰

19 62. Johnson Economics’ confusion is illustrated in its summary of the Simon
20 and El Jaouhari study, which was one of the two studies I evaluate above. While my
21 analysis found that the property value impact of four incremental trains per day would be
22 expected to range from 0.00 to 1.07 percent, Johnson Economics reports values of 5 to 7
23

24 ⁵⁰ Washington State Department of Transportation, “Washington State Rail Plan, Integrated Freight and
25 Passenger Rail Plan, 2013-2035,” Final Report, prepared by Cambridge Systematics, March 2014.

1 percent, which represent the full “discount” to property values from being nearby to rail
2 (as compared to being far from the rail). Johnson Economics failed to include
3 consideration of the change in rail traffic, as distinguished from mere proximity to the rail
4 line.

5 63. In fact, four of the six studies identified in Table 2 of the Johnson Review
6 have no information regarding the impacts of incremental changes in rail traffic, and thus
7 provide no information relevant to assessing the impact of the Project. When performing
8 my literature survey, these studies were not included because they do not consider the
9 incremental effect of additional rail traffic.⁵² My literature review includes the two other
10 studies – Futch and Simon and El Jaouhari.

11 64. Johnson Economics also cites to several studies that “support the
12 proposition that perception of hazard has a negative impact on property values.”⁵³ First,
13 the studies cited by Johnson Economics are not a representative sample of studies that can
14 reliably provide information about the potential impacts on property values associated
15 with proximity to hazards. For example, other studies have found that proximity to
16 hazards (e.g., hazardous waste sites) has not adversely affected property values.⁵⁴ Second,
17 while it is not controversial that environmental risks could have potential consequences
18 for property values, the relevance of the particular studies cited to Johnson Economics’
19 findings are unclear because these studies consider risks that are not directly comparable
20 to those relevant to the Project. Two of the three studies consider associations between

21 _____
22 ⁵² In addition, three of the four studies estimate property value impacts outside the U.S. (in Holland and
Norway) which is less likely to provide a reliable measure of impacts in the U.S.

23 ⁵³ Johnson Review, p. 16.

24 ⁵⁴ One study found that designation of a site for long-term clean under the federal Superfund program (i.e.,
placement on the National Priority List) had little impact on the growth of nearby property values.
Greenstone, M., and J. Gallagher, “Does Hazardous Waste Matter? Evidence from the Housing Market and
the Superfund Program,” MIT Department of Economics Working Paper 05-27, October 2005, p. 2.

1 property values and stationary facilities, such as hazardous waste disposal sites and
2 nuclear power plants, and particular events (in one case, an explosion at a chemical plant).
3 By contrast, the presumed risk associated with the Project arises from rail transport over a
4 wide geographic area. The third study examines rail transport, but considers a particular
5 type of freight (nuclear waste from foreign countries) that may lead to “perceptions” about
6 hazards that differ greatly from the transport of crude oil.⁵⁵ In this regard, I note that the
7 results of my statistical analysis indicate that, over two years since the Project’s
8 announced development, property values have not been adversely affected by any
9 perceived risk associated with the Project’s development.

10 65. Finally, Johnson Economics develops quantitative estimates of the
11 potential impacts to property values from development of the project. However, Johnson
12 Economics assumes property value impacts of 1.5, 5 and 7 percent, which correspond to
13 the impact of proximity to the rail line, rather than potential impacts that correspond to an
14 assumed increase in rail traffic (which range from 0 to 1.5 percent for the maximum
15 incremental traffic of four unit trains per day, as identified in Tables 6 and 7). Table 11
16 provides estimates of the percent impact over geographic ranges (from the rail)
17 appropriate to the Futch and Simons and El Jaouhari studies.⁵⁶ For the Futch study, the
18 average effect is a 0.65 decrease in property values within one mile of the rail line. For
19 the Simons and El Jaouhari study, the average effect is a 0.30 percent decline in property
20 values within 750 feet of the rail (which I conservatively assume extends to one-third of a
21

22 ⁵⁵ This nuclear waste was fuel rods made of highly enriched uranium that, in addition to producing energy,
could be used to produce nuclear warheads. Gawande and Jenkins-Smith, 2001, p. 211.

23 ⁵⁶ These estimates reflect an average effect across the individual geographic ranges evaluated in the Futch,
24 and Simons and El Jaouhari studies accounting for both the magnitude of the estimated effect and whether
the estimated effect is statistically significant. Impacts to property values and taxes reflect total property
25 values and assess tax values, as reported by Johnson Economics.

1 mile) based on the 1999 results, and a 0.0 percent decline in property values based on the
2 1996 results. These estimated effects shown in Table 11 are significantly smaller than the
3 range of values – 1.5 to 7 percent – considered by Johnson Economics.

4 66. Table 11 also provides corresponding estimates of real market value and
5 annual tax impacts. Potential impacts range from \$0.0 to \$66 million for real market
6 value, and \$0.00 to \$0.80 million in annual tax impacts based on Futch and Simons and El
7 Jaouhari. These estimates are substantially lower than those estimated by Johnson
8 Economics, which range from \$63.9 to \$396.5 million for property value impacts, and
9 \$0.7 to \$4.7 million for annual property tax impacts. As discussed above, when
10 considering these estimated potential impacts, it is important to recognize the wide
11 fluctuations that already occur in property values arising from many changes in the
12 regional and macro-economy, as well as the countervailing (and potential positive) effects
13 that the Project’s new economic activity may have on property values. However, in any
14 event, the estimated range of impacts shown in Table 11 are smaller than the estimated
15 assessed value and corresponding property tax revenues that are expected from the Project
16 as described in Section I.A, above.

17 **D. Impact on Economic Activity from Increased Delays at Road**
18 **Crossings**

19 67. As discussed in the DEIS, if the Project’s operations resulted in a change
20 (increase) in rail traffic, this could result in delays in vehicle traffic at at-grade rail
21 crossings. To the extent that such delays occurred, they could have economic
22 consequences.

23 68. In the Secondary Impacts Report, the economic costs associated with
24 delays at at-grade road crossing were estimated for crossings within Vancouver and at
25 several different locales throughout Washington State, which were identified as a

1 representative case for the range of potential impacts that might occur across the state,
2 including Bingen and Spokane. To provide an indicative measure of economic
3 consequences, I estimated the costs to business activity from increased delays at rail
4 crossings in each of these locales. The estimated costs reflect a number of factors that
5 were identified in the Secondary Impacts Report. My analysis assumes four incremental
6 train crossings (although, as discussed above, I understand no incremental traffic is
7 anticipated). Assumptions regarding anticipated down times (reflecting train length and
8 speed), and average traffic volumes were developed by transportation experts.⁵⁷ The
9 analysis only considers potential impacts to economic activity, and does not reflect other
10 potential impacts, such as increased delays for emergency vehicles. Details on these
11 calculations are provided in the Secondary Impacts Report.

12 69. Table 11 from the Secondary Impacts Report describes estimates of annual
13 total costs and costs related to business activity for six at-grade intersections within
14 Vancouver, while Table 12 reports the same metrics for 13 intersections outside of the
15 Vancouver area (see Attachment B).⁵⁸ Business impacts are relatively limited. Within
16 Vancouver, intersections potentially affected by incremental rail traffic all have relatively
17 low traffic levels, with half of these occurring in industrial areas nearby the Port. The
18 incremental impacts to business are all estimated to be less than \$1,200 annually. Outside
19 of Vancouver, intersections east and west of Spokane, which are likely to have an
20 additional 8 trains per day from the Project (four loaded inbound trains, and four empty
21 outbound trains), could experience impacts of up to \$7,000 per year.

22
23 ⁵⁷ Vancouver Energy Draft Environmental Impact Statement, Section 5.17, Traffic and Transportation.

24 ⁵⁸ Table 9 excludes the Jefferson and 8th Street at-grade crossings, which have been closed permanently.
25 Two of the at-grade crossings in Table 9 are not in Figure 6, but are to the east of the geographic area shown
(see Attachment B).

1 70. These impacts could have some tangible effects in terms of lost income or
2 value added. However, compared to the magnitude of the economies of the communities
3 in which these impacts occur, they are extremely limited. For example, in 2013, the total
4 income earned for the city of Vancouver was about \$4.3 billion, while total income in
5 Spokane was about \$12.4 billion.⁵⁹ In percentage terms, total potential business impacts
6 (relative to income earned) are less than one-thousandth of one percent.

7 **E. Impact of changes in Rail System Congestion**

8 71. As discussed above, under certain future scenarios, other parties have
9 asserted that development of the Project could lead to increases in traffic on the rail
10 system within Washington State which, in turn, could contribute incrementally to rail
11 system congestion, potential delays, and associated impacts on rail operators and
12 customers. In this section, without regard to the likelihood of this impact, I consider those
13 potential economic consequences for the rail system.

14 72. As a starting point, it is important to recognize that, according to BNSF
15 routing of freight rail traffic is very dynamic and does not adhere to a particular route.⁶⁰
16 The route taken by a freight train on a given day will depend not only on convenience or
17 distance, but also on other numerous factors, including weather events, customer needs
18 and market demands.

19 73. The Secondary Impacts Report reported that current utilization on lines
20 affected by the assumed routes range from 15 to 86 percent,⁶¹ based on the traffic levels as
21

22 _____
⁵⁹ U.S. Census Bureau, State and County Quick Facts.

23 ⁶⁰ BNSF Railway Comments.

24 ⁶¹ These routes assume that all inbound fully-loaded trains will arrive from the east via the BNSF rail lines
25 that follow the Columbia River and that empty trains will head north towards Kalama/Longview back to
their point of origin.

1 reported in the State of Washington's Final Draft State Rail Plan.⁶² With the additional
2 traffic from the Project, and assuming none of the planned capital improvement projects
3 will be constructed, it is expected that utilization would range from 26 to 108 percent.
4 Thus, except for the Spokane to Pasco segment, there is sufficient capacity to
5 accommodate increased rail traffic from the Project without any capital improvements to
6 the rail infrastructure and without adjustments to other rail traffic.⁶³

7 74. These estimates reflect a static view of the potential impact of the Project
8 on the rail system in Washington State. They do not account for the various dynamic
9 adjustments that can occur within an economic market that allow the supply of available
10 and potential resources to shift to meet the demand for goods and services. In this case,
11 rail system operators have many alternatives available to optimally utilize, enhance, and
12 expand the existing rail system to serve various rail customers whose demand for service
13 may vary over time in both intensity and location. For example, BNSF has undertaken
14 investment aimed at increasing capacity in its Lakeside subdivision, which roughly
15 corresponds to the Spokane to Pasco section, which has the highest capacity utilization of
16 any section over the assumed route.⁶⁴

17
18 ⁶² Washington State Department of Transportation, "Washington State Rail Plan, Integrated Freight and
19 Passenger Rail Plan, 2013-2035," Final Report, prepared by Cambridge Systematics, March 2014; other
20 recent estimates of rail capacity and forecast demand are provided in: BST Associates, MainLine
21 Management, "Pacific Northwest Marine Cargo Forecast Update and Rail Capacity Assessment," prepared
22 for Pacific Northwest Rail Coalition, December 2011. The estimates in Table 11 do not reflect certain
23 investments currently being undertaken by BSNF that will likely increase rail capacity of the Washington
24 rail system. In 2014, BNSF plans called for investment of \$1 Billion in capital on expansion and
25 maintenance on the Northern Corridor, with \$235 million going to projects in Washington State. There are
several major capital projects currently under way in Washington, including construction of a second
mainline track at various locations on the route between Cheney, Wash. and Mesa, Wash., and replacement
of the railroad bridge over the Washougal River in Camas, Wash.

⁶³ BNSF Railway Comments.

⁶⁴ This includes investment in siding and double-tracks. <https://www.bnsf.com/customers/oil-gas/img/northern-corridor.pdf>. Also, see the 2015 capital projects identified in: BNSF Railway Comments.

1 75. From an economic standpoint, it is important to evaluate potential impacts
2 from both short-run and long-run perspectives that account for the dynamic adjustments
3 made by market participants that allow the supply (and location) of resources to meet
4 demand. In the short-run, options to adjust rail use for new demand from the Project are
5 more limited, while in the long-run, there is a larger set of options available to adjust
6 system use, configuration, and capacity. It is important to account for these economic
7 adjustments in any assessment, because they can mitigate many apparent impacts from
8 static assessments.

9 76. The impact of any additional traffic from the Project is not expected to be
10 significant. Moreover, the ability of the system to increase capacity to meet expanding
11 demand will not depend on any additional traffic from the Project, but from factors such
12 as the ability of the railroads to earn sufficient return to justify potentially significant
13 investments.⁶⁵ Thus, the Project would not be expected to have significant impacts on the
14 rail system, in the form of disruption to other services or significant price increases, in the
15 long-run.

16 **II. ASSESSMENT OF THE DRAFT EIS**

17 77. The DEIS considers both the primary and secondary socioeconomic
18 impacts of the Project. As recognized by the DEIS, the Project is expected to result in
19 substantial positive economic impacts to the local, regional and state economies.⁶⁶ These
20 positive impacts include increases in economic value added, employment, and tax
21 revenues. The DEIS also assesses the potential adverse secondary economic impacts from
22 the project.

23 _____
24 ⁶⁵ For example, *see* Cambridge Systematics, Inc., “National Rail Freight Infrastructure Capacity and
Investment Study,” prepared for the Association of American Railroads, September 2007.

25 ⁶⁶ DEIS, Chapter 3.16.3.

1 78. In general, the DEIS reaches reasonable conclusions about the Project's
2 economic impacts. Despite my general concurrence with the DEIS findings, in this
3 section, I identify and discuss several socioeconomic findings in the DEIS that either
4 warrant correction or clarification.

5 **A. Additional Socioeconomic Benefits from the Project**

6 79. The DEIS identifies two additional primary socioeconomic benefits that
7 were not identified in analyses I performed. First, the DEIS considers taxes to the
8 governments within the State of Oregon. I did not include an estimate of Oregon income
9 tax revenue in my Primary Impacts Report. Specifically, the DEIS quantifies income tax
10 revenues to the state of Oregon, finding that the project would generate approximately
11 \$362,100 in income tax during both construction phases and \$332,900 annually with full
12 operations in 2017.⁶⁷ Second, the DEIS also notes that the additional rail activity may
13 lead to additional railroad employment (and associated economic benefits), which are not
14 included in the DEIS statements regarding economic impact.⁶⁸

15 **B. Rail Congestion**

16 80. The DEIS identifies potential impacts from increased congestion on the rail
17 system. While the DEIS does not quantify an aggregate effect, it does find that the
18 average costs of carrier and shipper cost per train hour of delay was estimated to be
19 \$409.07 (2014 dollars) based on review of multiple studies.⁷² However, the DEIS does
20 not provide an estimate of the expected shipping delays as a consequence of the Project.
21 As a result, it does not provide an estimate of the aggregate economic impact of any such
22 delays. An analysis to estimate any delays in rail delivery as a result of the project would

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⁶⁷ DEIS, Table N-17, Appendix N.

24 ⁶⁸ DEIS, Section 3.16.3.2, p. 3.16-14.

25 ⁷² DEIS, Section 3.16.1.5, p. 3.16-3.

1 need to account for both the current system operations and the responses that the rail
2 system operators could make to mitigate any changes in shipping times that might occur.
3 Given such responses and recognition that rail traffic associated with the Project is a small
4 share of total Washington State rail traffic,⁷³ it is likely that such delays (and any
5 consequent economic impact) would be insignificant.

6 **C. Secondary Impacts from an Accident or Spill**

7 81. The DEIS identifies potential economic impacts that would be expected as
8 a result of an accident associated with the Project's operations, including a spill of crude
9 oil during rail or marine transport.⁷⁴ Proper assessment of the expected economic impacts
10 from such accidents or spills requires consideration of both the likelihood that accidents of
11 varying severity occur and the corresponding economic impacts arising from such
12 accidents. Evaluation of the likelihood of an incident that would result in a spill of crude
13 oil is outside the scope of my testimony and has been addressed by other witnesses.

14 82. The DEIS describes potential economic impacts to commercial fishing
15 activity in the event of a spill at the Project. The economic impacts contemplated assume
16 that the entire economic activity associated with all fishing activity in the Columbia River
17 would be lost for the entire duration of any restriction or closure of fishing activity. When
18 considering the economic impact of any limit on economic activity, it is important to
19 consider ways in which producers (e.g., fishermen) can change their activity to mitigate
20 the economic impacts of the limitation on production. One option producers have is to
21 shift the location of their activity. For example, fishermen may be able to shift the
22 location of their fishing activity to areas that are not covered by the restriction or closure.

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24 ⁷³ See BNSF Comment Letter.

25 ⁷⁴ DEIS, Section 4.7.17.1 and 4.7.17.2.

1 A second option is for producers to shift the timing of their activity. In this case,
2 fishermen may shift the timing of their fishing activity. In particular, if fishing is
3 restricted or closed for a period, they may be able to increase fishing activity during
4 periods when the fishing area is permitted to compensate for the temporary restriction on
5 fishing activity. By not accounting for these actions to mitigate economic impacts, the
6 DEIS may overstate the economic impacts that would likely arise from a marine oil spill.

7 83. The DEIS also describes impacts from vessel diversions in the event of a
8 spill at the Project. As with the response of fishermen to a restriction in fishing activity,
9 when assessing impacts, it is important to evaluate the responses of businesses to such a
10 diversion in vessels. First, vessels may shift the timing of their landings. For example,
11 the source relied on by the DEIS for estimates of the impacts of vessel delays assumed
12 that business was delayed, but was not actually eliminated.⁷⁵ That is, vessel diversions
13 may delay the timing of when landings occur, but not eliminate the landings (and the
14 associated economic activity) entirely.⁷⁶ Second, vessels unable to land at the Port of
15 Vancouver due to a diversion may be able to shift landings to other ports (e.g., the Port of
16 Portland or the Port of Longview), which would produce economic activity for region,
17 albeit potentially at a greater distance to the Vancouver region.

18 84. The DEIS analysis of a discharge during rail transportation identifies
19 current economic activity associated with recreational fishing and tourism in the Columbia
20 River Gorge, suggesting that all of this economic activity would be eliminated in the event

21 ⁷⁵ "Business was assumed to be delayed rather than completely voided." Ecology, 2005, p. 9.

22 ⁷⁶ Further, some of the findings in the source relied on in the DEIS for certain impacts estimates, Ecology
23 (2005), raise questions about its reliability. For example, the study reports significant differences in the
24 daily impact of port disruption due to an oil spill. While the study identifies a daily "wage" impact of over
25 \$1 million to the Port of Vancouver, the impacts to other Ports are orders of magnitude smaller for larger
ports: \$762,430 for Portland, \$179,517 for Seattle, and \$1,849 for Anacortes. The study does not explain
these differences.

1 of a spill. However, such a conclusion may overstate impacts by failing to consider the
2 many changes in behavior and substitutions that are made in response to restrictions in
3 certain recreational activities. First, a spill may not lead to a complete restriction on
4 fishing activity, but may only lead to advisories, particularly with respect to the fish
5 consumption. In this case, many fishermen may continue recreational fishing, despite the
6 reduced pleasure received from the recreational experience. Second, to the extent that a
7 spill results in reduced recreational fishing, people will likely shift their free time to other
8 sorts of recreational activity that can also result in economic activity, depending on
9 particular activities undertaken. The Columbia River Gorge offers multiple recreational
10 and tourism opportunities, not all of which are connected to recreational fishing activity.
11 Assuming a shift to a different recreational activity, the impact would reflect the
12 difference in economic impacts between recreational fishing and the alternative
13 recreational activity, not the impacts associated with recreational fishing, by itself. The
14 DEIS fails to consider these types of responses and thus may overstate expected impacts.

15 85. The DEIS identifies many economic impacts arising from an accident
16 associated with Project operations,⁷⁷ but fails to recognize economic activity that would be
17 generated by spill response.⁷⁸ When a spill occurs, new economic activity occurs to
18 clean-up contaminated areas, remediate affected properties, and supply equipment for
19 cleanup activities. Anecdotal evidence from recent spills suggests that such activity can
20 be potentially large.⁷⁹ A complete assessment of economic impact from spills would need
21

22 ⁷⁷ DEIS, Section 4.7.17.1, p. 4-109 to 4-110.

23 ⁷⁸ These economic activities are typically paid through a combination of insurance claims and funding from
24 the companies involved in these accidents.

25 ⁷⁹ A recent spill in Santa Barbara, California led to more than 700 new temporary positions (Panzar, Javier
and Tony Perry, "More than 700 workers to help with California oil spill cleanup," *Los Angeles Times*, May
22, 2015). The BP Deepwater Horizon spill led to an even larger increase in employment and economic

1 to take into an account both the potential losses (and the duration of those losses), but also
2 the potential new opportunities to reach on overall conclusions regarding the economic
3 impact of the incident and the response.

4 **III. CONCLUSION**

5 86. Through my analysis, and that of EFSEC's consultant Cardno, there has
6 been substantial analysis of the potential primary and secondary economic impacts to be
7 expected from the construction and operation of the Project. This analysis has been
8 detailed, comprehensive and has considered both potential positive and negative impacts,
9 therefore providing an assessment of the Project's expected "net" impacts. Thus, in my
10 judgment, TSPT has met the general requirements, as I understand them, for
11 socioeconomic impacts analysis of new energy facilities under Washington statutes.⁸⁰

12 87. My analysis demonstrates that there are significant economic benefits
13 associated with development of the Project. It has also shown that claims of meaningful
14 negative economic benefits by certain parties, as reflected in the Johnson Economics'
15 comments, are inaccurate or otherwise unsupported.

16 88. The following documents are attached to my testimony for reference:

- 17 • Attachment A: Curriculum Vitae of Todd Schatzki
- 18 • Attachment B: Tables and Figures to this Testimony
- 19 • Attachment C: Todd Schatzki and Bruce Strombom, "Assessment of
20 Vancouver Energy Socioeconomic Impacts: Primary Economic Impacts,"
21 July 28, 2014 ("Primary Impacts Report")

22
23
24 activity, with employment of approximately 25,000 workers (Kawamoto, Dawn, "BP Oil Spill Creates a
25 Wave of New Jobs, Takes Others Under", Daily Finance, June 1, 2010).

⁸⁰ Washington Administrative Code, 463-60-535.

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- Attachment D: Todd Schatzki and Bruce Strombom, “Assessment of Vancouver Energy Socioeconomic Impacts: Secondary Economic Impacts,” September 5, 2014 (“Secondary Impacts Report”)
- Attachment E: Todd Schatzki, “Assessment of Vancouver Energy Socioeconomic Impacts: Statistical Analysis of Potential Property Value Impacts from Vancouver Energy” May 13, 2016.

[Signature on the Following Page]

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DATED this 13 day of May, 2016.



Todd Schatzki, Declarant

STATE OF Massachusetts)
COUNTY OF Suffolk)

TODD SCHATZKI, being duly sworn upon oath, deposes and says: The foregoing testimony is true, correct, and complete to the best of my knowledge, information, and belief and is given subject to the laws of perjury in the State of Washington.

GIVEN under my hand and official seal this 13 day of May, 2016.

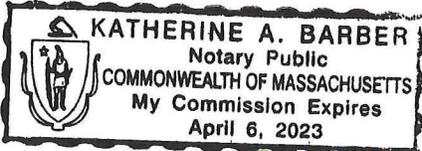
NOTARY PUBLIC in and for the State of:
Massachusetts

Residing at: _____

My Commission Expires: 4/6/23

Katherine A. Barber
Printed Name of Notary:

Katherine A. Barber



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